A mixed-methods study of examining the concerns of Saudi Arabian middle and secondary school teachers in adopting the Future Gate Learning Management System: A transformation to digital learning

by

Abdullah Essa Masmali

B.A., Teachers College, Jazan University, 2001
M.A., Cleveland State University, 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

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Manhattan, Kansas

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Abstract

The purpose of this mixed-method study was to examine the concerns of teachers in middle and secondary schools as they began to implement the Future Gate LMS in Saudi Arabia. A sample of 1045 teachers participated in this study, who represent teachers from schools selected by the Ministry of Education to implement the transformation to digital learning through the Future Gate LMS project. The study examined teachers' concerns through the lens of the Concern Based Adoption Model (CBAM) framework. The data in this sequential mixed-method study were obtained through two phases. The first phase was quantitative data through the Stage of Concern Questionnaire (SoCQ) and the second phase was qualitative data through an open-ended question on the SoCQ as well as semi-structured interviews.

The results from the SoCQ indicated that teachers in the middle and secondary schools who were selected to implement the Future Gate LMS were in the early concern stages. The highest percentile score was Stage 0 Unconcern 87% followed by Stage 1 Personal 84%, Stage 2 Informational 83%, and Stage 3 Management 73%. The lowest percentile score was in Stage 4 Consequences 54% followed by Stage 5 Collaboration 59% and Stage 6 Refocusing 69%. A one-way MANOVA test revealed a statistically significant difference between teachers' stages of concerns and their gender and type of degree. It also revealed statistically significant differences between teachers' stages of concerns and their technographic characteristics (prior experience in educational technology use, type of professional development in educational technology, duration of professional development in educational technology, type of professional development in Future Gate LMS, and duration of professional development in Future Gate LMS). One-way MANOVA also revealed statistically significant differences between teachers' stages of concerns and technology availability in the classroom (technology in the classroom and

Internet access in the classroom). The qualitative data analysis indicated that the top three concerns of teachers were centered around technology and Internet in the school, Future Gate LMS activation, and how students deal with Future Gate LMS.

This study contributes to the literature to understand teachers' needs for successfully implementing innovations. Results obtained from this study are important for all stakeholders so that they can understand teachers' concerns regarding adopting the transformation to digital learning in Saudi Arabia as it is an important project for the Saudi Arabia 2030 vision.

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Major Professor
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Dedication

To the soul of my father, may Allah (God) have mercy on him

To my mother, Salihah, may Allah (God) prolong her age

To my beloved wife, Sultanah

To my children, Nooran, Ameer, Loreen, and Asser

To my brothers, Ahmed, Hadi, Ali, and Dr. Omar

To my sisters, Jomaa, Layla, and Aishah

To all my friends

Chapter 1 - Introduction

The purpose of this study was to investigate the concerns of middle and secondary school teachers as they transform to integrate digital learning through Future Gate Learning Management System. Transforming into digital learning is one of the initiatives of the National Transformation Program in Saudi Arabia by 2020. This study contributes to the field of educational technology, particularly in education in Saudi Arabia, since it investigates middle and secondary teachers' concerns about transforming into digital learning. This study clarifies teachers' level of concern, and their professional development needs when they begin using Learning Management System as in 7-12 schools in the Kingdom of Saudi Arabia.

The Country of Saudi Arabia

The Kingdom of Saudi Arabia is situated in the Arabian Peninsula, which is located in the southwestern part of Asia. Saudi Arabia borders Kuwait, Iraq, and Jordan in the North; the Red Sea in the West; Yemen and Oman in the South; the Arabian Gulf, United Arab Emirates, and Qatar in the East, and covers an area of around 2,000,000 square kilometers, with a population of 34,218,169 (General Authority for Statistics, 2020). The country of Saudi Arabia as depicted in Figure 1.1 was founded by King Abdul Aziz in 1932. There are 13 administrative regions in the country, and each contains several cities and villages. The constitution of Saudi Arabia is based on the Holy Quran and Shariah law. The main language in Saudi Arabia is Arabic, which also is the main language used in public education. The Council of Ministers is the executive and administrative body of government and the King heads the government and the Council of the Ministers.

The government of Saudi Arabia controls the policies of education. The Ministry of Education decides on the textbooks and curriculum so that it is uniform in all K-12 schools around the country.

Figure 1.1 Map of Saudi Arabia (World Atlas, 2020)

History of Education in Saudi Arabia

The foundation, growth, and development of Saudi Arabia's education system in its historical context can be categorized into five stages, phases, or eras that marked significant paradigms and changes to the system. These stages include (1) the period prior the establishment of Saudi Arabia, (2) the period after the establishment of Saudi Arabia, (3) the period before and during the establishment of the Saudi Arabian's Ministry of Education (1932 to 1954), (4) the period before Internet was established in Saudi Arabia (1954 to 1993), (5) and the period after

the integration of the Internet in the education system in 1993. In a more specific perspective, the generic historic context of the technologic paradigm in Saudi Arabia's education system can be divided into two major influential periods, namely the pre-internet period and the post-internet period.

Stage 1: Education before the establishment of Saudi Arabia

Before King Abdul Aziz founded Saudi Arabia, the Arabian Peninsula was under the rule of the Ottoman Empire from 1299 to 1920 (Al Thowaini, 2015). The region given the most attention by the Empire state in the Arabian Peninsula was in the west where the two holy cities, Mecca and Medina, sit. There were approximately 50 traditional schools in Mecca called Katateeb. (Al Thowaini, 2015) Katateeb or kottab is an Arabic word that means writer, but it evolved to mean the place where people study and learn. Katateeb were presided over by Muslim preachers.

In 1889, there were six primary schools in Mecca and 17 in Medina. In the last portion of the Ottoman Empire's rule, they established aspects of modern education in Mecca and Medina. The curriculum in these schools included religion, mathematics, astronomy, and the Turkish language. The first middle school in Medina was established in 1898. In 1907, a teachers' training center was established in Medina (Al Thowaini, 2015). The Ottoman Empire's rule in the west of Arabian Peninsula, Hijaz, started a six-year education program in different subjects such as geography and history, but many parents did not allow their children to enroll because it was conducted in the Turkish language and they were afraid that their children would be conscripted to serve in the Ottoman army. Therefore, the merchants in Hijaz established private schools in Mecca, Medina, and Jeddah that taught different subjects in Arabic (Rugh, 2002). Examples of these schools include Sawlati, that was founded by a woman from India in 1874, the

Fakhria school in 1881, the Dar Al Faizeen school in 1886, and the Al Falah in 1912. Students enrolled in these schools because their curricula were in the Arabic language (Al Thowaini, 2015). The other parts of the Arabian Peninsula had a primitive level of learning, which was in Katateeb and Halaquat. Halaquat means circles, where students sit in circles on the ground to study with their teacher. It was optional for children to learn Qur'an, religion, and writing. This was because children were expected to help their parents with home chores or on farms. Poor learning materials were used during this era. For instance, learners only had pieces of wood to write on. Students wrote on this wood slate using natural limestone as they heard a dictation by the teacher, and students had to keep the words on the wood until they were memorized (Al Thowaini, 2015).

Stage 2: Education from 1924 to 1953

The period of education development in Saudi Arabia was after King Abdul Aziz founded and unified Saudi Arabia in 1932. King Abdul Aziz's rule began in 1902 when he started from Riyadh and worked to unite the country by taking control of the holy city of Mecca in 1932. During the period from 1902 to 1932, King Abdul Aziz focused on the military and how to unify the country. As such, education was not a major interest or priority to the King (Al Thowaini, 2015). Before the announcement of the formation of the Kingdom of Saudi Arabia, King Abdul Aziz supported education in many cities under his rule. He established the Directorate of Education in 1925, which created government schools (Saudi Arabian Cultural Mission, 2006).

However, schools didn't open in some places in the Kingdom during that period due to obstacles such as Bedouin communities. Communities in Saudi Arabia before the discovery of oil largely consisted of Bedouin and small urban communities (Al-Sultan, 1988). Education was

hard for many people since there were not many formal schools during that time. Most of the formal schools were in the major cities such as Riyadh, Mecca, Medina, and Jeddah. In the 1930s, Aramco, an oil company, discovered rich oil wells in Saudi Arabia. Oil mining became a major resource that brought the country huge revenues. This resulted in a significant boost to the economic growth and development of the country. Similarly, the Aramco company started building schools in the eastern region of Saudi Arabia and other zones where it drilled oil. The Directorate of Education started building schools in several cities around the Kingdom, and by 1945, King Abdul Aziz had started a comprehensive program to establish schools in the Kingdom as shown in Appendix O Figure R.1 and Figure R.2 (Albalawi, 2007). The number of modern schools in Saudi Arabia grew from four schools in 1925 to 326 schools in 1953 (Al Thowaini, 2015).

Many Bedouin communities migrated to cities where education and schools were available. Also, the government started building schools in certain Bedouin areas because most of the Bedouin wanted their children to attend schools. Many factors led to the nomadic Bedouins to start their migration to cities and letting schools teach their children due to the government's mandate that they settle. According to Shamekh,

> Sedentarization has significantly affected the population distribution, the settlement pattern, and other socio-economic features of the country. The proportion of nomads has decreased from 50 to 25 percent of the total population since 1912. The spatial processes of nomad sedentarization are related to traditional settlement. Most traditional settlements in Saudi Arabia evolved from Bedouin settlements. (Shamekh, 1975, p. 336)

All these conditions contributed to the diffusion of education and schools around the country. Secondary education was only in a few cities, in particular in Mecca and Medina in this period

because primary education was the objective of King Abdul Aziz. Some students traveled to Mecca and Medina to study secondary education, and the transportation was free to support students continuing their education (Al Thowaini, 2015).

Many of the native population did not allow their children to attend formal schools because they did not trust the school system and they believed the way to study was the Katateeb school model (Al-Shami, 1977). Many families rejected portions of the school system such as learning foreign languages, science, and geography because they thought it would affect their children's religious belief (Al-Shami, 1977). Communities in Saudi Arabia became aware of the importance of education. This led to next stage of education in Saudi Arabia, which was from 1954 to 1970s.

Stage 3: Education in Saudi Arabia from 1954 to 1970

On December 24, 1953, the Directorate of Education transformed into the Ministry of Education and it started building more schools around the country, hiring teachers, designing curriculum, and publishing textbooks. The first minister of the Ministry of Education was Prince Fahad bin Abdul Aziz, who later became the fifth king of Saudi Arabia in 1982 (Albalawi, 2007). In 1958, Saudi Arabia and other Arab countries agreed to create a uniform system of education that consisted of six years for elementary, three years intermediate, and three years secondary that were separate from higher education (Saudi Arabian Cultural Mission, 2006). There was an increase of the number of teachers, students, classrooms, and schools after the Ministry of Education was established as shown in Table 1.1. The number of teachers increased 6028%. The number of male students increased 3385%. The number of classrooms increased

5027%. And the number of schools increased 2427%[1] (Al-Swelem, 1997, p. 8).

Table 1.1
Growth of Elementary Schools from 1951 to 1993 (Al-Swelem, 1997, p. 8)

Growth of Elementary Schools from 1951 to 1993 (Al-Swelem, 1997, p. 8)

Year	Teachers[2]	Students[3]	Classroom	Schools
1951	1061	28317	941	210
1954	1998	49740	2070	446
1959	4075	95960	3710	600
1963	7802	174514	7374	1072
1969	12157	267529	10972	1383
1974	20454	391677	16891	2067
1979	28156	517069	26607	3638
1984	45405	688170	34801	4413
1990	55381	919949	42763	4806
1993	65020	986822	48248	5307
% increases from 1951-1993	6028%	3385%	5027%	2427%

This growth happened as there was an increasing number of schools with equipment and instructional technology. Because of that, the government increased the budget for education every year to develop education as demonstrated in Table 1.2.

[1] This statistic was only for male teachers, students, classrooms, and schools since the Ministry of Education was responsible only for the male gender.

[2] The numbers include full-time teachers, principals, vice principals, librarians, and student counselors

[3] Only boys

Table 1.2
Budget for Education from 1953 to 1993 (Al-Swelem, 1997, p. 9)

Year	Saudi Rials[4]
1953	12,817,466
1955	65,089,404
1961	158,000,000
1965	523,967,527
1970	665,651,478
1982	11,618,367,000
1993	13,069,000,000

Before 1959, there were no formal schools for women in Saudi Arabia (Al Rawaf & Simmons, 1991). The rich families hired private tutors for their daughters while other families let their daughters go to Katateeb, but the majority of girls did not attend to schools or Katateeb except for a few private schools (Al Rawaf & Simmons, 1991). Accordingly, private schools for women were rare. The first private school for girls was Madrasat AlBanat AlAhliah, which was established in 1941 in Mecca by immigrants from Indonesia and Malawi. The beginning of state-sponsored formal education for women was in 1960 when The General Presidency for Girls' Education (GPGE) was established. In 1961, 15 new elementary schools were established. In 1964, the first four intermediate schools and the first secondary school opened for girls' education. The GPGE and The Ministry of Education started a program for adult literacy, and the ratio of female students to the total enrollment of the program increased from 27.4 percent in 1979-1980 to 37.9 percent in 1980-1981 (Eraqi, 1986). The number of school buildings increased because of the growing number of female students that attended schools, which increased to 3,676,039 female students in 2015 (General Authority for Statistics, 2016). In 2002,

[4] 1 Saudi Riyal = $3.75 USD

The GPGE merged with the Ministry of Education. Girl's education since then has become more developed as they have the same technology equipment that the boys' schools have.

The Saudi Arabian government started focusing on using oil benefits to develop and modernize education in 1963 (Al-Shami, 1977). The government spent money on building modern schools and providing equipment. Certain technologies, such as radio, existed to support education in Saudi Arabia in 1948 (Gazzaz, 2006). Television was introduced to the Saudi society in 1965. People adopted this innovation and it became part of their life, including in education. In 1957, the Aramco Oil Company started its special television station before the Saudi government started any stations, and educational programs on their channel were helpful for learners. Aramco also contributed to schools in the eastern region of Saudi Arabia when it created an educational program that gave televisions to schools.

After the Saudi society adopted televisions and they became part of many schools' equipment, video devices also increased in Saudi society (Gazzaz, 2006). Schools also used educational videos for technological instructions.

Education in Saudi Arabia was influenced by western education because many Saudi Arabian education leaders were educated in the west (Profanter, 2014). Al-Shami (1977) explained the influence of western culture on Saudi Arabia at that time, and that influence included educational curriculum and instructional technology. He said that the influence and the process of modernization had been selective and controlled by decision makers in Saudi Arabia (Al-Shami, 1977). The influence from western education included applying different teaching methods and supporting learning with technology. The Ministry of Education started providing devices in many schools to aid the learning process.

Alqarni (2015) wrote that:

> Between the years 1964 and 1971 the major change which took place in Saudi education was the introduction of a graphic and illustrations unit for limited production of slides, filmstrips, photography, transparencies, and silk screen prints. To implement Educational Technology, Saudi Government sought foreign expert recommendations and cooperation such as; Wade Media Consultant, Inc. in 1973, and Indiana University in 1975. (p. 63)

This was the beginning of educational technology in Saudi Arabia. However, educational technology has several meanings in Saudi Arabia, including teacher professional development programs using new teaching methods and strategies (Alqarni, 2015). The Ministry of Education and GPGE spent money to develop education since they were given a budget for improving education. They created training programs for teaching instructional methods that included technology available at that time.

Stage 4: Education in Saudi Arabia from 1970 to 1993

In the 1970s, a huge discovery of oil reserves and an increase in the oil price impacted the Saudi Arabian economy. Sedgwick (2001) stated that this discovery of oil and fuel consumption worldwide led to rapid industrial development and urbanization beginning in the 1970s (Sedgwick, 2001). This led to development in many fields, including education (Profanter, 2014).

> According to United Nations Development Programme, and Unesco,
>
> Considerable expansion of educational facilities and enrollments at different levels and types of education has taken place in the Kingdom of Saudi Arabia during the last decade and a half as a result of the Kingdom's emphasis on development of human resources during the three successive 5-year Development Plans (1970-1975, 1975-1980 and 1980-1985). At the same time, qualitative improvement of education was also accorded high

> priority, particularly during the Third Development Plan (1980-1985), with measures taken for curriculum reform, diversification of courses, provision of better equipment in schools, improved evaluation procedures and increased efficiency of educational administration. (United Nations Educational Scientific and Cultural Organization, 1987, p. 1).

With this increasing income, the Saudi Arabian government invested in new technology. In 1960 the first computers were introduced to the government, but they only went to the Ministry of Finance and National Economy. In 1980, after the government economy increased, the computer was introduced to other sectors (Aldawood, 2000). The use of computers in the education field included other technology connected to computers such as floppy disks and printers. The number of computers increased from 47,500 units in 1986 to 80,000 units in 1989 (Aldawood, 2000). This big change was the result of the establishment of the General Administration for Educational Technology in 1985, which was within the Education Development Department in the Ministry of Education (Aldawood, 2000). The main objectives that the Educational Technology administration were focused on were training the leaders on educational technology, producing instructional technology materials, supplying instructional films and materials equipment for mathematics and science, offering computers and computer software and hardware for schools, and founding a unit for instructional videos and the recording and copying of audio tapes. During seven years of work from 1976 to 1982, the Saudi Arabian government spent 281,658,489 Saudi Riyal on instructional media and equipment (Aldawood, 2000).

Saudi television officially started educational programs in 1974. The program called The Elimination of Illiteracy began soon thereafter. Another educational program was called Our Students in the Field, and other educational programs that supported learning also were funded

(Eraqi, 1986). However, women's education in this period did not receive the same benefits of school technological equipment that was made available in boys' schools. Al Rawaf and Simmons (1991) stated that

> However, despite a growing acceptance of women's education in Saudi Arabia there are still a number of limitations on its development. Restrictions are curricular in that not all courses open to men (e.g. engineering) are open to them, economic in that less money is spent on women's education and the equipping of libraries and laboratories than on men's, cultural in the sense that they have to be driven to their institution by a man but must be taught by a woman or by a man through CCTV, and occupational in that only a limited number of jobs are open to women and that only a small percentage of women are therefore able to find work. (p. 294)

Stage 5: Education in Saudi Arabia after Internet (1997 to present)

Saudi Arabia was interested in becoming one of the countries that was using the Internet so that it could be used in the education sector. According to Gershner and Snider (1999), "The most significant change in the classroom today is not just a computer, but also direct access to the Internet" (p. 3). Many educational institutions in the world started having the Internet at the beginning of the emergence of the Web in the 1990s (Albalawi, 2007). King Fahad University of Petroleum and Minerals was the first Saudi institution to connect to the Internet in 1993 (Albalawi, 2007). In 1994, King Abdul Aziz City of Science and Technology (KACST) registered as the domain (sa) and provided Internet access around the Kingdom. However, the public did not have access to the Internet until March 1997, when the Saudi Council of Ministers made decision number 163 that allowed public access to the Internet (Albalawi, 2007). The Ministry of Education realized many benefits after adding the Internet. The Ministry of

Education designed its website and made it easy for teachers to communicate with the ministry administrators. Aside from the development of the Internet, many other technologies make use of the Internet such as tablets and interactive whiteboards. One of the most important reasons that made computers and the Internet important educational technology resources is that they offers access to database searches so that students can find resources from around the world. The adoption of computers and the Internet in education leads to understanding the Saudi Arabian educational society's decision to utilize this innovation and diffuse it into schools. However, despite the advantages of using technology for education, some parents are still concerned about Internet safety and ask for restrictions and filters on the Internet in schools.

The new generation of students has a desire to learn and work with technology, including computers and Internet. This came about because of the diffusion of the Internet and the influence of western culture. People who own computers and other technology such as mobile phones, DVD players, and digital cameras influenced the increasing use of Information Communication Technology (ICT) outside of schools. Students also use computers at schools in the learning process and spend time doing activities on them. Oyaid (2010) conducted a study to look at students' usage of ICT inside and outside schools. She surveyed 270 secondary school students and found that most young people in Saudi Arabia own computers and have access to the Internet, and students generally have a positive outlook toward computers.

Education in Saudi Arabia had changed from traditional education that had learning without technology into learning with new methods and materials based around educational technology. The growth of technology inventions mirrors the growth of the Saudi society, especially among young people, and shows the importance of modern technology. One of the most important reasons that made the Saudi society adopt these technologies is that the highest

percentage of Saudi society is young. A demographic survey in 2016 shows that the Saudi population was 31,742,307, and the ratio of Saudi nationals who are less than 15 years old is 30.4 percent (General Authority for Statistics, 2016). E-learning began in 2002, especially in higher education (Al-Asmari & Rabb Khan, 2014). With the growing number of students who are digital natives that were born into the technology revolution, it is essential that the Ministry of Education plan to develop education in Saudi Arabia. Al-Asmari and Rabb Khan (2014) explained that several efforts were made to encourage technology use in education, such as the Watani schools' NET project that was launched in 2001 to connect all public schools and educational directorates all over the country through a wide area network (WAN). Another was the collaboration between Intel and local software company Semanoor to produce an electronic version of curricula and multimedia materials for all public and private K–12 schools in Saudi Arabia. Intel also worked with Obeikan Education to produce more than 250 interactive lessons for K–12 mathematics and science courses through a website called Skool (Al-Asmari & Rabb Khan, 2014).

King Abdullah bin Abdulaziz Public Education Development Project Tatweer

In 2007, the Ministry of Education started a new project to develop and reform education: the King Abdullah bin Abdul-Aziz project for Public Education: Tatweer,[5] which was implemented in a few number of K-12 schools (Alyami, 2014). The government funded $2.4 billion to find the best way of developing education to fit the needs of a new generation, including up-to-date educational technology. The Tatweer Company also has a program called Jehazi, which is aimed at developing teachers' computer and technology skills (Al-Madani & Allaafiajiy, 2014). Dr. Alzaghaibi, the former chief executive officer of Tatweer, explained that

[5] Tatweer is an Arabic word that means development.

> The accomplishments of T4edu integrated with the funding provided by our forward thinking government, as part of the King Abdullah bin Abdulaziz Public Education Development Project, along with the support of His Excellency, the Minister of Education, contribute to achieving the goals of the Kingdom of Saudi Arabia's Vision 2030 and the initiatives relating to education in the National Transformation Program. (Tatweer Co. for Educational Services-annual report, 2018, p. 9)

The Internet helps diffuse educational applications and social media apps. Technology that was found to support the learning process was used in schools, such as Noor software.[6] The Ministry of Education is interested in educational technology and providing modern technology and modern instructional methods.

Saudi Arabian Vision 2030 and The National Transformation Program 2020

Saudi Arabia adopted a vision to develop the country's economy and create developmental action in the Kingdom (Vision2030, 2017a). This vision aims to place the Kingdom in a leading position in all fields. Accordingly, the vision sought to identify the goals, objectives, policies, and the general direction of the Kingdom of Saudi Arabia. There are three main programs that the 2030 vision plan will work to achieve: privatization program, Fiscal Balance Program, and National Transformation Program. The program that is the most relevant to this study is the National Transformation Program.

[6] Noor software program is a comprehensive and integrated educational processes learning program, which relies on the most advanced technology in the field of educational management. This program covers all of the schools in the Ministry of Education, educational districts, and public administrations in the Ministry of Education and the Ministry itself. The school administrators can also contact with parents via this program. Here is Noor program website: https://noor.moe.gov.sa/Noor/login.aspx

The National Transformation Program 2020

The National Transformation Program 2020 was launched in 2016 to find the challenges that face the 2030 vision and "will develop government action and establish the necessary foundations to accommodate its ambitions and requirements" (Vision2030, 2017b). The program was launched across 24 government bodies including the Ministry of Education. The program identifies initiatives that each sector is responsible to work on and achieve by 2020. The Ministry of Education must work on 36 initiatives with a fund of 24,365,842 SR. One of these initiatives is making a shift to digital education to support student and teacher progress with a fund of 1,600,000 SR (Vision2030, 2017b).[7]

Technology Integration in Saudi Arabia through the 2020 National Transformation Program

The Ministry of Education started working with Tatweer Educational Technologies (TETCO) to fulfill the initiative of transforming digital education. A Virtual School was the first project that the Ministry of Education announced at the beginning of the transformation program, which is a Tatweer project (Tatweer Co. For Educational Services, 2017). In March 2016, the Ministry of Education announced the Future Gate platform transformation program to digitize learning for all Saudi 7–12 schools by 2020 (Toumi, 2017). The Future Gate platform was implemented in 150 schools in three regional education departments during the 2017-2018 school year, and they added 160 more schools later in the same school year. The program expanded to 1,583 schools in the second year, and then proceed in several steps until 2020. The plan ensure that all 7–12 students can digitize learning through the Future Gate platform.

[7] According to the Vision2030. This is the total cost of the initiative for five fiscal years from 2016/2017 to 2020/2021, which will be borne by the government (numbers do not include the contribution of the private sector in the initiative costs).

Teachers and parents can connect with the platform to view their children's progress. The system adapts intelligently to individual student needs as illustrated in Figure C1 (Ministry of Education, 2017).

Notably, the wealthier schools carefully chosen in the first phase were provided with educational technology equipment including laptops, SMART board, projectors, and reliable Internet to help digitize learning. On the contrary, many of the schools that did not start the program lack technology and internet access, especially schools located in rental buildings and schools in the rural areas. As such, it is important to provide the same equipment to all schools when implementing the transformation program to all schools in the country to prevent the digital divide.

Future Gate Platform

It is important to note that the Future Gate platform is a LMS that provides a range of features for teachers and students to accomplish their tasks in the system. Tatweer Educational Technologies (TETCO) is under Tatweer Company, which is owned by the Public Investment Fund in Saudi Arabia. Tatweer is responsible for supporting the Ministry of Education in carrying out the Ministry's IT functions, providing quality solutions and services to both the public and private sectors, and developing the technology and communication services in the education sector of the Kingdom, which will raise the level of this sector to keep up with future growth at the local and international levels (TETCO, 2019). TETCO is responsible for providing the Future Gate project in schools and educational technologies that support the Future Gate initiative and the National Transformation Program 2020. Appendix P, Figure B1 shows students have a 1:1 ration of computers in some schools that implement Future Gate in the school year 2017-2018.

Future Gate is a country-wide, large-scale initiative which, upon completion, will have set up a LMS for 25,000 schools, 4,500,000 students, and more than 500,000 teachers in Saudi Arabia (Al Ohali, Al Suhaibani, Palavitsinis, & Koutoumanos, 2018). According to Future Gate (2017), the goals of the National Transformation Program 2020 are as follows:

1. Change the traditional style of education.
2. Create an enjoyable learning environment with positive interactions between students and teachers.
3. Expand learning and teaching processes beyond classrooms and school environments.
4. Equip students with personal skills to prepare them for university and the labor market.

Al Ohali et al. (2018) stated there were three different LMSs introduced in the first phase of implementing Future Gate LMS for the educational departments in Riyadh, Jeddah, and Dammam. Schools in Riyadh used Moodle implementation; schools in Jeddah used Classera implementation; and schools in Dammam used an LMS provided by ITWorks. The reason for choosing three different LMSs was to "evaluate the use of each LMS during the first stage of the project in order to select one LMS that would be deployed in all the schools of the Kingdom, in the final stage of the project" (Al Ohali et al., 2018, p. 3).

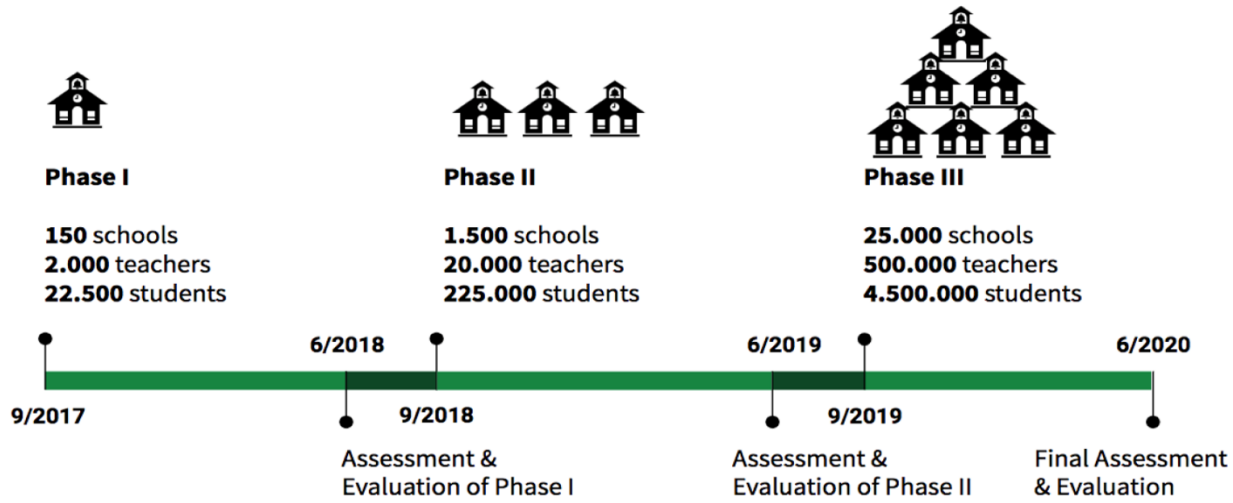

Figure 1.2 The phases of the Future Gate project (Al Ohali et al., 2018, p. 2).

The total number of Departments of Education selected in Phase I and Phase II to implement Future Gate LMS are 16 out of 47 Education Departments. More details about the number of schools in the Departments of Education that were selected to implement Future Gate LMS in phase I and II are in Table 1.3.

Table 1.3

Number of Schools in the Departments of Education Selected to Implement Future Gate LMS in Phase I and II (Future Gate [FutureGate_sa], 2018)

	Education Department	N of schools in the First phase	N of schools in the Second phase	Total
1	Riyadh	57	328	385
2	Jeddah	82	156	238
3	Eastern Province	80	126	206
4	Qassim	40	258	298
5	Al-Ahsa	23	259	282
6	Asir	18	142	160
7	Onizah	10	54	64
8	Sabia	X	50	50
9	Madinah	X	50	50
10	Tabuk	X	50	50
11	Qunfudah	X	20	20
12	Hail	X	20	20
13	Al-Jouf	X	20	20
14	Northern Borders	X	20	20
15	Hafar Al-Batin	X	20	20
16	Al-Zulfi	X	10	10
	Total	310	1583	1893

Al Ohali et al. (2018) indicated that schools in the first phase of the Future Gate project had high speed internet (10 Gbps), and their buildings were equipped with wireless access points. Gradually, per the National Transformation Program 2020, all remaining schools will be the same as the schools in the first phase.

The Future Gate project gradually equipped schools with interactive projectors, which have many features, such as allowing the presenter or audience to interact with the projected image, and they began providing this equipment to schools in the first phase (Al Ohali et al., 2018). However, after the end of the first phase, only 20% of the schools have had interactive projectors installed (Al Ohali et al., 2018). Moreover, some teachers received laptops for the purpose of Future Gate. The project has taken on the initiative of providing one laptop for every student (Al Ohali et al., 2018).

To achieve the objectives that the Ministry of Education aims in the transformation to digital learning, essential tasks are required from students, teachers, the coordinator of the transformation to digital learning, and school's principal and vice principal. This section will focus on teachers' tasks since this research is concerned with teachers' adaptation to the Future Gate platform.

Teacher's Tasks in the Future Gate LMS

There are several features that will benefit teachers when starting to utilize the Future Gate platform. The following seven features are required for teachers to implement and they will include in teachers' assessment in utilizing Future Gate:

1. Electronic homework and activities. E-learning activities and assignments offer new concepts and methods in terms of content. They are not limited to textual questions, but a video presentation, voice recording, or image can be presented to the student.

2. Electronic tests. Currently e-tests are used only for short tests. In the future, e-tests will be used for the finals. Teachers have to create e-tests in the Future Gate platform and engage students to do these e-tests. There is also a test bank in Future Gate that teachers can use at any time.
3. Interactive content refers to educational content placed electronically using text, images, videos, charts, and data. It is used to achieve the educational objectives, taking into account individual differences and needs. Learners also have a key role in building knowledge. Teachers can use the content created by the Ministry of Education or design their own content using the publishing capabilities through the Future Gate platform.
4. Discussion rooms. A thematic space in the Future Gate where teachers can ask and follow students' discussions.
5. Preparation of lessons and detailed plan. A space dedicated to creating lesson plans and building annual plans for teachers.
6. Attendance and absences. This feature helps teachers monitor absences electronically, thus making it easy to extract reports of attendance and absences.
7. Smart Classroom. Also called the virtual classroom, encompasses direct and indirect learning environments where students can communicate with teachers and other students and interact with participants, work as groups to engage with resources, and do presentations.

Other available features that teachers can utilize in the Future Gate include the following:

- Communication through Future Gate with students, teachers, school principal, school vice principal, school counselor, parents, or the future gate coordinator.

- Weekly plans available for student viewing. In addition, teachers can create a weekly plan where they upload interactive content and worksheets on the Future Gate platform.
- Educational games
- Teacher's personal profile and ways to communicate through the Future Gate platform.

Additionally, teachers can benefit from educational technologies that are available in schools such as smart boards in order to use Future Gate LMS in the class activities.

Saudi Virtual School

The Ministry of Education's continuing support for blended learning in 7–12 schools includes the establishment of the smart school initiative on the Saudi Virtual School according to its official account on Twitter (Virtual School [SaudiVS], 2017). The official account on Twitter of the Saudi Virtual School explained that it will help students, especially those in rural areas, to benefit from high-quality teachers who can interact with them and support learning (Virtual School [SaudiVS], 2017). Accordingly, students can attend virtual classes in a special classroom at school equipped with technology connected to the broadcasting center in the regional Education Department. Students can access the Virtual School through the Future Gate platform. Additionally, the link to the virtual school is available for all students to use. Schools might use the Virtual School when a school day is suspended due to reasons such as weather conditions. In February 2020 with the spread of COVID-19 disease (Centers for Disease Control and Prevention, 2020) around the world, the Ministry of Education suspended schools in all Departments of Education, and they announced that the Virtual School was ready to provide online learning for all students (Ministry of Education, 2020a; Reuters, 2020). Learning with

Virtual Schools is a good step forward for developing blended learning through Learning Management System; however, it needs professional leadership that will organize students' attendance and prevent possible risks such as impersonal virtual teacher-student interaction by encouraging a more personal interaction (Alotebi, Alharbi, & Masmali 2018).

National Center for E-learning

On October 3, 2017, the Saudi Arabian government established the National Center for E-learning as an independent center (Ministry of Interior, 2017). This center operated under the Ministry of Education and had been focusing more on higher education, but the government decided to make it an independent center to control all the E-learning and initiatives in Saudi Arabia. The National Center for E-learning established SHMS Open Education Resources that will help teachers to find free sources to use and support the learning process (SHMS, 2020). The total resources in SHMS by March 2020 were 372,546 resources, including 14,475 scientific materials, 49,635 lessons, 3,727 materials, 24,376 activities, and 40,047 videos (SHMS, 2020). Teachers have a chance to use SHMS resources that are uploaded from other educators. They can upload it to the Future Gate LMS through the interactive content feature that allows them to upload content. They can also use it either in the classroom activities or as materials for the flipped classroom.

iEN National Education Portal

The iEN National Education Portal is one of the digital learning portals supported by the Saudi Arabian Ministry of Education that contributes to digital development and achieving the 2030 vision by presenting several services and solutions in educational technology. The iEN National Education Portal targets all students, teachers, parents, guardians, administrators, and school leaders in Saudi Arabia (iEN, 2019a). The iEN offers several services:

1. Courses in electronic format
2. Guides for teachers and sources for classroom activities
3. Resources for educational enrichment with helpful additional material
4. Lesson plans
5. Banks of online questions
6. Virtual learning communities
7. Augmented reality experiences
8. Programming courses
9. Tests for students (for parents to use)
10. “My students” section, in which teacher discuss issues related to education
11. Sharing options (for sharing educational resources)
12. Support for digital content

The iEN National Education Portal has more than 38,000 visual and interactive digital educational contents, 2,000 digital books, more than 100,425 electronic questions, and more than four million registered users. This portal will help teachers integrate technology into their classrooms, and teachers can activate the Future Gate LMS through it.

Courses in Electronic Format

Courses for all grades K–12 can be found on the iEN National Education Portal. A new update in the hard copies and electronic versions of the 2018/2019 courses is the presence of a QR code at the start of each lesson. Teachers may ask students to download a QR reader on their smartphones to access further explanations about the lesson on the iEN National Education Portal, as seen in Figure 1.3.

Figure 1.3 QR Code Reader to access further information for lessons. Source : (iEN National Education Portal, 2020)

Additionally, the iEN provides twelve TV channels for children in 1st to 12th grades. Students also can gain access to those channels through links on the iEN TV website, *ientv.com*. Moreover, there are more than 5,000 lessons on the iEN TV YouTube page, *youtube.com/ientv2*. The Ministry of Education announced that the iEN National Education Portal was ready to provide resources and live YouTube channels for all first through twelfth grade classes when schools were suspending because of the spread of COVID-19 in 2020 (Centers for Disease Control and Prevention, 2020). These resources are synchronous learning where students do not interact with teachers. When in the virtual school and Future Gate LMS, students can interact with teachers.

National Institute for Educational Professional Development

In October 2019, the government of Saudi Arabia launched the National Institute for Educational Professional Development (NIEPD) and all its employees were from the Ministry of Education (Bureau of Experts at the Council of Ministers, 2019). This institute has an important role in providing educational professional development for all educational institutions in Saudi

Arabia. NIEPD will help provide essential digital skills for teachers in order to help them improve their digital skills to adopt the transformation to digital learning.

According to the Bureau of Experts at the Council of Ministers, (2019), the main goals of NIEPD are as follows:

1. Supporting the generalization of education and raising the level of educational professional practices to the level of professionalism.
2. Building a system for educational professional development in the public education sector of high efficiency and effectiveness and supporting its implementation.
3. Organizing educational professional development operations and programs and controlling its quality to ensure its efficiency and effectiveness in the educational sector.
4. Promoting sustainable professional development in the educational sector by building diverse career paths and vocational professional development vessels.
5. Preparing educational leaders through detection, recruitment, and qualification. (Bureau of Experts at the Council of Ministers, 2019, Article 3)

Statement of the Problem

The Ministry of Education in Saudi Arabia is one of 24 governmental sectors that started implementing the National Transformation Program by 2020. The Ministry started the transformation program to digital learning to support student and teacher progress at the beginning of the school year of 2017-2018 in 150 schools in three educational departments. The number of the schools increased to cover all the middle and secondary schools by the school year of 2019-2020. The program requires that learning will be digitized so that it will use technology

in the learning process. This transformation program will also require utilizing a learning management system platform called Future Gate.

An issue facing the Ministry of Education before implementing the transformation project is that most schools do not have technology equipment and Internet in the classroom, plus teachers teach with traditional face-to-face methods. To prepare teachers to adopt Learning Management System, it is important to investigate their concerns and needs for professional development. The findings from this study will help to understand those needs that will make the transformation plan successful.

Purpose of the Study

The purpose of this study was to examine the concern and the professional development needs of middle and secondary school teachers to adopt Future Gate LMS as one of the projects of transforming to digital learning in Saudi Arabian schools. The goal of the study was to understand teachers' concerns and their needs for improving their skills in implementing Future Gate LMS in the learning process. The Ministry of Education started implementing Future Gate LMS project in a limited number of schools to identify the pros and cons of this project. This study's examination of teachers' concerns and their professional development needs in the schools that were selected to implement the Future Gate LMS project will address this goal.

Research Questions

This study was designed to investigate the concern of middle and secondary school teachers in Saudi Arabia regarding their adoption of the Future Gate LMS. The study also investigated the relationship between teachers' concern and their needs for professional development. There were five research questions:

Research Question #1: What is the most intense stage of concern of Middle/Secondary grade teachers in Saudi Arabia about the learning management system adoption, as measured by the stages of concerns questionnaire (SoCQ)?

Ho 1. The most intense stage of concern of Middle/Secondary grade teachers in Saudi Arabia about the Future Gate learning management system adoption, as measured by the stages of concern questionnaire (SoCQ) is not the personal stage.

Research Question #2: What is the relationship between Middle/Secondary grade teachers' demographic characteristics (gender, age, years of teaching experience, grade level, subject taught, and type of degree) and their concerns in adopting Future Gate Learning Management System?

Ho 2.1. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' gender.

Ho 2.2. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' age.

Ho 2.3. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' years of teaching experience.

Ho 2.4. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' grade level.

Ho 2.5. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' subject taught.

Ho 2.6. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' type of degree.

Research Question #3: What type of relationship exists between Middle/Secondary grade teachers' technographic characteristics (prior experience of instructional technology use, type of professional development in instructional technology use, duration of instructional technology related professional development, type of professional development in LMS use, and duration of LMS-related professional development) and their concerns in adopting Future Gate Learning Management System?

Ho 3.1. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by teachers' prior of instructional technology use.

Ho 3.2. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by the type of professional development in instructional technology use.

Ho 3.3. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by duration of instructional technology related professional development.

Ho 3.4. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by the type of professional development in LMS use.

Ho 3.5. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by duration of LMS-related professional development.

Research Question #4: Is there any relationship between teachers' concerns in adopting Future Gate LMS and the school technology (technology in the classroom and Internet access in the classroom)?

Ho 4.1. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by the technology in the classroom.

Ho 4.2. There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate Learning Management System by the Internet access in the classroom.

Research Question #5: What are the three top concerns of teachers that are related to implementing Future Gate LMS?

Methodology

This study investigated teachers' concerns in adopting Future Gate Learning Management System through the transformation from traditional face-to-face learning in middle and secondary schools in Saudi Arabia. It helps to understand teachers' needs for professional development in order to adopt the digital transformation plan that integrate Future Gate LMS. Concern Based Adoption Model (CBAM) (Hall, et al., 1979; Hall & Hord, 2015) served as the theoretical framework lens for analysis and interpretation (George, Hall, & Stiegelbauer, 2013; Hall & Hord, 2015).

Concern Based Adoption Model (CBAM) (Hall, et al., 1979; Hall & Hord, 2015) was used as the theoretical framework for this study. It employs the assumption that how the change process reacts to the implementation of the innovation can affect individuals (Hall & Hord, 1987). CBAM is defined as "a framework for measuring implementation and for facilitating change in schools" (George et al., 2013, p. xi). It was designed to conduct any educational studies regarding the adoption of innovation (Hall, George, & Rutherford, 1979). This model is suitable for this study because "understanding teacher perceptions regarding change enables researchers to address the change process from the teacher's point of view" (Hall & Hord, 1987, p. 53). The model has three dimensions used to understand changes in individuals: stage of concern (SoC), level of use (LU), and innovation configuration. SoC was the theoretical framework used in this study because it focuses on teachers' concerns regarding the adoption of an innovation. SoC "addresses how teachers or others perceive an innovation and how they feel about it" (Hall & Hord, 1987, p. 13). There are four typical expressions of concern about an innovation: unconcern, self, task, and impact.

This study is an explanatory sequential mixed-methods design for which quantitative data was collected first then the results from the quantitative phase was explained in-depth through the qualitative data (Creswell, 2014). The Stage of Concern Questionnaire (SoCQ) was used in the quantitative phase, which was given to teachers in the schools that selected to implement Future Gate LMS to test CBAM (Hall, et al., 1979; Hall & Hord, 2015) to examine if the demographic, technographic, and technology in the classroom factors related to teachers' Stages of Concern.

Analyzing demographic, technographic, and classroom technology quantitative data was descriptive statistics. To find the value of significance, this research used the Multivariable

Analysis of Variance (MANOVA) test. The Analysis of Variance (ANOVA) was conducted multiple times, once for each variable, because it is inadequate for testing groups' difference on several dependent variables, which would increase Type I errors.

There are four different tests on SPSS based on the MANOVA table. Pillai Trace was selected to determine the statistical difference at the .05 level. If the result of revealed statistically significant differences, the Analysis of Variance test (ANOVA) was conducted to identify the value of significance. To determine where differences exist between groups, a series of Tukey tests was conducted because it is considered robust (Lane, 2010).

The qualitative phase was conducted as a follow-up to the results obtained from the quantitative phase, which provided an in-depth explanation of the quantitative results (Creswell, 2014). The open-ended question on the questionnaire as well as the semi-structured interviews was used for further investigation about teacher perceptions and concerns about implementing Future Gate LMS.

The research setting was the schools around the country that were chosen by the Ministry of Education in the first, second, and the beginning of the third phase to implement the transformation program and Future Gate platform. The population of the study were male and female teachers from middle and secondary schools that implemented the digital transformation program. The Institution Review Board (IRB) modules was completed after approving this proposal.

Complete details of the methods that will be used in this research are in Chapter 3.

Definition of Terms

Adoption: Defined by Rogers (2003) as "the decision to make full use of an innovation as the best course of action available" (p. 21).

Attitude: “Informed predisposition to respond and is comprised of beliefs, feelings and an intent for action,” (Koszalka, 2001, p. 2).

Blended learning: A combination of traditional face-to-face and online learning (Wong & Tatnall, 2009; Kihoza, Zlotnikova, Bada & Kalegele, 2016)

Change: Defined by Hall (1979) as “an unfolding of experience and a gradual development of skill and sophistication in the use of an innovation; a developmental process” (p 204).

Change facilitators: People who assist in the process of innovation adoption such as district, school administrators, teachers, and others in the educational system (Hall & Hord, 2011).

Concern Based Adoption Model: “A framework designed to provide measurement concepts and tools for evaluators and researchers to evaluate the effects or progress of implementation of an innovation or multiple innovations that may constitute a reform program” (Hord, Stiegelbauer, Hall & George, 2006, pp. 1-2) or it is “a framework for measuring implementation and for facilitating change in schools” (George et al., 2013, p. xi).

Digital Citizens: "Those who use the Internet regularly and effectively—that is, on a daily basis.” (Mossberger, Tolbert & McNeal, 2008, p. 1).

Digital Divide: is a term with multiple meanings and use. In this research, it means the mismatch in using and accessing Information and Communication Technologies (Norris, 2001).

Digital native: people who born in the age of digital technology, grew up with using technology, and had easy access to use computer resources all their life (Prensky, 2001).

Digital immigrant: “those of us who were not born into the digital world but have, at some later point in our lives, become fascinated by and adopted many or most aspects of the new technology” (Prensky, 2001, p.1).

Flipped classroom: “a new pedagogical method, which employs asynchronous video lectures and practice problems as homework, and active, group-based problem solving activities in the classroom” (Bishop & Verleger, 2013, p. 1).

Future Gate: A Learning Management System (LMS) platform designed by Tatweer Educational Technologies Company for 7-12 grade levels.

Innovation: “An idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p. 12), or “Whatever change or reform is being implemented” (Hord et al., 2006, p. 5).

Learning Management System (LMS): "a software package that supports the management of learning in an organization" (Lewis & Whitlock, 2003, p.159). Examples include Canvas, Blackboard, Moodle, and Classera.

Middle and Secondary Schools: In Saudi Arabia, there are three years of middle school from grade 7 to grade 9. Secondary school is three years from grade 10 to 12. This is called secondary education in the United States.

Stages of concern (SoC): One of three aspects of CBAM (Hall, et al., 1979; Hall & Hord, 2015). The stage of concern that “addresses how teachers or others perceive an innovation and how they feel about it” (Hall & Hord, 1987, p. 13). There are seven stages of concerns: Unconcerned, Informational, Personal, Management, Consequence, Collaboration, and Refocusing.

Stage of Concern Questionnaire (SoCQ): It is a 35 item Likert scale questionnaire developed by Southwestern Educational Development Laboratory. It "provides a way for researchers, program evaluators, administrators, and change facilitators to assess teacher concerns about strategies, programs, or materials introduced in a school" (George et al., 2013, p. xi).

Technographic Characteristics: Technographic characteristics are related to demographic characteristics but are concerned with personal technology demographics (Mitra, Joshi, Kemper, Woods, & Gobble, 2006). The selected technographic characteristics in this study were teachers' experience using instructional technology, the type and duration of the professional development received using Future Gate LMS, and received using instructional technology.

Limitations of the Study

Certain limitations are applicable to this study that affected the generalization of the study's results.

1. Lack of prior studies regarding the implementation of Future Gate LMS in middle and secondary schools in Saudi Arabia.
2. Since the sample will represent only schools that implement the transformation program, the results of the study cannot be generalized to other schools in the country.
3. The study represents teachers' concerns at the time of the beginning of the transformation program, which means their ideas might change after adopting the program.

4. This study did not apply to middle and secondary schools that were not chosen in the first phase, second phase, and the beginning of the third phase to implement the Future Gate LMS through the National Transformation Program that the Ministry of Education started.

Thus, the study's results will not reflect teachers in schools that have not implemented the Future Gate LMS project since they did not start it yet. However, the Ministry of Education will find portions of this study beneficial since schools and teachers in all 47 educational departments will be encountering similar situations when they implement the Future Gate LMS project.

Delimitations of the Study

The delimitations of this study are as follows:

1. This study was delimited to be a sequential explanatory mixed-method study of the teachers in middle and secondary schools that selected to implement Future Gate LMS.
2. The study was conducted at the beginning of the third phase of implementing Future Gate LMS, so some schools still had not implemented the project and teachers in that schools did not participate in this study.
3. Only middle and secondary school teachers in the selected schools participated in this study because the program was not implemented in elementary schools.
4. Participants in the interview section had a high level of technology use, which does not reflect other participants who had medium or lower level of technology use.

Significance of the Study

The Kingdom of Saudi Arabia launched a program called The National Transformation Program 2020, which includes all sectors in the government such as the Ministry of Education.

The Ministry of Education launched many programs including the transformation to digital learning program to transfer education and digitize learning by implementing a Learning Management System called Future Gate. Essentially, the transformation to digital learning program 2020 in the Ministry of Education focuses on digitized learning through Future Gate LMS in middle and secondary school settings. Retrospectively, most teachers in middle and secondary schools in Saudi Arabia used traditional methods in classrooms that lacked technology. Apparently, most of teachers did not integrate technology into the learning process before the implementation of Future Gate LMS. To justify the cost of the transformation program, there is a need for professional development for teachers who expected to use the LMS. Therefore, it is important to understand teachers' concerns, their technology needs, and their needs for professional development by conducting research that measures their concerns in adopting LMS.

CBAM (Hall, et al., 1979; Hall & Hord, 2015) provides a useful framework of the study to measure and identify teachers' concerns regarding the LMS. George et al. (2013) observe that the successful adoption of innovation depends on the individual teachers. According to Lochner, Conrad, & Graham (2016) and Hadjipavili (2011) professional development is important for teachers to adopt the LMS. Similarly, it is important to understand middle and secondary school teachers' concerns when adopting the Learning Management System to provide an appropriate training program. Notably, these needs and concerns must be addressed so there will be alignment between teachers' concerns and the Ministry of Education's professional development programs to have a successful National Transformation Program. In addition, this study will contribute to closing the gap between the level of concern of middle and secondary school

teachers to adopt the LMS that is currently expected from them to what they will need to use the LMS Future Gate platform that is expected by the Ministry of Education.

Researcher Positionality

My background is identified in order to strengthen the research. My past experience in teaching in public schools in Saudi Arabia might affect my perspective as a researcher. Additional factors that might affect my perspective includes my support of integrating LMS as a graduate student in the Educational Technology program. I taught in traditional face-to-face environments and experienced many obstacles that other teachers also face when they work to implement the Learning Management System. Furthermore, my graduate program studies were most often held in integrating technology that were in rich technology classrooms and utilizing Learning Management System; this experience led me to believe how important it is for teachers to utilize Learning Management System in middle and secondary school settings. All these factors could influence my interpretation of the research results.

Organization of the Study

The purpose of this sequential explanatory mixed-method study is to examine the Saudi Arabian middle and secondary grade teachers' concerns in adopting Future Gate LMS. This dissertation is organized into five chapters. Chapter 1 investigates the historical development and transformations in education in Saudi Arabia and the study rationale related to integrating the learning management system. Chapter 2 reviews the Concern Based Adoption Model as the study's theoretical framework and it considers literature on integrating learning management system research. Chapter 3 discusses the methodology that used to guide the study. Chapter 4 presents the findings of the study. Chapter 5 discusses and interprets the findings.

Chapter 2 - Review of the Literature

Overview

The purpose of this explanatory sequential mixed-methods research was to examine the concerns of Saudi Arabian teachers regarding adopting the Future Gate LMS that is being implemented through the Transformation to Digital Learning Program. There are four main sections organizing the literature review. The first section is the theoretical framework that guides this research, which is the Concern Based Adoption Model (CBAM) (Hall, et al., 1979; Hall & Hord, 2015). The second section is a review of literature about integrating technology in education. The third section reviews variables such as gender, age, years of teaching experience, grade level, subject taught, type of degree, type and duration of professional development, and technology in the classroom. The fourth section reviews the Saudi Arabian transformation program to digital learning by 2020.

Theoretical Framework: CBAM

The issue of technology integration in the classroom is individual because some teachers use advanced technologies in their instruction while others use computers rarely or even are scared to touch them. Several definitions of concern describe how teachers react when implementing a new innovation. Christou, Eliophotou-Menon, and Philippou (2004) explained that concern is “a state of mental arousal resulting from the need to cope with new conditions in one’s work environment" (p.160). Hall, George and Rutherford (1979) defined concern as “[T]he composite representation of feelings, preoccupation, thought and consideration given to a particular issue or task” (p. 5). CBAM (Hall, et al., 1979; Hall & Hord, 2015) helped for several decades to measure and explain the concerns of individuals when implementing a new innovation. CBAM employs the assumption that how the change process reacts to the

implementation of the innovation can affect individuals (Hall & Hord, 1987). CBAM is defined as "a framework for measuring implementation and for facilitating changes in schools" (George et al., 2013, p. xi). It was designed to conduct educational studies on the adoption of innovation (Hall et al., 1979). This model is suitable for this study because "understanding teacher perceptions regarding change enables researchers to address the change process from the teacher's point of view" (Hall & Hord, 1987, p. 53). This model helps administrators to identify teachers' concern about innovation and design professional development programs that are based on their need as their level of concern explains that. CBAM illuminates "the personal side of change" that teachers experienced (Hall & Hord, 2015, p. ix).

Hall, Wallace, and Dossett (1973) introduce CBAM based on the work of Frances Fuller (1969). She was a counseling psychologist at the University of Texas at Austin. Fuller developed CBAM gradually and proposed the development of concern theory that emerged in 1960s (George et al., 2013).

At the beginning, Fuller developed the Teachers' Concern Model. This model categorized types of concern based on educational change into three types of concern:

- Preteaching Phase (Nonconcern): concern with self and concern with pupils. Non-concern or pre-teaching concerns occur when student teacher with no experience in teaching have rarely concern of teaching itself.
- Early Teaching Phase (Concern with Self): Student teachers and beginner teachers usually express concern about their ability to control a class, their adequacy, and handling classroom situations.
- Late Teaching Phase (Concern with Pupils): Superior and experienced teachers who have concerns about their professional development and about students' learning.

Fuller's later work classified concern into four major clusters of concern (Hall & Hord, 2015):

(1) Unrelated Concern: Concern preservice teachers have that is not related to teaching, such as a concern with passing tests.

(2) Self-Concerns: The concern is related to teaching, but it is usually with preservice teachers' individual feelings, such as doubts about their knowledge.

(3) Task Concerns: This type of concern occurs with beginner teachers about the job itself such as preparing materials for teaching and scheduling.

(4) Impact Concern: Concern with experienced teachers about how they can improve their teaching and how their teaching has an effect on their students' learning.

CBAM has three dimensions used to understand changes in individuals. These dimensions are stage of concern (SoC), level of use (LU), and innovation configuration (IC). SoC will be used in this study because it focuses on teachers' concerns regarding the adoption of an innovation. SoC "addresses how teachers or others perceive an innovation and how they feel about it" (Hall & Hord, 1987, p. 13). These dimensions as shown in Figure 2.1 work dynamically to allow a change facilitator (e.g., principals, districts administrators, and other related leaders) to "assist others in ways relevant to their concerns so that they can become more effective and skilled in using new programs and procedures" (Hall & Hord, 1987, p. 11).

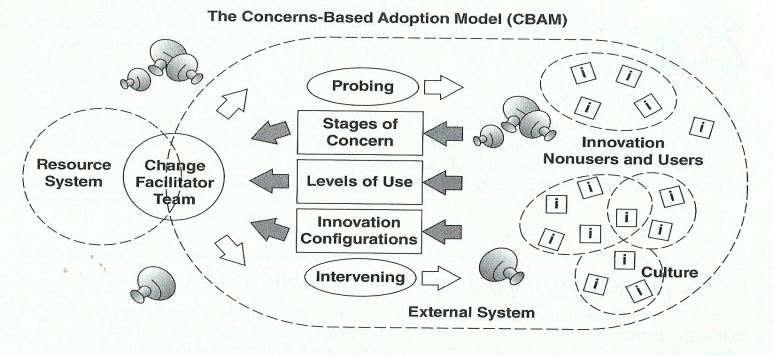

Figure 2.1 The Concern Based Adoption Model (CBAM) (Hall & Hord, 2015, p. 51)

There are four typical categories expressions of concern about an innovation: unconcern, self, task, and impact as detailed in Table 2.1.

Researchers during 1969-1970 found that teachers who engaged with innovations have concerns, which are similar to the concerns proposed by Fuller (1969). Seven stages of concern (SoC) about innovations were identified by researchers, for according to Hall and Hord (2006), "we have identified and confirmed a set of seven specific categories of concerns about the innovation that we call *Stages of Concern,* or *SoC"* (p. 138). The seven stages of concerns are Stage 0: unconcerned, Stage 1: informational, Stage 2: personal, Stage 3: management, Stage 4: consequence, Stage 5: collaboration, and Stage 6: refocusing. Table 2.1 explains the typical expressions of the seven Stages of Concern about an innovation.

Table 2.1
The Typical Expressions of the Seven Stages of Concern about an Innovation (George et al., 2013, p. 8)

Fuller Stages	Stage of Concern	Expression of Concern
Impact	Stage 6: Refocusing	I have some ideas about something that would work even better.
	Stage 5: Collaboration	I am concerned about relating what I am doing with what my co-workers are doing.
	Stage 4: Consequence	How is my use affecting students?
Task	Stage 3: Management	I seem to be spending all of my time getting materials ready.
Self	Stage 2: Personal	How will using an innovation affect me?
	Stage1: informational	I would like to know more about the innovation.
Unrelated	Stage 0: Awareness	I am not concerned about the innovation

According to Table 2.1, in the change process, there are four categories in which the seven stages are grouped: unconcern or unrelated concern, self-concern, task concern, and impact concern. The stage of awareness (Stage 0) belongs to the unrelated or unconcerned level; informational and personal stages (Stages 1 and 2) belong to the self-level; management stage

(Stage 3) belongs to the task level; and consequence stage (Stage 4), collaboration stage (Stage 5), and refocusing stage (Stage 6) belong to the impact level (Hall & Hord, 1987).

Based on the stage of concern in Table 2.1, an individual has awareness concerns with little knowledge about the innovation. Next, in the information stage of concern, the individual has willingness to attain knowledge about the innovation. After that, the individuals have personal concerns about the innovation affecting his or her responding to the innovation's requirement. Management stage indicates that the individual has started focusing on spending time to manage materials to be ready for use. In the consequence stage, the individual focuses more on the students' learning and how he or she can have an effect on their learning outcomes. Individuals also have concerns on how to collaborate with others to increase their use of the innovation. At the refocusing stage, individuals suggest and recommend others to improve reform. Table 2.2 has details about the individuals' characteristics of the stages of concern of the innovation.

Knowing the stage of concerns that teachers are in will help school principals and administrators to provide powerful tools and professional development to go to the next stage. As Fuller (1969), George et al. (2013), and Hord and Hall (2015) explained, the SoC seems to be a developmental process. Research studies show that there is a quasi-developmental path to the concern when the change process starts (Hall & Hord, 2015). However, this is not guaranteed and does not always move in one direction. The ideal flow to concern can move in the developmental direction "if the innovation is appropriate, if there is sufficient time, if the leaders are initiating, and if the change process is carefully facilitated, then implementers will move from early Self-concerns to Task concerns (during the first years of use) and ultimately, to Impact concerns (after 3 to 5 years)" (Hall & Hord, 2015, p. 87).

The progression of teachers' concerns develop because they gain more experience regarding the innovation and then they move from one stage to the next stage. In this research, teachers are at the beginning of implementing the Future Gate LMS. It will provide an opportunity for researchers to follow up teachers' level of concerns to identify the development stage they are in.

Table 2.2
The Stage of Concern about an Innovation

Fuller Stages	Stage of Concern	Expression of Concern
Impact	Stage 6: Refocusing	The individual focuses on exploring ways to reap more universal benefits from the innovation, including the possibility of making major changes to it or replacing it with a more powerful alternative.
	Stage 5: Collaboration	The individual focuses on coordinating and cooperating with others regarding use of the innovation.
	Stage 4: Consequence	The individual focuses on the innovation's impact on students in his or her immediate sphere of influence. Considerations include the relevance of the innovation for students; the evaluation of student outcomes, including performance and competencies; and the changes needed to improve student outcomes.
Task	Stage 3: Management	The individual focuses on the processes and tasks of using the innovation and the best use of information and resources. Issues related to efficiency, organizing, managing, and scheduling dominate.
Self	Stage 2: Personal	The individual is uncertain about the demands of the innovation, his or her adequacy to meet those demands, and/or his or her role with the innovation. The individual is analyzing his or her relationship to the reward structure of the organization, determining his or her part in decision making, and considering potential conflicts with existing structures or personal commitment. Concerns also might involve the financial or status implications of the program for the individual and his or her colleagues.
	Stage 1: Informational	The individual indicates a general awareness of the innovation and interest in learning more details about it. The individual does not seem to be worried about himself or herself in relation to the innovation. Any interest is in impersonal, substantive aspects of the innovation, such as its general characteristics, effects, and requirements for use.
Unrelated	Stage 0: Awareness	The individual indicates little concern about or involvement with the innovation.

Source: (George et al., 2013, p. 4)

Change is a process, not an event, so people and organizations develop and move as they learn gradually and become more experienced and skilled about the innovation (Hall & Hord,

2015). Change can fail when there is no support or leaders fail to facilitate effectively or government adds more innovations where none can be fully implemented. These situations do not lead to progress from the Self to Task to Impact concern, so if there is no change, in time many teachers return to self-concern (Hall & Hord, 2015).

Integrating Technology and Learning Management System in K-12 Education

Integrating technology into learning is essential for 21st century students that connect with the world via the Internet and mobile devices (Lakhana, 2014). That is because the new generation of students are digital natives who grew up practicing technology (Prensky, 2001). The technology in education since the 1980s "was no longer solely concerned with devices or equipment but was a branch of the behavioral sciences" (Issroff & Scanlon, 2002, p. 3). Educational technologies are not only applications and materials that the school districts provide, but they are also "immaterial tools, such as processes and ways of thinking" (Lakhana, 2014, p. 2). The technology integration in the classroom and the use of technology aligns with the study of the National Center for Educational Statistics that explains how frequently teachers use software and Internet for preparing classroom instruction and for administrative tasks (Gray, Thomas, & Lewis, 2010).

Students use technology outside the school building and spend time from their day working online. However, many schools do not allow students to use technology at schools and keep their devices away from them (Vanwelsenaers, 2012). Students need to be able to make decisions at any time and under any circumstances and for any purpose (Facer, 2012) by allowing them to use technology to complete their task at hand. Technology integration needs support from teachers who are prepared to use it for instruction and allow students to access it anywhere and at any time.

Change in education with any initiative needs to go with implementing the innovation, and therefore focusing on individuals who will carry out the innovation implementation (Hall & Hord, 2015). The change process that occurs when implementing innovation in schools is often a significant concern due to the new features of the innovation (Hall & Hord, 1987). Integrating technology in schools that lack in technology is a particular kind of change in education. Many schools started changes in teaching and learning to online and virtual learning as is done in secondary schools in the United States (Barbour & Reeves, 2009). The changes in education and in teaching practices need to have time (Brinkerhoff, 2006) and also need to focus on teachers' professional development (De Smet, Valcke, Schellens, De Wever, & Vanderlinde, 2016).

On the other hand, change does not always lead to success despite educators who support the change initiatives. Some initiatives have been discarded a few years after implementation (Ramirez, 2011). Barriers might guide those initiatives to fail. Bingimlas (2009) stated that professional development is the most cited barrier to making a successful change into ICT integration. Barri (2013) also found eight barriers in education and integrating technology into classroom in Saudi Arabia, such as professional development, lack of technology equipment, and the number of students without computers.

However, change needs a well-developed plan that consider all factors that are part of the change process. Fullan (2011) explained that there are four wrong system change drivers. These four mistakes are first, accountability, which is using tests and teacher's appraisals; accordingly, the capacity of building teachers is more important. The second is focusing on individual teachers and leader quality instead of group approaches. The third is focusing on technology instead of on teaching and learning, as they more important. The fourth mistake that can happen

when making change is fragment strategies instead of integrated systems and aligned strategies (Fullan, 2011).

How are teachers willing to change and integrate technology in the classroom? Teachers' perceptions about integrating technology and implementing innovations is important because they have experience in implementing technology in teaching and learning. Several studies discussed teachers' perceptions on integrating technologies in teaching and learning (Bingimlas, 2009; Dittoe, 2018; Edannur, & Marie, 2017) and designing models for technology integration (Liu, Ritzhaupt, Dawson & Barron, 2017); these studies found several factors and barriers that influence technology integration.

Bingimlas (2009) conducted a research synthesis study of the relevant literature that aimed to present the barrier when integrating technology in science education. He found that teachers want to integrate technology in teaching and learning; however, the major barriers found in schools were lack of confidence, lack of competence, and lack of accessibility to resources. The barriers that he found in teachers were ICT resources, effective professional development, sufficient time, and technical support. The researcher suggested ways to overcome those barriers such as taking advantage of the school resources, access to the ICT resources at home, teachers' self-training, and accessing available support.

Dittoe (2018) did a qualitative study with teachers who implemented Schoology as an LMS platform. The researcher found many challenges that teachers face to adopt the innovation, such as the challenge of teachers who have no experience in adopting the innovation. Another challenge was that the amount of time and preparation that they are required to add on the LMS as administrators require them to do.

Edannur and Marie (2017) conducted a study to examine student teachers' perceptions about technology integration. Their study focused on blended learning in an experimental program designed for eight weeks. They used Edmodo software application as their LMS. The participants were 29 student teachers in India. They found that teachers' perception of blended learning changed in terms of their general perception of blended learning, and in the content knowledge, the benefit of technology become positive after the experiment. This study recommended stakeholders stay close to teachers so that they could address their perception in integrating technology in teaching and help them to improve the quality of teaching and learning by integrating technology. Technology integration requires support from administrators so that teachers have a person they can discuss their problems with.

Technology integration is influenced by several factors that impact the effective use for technology in the classroom. Liu, et al., (2017) investigated a model of classroom technology integration in K-12 schools. They collected data from 1,235 K-12 teachers from 336 schools in Florida. The study showed that the more teachers have technology experience, the more they integrate it in the classroom. Additionally, they found that technology integration in the classroom increased with availability of quality support; access to technology in the classroom is another important role in the technology integration in the classroom.

Learning Management System in Educational Settings

Learning Management System (LMS) is software that educators can use to support learning and by combining online learning with face-to-face instruction, which is called blended learning or using it for completely online learning. It allows students to access the courses information at anytime and anywhere (Asiri, Mahmud, Abu Bakar, & Mohd Ayub, 2012). LMS has features that makes it easy for users to access the course content. LMS is an educational

innovation that has seen increased usage in many educational institutions. The use of LMS has increased in higher education (Alahmari, & Amirault, 2017; Holmes, & Prieto-Rodriguez, 2018; Klobas, & McGill, 2010; Rucker & Downey, 2016) and is growing in K-12 education (De Smet et al., 2016; Dittoe, 2018; Jones, 2015; Parcell 2017). LMS used in online and blended learning instruction and adopted in secondary schools is a way to support distance learning and face-to-face learning (Picciano & Seaman, 2009; Pynoo et al., 2011).

LMS programs used in educational setting have various names such as Virtual Learning Environments, Digital Learning Environments, Course Management Systems, or Electronic Learning Environments (De Smet et al., 2012). Educational institutions focus on the software quality that support students learning (Ryan, Tyoe, Charron, & Park, 2012) and use different kinds of LMS such as Blackboard, Canvas, Moodle, and Classera. LMS companies usually add features and new updates to the software to stay updated with new features.

The Advantage of LMS in Teaching and Learning

Teaching and learning using LMS is a new way that became used after the diffusion of the Internet and web-based learning. Studies found that LMS has advantages for the teaching and learning process and promotes effective teaching (Alghamdi & Bayaga, 2016), ease and comfort of use (De Smet, Bourgonjon, De Wever, Schellens, & Valcke, 2012; Dittoe, 2018), helps administrators to meet their educational technology goal (Jones, 2015), and has an advantage in collaborative learning (Papadakis, Dovros, Paschalis, & Rossiou, 2012).

Klobas and McGill (2010) conducted a quantitative study on instructors' and students' involvement in LMS success. The researchers gathered data by questionnaire from students enrolled in an Australian university. The researchers found that instructors' and students' participation in integrating LMS, such as downloading materials, submitting assignments, and

doing tests plays an important role in LMS success; that is, when students participate more in with LMS for the course offering, students report that they received stronger benefits from using LMS. Additionally, students received more benefits from LMS because instructors' using LMS plays an important role in encouraging students to use LMS and guiding them to use it appropriately (Klobas & McGill, 2010).

One of the most important features is students can submit electronic homework. A study conducted by Smolira (2008) examined student perceptions concerning online homework assignments for undergraduate students in a finance class. Students preferred online assignments to traditional homework assignments that were turned in to the instructor. Students explained that the online homework assignment increased their understanding of the course material. Graduate students have a higher level of satisfaction with online homework submission than undergraduate students. However, this study is contrary to Hallatt, Huss, Unsbee, Al-Bataineh, and Chumpavan (2017), who examined the rate of homework completion by the use of digital completion versus digital submission for 6^{th} – 12^{th} grade students. The researchers presented digital submission as an optional format. The researchers found a significant decrease in digital submission than in traditional submission. Hallatt et al. (2017) did not consider students' socio-economic level, Internet access, or power outages to explain more about students' information in the study results, which might affect their using of digital submission.

Another advantage of LMS in education is students' engagement during online interaction. There are several tasks that students are required to do through LMS as online work. Online learning helps students to learn and achieve more than traditional learning (Dixson, 2010). Louwrens and Hartnett (2015) studied students' interactions with online learning through an LMS. The study was conducted on online middle school students in New Zealand through

interviewing students and teachers, transcripts from online asynchronous discussion, and statistical data from the LMS. The study found that students were engaged behaviorally through the requirement activities, cognitively through teachers' feedback, and socially through students' interest on the activities. Additionally, students were engaged emotionally through the design and facilitation of the activities. Students engaged in online tasks that used ICT integration in comparison to their other tasks and activities (Jogezai, Ismail, & Baloch, 2018). Therefore, designing courses in LMS needs to include more interactive activities that engage student learning.

Flipped classroom is a term sometimes used for blended learning through LMS (Gough, DeJong, Grundmeye, & Baron, 2017). Many advantages of using LMS in traditional face-to-face learning were found in the Gough et al. (2017) study. The researchers in this study investigated K-12 teachers' perceptions on using flipped classroom as a blended learning method. The participants were 44 teachers in a K-12 public school in Minnesota in the United States. Teachers explained advantages of the flipped classroom through LMS, such as helping absent students, helping with active learning, increasing time by adding various learning activities in the classroom, advantages for struggle students who could re-watch recorded lessons, and increased interaction between students and teacher. However, teachers recommended considering the need for accessibility in the blended learning flipped classrooms because of the technological requirements. Although the researchers found that blended learning in LMS can increase time for active learning, teachers should understand that it may not increase students' learning (Gough et al., 2017).

Research on CBAM for Technology Implementation

Various studies have been conducted on technology as an innovation through the use of CBAM. Stage of Concern (SoC) is one of the CBAM dimensions that examines teachers' level of concern to adopt innovation. Most of the studies were in higher education (Fontenot, 2012; Gasaymeh, 2017; Hwu, 2011; Matar, 2017; Omar, 2016; Song, Wang, & Lui, 2011) while other studies were in K-12 education (Alenezi, 2015; Al-Shabatat, 2014; Asiri, 2019; Barri, 2013; Sarfo, Amankwah, Baafi-Frimpong, & Asomani, 2017; Somera, 2018; Wang, 2013; Yoon & Kang, 2018). Research also was conducted in qualitative methods (Al-Shabatat, 2014; Hamilton, 2014; Somera, 2018; Washington, 2017), quantitative methods (Al-Rawajfih, Fong, and Idros, 2010; Al-Shabatat, 2014; Lochner et al., 2016), and in mixed methods (Jogezai, Ismail, & Baloch, 2018; Walker, 2017). All this research contributed to the knowledge of the teachers' level of concerns when adopting an innovation. This research also showed that CBAM (Hall, et al., 1979; Hall & Hord, 2015) is an effective model that identifies and addresses issues and teachers' concerns when implementing an innovation and promote teachers' professional development. Researchers around the world used SoC to investigate the level of concerns that teachers might have when adopting innovation. In the United States, for example, Walker (2017) conducted a mixed method study to examine the behaviors and concerns of K-12 teachers in Georgia regarding the transformational change toward implementing blended learning in the classroom. A total of 106 K-12 teachers participated in the study using CBAM to examine their concerns regarding the innovation. The researcher used a mixed method that combined survey with open-ended questions using SoCQ and semi-structured interviews. The result of the quantitative data in this study indicated that teachers were in the early stage of concern and there was a statistically significant relationship between teachers' intensity stage of concern and their

age and number of years implementing blended learning. The qualitative data indicated three concerns, which centered around blended learning resources, school technology, and students' access to technology and WIFI at home (Walker, 2017).

In the Republic of Korea, Yoon and Kang (2018) conducted a quantitative study focused on in-service teachers to examine their concerns regarding app development education. The researchers applied CBAM (Hall, et al., 1979; Hall & Hord, 2015) using SoCQ to collect the data. The participants on this study were 23 teachers who attended a one day training session regarding app development. The result of the teachers' concerns regarding the innovation showed that the teachers' highest relative intensity concern was in stage 0 (unconcerned). The second highest relative intensity concern was in stage 1 (informational). The lowest intensity level of concern was stage 4 (consequence). Researchers also used open ended questions for this study, which indicated that teachers were expecting a benefit for students to implement and develop creative ideas. The participants in this study were only 23 teachers, which is considered a small size of participants, so the result of this study cannot be generalized.

In Jordan, Al-Rawajfih, Fong, and Idros (2010) conducted a quantitative survey study to examine teachers' stages of concerns in Jordan Discovery schools regarding integrating e-learning into their teaching. They used gender and teaching experience as variables. The participants in this study were 350 teachers randomly selected from all secondary Discovery schools in four districts in the capital Amman. The results of this study showed that teachers were predominately at the personal stage. The second most dominate stage was collaboration, and the third most dominate stage was informational. The least dominate concern stage was management. The researchers found that three stages (management, information, and

consequence) have a significant contribution on the variance of e-learning integration of (Al-Rawajfih, Fong, & Idros, 2010).

In South Africa, Gudyanga and Jita (2018) conducted a quantitative study to investigate the concerns of physical science teachers' concerns regarding implementing the curriculum and assessment policy. The participants on this study were 81 physics teachers from 62 schools in a South African district. The results showed that the most dominant concern for teachers was self-concern. The study also found no significant differences between teachers' SoC and their years of experience with the innovation. Although this study did not integrate technology in teaching, results indicated that any program of support offered may result with no significant impact in teachers' stage of concerns shifting.

It is essential that school administrators, leaders, and other change facilitators understand teachers' concerns before implementing an innovation (Hall & Hord, 2015). Thus, CBAM's focus is on the concern as a personal feeling for teachers as they gain experience in the innovation. CBAM is a suitable framework to examine teachers' concerns and how these concerns influence them when implementing innovations.

CBAM Studies in Saudi Arabia

In the context of Saudi Arabia specifically, studies exist related to educational innovation adoption that used CBAM (Hall, et al., 1979; Hall & Hord, 2015) as a theoretical framework in higher education (Al-Sarrani, 2010; Kamal, 2013; Omar, 2016). A few studies used CBAM for K-12 education (Alenezi, 2015; Alharthi, 2017; Asiri, 2019; Barri, 2013). None of these studies examined teachers' concerns in adopting LMS.

An example of using CBAM (Hall, et al., 1979; Hall & Hord, 2015) as a theoretical framework in higher education in Saudi Arabia is a study conducted by Omar (2016). The study

investigated the concerns of the faculty in the nine departments of the College of Education at King Saud University in Saudi Arabia regarding the adoption of online teaching and how the faculty's concerns were related to their professional needs. The study used CBAM as a theoretical framework. The findings were that respondents' SOC 0–2 (unconcerned, informational, and personal) was the highest, with a 96% percent score in stage zero (unconcerned). This means the respondents had little concern about teaching online. Stages 4–6 (consequences, collaboration, and refocusing) were the lowest, with 15 percentile points in stage six (refocusing), which means that the respondents might have been resistant to online teaching.

Faculty in higher education share many cultural features with teachers in K-12 settings. However, teaching in K-12 settings may have many obstacles to integrating technology (Alkahtani, 2017). Additionally, faculty have more experience in teaching with technology since some of them graduated with Master or PhD degree from developed countries that integrated technology in education (Omar, 2016). Moreover, faculty in higher education in Saudi Arabia started earlier in using e-learning (Albalawi, 2007). Therefore, their concerns might be different in adopting e-learning than teachers in middle and secondary schools in Saudi Arabia.

In the K-12 setting, Alenezi (2015) conducted a study using a qualitative method to examine the influences of the mandated presence of ICT in Saudi Arabia's secondary schools. He used CBAM (Hall, et al., 1979; Hall & Hord, 2015) and grounded theory together to explore the ways that make the integration of ICT in Saudi schools strategic. The researcher interviewed 18 teachers from the Northern Border region, among them nine male teachers and nine female teachers in three subjects: mathematics, science, and Arabic. He found that the ICT integration with mandatory use impedes the transition from adopting ICT to implementing ICT within the reform of the overall education. The teachers' level of concerns were informational, personal,

and management. The cultural implementation factors in Saudi Arabia dominate over technical and political factors (Alenezi, 2015). The government mandate directs the teachers' decision to use ICT in a classroom. Alenezi (2015) found that teachers explained that they are successful in teaching without using ICT. Hall and Hord (2015) explained that the innovation implemented by using mandated strategy will work, and it is a successful way only if it is "accompanied by continuing communication, ongoing learning, on-site coaching, and time for implication" (p. 18). This study does not represent all teachers' opinions in Saudi Arabi; however, it gives a sense of how the cultural factors influence people's adoption of innovation. Thus, the change facilitators for the Future Gate LMS initiative should focus on these factors to make it a successful initiative.

Barri (2013) conducted a quantitative study to examine the factors affecting technology implementation in the K-12 classroom in the Medina school district in Saudi Arabia. The researcher used CBAM (Hall, et al., 1979; Hall & Hord, 2015) as a theoretical framework with SoCQ for this study. The study found that teachers were motivated to bring technology into the teaching and learning process. The study also found barriers to technology integration, which were ranked in descending order as "insufficient in-service training, large number of students in the computer lab and learning resources center, poor in-service training, insufficient pre-service training, broken-down technology equipment, lack of teacher time, lack of technology equipment, and old technology equipment" (Hall & Hord, 2015, p. iv). The teachers' concerns based on CBAM in this study were awareness, informational, and personal concerns. The study also found that female teacher self-concerns were significantly higher than male teacher concerns. This study is important in terms of understanding how general education teachers think about integrating technology and implementing the new vision of digitizing learning in Saudi Arabia by 2020.

CBAM and Teachers' Concerns in Adopting LMS

Only a few studies found in the literature considered CBAM (Hall, et al., 1979; Hall & Hord, 2015) and teachers' concerns in adopting LMS in the middle and secondary school settings. This researcher only found two studies that considered LMS using SoC, which are Hadjipavli (2011) and Lochner, et al. (2016). These two studies were in quantitative methods and were in two different countries and different cultures that examined teachers' concerns in adopting LMS. Hadjipavli (2011) conducted a quantitative survey study to examined teachers' concerns regarding LMS in Cyprus secondary schools. The researcher examined 345 teachers and found that the most intense of teachers' concern were in Stages 0 (Unconcerned), 1 (Informational), and 6 (Refocusing). Teachers' prior experience using LMS instruction was the strongest variable associated with teachers' most intense concerns. The significant predictors that could predict the dichotomous outcome of the most intensive concerns of teachers to adopt LMS were age, gender, area content, training on instructional LMS use, and training on using instructional LMS for more than six months. This study focused on teachers in specific areas, and that may not apply to teachers in different areas because of different cultures and educational philosophy.

Lochner, et al. (2016) conducted a quantitative survey study to examine teachers' concerns in adopting LMS. This study examined 206 teachers in a southwestern U.S. state that decided to adopt LMS in secondary schools. The researchers found that the selected demographic variables such as age, gender, teaching experience, degree, grade level and subject taught, and technographic variables such as instructional technology experience, experience with the LMS, type and duration of LMS professional development, and self-reported level of LMS use are significantly associated with the teachers' stages of concern. Stage 0 awareness was the

highest stage of concern for the all participants. There was no significant relationship between age and gender alone and the most intense stage of concern. The result of this study is not applied to other teachers in other locations due to different cultures and attitudes toward technology integration, for schools in other locations might not have technology equipment as the schools in the study. Lochner, et al.'s (2016) study location was in the United States, which has a different education philosophy and different culture.

The Hadjipavli (2011) and Lochner, et al.'s (2016) studies were conducted in different locations, Cyprus and the United States, which are in different education systems, different cultures, and different teachers' levels of concern and attitudes toward integrating technology in education. Although these two research studies found a positive attitude regarding LMS adoption in these two locations, no study have yet examined teachers' concerns in the middle and secondary schools regarding LMS adoption in Saudi Arabia. Additionally, Hadjipavli (2011) and Lochner, et al. (2016) did not examine the relationship between the availability of school technology and Internet in the classroom and teachers' concerns in adopting LMS. Moreover, Hadjipavli (2011) and Lochner, et al. (2016) used quantitative methods in their research study. Therefore, there is a need to conduct a study to examine the Saudi Arabian teachers' concerns regarding adopting Future Gate LMS to determine their level of concerns and address their concerns with their needs of professional development.

Selected Teacher Demographic Characteristics

The recent studies about concerns revealed that there are demographic characteristics of individual are associated with their concerns. However, Hall et al. (1979) did not find demographic variables that related to concerns. Studies in reviewed literature highlighted demographic characteristics variables such as age (Hao & Lee, 2015; Walker, 2017) gender

(Alshammari, 2017; Sarfo et al., 2017), degree (Alshammari, 2017; Gudyanga & Jita, 2018), years of teaching experience (Al-Rawajfih, Fong, & Idros, 2010; Hwu, 2011), subject taught (Hao & Lee, 2015), and grade level (Gabby, Avargil, Herscovitz, & Dori, 2017).

Age

George et al. (2013) argued that the original authors of CBAM did not consider age as a predictive variable for individual adoption of innovation. Other studies also supported this, such as Al-Derbashi and Abed (2017). However, other studies about technologies research in education indicated that age is a predictive variable for adopting innovation (Petherbridge, 2007), and young teachers use and utilize technology more than older teachers (Al-Sarrani, 2010).

Hao and Lee (2015) conducted a quantitative survey research study to investigate the relationship between teachers' concern about integrating Web 2.0 technologies and their characteristics. Participants in the study were 200 middle schools' teachers in Taiwan. The researchers used the Stage of Concern Questionnaire to assess teachers' stage of concern. The results show that teachers' concern regarding age was in stage 6 (refocusing) and researchers found a significant difference in the age group. The post hoc test was conducted, and indicates no significant differences among the age group. The researchers explained that the age may not make a difference to current teachers on the job. They suggest conducting further study with a large size of participants to verify the conclusion (Hao & Lee, 2015).

Gender

Hall, George, and Rutherford, (1977) and George et al. (2013) found that gender was not a predictor of teachers' concerns when adopting an innovation. This finding was supported by other research that found teachers' gender are not predicted variables in technology adoption (Petherbridge, 2007). However, some studies found a statistically significant in gender on several

issues such as attitude toward technologies (Cooper, 2006), technology use (Joiner et al., 2005), technology competency (Whitley, 1997), and other related issues (Huang, Hood, & Yoo, 2013). Moreover, recent studies found that gender plays a role in teachers' adoption of technology (Al-Sarrani, 2010; Omar, 2016).

In the case of education in Saudi Arabia, there is a segregation of gender in schools due to cultural and religious reasons. There are male schools for male teachers, students, and administrators. Female schools are in different buildings for only female teachers, students, and administrators. However, the Ministry of Education made a recent decision to combine kindergarten with early grades classes (1st, 2nd, and 3rd grades), so boys and girls from kindergarten to third grade will study in the female schools and teachers will be female. There is also segregation in the regional departments of education that female administrators are in separate buildings, but the female department is under the general department of education. However, the connection between the two departments is via phones and other technologies such as email. In the recent years, male and female educators gather in conferences and meetings so they can share their presentations and conversations.

The case of gender segregation in schools was hypothesized because of the cultural and religious rule, gender might be a significant influence on teachers' concern in adopting technology. Therefore, it is important to compare how male and female teachers use Future Gate LMS in their teaching process. Past research has shown that female teachers, in general, perceive instructional technology as less useful and more challenging to use, and they have lower behavioral intentions toward using e-learning system than do their male counterparts (Ong & Lai, 2006). However, Al-Shabatat (2014) found that female participants had a positive interest in e-learning, whereas male participants had a negative interest in e-learning. All participants had a

low interest in e-learning compared with other activities. Several studies have examined the gender influence in adopting technology in Saudi Arabia in higher education (Al-Sarrani, 2010; Kamal, 2013; Omar; 2016). For example, Al-Sarrani (2010) examined the concern of the faculty in Taibah University in Saudi Arabia and found a statistically significant difference in the female faculty's concern in adopting blended learning in stage one (Informational) and stage five (Collaboration). Simsim (2011) stated that Internet use has spread more rapidly among males than females. This might lead to a digital divide between the genders when adopting the innovation. Alanazy (2011) explained that there is a gap between male and female education with online interaction in Saudi Arabia because of some social and cultural issues.

A study conducted by Alshammari (2017) investigated the stage of concern of teachers and school principals regarding the implementation of the professional learning community as an innovation in Hail Education Department. The finding of this study shows that there is no statistically significant between teachers' gender and their concerns in adopting innovation.

On the other hand, gender concern in adopting technology in K-12 education in Saudi Arabia were examined by Barri (2013) who found that Saudi female teachers have significantly higher concern than do male teachers in awareness, informational, personal, consequence, collaboration, and refocusing concerns in adopting technology in teaching in K-12 schools in Saudi Arabia.

Overbaugh and Lou (2009) investigated the effect of teachers' gender on their concerns about instructional technology. They found that male and female groups have significant differences on the personal and management stages. The male teachers had a more intensive stage of concern in personal and task concerns than did their female counterparts (Overbaugh & Lou, 2009).

Hao and Lee (2015) found that gender was a factor that showed a difference in concern in stage 0 (awareness) and stage 1 (informational). In these two stages, females had significantly higher intensity of concern than did males. However, in other stages, males and females had similar intensity of concerns.

Sarfo et al. (2017) found a significant difference between teachers' gender and their concern in adopting innovation. Sarfo et al. (2017) investigated teachers' concern regarding the implementation of information and communication technology (ICT) curriculum in schools in Ghana. The number of participants were 346 teachers (181 males and 165 females). The results showed that there is a statistically difference in female teachers' informational, management, consequence, collaboration, and refocusing concerns. This result indicates that female teachers expressed more concerns on adopting innovation than did their male counterparts (Sarfo et al., 2017).

Type of Degree

Type of degree in this study will be the last degree obtained by teachers participating in the study, with three options (Bachelor, Master, and Doctorate). Several studies examined the teacher's degree as a predictive variable on their concerns in adopting technology. Gudyanga and Jita (2018) investigated the relationship between teachers' level of education and their concern in adopting innovation. The researchers conducted a quantitative survey study that studied a group of teachers with certificate/diploma and a university degree. The study showed no statistically significant difference between teachers who have a university degree and those who are without university degree and their concern in adopting innovation. However, teachers who were more educated were less concerned about seeking information about innovation, teachers less educated

scored higher on the refocusing stage, and both groups were equal on the management and collaboration stages of concerns.

Alshammari (2017) investigated the stage of concern of teachers and school principals regarding the implementation of the professional learning community as an innovation in Hail Education Department. The finding of this study shows that there is no statistically significant between teachers' type of degree and their concerns regarding the innovation. Three types of degree were used of this study, which were Bachelor, Masters, and Doctorate degree.

Years of Teaching Experience

Researchers found that years of teaching experience related directly to the factor of teachers' age regarding adoption of innovation and used as an indicator of teachers' attitude regarding adopting the innovation (Adams, 2002; Petherbridge, 2007). Older teachers were less likely to adopt he innovation than younger teachers. Therefore, there is a possible relationship between teachers' concerns in adopting LMS and their experience in teaching**.**

However, other studies found no relationship regarding teachers' experience in adopting technology and their years of teaching experience. Sarfo et al., (2017) examined the relationship between teachers' concerns in adopting innovation and their years of teaching experience. The results showed that there were no statistically significant differences between teachers' teaching experience (1-5 years or 6 years and above) and their concern in adopting ICT curriculum. This study was supported by Gudyanga and Jita (2018), who found no significant differences between teachers' years of teaching experience and their concern in adopting innovation. However, Gudyanga and Jita (2018) made a different group of years of teaching experience than Sarfo et al., (2017), which was under 5, 5 to 10, 11 to 15, 16 to 20, and more than 20 years; the result was

the same, which is no relationship between teachers of teaching experience and their concern in adopting innovation.

A quantitative research study in Saudi Arabia conducted by Alshammari (2017) used SoCQ to investigate the stage of concern of teachers and school principals regarding the implementation of the professional learning community as an innovation in Hail Education Department. The finding of this study shows that there is no statistically significant difference between teachers' years of teaching experience and their concerns regarding innovation. The years of teaching experience in this study was less than five years, five to ten years, and more than ten years.

Walker (2017) conducted a mixed method study to investigate teachers' concerns toward implementing blended learning. The participants were classified into four groups: 0-5, 6-10, 11-20, or 20 or more. She found no statistically significant difference between teachers' years of teaching experience and their concern in adopting the innovation.

However, other studies found that teaching experience had a significant difference in adopting innovation (Al-Rawajfih, Fong, & Idros, 2010; Hwu, 2011). Al-Rawajfih, Fong, and Idros (2010) examined teachers' stage of concerns on their years of teaching experience on adopting e-learning integration. The participants were 350 teachers from Jordan Discovery schools in the secondary school level. Although the study found that the largest stage of concern was the personal stage (6 or more), teaching from 1 to 5 years was placed at the collaboration stage. Al-Rawajfih, Fong, and Idros (2010) indicated that there is a connection between the results and the self-efficacy of e-learning integration among teachers that have different of years of teaching experience. Accordingly, experienced teachers lagged behind younger teachers in the e-learning integration.

Hwu (2011) did a mixed method study that aimed to explore educators' concerns in adopting innovation and their needs for professional development. His quantitative measure had 253 participants. He found a statistically significant difference between their concerns in adopting innovation and their years of teaching experience. However, no data found in this study indicated if the years of teaching experience increased or decreased their concerns in adopting innovation. This study was for higher education, so further studies need to be conducted on K-12 education.

A few studies investigated the years of teaching experience and its relationship to teachers' concerns in adopting innovation in higher education in Saudi Arabia (Al Sarrani, 2010; Omar, 2016). There is a need to investigate this variable for Saudi Arabian teachers in middle and secondary schools.

Alenezi (2015) did a qualitative study that showed teachers who had many years of teaching experience claimed they were successful without using ICT applications. Hence, years of teaching experience need more investigation to examine its relationship regarding teachers' concerns in adopting Future Gate LMS.

Grade Level

Several studies examined the grade level of teaching and the technology integration; however, most of these studies did not examine the relationship between the grade level and teachers' stage of concern. Barron, Kemker, Harmes, and Kalaydjian, (2003) found that middle school teachers are more likely to use computers in teaching than high school teachers.

Gough et al. (2017) examined K-12 teachers' grade level and their perceptions regarding the flipped classroom model for teaching and learning. The participants on the survey included 27 high school teachers and15 middle school teachers. The result shows that middle school

teachers agreed significantly that flipped classrooms are difficult for some students to access because they are required to use additional technology outside the school.

In Saudi Arabia, a study conducted by Alshammari, (2017) used SoCQ to investigate the stage of concern of teachers and school principals regarding the implementation of the professional learning community as an innovation in Hail Education Department. The finding of this study shows that there was no statistical significance between teachers' grade level and their concerns regarding the innovation. The grade levels of this study were elementary school, middle school, and high school.

Subject Area Taught

The subject area was investigated to find its relationship to teachers' technology integration. Barron et al. (2003) found that teachers who used computers in research for students are 51% science teachers, 44% social science teachers, 30% English teachers, and 24% math teachers. Recent studies also investigated grade level on teachers' perception regarding the innovation. Gough et al. (2017) did not indicate a significant difference in the math teachers or other teachers' perceptions in any of the flipped classroom areas that the researchers examined.

Hao and Lee (2015) examined the relationship between the subject taught and teachers' concerns in adopting Web 2.0. They divided the subject taught into science (including natural sciences, applied sciences, and computer technology) and non-science areas (including social studies, liberal arts, music, and arts). The results showed a concern difference in stage 3 (management). Science teachers' intensity of concerns were significantly higher than non-science teachers.

Selected Teacher Technographic Characteristics

Technographic characteristics are related to demographic characteristics, but are about personal technology-related demographics (Mitra, Joshi, Kemper, Woods, & Gobble, 2006). The selected technographic characteristics in this study will be teachers' experience with using instructional technology, type and duration of professional development received in using LMS and instructional technology.

Experience with Using Instructional Technology

The experience with instructional technology in this study reveals teachers' experience in using any technology for instructional purposes. Studies found that the more teachers have technology experience, the more they integrate it in the classroom (Alshmrany & Wilkinson, 2017; Liu, et al., 2017). Jimoyiannis, Tsiotakis, Roussinos, and Siorenta (2013) conducted a quantitative study to prepare teachers regarding integrating Web 2.0 in school practice. The result shows that 87% of the teachers reported that they already had the necessary skills for using Web 2.0 and searching information for their instructional needs.

Aziz (2017) investigated ESL teachers' concerns in adopting technology. While the teachers' highest level of intensity was in the self-concern stage, there was no significant effect found between years of adopting technology experience in ESL and their scores on all levels of concern (Aziz, 2017).

Alfieri (1998) found that no significant difference existed between teachers who have technology based-experience and teachers who are without. The same result was found by Aziz (2008) as it showed no significant effect on teachers' years of experience in using technology on their level of concern. Hwu (2011) conducted a study to examine faculty concerns in adopting online learning. He found that no statistical difference existed between faculty using technology

in teaching and their prior use of instructional technology. However, recent studies, such as Omar (2016) and Walker (2017) showed that there is a relationship between teachers' intensity of concerns and their experience in using technology.

Walker (2017) investigated the concerns of K-12 teachers regarding implementing blended learning in the classroom. She found that teachers were in early stage of concern and there was a significant relationship between the most intensive stage of concern and number of years implementing blended learning. The participants who utilized the innovation were 17% never, 16% for 1 year, 21.7% for 2 years, 17.9% for 3 years, 6.6% for 4 years, and 20.8% for 5 or more years in implementing the innovation.

Duration of LMS Related to Professional Development

Professional development plays a role in teachers' concerns in adopting innovation since it reflects on their knowledge on practicing technology in the teaching and learning process. While there are different types of professional development duration, Liu, Ko, Willmann, and Fickert (2018) suggested that the duration of professional development needs to be more than one year to see significant change. Several studies addressed the relationship between professional development and teachers' concerns on adopting innovation. Sanders and Ngxola, (2009) examined the concerns of teachers based on the length of the professional development. The researchers found differences between concerns in the duration of workshop in the group teachers that attended a workshop in one day, and the concern was far more than the group of teachers that attended three days of workshop and those who attend a one-day fieldtrip. The highest intensity of concern in this group (one-day workshop) was informational and personal self-concern (Sanders & Ngxola, 2009).

Type of Professional Development

Teachers' concerns toward adopting innovation is influenced by the type of professional development that they get. Hall and Hord (2015) indicated that the type of professional development influences teachers' concerns and it helps them to address their concerns in adopting innovations. Teachers' attitudes can change when attending professional development sessions that help teachers to adopt innovation. Owston, Singlair, and Wideman (2008) conducted a study to examine two one-year professional development programs that were designed for mathematics and science/technology teachers in middle school. The teachers included 68 in mathematics and 65 in science/technology. The researchers found that teachers had a higher level of satisfaction from the professional development program and had a positive attitude and were motivated to transform their classes. The most satisfaction for the professional development program were in the face-to-face sessions, with mixed feelings in satisfaction with online component. However, all participants in this study were from urban schools, so teachers' perceptions in rural areas may be different and should be considered.

Papadakis, et al. (2012) conducted a mixed-method study to investigate teachers' initial perceptions about the integration of Learning Activity Management System (LAMS) in the educational praxis. The researchers designed two tutorial workshops with 46 educators from urban areas. The study found a positive attitude toward the LAMS workshop.

Teachers' level of concerns may change based on the type of the professional development that they received such as a theoretical seminar and practice-based workshop. A quasi-experimental study conducted by Dobbs (2004) investigated the differences in stages of concerns in 27 administrators and faculty in distance training. They were divided into four groups, in which the first group received only-classroom training. The second group received

classroom and laboratory training, and the third group, which was the control group, received no training at all. The finding of this pretest and posttest study showed that combining classroom and laboratory training helped participants to move from an early stage of concern to a higher stage (impact). The results support the classroom and laboratory training; however, the results cannot be generalized since the sample size was small (only 27 participants). Additionally, this study was for faculty and teachers in higher education. The relationship between the type of professional development and teachers' concerns in adopting LMS need to be investigated in K-12 education.

Facilitators and administrators who are leading the transformation to digital learning should investigate and identify teachers' concerns in adopting innovation. Research that used CBAM (Hall, et al., 1979; Hall & Hord, 2015) to examine teachers' level of concerns will guide educators to develop and design professional development programs based on concerns about adopting innovation.

Technology in the Classroom

School environment plays an important role when integrating technology in the classroom. Technology in the classroom in this research means the type of technology that is available in the classroom, such as computers, laptops, projectors, Smartboards, or any other technology that can be used for LMS in the classroom. Some schools lack technology equipment while others have broken-down technology equipment that impacts the ability of teachers integrate technology and their concerns in adopting it (Barri, 2013). A quantitative survey study conducted by Alkahtani (2009) showed that one issue that impacts technology integration in the classroom is a lack of modern equipment and facilities in classrooms. Leung, Watters, and Ginns

(2005) indicated factors stood in the way of teachers to use ICT in their teaching; one of these factors was shortages of school computers, computer-based equipment, and computer software.

Availability of up-to-date technology helps teachers to focus on using instead of fixing equipment when integrating technology in the classroom. Alkahtani (2017) conducted a mixed methods study to investigate the challenges that facing the integration of ICT in teaching in Saudi secondary schools. Teachers in the study explained major problems that hinder their successful integration of technology in the schools such as equipment maintenance and lack of resources.

Internet Access in Schools

Internet access is important especially when using LMS in the classroom, so when the Internet signal is weak that has an effect on the class activities and wastes class time. Alshmrany and Wilkinson (2017) examined the adoption of ICT by teachers in Saudi elementary schools. They used mixed methods to identify the factors, and one of those was that the majority of teachers (75%) did not have a computer or Internet access in the classroom for educational purposes, which are essential for computers or laptops.

In using LMS platforms in Saudi Arabia, Alahmari, and Kyei-Blankson (2018) conducted a quantitative survey study that compared teachers' experience in using Classera as LMS in K-12 public and private schools. One of the major issues that the researchers found was that public schools have limited Internet access. This study surveyed 288 teachers, 86 from public schools and 202 from private schools, as Classera LMS was used more in private schools than in public schools. After implementing Future Gate LMS in public schools, this research will investigate the Internet access in schools and its relationship to teachers' concerns in adopting Future Gate LMS.

The Impetus for Integrating LMS Platforms in Saudi Arabia Schools

Many factors led to the Ministry of Education's decision to digitize learning in K–12 schools. First, the government of Saudi Arabia has been interested in developing education since the establishment of the Kingdom in 1932 (Albalawi, 2007; see Appendix O). This became clear when King Abdulaziz, the founder of Saudi Arabia, decided to make public and higher education free for everyone (Baki, 2004). The Ministry of Education in Saudi Arabia was established in 1954 and is funded by the government (Ministry of Education, 2020b), and educators have embraced emerging state-of-the-art technologies to develop education in Saudi Arabia. The diffusion of the Internet has made it possible to create new methods for delivering information to students. The Ministry of Education receives support from the government to implement policies to develop education along with technological improvements. For example, the government spent 9 billion Saudi riyals (around $2.5 billion USD) for the King Abdullah bin Abdulaziz Public Education Developing Tatweer for the years 2007–2013 (Kamal, 2013), and it has allocated 2.6 billion Saudi riyals (around $700 million USD) for 2017-2020 to help digitize education (Future Gate [FutureGate_sa], 2017). The support of education from the Saudi government will help to develop the education system and integrate technology to support the learning process.

The second factor is that the diffusion of the Internet throughout the country has led the Ministry of Education to create new policies and initiatives to improve education. Table 2.3 shows how Internet subscriptions and use have increased greatly since 2000. For example, there were 200,000 Internet users in 2000 and 20,813,695 in 2016. In that time frame, the country's population increased by roughly 10.5 million, from 21,624,422 to 32,157,974 (Saudi Arabia Internet Usage and Telecommunications Report, n.d.). This rapid increase in the number of

school-age students and number of Internet users has convinced the Ministry of Education to use technology to develop education in the country.

Table 2.3
Internet Growth and Population Statistics in the KSA

Year	Users	Population	% Pop.
2000	200,000	21,624,422	0.9%
2003	1,500,000	21,771,609	6.9%
2005	2,540,000	23,595,634	10.8%
2007	4,700,000	24,069,943	19.5%
2009	7,761,800	28,686,633	27.1%
2010	9,800,000	25,731,776	38.1%
2012	13,000,000	26,534,504	49.0%
2016	20,813,695	32,157,974	64.7%

Source : http://www.Internetworldstats.com/me/sa.htm

A report from the Ministry of Communications and Information Technology showed that in the second quarter of 2017, the number of mobile subscriptions was about 43.63 million, with a population penetration rate of 137%, and the number of Internet users reached 24.1 million. Internet use increased from 54% in 2012 to 76% at the end of Q2-2017 (Ministry of Communication and Information Technology, 2017). Due to the popularity of social networking applications and smart devices, the demand for Internet service is expected to continue to increase steadily. This is because of the considerable expansion in utilizing mobile devices in Saudi Arabia (Alharbi, Alotebi, Masmali, & Alreshidi, (2017).

Based on the historical development of educational technology in Saudi Arabia and the statistics in Table 2.3 and the ICT sector indicator, it is clearly time to integrate technology and use it in LMS platform in K–12 schools in Saudi Arabia. The enrollment in K–12 schools is 7,277,317 students, which is about 22.62% of the population (Ministry of Education, 2016). The new generation of students are called “digital natives” (Prensky, 2001) because they have had

access to information technology from a very young age and are ready to study courses with integrating technology and utilizing LMS platform (Roehl, Reddy, & Shannon, 2013).

These new policies of integrating digital learning by 2020 come from the 2030 vision that was launched by a new young leader in the Saudi Arabian government: 34-year-old Crown Prince Mohammed bin Salman (Hennessy-Fiske, 2017). Prince Mohammed bin Salman launched 2030 vision in 2016 for developing the country, which was preceded with a short plan for digital shifting called the Saudi Arabian Vision 2030, which includes the National Transformation Plan 2020 (Thompson, 2017; Vision 2030). Many sectors in the government have a plan for 2020 to help them achieve Vision 2030 including the Ministry of Education. It is an opportunity to develop public education in Saudi Arabia through the recent renaissance witnessed by the Kingdom of Saudi Arabia during this period.

Barriers to Achieving the Goal of 2020 Transformation to a Digital Learning Program

Before explaining the barriers that might affect achieving the 2020 vision goal, it is necessary to explain the diffusion of innovation (DOI) theory published by Rogers in 1962 (Chang, 2010). When people are presented with a new technology, they undergo the process of deciding whether to adopt it, which includes gathering information about the innovation, testing the innovation, and evaluating whether the innovation deserves to be adopted (Rogers, 2003). Rogers's DOI was intended for individuals and organizations. The definition of diffusion is the "process in which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5). The innovation can be defined as "an idea, practice, or project that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p. 11). When an individual considers the idea to be new, it is an innovation. Rogers defined the main DOI concept as the slow adoption of the new idea during the early stages of the

diffusion. Early adopters obtain an advantage and share their experience about the innovation to potential adopters. The four elements in DOI are innovation, communication channels, time, and social system. The social system was classified by Rogers (2003) as adopter categories, or "the classifications of members of a social system on the basis of innovativeness, the degree to which an individual or another unit of adoption is relatively earlier in adopting new ideas than other members of a system" (pp. 268–269). Rogers noted five categories by which innovation gets adopted over time: innovators, early adopters, early majority, late majority, and laggards. These categories, as shown in Figure 2, shape a normal adoption distribution.

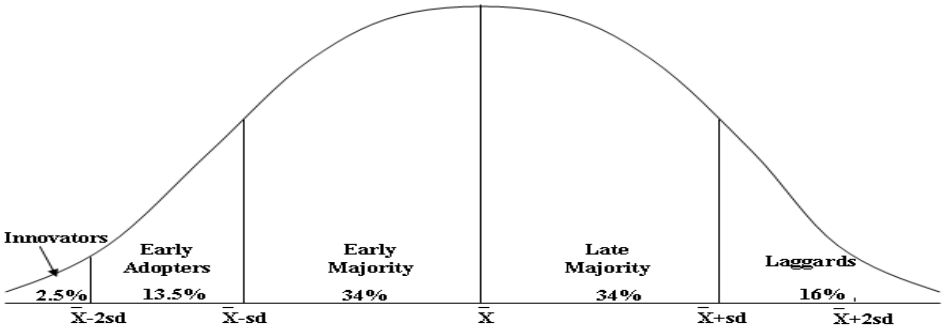

Figure 2.2 Adopter categorization on the basis of innovativeness (source: Rogers, 2003, p. 551). Diffusion of Innovations. New York: The Free Press

The development of education in Saudi Arabia has faced many challenges, including the decision in 1959 allowing women to attend schools (Al Rawaf & Simmons, 1991). Adopting innovation depends on the social system, which either accepts or rejects the innovation, and that decision can take a long time (Rogers, 2003). It is important to understand that societies may adopt the innovation or reject it based on Rogers's theory. Since the beginning of public education in 1924 in Saudi Arabia, many types of technological equipment, such as television, radio, and computers, have been introduced to schools and were adopted by both educators and people in the country (Almogbel, 2002). Hence, there are some factors that should be considered when planning to adopt an innovation. DOI theory can help with understanding how people in

Saudi Arabia have adopted an innovation in the past, and it can illuminate the cultural challenges policymakers face.

The first challenge to achieving the 2020 goal is access to the Internet inside and outside of school. Rogers (2003) explained how people can take time to access the innovation and how the S curve shapes people's decision to adopt it. As discussed above, the diffusion of the Internet increased rapidly between 2000 and 2016, but many public schools still lack Internet service (Alahmari & Kyei-Blankson, 2018). This may cause a digital divide because some schools will have an excellent Internet connection, whereas others will not (Alahmari & Kyei-Blankson, 2018; Napoli & Obar, 2014), and that will affect implementing digitized learning projects. However, the Ministry of Education has partnered with companies such as Saudi Telecom Company (STC) to provide Internet to all schools through the 2020 digital transformation plan (Ministry of Education, 2017b).

The second barrier to achieving the goal of the 2020 digital learning transformation is gender: schools in Saudi Arabia are separated by sex at all education levels, except in some medical classes, for cultural and religious reasons. Because Internet adoption spread more rapidly among males than females (Simsim, 2011), this might lead to a digital divide between the genders when adopting the innovation. However, evidence shows that women overcame other obstacles once they were officially allowed to attend schools in 1959 (Al Rawaf & Simmons, 1991). This researcher finds it inspiring that women are ready to become leaders in technology and increase their ability to use the Internet and technology. This is supported by Al-Shabatat (2014), who found female teachers have positive concerns towards e-learning and they are more interested in e-learning than are male teachers. It is important to uncover female teachers'

concerns toward adopting the 2020 digital learning transformation plan with regard to using Learning Management System platforms.

The third challenge to achieving the goal of the 2020 transformation program is teachers' ages. There are many older teachers who might reject the LMS platform. Simsim's study indicated that Internet adoption spread more rapidly among younger people in Saudi Arabia (Simsim, 2011). Furthermore, it is hard to persuade some later career teachers, or as Snyder (2017) called them "veteran teachers", to change their methods of teaching because they are frustrated with the increase of changing curriculum and increasing of using technology (Snyder, 2017).

The fourth challenge is that many schools are not ready to implement the 2020 vision project. Teaching with using LMS platforms and other related technologies requires that classes have technological equipment inside the classroom. The diffusion of technologies has spread through schools in Saudi Arabia; however, most schools and classrooms lack educational technology equipment, and there are schools in rented houses that were not designed to be schools (Alkahtani, 2017). However, some educational departments launched initiatives regarding the issue of schools in rented buildings, such as the initiative made by the General Department of Education in Jazan Region which calls for Jazan schools not in rented buildings by 2023 (Sabq, 2018).

Finally, teachers' professional development is a major challenge that the Ministry of Education should consider. Prior to the establishment of formal education in Saudi Arabia, teachers used basic instructional materials such as wood slates and natural limestone to write, but teachers' performance was developed during the stages of developing of education because of training (Al Thowaini, 2015). When teachers are provided with new instructional materials, they

need to be trained on their use. The Ministry of Education started offering professional development programs for teachers in schools that will adopt the project, and it announced that it had already trained 5,255 employees for the first year, including school supervisors, school leaders, and teachers (Ministry of Education, 2017b). However, the desire of teachers to adopt an innovation is an important first step before implementing training on utilizing the innovation and whether schools will adopt or reject the new project.

Studies Regarding the Need for LMS for Learning in Saudi Arabia

Most of the studies conducted on integrating LMS in Saudi Arabia have focused on higher education (Alharbi & Drew, 2014; Alenezi, 2018; Asiri, et al., 2012; Binyamin, Rutter, & Smith, 2017; Hussein, 2011; Khan, 2018); however, other studies have looked at K–12 settings. Alahmari and Kyei-Blankson (2018) compared teachers' experiences using the learning management system Classera by surveying 288 teachers, 86 from public school and 202 from private schools. The researchers explained that the large number of private school participants was because Classera is used more in private schools than in public schools. Ultimately, the study found that teachers have had positive experiences using Classera and showed that teachers who adopted LMS agreed that it helped them in their teaching. However, the study also found that public schools have limited Internet access, and their teachers have less training compared with teachers in private schools, which means the new 2020 plan will help public schools acquire the technology to use LMS.

Al-Madani (2015) conducted a study in a Saudi Arabian elementary school to investigate the effect of blended learning on fifth grade students' academic achievements and their verbal critical thinking, compared to traditional face-to-face learning. In this study, 49 students participated: 25 male students as an experimental group that learn through blended learning

approach and 24 female students as a control group that learn through traditional learning approach. The researcher found a statistical significance ($\alpha \leq 0.05$) between the groups' mean scores in achievement posttest and verbal creative thinking on the post application test. The researcher found that the experimental group outperformed the control group in both tests. The researcher concluded that the study improved students' verbal creative thinking. This study recommended the adoption of blended learning, and it is a good resource for those who want to see the effect of using LMS to adopt blended learning on elementary school students' academic achievement. However, the researcher did not explain the LMS platform that he used to conduct the study.

Using Web 2.0 applications is essential when teaching with using learning management system. Bingimlas (2017) studied teachers' perceptions of using Web 2.0 applications in K–12 schools in Saudi Arabia and surveyed 352 teachers from K–12 schools. Bingimlas found that the teachers were familiar with Web 2.0 applications but rarely used them in their classrooms because of obstacles such as the large number of students, the lack of Internet access in the classroom, and unclear guidance on using web 2.0 in the classroom. Bingimlas (2017) further explained that teachers' responses varied according to gender, teaching level, and specialty. Because teachers' perceptions in this study were positive, utilizing Web 2.0 applications as an LMS would improve learning outcomes.

Contribution to the Study

The aim of this sequential explanatory mixed-methods study was to examine the concerns of Saudi Arabian teachers in adopting Future Gate LMS. To date, research exploring the Transformation to Digital Learning 2020 through adopting Future Gate and Saudi Arabian 7-12 grade teachers' concerns about adopting Future Gate LMS are lacking. Studies that used CBAM

(Hall, et al., 1979; Hall & Hord, 2015) as a theoretical framework to examine the concerns of Saudi Arabian teachers were predominantly about technology integration. Globally, there are two studies that addressed teachers' concerns regarding adopting LMS. However, this study will use sequential explanatory mixed-methods to examine 7-12 grade teachers' concerns in Saudi Arabia, which has a different educational system and different culture.

In addition, this research examined the relationship between teachers' level of concern and school availability of technology and Internet service at selected schools. This gap was noted through the literature review in this research and identifies the need to investigate all aspects that affect teachers' concerns to utilize an innovation. As such, this research focused on schools in Saudi Arabia that implemented Future Gate LMS in the middle and secondary schools from the first phase, second phase, and the beginning of the third phase of the implementation. Therefore, this research promises to add an important finding contributing to the Transformation to Digital Learning 2020 and the field of educational technology in the Kingdom of Saudi Arabia.

Summary

Chapter 2 provided a literature review of research on technology integration, particularly in adopting LMS. The researcher organized topics and subtopics that relate to the research questions. CBAM (Hall, et al., 1979; Hall & Hord, 2015) was explained as a theoretical framework that will guide this research. Studies that are related to technology integration, as well as studies in CBAM that related to the topic, were presented and discussed. This chapter also overviewed studies that used CBAM to find out the relationship between the innovation concerns and teachers' demographic variables, technographic variables, and instructional technology in the classroom. It was essential to discuss teachers' concerns regarding technology adoption in K-12 education generally and particular in K-12 education in Saudi Arabia.

Chapter 3 addresses the methodology of the research and the research design. It also includes a detailed discussion of the selected population, the method of data collection, data analysis, and ethical considerations.

Chapter 3 - Methodology

Introduction

A Learning Management System (LMS) is a software program that is used to support the learning process. This explanatory sequential mixed-methods study examined the level of concerns of teachers who are required to implement Future Gate LMS in middle and secondary schools in Saudi Arabia. Mixed-methods is a procedure that collects and analyzes data through mixing quantitative and qualitative methods to gain a deeper understanding of the research problem (Creswell, 2014). Accordingly, researchers can analyze more complicated research questions through mixed-methods by collecting stronger evidence than what occurs when conducting a single method alone. There are three basic types of mixed-method design: (1) convergent parallel mixed-methods, (2) explanatory sequential mixed-methods, and (3) exploratory sequential mixed-methods (Creswell, 2014). This research used an explanatory sequential mixed-method. The rational for conducting explanatory sequential mixed method research as noted by Creswell and Plano Clark (2011) is that it provides a better understanding of the research problem. Accordingly, the qualitative data explains the statistical results by exploring the in-depth views of participants.

The explanatory sequential design starts by analyzing data from a quantitative method followed by conducting qualitative research that explains the results from quantitative research (Creswell, 2014; Creswell & Plano Clark, 2017). This research used two data sets to answer the research questions, which are the Stage of Concern Questionnaire (SoCQ; George et al., 2013) and open-ended question at the end of the survey, which followed by semi-structured interviews that conducted with a random sampling of the participants. The questionnaire provided primary data gathered from participants; further explanation will come from the questionnaire by

interviews. The researcher used triangulation of the data through the mixed method of quantitative and qualitative methods in order to obtain different data on the same phenomenon (Creswell, 2014; Creswell & Plano Clark, 2017). Conducting this research by using a survey and a semi-structured interview provided triangulation of the data. The SoCQ (George et al., 2013) provided a foundation for the quantitative result and was the framework for the interview in the qualitative section.

The Concern Based Adoption Model (CBAM) (Hall, et al., 1979; Hall & Hord, 2015) was used as a theoretical framework to examine the personal element of change; it determined the individual differences in the level of concerns related to implementing the new program (Hall & Hord, 2015). This framework allowed an exploration of teacher concerns and, therefore, provide them with aid and support when implementing Future Gate LMS.

The organization of the chapter is as follows: first, the research design was discussed, then a description of the population being studied was presented, and finally, the procedures that was used to collect and analyze the data was examined.

Purpose of the Research

The purpose of this explanatory sequential mixed-methods research study is to examine the concerns of middle and secondary school teachers regarding adopting Future Gate LMS as innovative digital learning in Saudi Arabian schools. The goal of the research study is to understand teachers' concerns and their needs for improving their skills in order to fully integrate Future Gate LMS in the learning process. The Ministry of Education in Saudi Arabia started implementing the transformation to a digital learning program in a limited number of schools, and following that, the program will be implemented in all middle and secondary public schools. This research's examination of teachers' concerns in the schools that were selected to implement

the program will address this goal. This research will utilize CBAM (Hall, et al., 1979; Hall & Hord, 2015) along with open-ended questions on SoCQ (George et al., 2013) and semi-structured interviews for collecting and analyzing data.

Research Questions

This study was designed to investigate the concerns of middle and secondary teachers in schools that implemented Future Gate LMS in Saudi Arabia regarding their adoption. Five research questions will guide the study.

Research Question #1: What is the most intense stage of concern of middle and secondary grade teachers in Saudi Arabia about the learning management system adoption, as measured by the stages of concerns questionnaire (SoCQ)?

Ho 1. The most intense stage of concern of middle and secondary grade teachers in Saudi Arabia about the Future Gate LMS adoption, as measured by the stages of concern questionnaire (SoCQ), is not the personal stage.

Research Question #2: What is the relationship between middle and secondary grade teachers' demographic characteristics (gender, age, years of teaching experience, grade level, subject taught, and type of degree) and their concerns in adopting Future Gate LMS?

Ho 2.1. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' gender.

Ho 2.2. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' age.

Ho 2.3. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' years of teaching experience.

Ho 2.4. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' grade level.

Ho 2.5. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' subject taught.

Ho 2.6. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' type of degree.

Research Question #3: What type of relationship exists between middle and secondary grade teachers' technographic characteristics (prior experience with instructional technology use, type of professional development in instructional technology use, duration of instructional technology related professional development, type of professional development in LMS use, and duration of LMS-related professional development) and their concerns in adopting Future Gate LMS?

Ho 3.1. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by teachers' prior experience with instructional technology use.

Ho 3.2. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by the type of professional development in instructional technology use.

Ho 3.3. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by duration of instructional technology related professional development.

Ho 3.4. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by the type of professional development in LMS use.

Ho 3.5. There are no statistically significant differences in middle and secondary grade teachers' concerns in adopting Future Gate LMS by duration of LMS-related professional development.

Research Question #4: Is there any relationship between teachers' concerns in adopting Future Gate LMS and the school technology (technology in the classroom and Internet access in the classroom)?

Ho 4.1. There are no statistically significant differences in middle secondary grade teachers' concerns in adopting Future Gate LMS by the technology in the classroom.

Ho 4.2. There are no statistically significant differences in middle secondary grade teachers' concerns in adopting Future Gate LMS by the Internet access in the classroom.

Research Question #5: What are the top three concerns of teachers that are related to implementing Future Gate LMS?

Method

A sequential explanatory mixed-methods (Creswell, 2014) research was employed to determine middle and secondary school teachers' concerns regarding implementing Future Gate LMS. In designing sequential explanatory mixed-methods, researchers collect and analyze quantitative data first, and after that, they collect and analyze qualitative data (Creswell, 2014; Creswell & Plano Clark, 2017). In this case, the researcher used triangulation of the data by mixing the data from quantitative and qualitative methods in order to obtain different complimentary data regarding the same phenomenon (Creswell, 2014). Therefore, using the

survey and semi-structured interview provided triangulation of the data. Using CBAM (Hall, et al., 1979; Hall & Hord, 2015), and particularly SoCQ (George et al., 2006), provided a foundation for the quantitative results as well as a framework for the interview in the qualitative phase. Table 3.1 summarizes the methods that was used to address each research question.

Table 3.1
Overview of the Mixed-methods Used in the Research Study

Evaluation Questions	Quantitative	Qualitative	
	Detailed Statistical Analysis	**Open Ended Questions**	**Semi-Structured Interview**
1. What is the most intense stage of concern of Middle/Secondary grade teachers in Saudi Arabia about LMS adoption, as measured SoCQ?	X		
2. What is the relationship between Middle/Secondary grade teachers' personal characteristics (gender, age, years of teaching experience, grade level, subject taught, and type of degree) and their concerns in adopting Future Gate LMS?	X		
3. What type of relationship exists between Middle/Secondary grade teachers' technographic characteristics (type and duration of professional development, administrative support of LMS) and their concerns in adopting Future Gate LMS?	X		
4. Is there any relationship between teachers' concerns in adopting Future Gate LMS and the school technology (technology in the classroom and Internet access in the classroom)?	X		
5. What are the top three concerns of teachers that are related to implementing Future Gate LMS?		X	X

Research Setting

This research was conducted in middle and secondary schools in Saudi Arabia,

specifically, in the schools that have implemented the Future Gate LMS project. In Saudi Arabia, there are 17 main general departments of education in regions and 28 departments of education in the governorates, and each are supported by the Ministry of Education. Six of these departments of education were selected by the Ministry of Education in the first year (2017-2018) of the transformation to digital learning initiative to implement Future Gate LMS as the first phase. In the second phase (2018-2019), the total number of the departments of education that were selected for the implementation were increased to be 16 departments of education around the country. The third phase started in Fall 2019 and the departments of education that were selected to implement Future Gate LMS increased starting with 17 departments of education, so the total number were 33 departments of education implemented Future Gate LMS at the time of conducting this study at the beginning of the third phase..

Population and Sampling

The population of this research were all classroom teachers employed in the public middle and secondary schools in Saudi Arabia whose schools were selected to implement Future Gate LMS. The research was conducted in schools from 33 departments of education that started implementing Future Gate LMS at the beginning of the third phase of implementation (Fall 2019). Teachers that participated in this study were from schools in the first phase (310 schools from seven departments of education), the second phase (1,583 schools from 16 departments of education), and the beginning of the third phase (1,981 schools from 33 departments of education). The total number of schools that implemented Future Gate LMS at the time of study were 3,874 middle and secondary schools. Middle and secondary schools are gender separated, so the study will include both male and female teachers.

The target population were teachers in schools that were selected by the Ministry of Education to implement Future Gate LMS. Only full-time teachers from these schools were sampled to complete this study, so administrators, support staff, and students are excluded from the population. The researcher contacted TETCO to distribute the survey to teachers through the Future Gate LMS. Only teachers can see the survey from their account in the Future Gate LMS, which means anyone from the school staff who does not teach did not get the pop-up window. Also, teachers from schools that did not implement the Future Gate LMS did not get the link since their schools were not implemented in the Future Gate yet.

Instrumentation

There were two phases used in this study. The first phase was the quantitative phase that included the survey that were sent to teachers. The second phase was the qualitative phase that included the open-ended question at the end of the survey and semi-structured interview.

Phase I: Quantitative Phase

The survey was administered using online Qualtrics software, which is a comprehensive survey platform that Kansas State University provides. Qualtrics is suitable to use in this study because the survey can be translated, so the English and Arabic languages were used because the participants' native language is Arabic. Participants will start the online survey by reading the introduction of the survey on the front page. This is the consent page that explains the purpose of the study and participants' rights. If they agree to participate in the study, they can check "Agree" to confirm and start the survey.

The survey consisted of five sections. The first section included an introduction that reflects a customized version of the SoCQ (George et al., 2013) and a statement of the purpose of the study; in addition, there were instructions for participants that illustrated how to fill out and

submit the questionnaire as depicted in Appendix D. The statement encouraged them to respond regarding their current concerns about Future Gate LMS and not to generalize concerns about their teaching; after this, the participants start answering the 35-items of the SoCQ (George et al., 2013). The second section of the survey had questions designed to gather information for teachers' demographics data (i.e., gender, age, years of teaching experience, degree, grade level, and subject taught). The third survey section had questions about teachers' technographic information (i.e., teachers' experience with using instructional technology, and type and duration of professional development received in using LMS and instructional technology). The fourth section had questions about the availability of technology and Internet service in the school. The fifth section was an open-ended question asking participants for their top concerns in implementing Future Gate LMS. The total of the survey items was 52 items, which were expected to take about 15 - 20 minutes to answer. The questions were not forced so participants could skip the item and still answer the following items.

The Stage of Concern Questionnaire SoCQ (George et al., 2013)

Hall and Hord (1977) indicated that the instrument was tested for validity and reliability, and it was noted as acceptable for research. Studies during the 1980s used the 35-item SoCQ (George et al., 2013) to measure the concerns about the innovations and replicated categorization of the seven stages. Table 3.2 summarizes the estimates of reliability and Cronbach's alpha coefficients for several studies.

Table 3.2
Coefficient of Reliability for the Seven Stages in SoCQ by Researchers

		Stages of Concern						
Author	**Sample Size**	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Hall, George, & Rutherford, 1979	830	.64	.78	.83	.75	.76	.82	.71
Van den Berg & Vandenberghe, 1981	1585	.77	.79	.86	.80	.84	.80	.76/

								73*
Kolb, 1983	718	.75	.87	.72	.84	.79	.81	.82
Barucky, 1984	614	.60	.74	.81	.79	.81	.79	.72
Jordan-Marsh, 1985	214	.50	.78	.77	.82	.77	.81	.65
Martin, 1989	388	.78	.78	.73	.65	.71/ 78*	.83	.76
Hall, Newlove, Rutherford & Hord, 1991	750	.63	.86	.65	.73	.74	.79	.81

* In these studies, the authors proposed two subscales in place of the original SoC scale.
George et al., 2013, p. 21

The SoCQ (George et al., 2013) is a two-page list of a 35 item, 8-point (0-7) Likert-type scale questionnaire (Appendix D, section I). The 35 items are divided equally into seven scales, composed of five items each as shown in Appendix M. Participants are asked to mark each item of the questionnaire from the 8-point Likert scale based on how true the statement seems to them at the current time. The scales range from 0 to 7, in which 0 represents the participant's response that "the statement is irrelevant to me," scales 1 and 2 represent that "the statement is not true of me now," 3 to 5 represent that "the statement is somewhat true of me now," and 6 and 7 represent "the statement is very true of me now." The data yield in the Likert scale with ordinal values since numbers 0-7 indicate order, but there is no distance between them.

The estimated time to complete this section of the questionnaire is approximately 15 minutes (George et al., 2013). Participants are asked to select the number that represents their own concern regarding the Future Gate LMS adoption.

Dependent Variables

The dependent variable in this research was the stage of concern with the highest score that was measured by SoCQ (George et al., 2013). The measure of the dependent variable was using the 35-items in the SoCQ that had a 0-7 Likert scale with the following ordinal values: 0 for unconcerned, 1 for informational, 2 for personal, 3 for management, 4 for consequences, 5

for collaboration, and 6 for refocusing. The row score for each of the stages was calculated as the sum of the score of the 5-item subscale. After that, the row score was transformed into a percentile score that was used to identify the most intense stage of concern.

Both quantitative and qualitative data were collected in this sequential explanatory mixed method research to answer the five research questions. Thus, the data analysis in the two methods was used to evaluate, analyze, and interpret the results and present conclusions. The first, second, third, and fourth research questions used the results from the online Qualtrics SoCQ (George et al., 2013) in phase I. The fifth research question was used for qualitative phase II. detailed in Table 3.3.

Independent Variables (IVs)

The independent variables are demographic variables (age, gender, degree, years of teaching experience, grade level, and subject of area taught), technographic variables (prior instructional technology use and type and duration of professional development in instructional technology use and in Future Gate LMS), technology in the classroom, and Internet access in the classroom. These characteristics were used as predictors or independent variables for this research (Questionnaire items 36-48).

Demographic Variables

The demographic information was gathered in Section II. A number of demographic variables were used in this study, which are teachers' gender age, years of teaching experience, degree, grade level, and subject area taught.

Gender in this study are male and female teachers. Participants in the research were asked to select age, and the assigned code was 0 = 20 years to 29 years, 1 = 30 years to 39 years, 2 = 40 years to 49 years, and 3 = 50 years or more. Teaching experience was coded as 0 = 0-5 years, 1 =

6-10 years, 2 = 11-15 years, 3 = 16-20 years, and 4 = more than 20 years. The type of degree was in four categories (0 = Bachelor's, 1 = Masters, 2 = Doctorate, 3 = Other). The grade of teaching level was coded as 0 = Middle school, 1 = Secondary school, 2 = both. The subject area of teaching was coded as the following categories: 0 = Science (Mathematics, Physics, Biology, Chemistry, Geology, and Ecology), 1 = Humanities (Social Studies, Islamic Studies, Arabic Language, English Language, and Sociology), 3 = Social Science (Health & Physical Education, Art Education, Family Education, Vocational Education, National Education, Educational Psychology, Life Skills, Library and Search, Special Education, Accounting, Principles of Economics, and Principles of Administration), as detailed in Table 3.3.

Technographic Variables

The demographic information was gathered in Section III. The technographic variables that were used for this study were teachers' experience with using technology in instruction, type of professional development in instructional technology use, duration of instructional technology related professional development, type of professional development in Future Gate LMS use, and duration of professional development in Future Gate LMS use.

Years of experience in using technology in instruction was coded as 0 = Never, 1 = 1 years, 2 = 2 years, 3 = 3 years, 4 = 4 years, and 5 = 5 years or more. The type of professional development in instructional technology use had four categories that will be coded as 0 = theory-based seminar, lecture, or program, 1 = practice-based workshop or program, and 2 = both theory and practice-based seminar, lecture, program, or workshop, 3 = never received training in using instructional technology. The duration of the professional development program in instructional technology was coded into five categories as 0 = A full day or less, 1 = more than 1 day and less than1 week, 2 = 1 week or longer but less than 1 semester, 3 = 1 semester long course or more,

and 4 = never. The type of professional development in the Future Gate LMS has four categories that was be coded as 0 = theory-based seminar, lecture, or program, 1 = practice-based workshop or program, and 2 = both theory and practice-based seminar, lecture, program, or workshop, 3 = never received training in using Future Gate LMS. The duration of the professional development program in Future Gate LMS was coded into five categories as 0 = a full day or less, 1 = more than 1 day and less than1 week, 2 = 1 week or longer but less than 1 semester, 3 = 1 semester long course or more, and 4 = never.

Technology in the Classroom Variables

The technology in the classroom information was gathered in Section IV. Technology in the classroom variables in this study was instructional technologies in the classroom and Internet access in the classroom. Instructional technology in the classroom was coded as 0 = technology rich environment, 1 = a few numbers of technology equipment, and 2 = no technology in the classroom. Internet access in the classroom was coded into four categories as 0 = High-speed internet and signal, 1 = medium-speed Internet, 3 = slow-speed Internet, and 4 = there is no internet service in the classroom.

Dependent Variables

The dependent variable in this research was the stage of concern with the highest score that will be measured by SoCQ (George et al., 2013). The measure of the dependent variable used the 35-items in the SoCQ that has a 0-7 Likert scale with the following ordinal values: 0 for unconcerned, 1 for informational, 2 for personal, 3 for management, 4 for consequences, 5 for collaboration, and 6 for refocusing. These stages were clustered to include items from the SoCQ as depicted in Appendix M. The row score for each of the stages was calculated as the sum of

the score of the 5-item subscale. After that, the row score was transformed into a percentile score that was used to identify the most intense stage of concern.

Both quantitative and qualitative data was collected in this sequential explanatory mixed method research to answer the five research questions. Thus, the data analysis in the two methods was used to evaluate, analyze, and interpret the results and present conclusions. The first, second, third, and fourth research questions used the results from the online Qualtrics SoCQ (George et al., 2013) in phase I. The fifth research question was used for qualitative phase II. As detailed in Table 3.3.

Table 3.3
Variables

Research Question	Variable	Level of Measurement
RQ1	Stage of Concern	Interval
	Gender	Nominal (0 = female, 1 = male)
	Age	Nominal (0 = 20 to 29, 1 = 30 to 39, 2 = 40 to 49, 3 = more than 50)
	Years of teaching experience	Nominal (0 = 0-5, 1 = 6-10, 2 = 11-15, 3 = 16-20, 4 = more than 20)
RQ2	Degree	Ordinal (0 = Bachelor's, 1 = Master's, 2 = Doctorate, 3= other)
	Grade level	Nominal (0 = middle school, 1 = secondary school, 2 = both)
	Subject area taught	Nominal (0 = Science (Mathematics, Physics, Biology, Chemistry, Geology, Ecology), 1 = Humanities (Social Studies, Islamic Studies, Arabic Language, English Language, Sociology), 3 = Social Science (Health & Physical Education, Art Education, Family Education, Vocational Education, National Education, Educational Psychology, Life Skills, Library and Search, Special Education, Accounting, Principles of Economics, Principles of Administration), 3= other)
	Prior experience	Nominal (0 = never, 1 = 1 year, 2 = 2 years, 3 = 3 years, and 4 = 4 years, 5 = 5 years or more)

Research Question	Variable	Level of Measurement
	with instructional technology use	
RQ3	Type of professional development in instructional technology use	Nominal (0 = Theory-based seminar, lecture, or program, 1 = Practice-based workshop or program, 2 = Both theory and practice-based seminar, lecture, program, or workshop, 3= Never received training in using instructional technology)
	Duration of instructional technology related professional development	Nominal (0 = A full day or less, 1 = More than 1 day and less than1 week, 2 = 1 week or longer but less than 1 semester, 3 = 1 semester long course or more, and 4 = Never)
	Type of professional development in LMS use	Nominal (0 = Theory-based seminar, lecture, or program, 1 = Practice-based workshop or program, 2 = Both theory and practice-based seminar, lecture, program, or workshop 3= Never received training in using instructional technology)
	Duration of LMS-related professional development	Nominal (0 = A full day or less, 1 = More than 1 day and less than1 week, 2 = 1 week or longer but less than 1 semester, 3 = 1 semester long course or more, and 4 = Never)
RQ 4	Technology in the classroom	Nominal (0 = technology rich environment, 1 = a few numbers of technology equipment, and 2 = no instructional technology in the classroom).
	Internet access in the classroom	Nominal (0 = Strong speed internet and signal, 1 = Medium Internet speed and signal, 2 = weak Internet service, 3 = Slow Internet speed and weak signal 4 = There is no Internet service in the classroom

The survey was translated into Arabic since the participants' first language is Arabic. Appendix D is the English version and Appendix E is the Arabic version. To ensure the validity

of the Arabic version, the translated version from Barri (2013) was used after the permission was obtained as provided in Appendix L. Barri (2013) created a workshop for Saudi PhD students in an English department in a U.S. university to get their comments about the survey translation. He used the final version, which was then used in this study as depicted in Appendix D, section I. Participants used Qualtric survey software, which has the option to change the language because the researcher inputs the survey in the software in the Arabic and English languages.

Phase II: Qualitative Phase

In an explanatory mixed-methods research, the qualitative phase follows the quantitative phase, which the data inform from the quantitative phase. There were two data sets in this phase; the first one comes from the open-ended questions at the end of the SoCQ (George et al., 2013) and the second one develops its information from the semi-structed interview that provides qualitative data. Themes that emerged from the open-ended questions and from the semi-structured interviews may provide more information and a comprehensive picture about teachers' concerns regarding implementing Future Gate LMS.

According to George et al. (2013), it is better to add open-ended questions at the end of the survey to gather additional information. In this research study, there was one open ended question at the end of the survey:

> **Survey open-ende question:** When you implement Future Gate LMS with your students, what are you concerned about? (Please do not say what you think others are concerned about, but only what concerns you now.) Please write in complete sentences and be frank.

Semi-structured interviews were the foundation of the qualitative phase of this research study. Appendix J has the interview questions in the English version and Appendix K has the

Arabic version. The participants that were selected based on their stage of concerns were interviewed to attain more in-depth information about teachers' concerns in adopting Future Gate LMS. Participants could write down their email address if they were willing to participate in the interview section. Participants who had a desire to participate in the interviews were divided into seven subgroups according to the seven stages of the SoC, which are Stage 0: awareness, Stage 1: information, Stage 2: personal, Stage 3: management, Stage 4: consequence, Stage 5: collaboration, and Stage 6: refocusing. Based on the participants' results of their subgroups, two volunteer participants were selected, one from the highly intensive concern level group and one participant from the lower intensive concern level group. An email was sent to the selected participants to schedule appointments for the interview process.

Data Collection Methods

The idea of collecting data is "to gather information to address the questions being asked" (Creswell & Plano Clark, 2017, p. 173). The necessary paperwork was submitted to the Institutional Review Board (IRB) at Kansas State University, and the approval was obtained prior to contacting the participants as shown in Appendix A. There were two methods to collect data that answer the research questions. The two methods are Phase I: An Internet-based questionnaire survey and Phase II: An open-ended question at the end of the survey and follow-up semi-structured interviews determined the concerns of middle and secondary school teachers regarding adopting Future Gate LMS along with the open-ended questions on the questionnaire. The questionnaire was the primary data source and administered first. The information that was obtained from the follow-up interviews and the open-ended questions was used to complement the data from the survey in the quantitative methods phase.

After gaining the approval of the IRB from Kansas State University as shown in Appendix A, the next step was securing participants. The SoCQ (George et al., 2013) was developed by the Texas Research and Development Center at the University of Texas in Austin. The permission to email and distribute the questionnaire was obtained. The researcher also received the copyright for the SoCQ from SEDL as shown in Appendix B. The questions in the questionnaire did not change because that would affect the validity and reliability of the measure. However, the authors of SoCQ indicated that changing the word "innovation" with the name of the phrase of the innovation is not considered altering the question (George, et al. 2013, p. 25). Therefore, the word "innovation" in the questionnaire will be replaced with "Future Gate LMS."

The researcher contacted the Saudi Arabian Cultural Mission in Washington DC, USA to support this study, which contacted the Ministry of Education in Saudi Arabia. A letter supporting this study was sent from the Ministry of Education to TETCO to facilitate the study, as depicted in Appendix C.

Phase I: Quantitative Data Collection

TETCO notified the researcher that they were ready to distribute the survey to teachers' accounts in Future Gate LMS. The researcher sent the link of the survey to TETCO, which sent it to teachers' accounts in Future Gate LMS through a pop-up window on September 8, 2019. This link included an introduction page of the questionnaire that explained the following: (a) participating as a teacher in the survey is voluntary, (b) teachers participating can withdraw from the study at any time, (c) teachers who are not participating in the study will not have any negative effect on their professional and professional status, (d) data will be entered in a database without identification information, and because of this, teachers will remain anonymous, (e) all data from teachers, principals, and schools will be kept confidential and private, so the only

person who can access this information is the researcher, (f) the materials that will be used during the process of the data collection will be destroyed at the end of the study, and (g) the data that will be collected during this research is for educational research so it will not pose a threat to the teachers.

The survey was administered via the online Qualtrics survey software program. The online questionnaire was conducted over the course of eight weeks. At the end of the survey, participants can find the researcher's contact information and a question to provide contact information if the participant is willing to participate in a semi-structured interview regarding the follow-up qualitative phase. After collecting the data, the raw data was imported into a spreadsheet in Excel and into Statistical Package for Social Science (SPSS) version 25 to analyze the data.

Phase II: Qualitative Data Collection Innovation

Participants who were willing to participate in the interview were identified through an open-ended question on the thank-you page of the survey to write their email. After analyzing quantitative data, two participants were selected for the interview section. They were chosen randomly because their highest and lowest SoC were the same as the SoC of the group concerns. The two participants were emailed two times; the first time was prior conducting the interview for confirmation as depicted in Appendix F. The second email was to determine the meeting date as depicted in Appendix G. The first email included the interview consent to the selected participants as shown in Appendix H for English version and Appendix I for Arabic version. The interviews were conducted online, and participants were given the options to use Zoom or Skype for the online interviews. The researcher contacted the participants via email for scheduling the

interview and then recorded and created a transcript of the interviews immediately after each interview.

This study used a predesigned interview guide based on the CBAM of change (Hall, et al., 1979; Hall & Hord, 2015), specifically the stages-of-concern dimension (George et al., 2013). The interview design involved individual interview questions. One-on-one interviews give participants the freedom to express their thoughts (Yin, 2017). The interview design helped the researcher to formulate questions that provided a better understanding of the participants' concerns regarding Future Gate LMS. The researcher engaged the participants during the interview and focus the conversation on questions related to the study (deMarrais, 2004, p. 55). The estimated length of each interview was 45 minutes. Each interview's audio was recorded with the participant's permission; the recording helped to focus on the participant without any interruption during the interview. The interview started with a friendly greeting and each participant was thanked for their participation. Next, the participant was given information about this study and why they are being asked for information about their specific experience. Confidentiality to all participants was assured, both verbally and in writing. There was built-in flexibility regarding related topics that came up during the interview (Seidman, 2006; van Manen, 1990). However, the researcher strove to keep the interview from detouring off topic (Creswell, 2014). Participants were encouraged to expand on their answers to provide as many details as possible. The interview process continued until the participants no longer added information (Lincoln & Guba, 1985; as depicted in Appendix J and Appendix K for the interview protocol).

Data Analysis

The data analysis in this study included the quantitative data from the SoCQ (George et al., 2013) in phase I. The analysis also included the qualitative data from open-ended questions at the end of the survey and through the semi-structured interviews.

Phase I Data Analysis

The statistical analysis for the quantitative phase questions was descriptive statistics and inferential statistics. The researcher used SPSS version 25 for the statistical analyses and the significant testing was the probability *(p)* value of .05 or less. The researcher used SPSS to test the reliability of the survey based on Cronbach alpha level (Cronk, 2017). The analysis grouped statements by stage (Hall et al., 1979) as shown in Appendix M. Descriptive and frequency statistics were used to answer the first, second, third, and fourth research questions.

To answer Research Question 1, "What is the most intense stage of concern of Middle/Secondary grade teachers in Saudi Arabia about the LMS adoption, as measured by the stages of concerns questionnaire (SoCQ)?," the researcher employed means, standard deviations, frequencies, a percentage to describe the concern of teachers toward using Future Gate LMS, as well as their personal characteristics.

All the item responses were totaled in each stage. The researcher averaged and converted the raw scores to percentiles scores for each one of the seven stages of concern based on the included table in the handed-scoring device sheet (George, et al., 2013) as depicted in Appendix N, part B. The researcher also used Microsoft Excel SOCQ-75 Graph and Print program to create the overall concerns profile for the group (Scott & Persichitte, 2006).

This research used George et al.'s (2013) SoCQ manual scoring program that score SoCQ data and produce the SoC profile of individuals and groups. The raw data and percentile scores

were used to identify the high and low stages of concern for the entire group of teachers. The last step was plotting the graphical representations that illustrated the distribution of the percentile stage score mean for the overall teacher group and for each subgroup. The researcher used Microsoft Excel SOCQ-75 Graph and Print program to create the overall concerns profile for the group (Scott & Persichitte, 2006).

For research questions two, three, and four, the researcher performed a series of one-way multivariate analysis of variance (MANOVA) tests to determine if a significant difference exists among variables. The reason for using MANOVA in this study is because it "look [s] at all dependent variables at once, in much the same way that ANOVA looks at all levels of an independent variable at once" (Cronk, 2017, p. 95).

Linearity, homogeneity of variance-covariance, and normality are assumptions that need to be met. The Pillai's test was used when the results reveal a significance of less than .05 in Levene's test of equality of error variances between the dependent variables. Field (2013) indicated that Pillai's test is robust when the assumption of homogeneity of variance-covariance matrices and equal cell size are violated. A series of Tukey's post hoc tests were conducted when difference is found in the MANOVA to determine where the differences exist between groups. Since the gender variable is dichotomous, the researcher conducted *t*-test to compare the gender's means on stages that are significant with teachers' concerns.

The research showed any statistically significant differences and the degree and the associations' strength. The variables in this research are from different categories (i.e., Nominal, Interval, and Ordinal); therefore, the researcher used an *eta* test for strength of association to measure the relationship between nominal and interval variables. The eta test result can range

from 0 to +/- 1.00, which indicates no association at all in .00, while a strong association is indicated in +/- 1.00 with either positive or negative signs indicating the direction.

The calculation of the coefficient of determination was by squaring *eta* (eta^2) that assesses the proportion of variance in one variable that the second variable can determine or explain (Warner, 2013). When the *eta* value is greater than 0, that indicates a positive association, and therefore it means increasing in the value of the variable when the value of other variables increases. On the other hand, when the *eta* value is less than 0, that indicates a negative association, which means increasing the value of the variable when the value of other variables decreases (Warner, 2013). An example of this is when *eta* is +.74 or -.74, for the eta^2 is .55 or 55%. Thus, the explanation is that about 55% of the variability in one variable can be determined or explained by the other variable.

Phase II Data Analysis

According to Merriam and Tisdell (2015), data analysis in the qualitative method is the "process of making sense out of the data. And making sense out of data involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read—it is the process of making meaning" (p. 202). After analyzing data from phase I, which includes answering research question one, the researcher used the results to make sure that phase II participants in the semi-structured interview were selected based on their SoC that they should be in the same higher SoC of the group and in the same lower SoC of the group. The next step was analyzing the open-ended question in the SoCQ (George et al., 2013) as well as the semi-structured interviews that delve into the top three concerns of teachers regarding implementing Future Gate LMS. Participants answered the open-ended question at the end of SoCQ.

Additionally, participants had the option to volunteer to participate in the semi-structured interviews.

Participants had the options to use Zoom or Skype software to conduct the interview. The researcher recorded the interview sessions and made a transcript of the interview on the same day of the interview. Each participant reviewed his or her transcripts that was sent via email to them to check the accuracy for member checking and modifying and deleting some of their responses. The researcher analyzed and coded the interview transcripts to ascertain emergent themes.

Research Question 5: What are the top three concerns of teachers that are related to implementing Future Gate LMS in the middle and secondary schools in Saudi Arabia? The data from the open-ended question on the survey (question 52) and the data from semi-structured interviews were used to answer this research question. The researcher uploaded the responses for the open-ended question into Dedoose software (Dedoose, version 8.3.17) in order to code and analyze for themes. The second qualitative data was from the semi-structured interview, which was in-depth interview with selected participants.

After completing an interview with each teacher participant, the audio file was transcribed the by hand using Express Scribe, a program for transcription (Express Scribe, version8). Each interview was transcribed within 24 hours to allow the researcher to review the data. Next, the researcher verified that the recording and transcript match by listening to the recording and reading the transcript simultaneously. According to Patton (2015), “doing your transcriptions, or at least checking them by listening to the tape as you read them, can be quite different from just working off transcripts done by someone else” (p. 525). In addition, each participant had two weeks to review their own interview transcript. The researcher read each

interview several times to identify phrases that relate to the transition to digital learning program and to teachers' concerns regarding adopting Future Gate LMS. After that, the researcher proceeded to make notes and code data (van Manen, 1990).

Coding and Themes

According to Winters, Cudney, and Sullivan (2010), "One of the major tasks involved is the development of the codes and the coding scheme that facilitates organization and interpretation of qualitative data" (p. 1415). The researcher began coding by reading the interview transcripts line by line. This process of line-by-line reading was repeated several times. As Patton (2015) noted, a human being does the analysis, but the researcher can use qualitative software programs to facilitate data storage, coding, retrieval, and comparison (p. 529). This research used Dedoose software (Dedoose, version 8.3.17) for coding and finding patterns, themes, and categories. After reading the interview transcript and looking at the codes and patterns, the researcher gave each theme a name and label. After that, the process was repeated, and during that time it refined, expanded, or rejected the initial categories. These steps helped identify the most important parts of the data. The researcher read the interview transcripts several times and highlighted the patterns related to each research question. After that, the researcher created primary topics to categorize information according to the emergent patterns and themes related to the research question.

Trustworthiness of the Qualitative Phase

Credibility

Credibility matches with internal validity in the quantitative research. The credibility of the researcher is essential because the researcher is considered the instrument of qualitative research (Patton, 2015, p. 707). The researcher used several steps to ensure credibility, including

triangulation, member checking, and peer debriefing. Triangulation supported the validity of the methodology when using several sources, such as data, methods, and researchers (Merriam, 1988; Patton, 2015). The triangulation for this study was made through asking for feedback and verification of the study and data findings from the major advisor. Each participant was asked to review their own responses to ensure the validity and meaning of their responses; this process is called participant debriefing (Fanning & Gaba 2007). Participants had an opportunity to refuse participating, which ensured honesty in participants during collecting the data. Using participant debriefing is considered an important precaution to make the research have strong credibility (Guba & Lincoln, 1989).

Transferability

Transferability means that the finding in one context can fit a similar situation (Guba & Lincoln, 1989). In the qualitative phase, transferability is the alternative for external validity in the quantitative phase. Accordingly, researchers use comprehensive description that describes the data in detail so readers and colleagues can understand it. This research had a careful description of the data collection and data analysis that provide the reader with an accurate understanding. The selection of the interviewee was based on their SoC so that each should be in the same higher SoC of the group and in the same lower SoC of the group.

Dependability

Dependability means that others can replicate the study and find similar results. Research must be consistent and accurate (Guba & Lincoln, 1989), which means that the research process should be in detail so other researchers in the future can repeat the study. Shenton (2004) explained that the in-depth details of the research will allow the readers to examine and develop an understanding of the methods and their effectiveness. The qualitative phase in this research

included many details of the design, implementation, analysis, findings, and interpretation that will help to achieve dependability.

Confirmability

Confirmability ensures that the data collected in the research is accurate and represents the voice of the participants, not the researcher (Lincoln & Guba, 1985). The researcher brought his own subjectivity to this research study. Subjectivity is a limitation that can influence a study; Peshkin (1988) described it as "a garment that cannot be removed" (p. 17). In this research, the researcher's biases and perspectives must not affect the interpretations so that the data finding will support the themes. The researcher provided personal experiences with LMS that will add to the confirmability of the research (Moustakas, 1994). Because the researcher's subjectivity may shape the qualitative research process, confirmability will ensure that the research findings reflect respondents' input (Lincoln & Guba, 1985). Confirmability was ensured in the qualitative phase by sharing a clear description of all steps in the research process with the major advisor.

Ethical Considerations

Human subjects' approval from the Institutional Review Board (IRB) at Kansas State University was obtained before contacting the participants, as depicted in Appendix A. Consent was granted for the quantitative phase when the participant read the introduction and checked "agree" to take the survey. For the qualitative phase, the researcher emailed a consent form to the participants as depicted in Appendices I, J, K, L with information needed to assist the participants in deciding whether or not to participate in the interview. The teachers remained anonymous when entered as data into the database. The data obtained was entered into SPSS 25 software for further analysis. Collected data was used by the chief investigator only and kept with password protected at the investigator's work office. A work computer was used to analyze

the data. Data was erased from the work computer and a hard copy of the data was displayed after the publication of the study. Participants were informed that the researcher would keep their responses to the survey and their identity confidential; in addition, they would be informed that the study results will be available to them upon request.

Summary

The purpose of this sequential explanatory mixed-method research was to examine the concerns of teachers regarding the implementation of Future Gate LMS in middle and secondary schools in Saudi Arabia. Participants of this research were teachers in the middle and secondary schools whose schools were selected to implement Future Gate LMS in 33 departments of education in Saudi Arabia. The instrument of the quantitative phase was an online survey (SoCQ) (George et al., 2013) that was used to collect quantitative data that was analyzed using the frequency distributions, *t*-test, MANOVA, and ANOVA. The qualitative phase was open-ended question on the SoCQ survey and a follow-up semi-structured interview that provided data for the qualitative analysis.

This chapter included (a) an introduction to the research methodology, (b) the purpose of the research, (c) the research questions, (d) the research setting, (e) population and sampling, (f) the quantitative phase instrumentation, (g) the quantitative and the qualitative data collection, (h) the data analysis for the quantitative and qualitative phases, (i) validity, reliability, and trustworthiness, (j) ethical consideration, and (k) a summary.

Chapter 4 presents the study findings, which includes descriptive statistics, presentation and analysis of data, and a summary of the chapter.

Chapter 4 - Results

This study used explanatory sequential mixed methods, which starts with a quantitative survey phase followed by a qualitative phase based on data described from the quantitative phase. Qualtrics software was used to administer the SoCQ (George et al., 2013) and to collect data for the quantitative phase. Data analysis was performed using SPSS version 25. Two data sets were used to collect qualitative data, one from an open-ended question at the end of the survey and the other through semi-structed interviews.

The data collection took place between September 8th, 2019 and November 8th, 2019, which was the beginning of the third phase. The survey was sent to all teachers in the schools that implemented Future Gate LMS. A reminder to participate in the study was sent by TETCO two times, the first reminder two weeks after the first time of sending the survey and the second reminder two weeks later. A total of 1045 surveys were completed, which represented teachers from schools that implemented Future Gate LMS at the time of sending the survey.

Phase I: Quantitative Phase

Participants' Demographic Characteristics

In this study, gender was defined as male or female. Of the 1045 participants who took the survey, 53.6% were female (560 teachers) and 46.4% were male (485 teachers), as depicted in Figure 4.1 and Table 4.1.

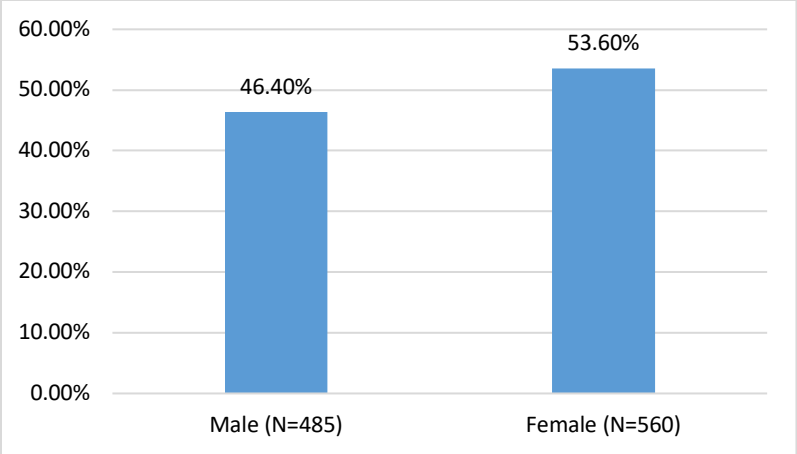

Figure 4.1 Percent of participants by Gender

Of the participating teachers, the majority of teachers were between 40 and 49 years old (52.2%), followed by teachers between 30 and 39 years old (33.4%), 50 years old or more (10 %), and the smallest group was from 20 to 30 years old (4.5%), as depicted in Figure 4.2 and Table 4.1.

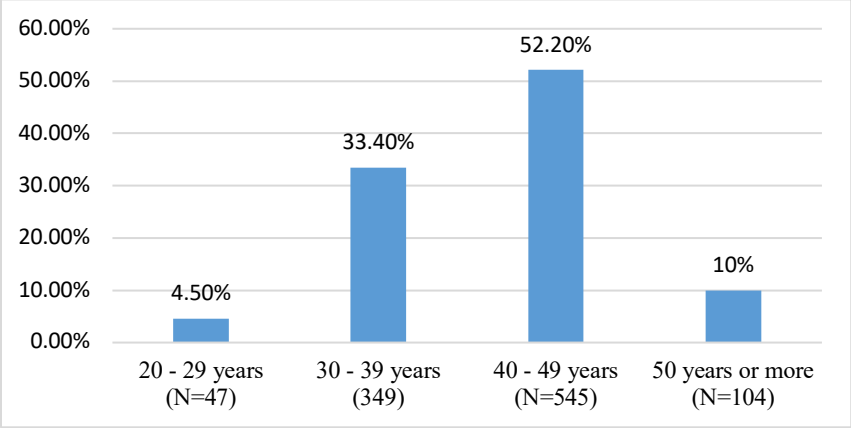

Figure 4.2 Percentage of Teachers' Age

The majority of participants in this study (30.8%) reported that they had 20 years or more teaching experience. This was followed by participants with 6 to 10 years of teaching experience (24.8%), 16 to 20 years of teaching experience (19%), 11 to 15 years of teaching experience (18.3%), and finally 1 to 5 years (7.1%), as depicted in Figure 4.3 and Table 4.1.

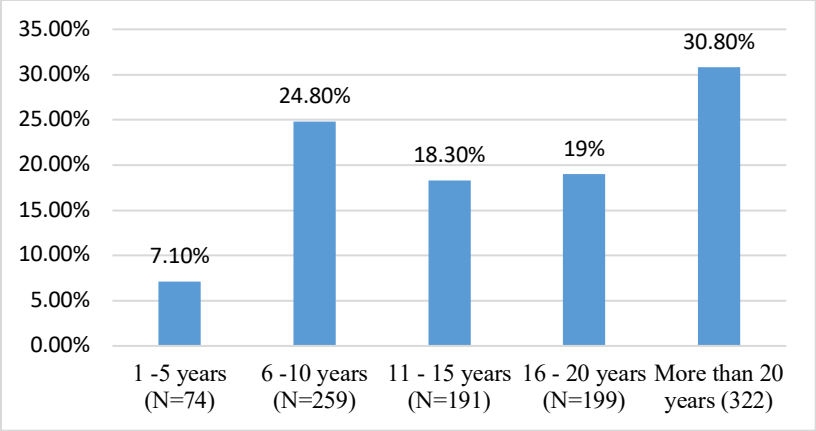

Figure 4.3 Percentage of Teachers' Experience in Teaching

In this study, the majority of teachers have a bachelor's degree as their highest degree (88%), followed by those who have a master's degree (7.8%), and finally those who have a doctoral degree (.40%). Some teachers chose other types of degrees, such as a diploma in education after a bachelors or a Khbrat certificate at 3.7% as depicted in Figure 4.4 and Table 4.1.

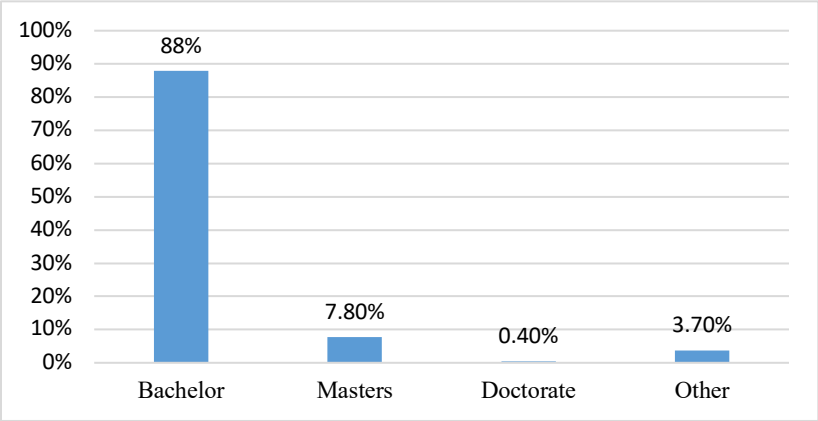

Figure 4.4 Percentage of Teachers' Higher Degree

For the grade level of teaching, teachers in this study who teach in middle schools were 56%, while teachers in the secondary schools were 41.1%. Teachers who teach in both middle and secondary schools were the lowest percentage at 3%, as depicted in Figure 4.5 and Table 4.1.

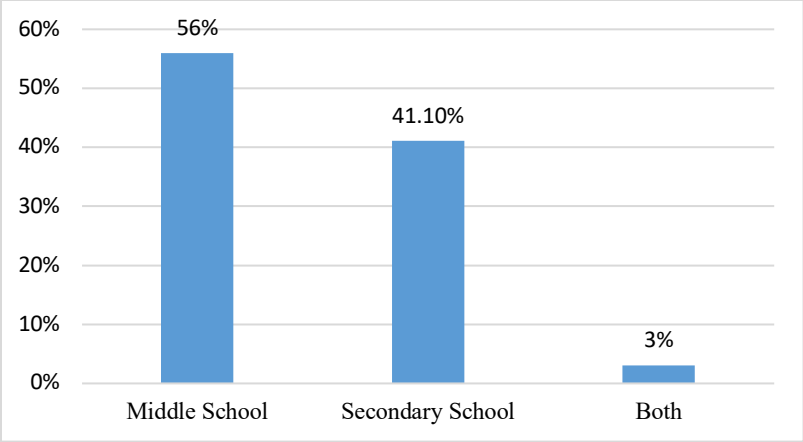

Figure 4.5 Percentage of Teachers' Teaching Level

In this study, the majority of participants teach the humanities (49.8%). Science teachers were the second largest group participating in the study (33.6%), social study teachers were 8.7%, and teachers choosing "other" were 7.9%, as depicted in Figure 4.6 and Table 4.1.

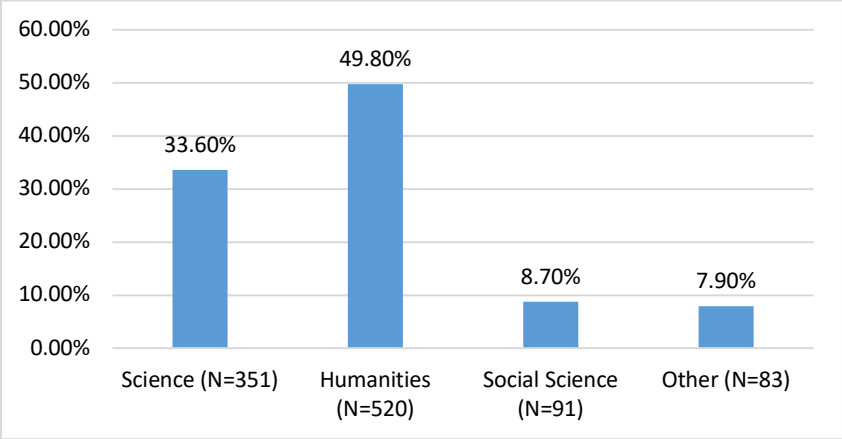

Figure 4.6 Percentage of Subject Taught

The largest percentage of teachers in this study were in the second phase of implementing Future Gate LMS (47.6%), followed by the third phase (33.3%), and finally those in the first phase of implementation were 19.1%, as depicted in Figure 4.7 and Table 4.1.

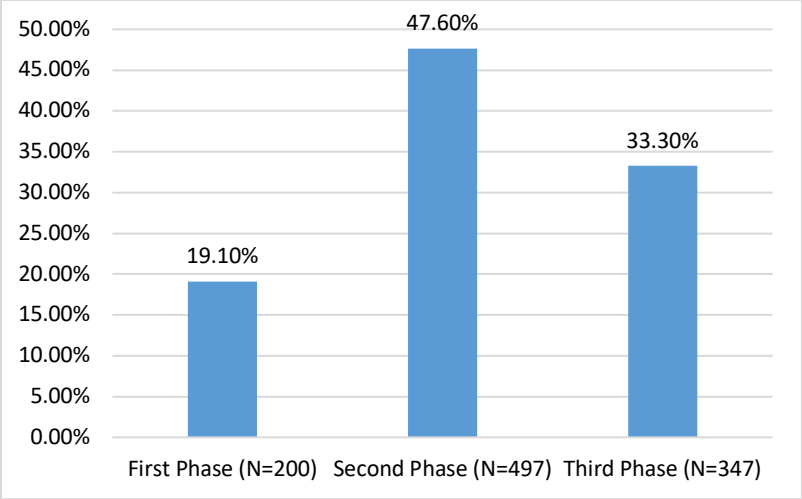

Figure 4.7 Percentage of Participants in Each Phase

Table 4.1

Summary of Participant Demographic Characteristics

Variable	Total Number (N= 1045)	Percent
Gender		
Male	485	46.4%
Female	560	53.6%
Age		
20-29	47	4.5%
30-39	349	33.4%
40-49	545	52.2%
50 or more	104	10%
Years of teaching experience		
1 – 5	74	7.1%
6 -10	259	24.8%
11 – 15	191	18.3%
16 – 20	199	19%
More than 20 years	322	30.8%
Highest degree		
Bachelor	920	88%
Master's	82	7.8%
Doctorate	4	.4%
Other	39	3.7%
Grade of teaching level		
Middle school	585	56%
Secondary school	429	41.1%
Both	31	3%
Subject area taught		
Science	351	33.6%
Humanities	520	49.8%
Social Science	91	8.7%
Other	83	7.9%

Variable	Total Number (N= 1045)	Percent
Phase of implementing FG (1044)		
First Phase (2017/2018)	200	19.1%
Second Phase (2018/2019)	497	47.6%
Third Phase (2019/2020)	347	33.3%

Descriptive Statistics of Participant Technographic Characteristics

In this study, the largest percentage of teachers had used technology for instructional purposes for five years or more (69.8%). Teachers who used it for one year were 10.9%, followed by teachers who used it for three years (6.8%), four years at 5.6%, and two years at 5.2%. The smallest group was teachers who do not use technology for instructional purposes (1.6%), as depicted in Figure 4.8 and Table 4.2.

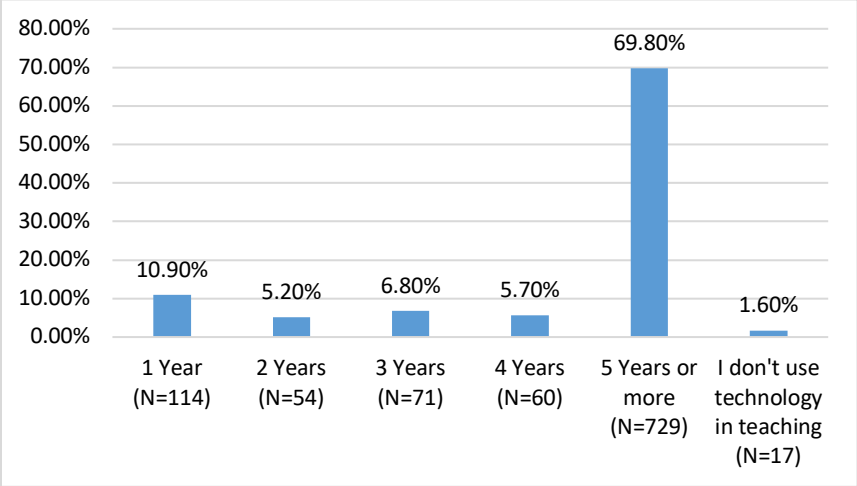

Figure 4.8 Percentage of Experience in Using Technology in Ed

The findings about formal training that teachers received in using technology in education showed that the largest percentage of teachers did not receive professional development (51.4%). Participants who received professional development that was both theory and practice-based seminar, lecture, program, or workshop were at 25.4%; participants who received practice-based workshop or program were 16.7%; while participants who indicated that

they received only theory-based seminar and lecture were at 6.5%, as depicted in Figure 4.9 and Table 4.2.

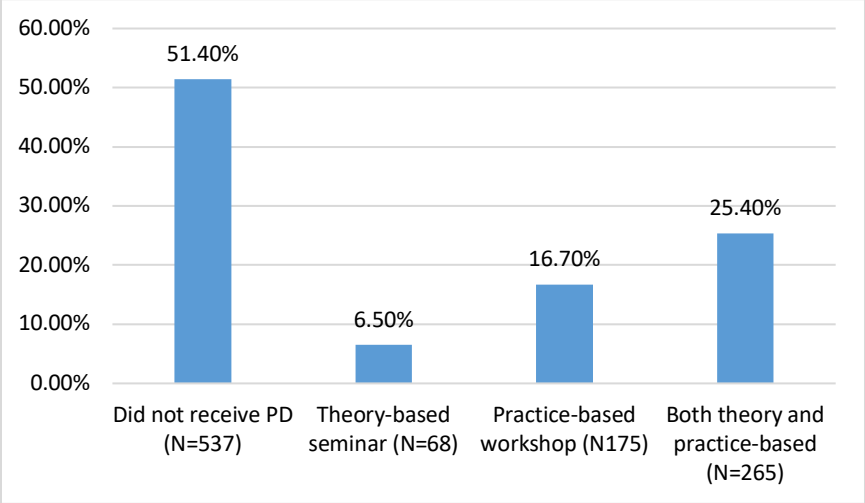

Figure 4.9 Percentage of Participants' Type of PD in Using Technology in Ed

Professional development for technology in education showed that 21.2% of teachers received more than one day but less than one week, followed by teachers who spent a full day or less (11.1%), teachers who spent one week or longer but less than one semester (10.5%), and finally teachers who took a semester long course or more (5.7%), as depicted in Figure 4.10 and Table 4.2.

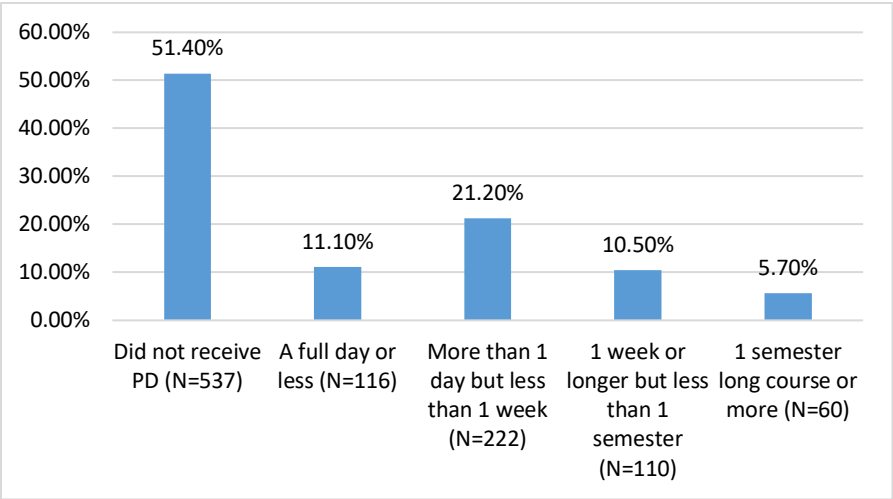

Figure 4.10 Percentage of Participants' PD Duration in technology use

Teachers who did not receive formal training to use Future Gate LMS were at 52.2%. Teachers who received formal training in Future Gate LMS through a practice-based workshop or program were at 19.3%, while 16.2% of participants received both theory and practice-based seminar, lecture, program, or workshop. Teachers who received only theory-based seminar and lecture were at 9.3%, as depicted in Figure 4.11 and Table 4.2.

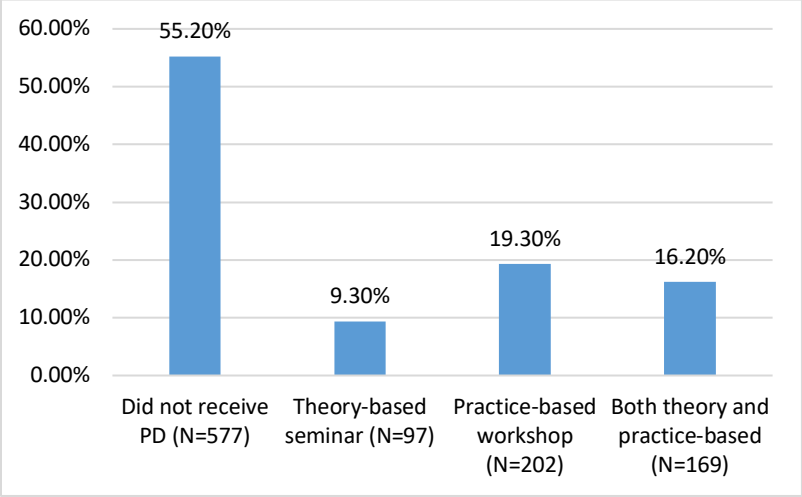

Figure 4.11 Percentage of Participants' Type of PD received in using Future Gate LMS

The duration of professional development for Future Gate LMS participants indicated that 18.5% received more than one day but less than one week, followed by participants who received the professional development in a full day or less (16.2%), one week or longer but less than one semester (9.6%), and a semester long course or more (.8%) as depicted in Figure 4.12 and Table 4.2.

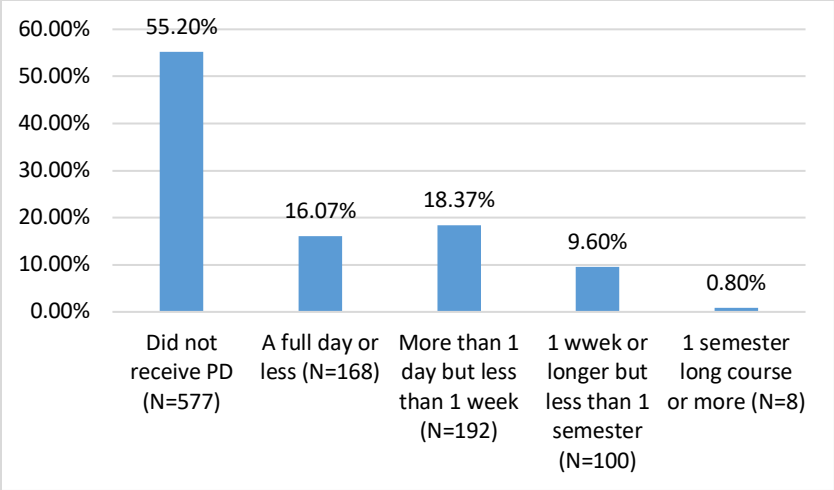

Figure 4.12 Percentage of Participants' Duration of PD in Future Gate use

Table 4.2
Summary of Participant Technographic Characteristics

Variable	Total Number (N= 1045)	Percent %
Years of using technology for instructional purpose		
I year	114	10.9%
2 years	54	5.2%
3 years	71	6.8%
4 years	60	5.7%
5 years or more	729	69.8%
I don't use technology for instructional purpose	17	1.6%
Type of PD in using technology in education		
Did not receive PD	537	51.4%
Theory-based seminar, lecture, or program	68	6.5%
Practice-based workshop or program	175	16.7%
Both theory and practice-based seminar, lecture, program, or workshop	265	25.4%
Duration of PD received in using technology in education		
Did not receive PD	537	51.4%
A full day or less	116	11.1%
More than 1 day but less than 1 week	222	21.2%
1 week or longer but less than 1 semester	110	10.5%
1 semester long course or more	60	5.7%
Type of PD received for using Future Gate LMS		
Did not receive PD	577	55.2%
Theory-based seminar, lecture, or program	97	9.3%
Practice-based workshop or program	202	19.3%
Both theory and practice-based seminar, lecture, program, or workshop	169	16.2%
Duration of PD received in using Future Gate LMS		
Did not receive PD	577	55.2%
A full day or less	168	16.07%
More than 1 day but less than 1 week	192	18.37%

Variable	Total Number (N= 1045)	Percent %
1 week or longer but less than 1 semester	100	9.6%
1 semester long course or more	8	.8%

Descriptive Statistics of Technology and Internet in the Classrooms

The majority of participants in this study indicated that there are limited amounts of instructional technology equipment in the classroom (51.2%), followed by no instructional technology equipment in the classroom (24.6%), and finally a technology rich environment in the classroom (24.2%), as depicted in Figure 4.13 and Table 4.3.

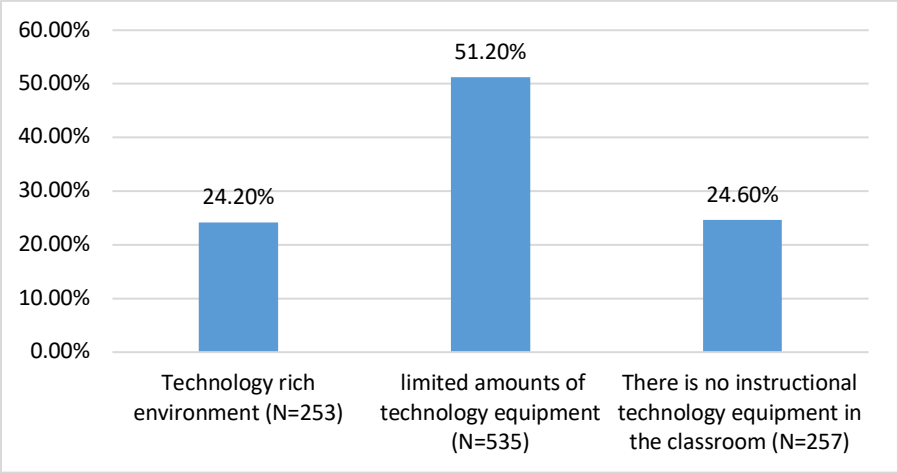

Figure 4.13 Percentage of Technology Availability in Participants' Classrooms

In this study, most participants indicated that there was no Internet service in the classroom (49.8%). Teachers with slow-speed Internet in the classroom were at 28%; teachers with medium-speed Internet in the classroom were at 18.3%, and teachers with high-speed Internet were at 3.9%, as depicted in Figure 4.14. Table 4.3 shows a summary descriptive of technology and Internet in the classrooms, as depicted in Figure 4.14 and Table 4.3.

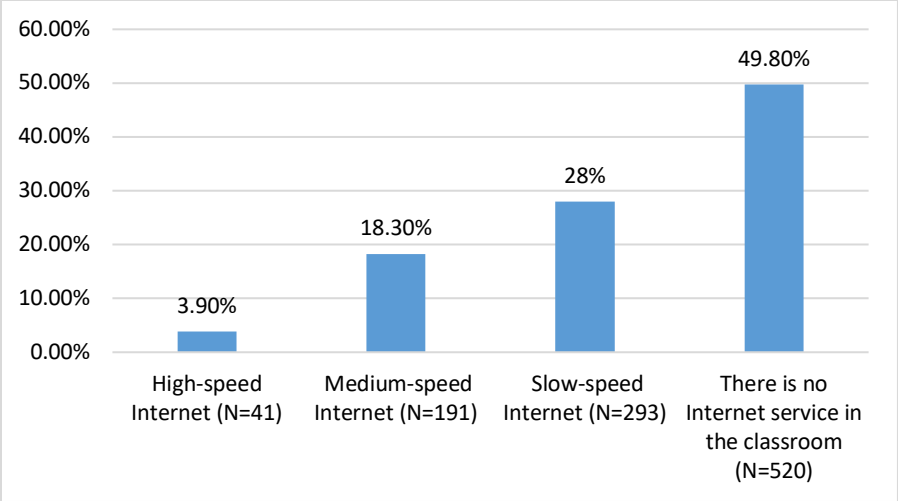

Figure 4.14 Percentage of Participants' Internet Access in Classrooms

Table 4.3

Summary of Technology and Internet in the Classroom

Variable	Total Number (N= 1045)	Total Percentage
Technology availability in the classroom		
Technology rich environment	253	24.2%
A few numbers of technology equipment	535	51.2%
There is no instructional technology equipment in the classroom	257	24.6%
Internet service access in the classroom		
High-speed Internet	41	3.9%
Medium-speed Internet	191	18.3%
Slow-speed Internet	293	28%
There is no Internet service in the classroom	520	49.8%

The Reliability Analysis of Stages of Concern

A reliability analysis was performed to assess the SoCQ (George et al., 2013) applicability regarding the measurement of teachers' concerns of implementing Future Gate LMS in middle and secondary schools Saudi Arabia. Each of the seven levels of concern was tested through examining the Cronbach alpha coefficients. Table 4.4 shows the Cronbach alpha coefficients of the seven levels of concerns, which ranged from .63 for Stage 0 to .83 for Stage 4.

Table 4.4
Coefficient of Internal Reliability for the Stages of Concern Questionnaire (n = 1045)

	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Alpha	.63	.67	.76	.80	.83	.82	.65

Statistical Analysis Findings for Research Question 1

Research Question #1: What is the most intense stage of concern of middle and secondary grade teachers in Saudi Arabia about the learning management system adoption as measured by the stages of concerns questionnaire (SoCQ)?

Ho 1. The most intense stage of concern of Middle/Secondary grade teachers in Saudi Arabia about the Future Gate LMS adoption as measured by the stages of concern questionnaire (SoCQ) is not the personal stage.

To identify the most intense stage of concern profile, the percentile was determined by averaging and converting the row scale scores into percentile. The Microsoft Excel SOCQ-75 Graph and Print program was used to create the overall concern profile for the group (Scott & Persichitte, 2006). The result shows that Stage 0 Unconcern (M = 2.94, SD = 1.34) was the highest stage of concern for the all participants group. The percentile score for Stage 0 was 87%. This indicates that respondents want to know more about the innovation (George et al., 2013). The high score in Stage 0 is an indication that other innovations or activities are a greater concern than the innovation under consideration (George et al., 2013). The second highest stage of concern for the all participants group was Stage 1 Informational (M = 4.60, SD = 1.32). The percentile score for Stage 1 Informational was 84%. This indicates that teachers want to know more information about Future Gate LMS; this score did not indicate how much knowledge that the participants had, but it indicates participants wanted to know more. This was followed by Stage 2 Personal (M = 4.90, SD = 1.48) with a percentile score of 83%. Stage 3 Management (M

= 3.87, *SD* = 1.69) was the fourth highest stage of concern with a percentile score of 73. Stage 6 Refocusing (*M* = 4.19, *SD* = 1.37) was fifth highest stage of concern with a percentile score of 69. The sixth highest stage of concern was Stage 5 Collaboration (*M* = 4.67, *SD* = 1.66) with a percentile score of 59. The lowest stage of concern was in Stage 4 Consequences (*M* = 5.03, *SD* = 1.47) with a percentile score of 54. The results are depicted in Table 4.5 and Figure 4.15.

Table 4.5

Percentile Stages Score for the Respondents

	Stage of Concern	Frequency	Percentile
Unrelated	Stage 0: Awareness	418	87%
Self	Stage 1: Informational	230	84%
	Stage 2: Personal	183	83%
Task	Stage 3: Management	78	73%
	Stage 4: Consequences	15	54%
Impact	Stage 5: Collaboration	72	59%
	Stage 6: Refocusing	49	69%

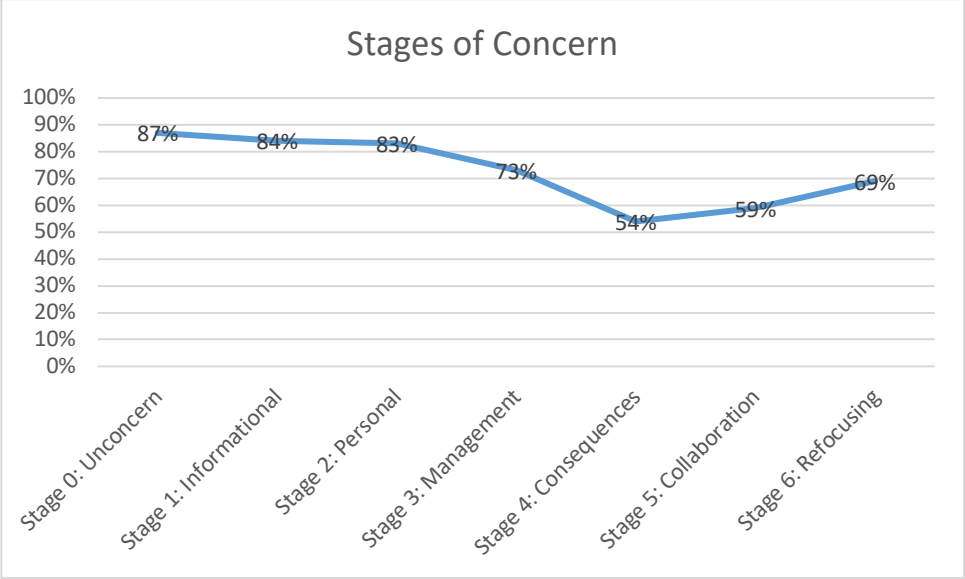

Figure 4.15 Stages of Concern Profile for Respondents

There are five associated questions for each stage, as depicted in Table 4.6. To provide deeper insight about each stage of concern, the average of individual raw score responses was

used. The average response of teachers for each item of the SoCQ (George et al., 2013) are in Tables 4.7 through Table 4.13. The 35 questions were answered on a Likert Scale from 0 to 7.

Table 4.6
Statements on the Stages of Concern Questionnaire Arranged According to Stage

Stage 0	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
3	6	7	4	1	5	2
12	14	13	8	11	10	9
21	15	17	16	19	18	20
23	26	28	25	24	27	22
30	35	33	34	32	29	31

In Stage 0 Unconcern (Awareness Concern), the items considered the degree of teachers' interests on the innovation at this time; it did not include questions about teachers' use or knowledge about the innovation. Table 4.7 shows the average Likert scores for each question related to Stage 0 Unconcern. The highest score was 4.38 for Question 21: "I am preoccupied with things other than the Future Gate LMS." This indicates that there are other innovations or activities that concern teachers at this time. The lowest average score in Stage 0 was for Question 12: "I am not concerned about the Future Gate LMS at this time."

Table 4.7
Item Averages for Stage 0: Unconcern

Question	Average	Question Text
Q 3	2.14	I am more concerned about another program rather than the program of Future Gate LMS.
Q 12	1.42	I am not concerned about the Future Gate LMS at this time.
Q 21	4.38	I am preoccupied with things other than the Future Gate LMS.
Q 23	3.28	I spend little time thinking about Future Gate LMS.
Q 30	3.48	Currently, other priorities prevent me from focusing my attention on the Future Gate LMS.
Mean	2.94	

Note: Questions were answered on a Likert scale from 0 to 7 as follows: 0: Irrelevant; 1,2: Not true of me now; 3,4,5: Somewhat true of me of now; and 6,7: Very True of me now.

The second analysis is for Stage 1 (Informational), in which the teachers want to know more information about the implementation of Future Gate LMS. Table 4.8 shows that the highest intensity average of 5.29 was for Question 35, "I would like to know how the Future

Gate LMS is better than what we have now," closely followed by an average of 5.28 for Question 15, "I would like to know what resources are available if we decide to adopt the Future Gate LMS." This indicates that teachers want to know how Future Gate LMS is different from what they use at this time. It also indicates that they want to know more resources that support their use of the Future Gate LMS. The lowest average of the five items was for Question 6, "I have a very limited knowledge of the Future Gate LMS," which indicates that teachers have limited knowledge of the Future Gate LMS.

Table 4.8
Item Averages for Stage 1: Informational

Question	Average	Question Text
Q 6	2.77	I have a very limited knowledge of the Future Gate LMS.
Q 14	4.61	I would like to discuss the possibility of using the Future Gate LMS.
Q 15	5.28	I would like to know what resources are available if we decide to adopt the Future Gate LMS.
Q 26	5.10	I would like to know what the use of the Future Gate LMS will require in the immediate future
Q 35	5.29	I would like to know how the Future Gate LMS is better than what we have now.
Mean	4.61	

Stage 2 (Personal) considers if teachers have high personal concerns about implementing Future Gate LMS. As depicted in Table 4.9, the high score for Stage 2 (Personal) is 5.03 for Question 28, "I would like to have more information on time and energy commitments required by the Future Gate LMS." The lowest average was 4.69 for Question 13, "I would like to know who will make the decisions in the Future Gate LMS." This indicates that teachers are not as concerned about who will make decisions regarding the implementation of Future Gate LMS.

Table 4.9
Item Averages for Stage 2: Personal

Question	Average	Question Text
Q 7	5.00	I would like to know the effect of the Future Gate LMS on my professional status.
Q 13	4.69	I would like to know who will make the decisions in the Future Gate LMS.

Question	Average	Question Text
Q 17	4.77	I would like to know how my teaching or administration is supposed to change.
Q 28	5.03	I would like to have more information on time and energy commitments required by the Future Gate LMS.
Q 33	5.01	I would like to know how my role will change when I am using the Future Gate LMS.
Mean	4.90	

Stage 3 (Management) looked at issues regarding organizing, managing, and scheduling that are related to the implementation of Future Gate LMS. Table 4.10 shows the average scores for Stage 3 (Management) questions. The highest average is 4.31 for Question 34, "Coordination of tasks and people is taking too much of my time when I use Future Gate LMS." This indicates that teachers have concerns about managing time regarding coordinating tasks and people in the Future Gate LMS. The lowest average is 4.31 for Question 34, "Coordination of tasks and people is taking too much of my time when I use Future Gate LMS."

Table 4.10
Item Averages for Stage 3: Management

Question	Average	Question Text
Q 4	3.71	I am concerned about not having enough time to organize myself each day in which I use Future Gate LMS.
Q 8	3.49	I am concerned about conflict between my interests and my responsibilities when I am using Future Gate LMS.
Q 16	3.57	I am concerned about my inability to manage all that the Future Gate LMS requires.
Q 25	4.29	I am concerned about time spent working with nonacademic problems related to the Future Gate LMS.
Q 34	4.31	Coordination of tasks and people is taking too much of my time when I use Future Gate LMS.
Mean	3.87	

The items for Stage 4 (Consequences) indicate the teachers' concerns about the impact of innovation on students. The average scores for Stage 4 (Consequences) are in Table 4.11. The highest average is 5.45, for Question 11, "I am concerned about how the Future Gate LMS affects students." This indicates that teachers' highest concern was how the innovation will

impact student learning. The lowest score is 4.57 with Question 32, “I would like to use feedback from students to change the Future Gate LMS program.”

Table 4.11
Item Averages for Stage 4: Consequences

Question	Average	Question Text
Q 1	5.18	I am concerned about students’ attitudes toward the Future Gate LMS.
Q 11	5.45	I am concerned about how the Future Gate LMS affects students.
Q 19	5.23	I am concerned about evaluating my impact on students when I am using the Future Gate LMS.
Q 24	4.76	I would like to excite my students about their part in the Future Gate LMS.
Q 32	4.57	I would like to use feedback from students to change the Future Gate LMS program.
Mean	5.03	

Items in Stage 5 (Collaboration) look at how teachers view cooperating with others regarding the use of Future Gate LMS. A depicted in Table 4.12, the highest average score is 4.85, with Question 27: “I would like to coordinate my efforts with others to maximize the effects of the Future Gate LMS.” This indicates that teachers want to collaborate with other teachers to enhance the effects of Future Gate LMS. The lowest score is 4.51 for Question 10: “I would like to develop working relationships with both our faculty and outside faculty using Future Gate LMS.”

Table 4.12
Item Averages for Stage 5: Collaboration

Question	Average	Question Text
Q 5	4.72	I would like to help other faculty in their use of the Future Gate LMS.
Q 10	4.51	I would like to develop working relationships with both our faculty and outside faculty using Future Gate LMS.
Q 18	4.59	I would like to familiarize other schools or teachers with the progress of the Future Gate LMS.
Q 27	4.85	I would like to coordinate my efforts with others to maximize the effects of the Future Gate LMS.
Q 29	4.69	I would like to know what other faculty are doing in the area of Future Gate LMS.
Mean	4.67	

Items in Stage 6 (Refocusing) refer to concerns about how teachers want to improve and develop the implementation innovation to make them work better. Table 4.13 shows the averages of the five questions for Stage 6 (Refocusing). The highest average is 4.98 with Question 9: "I am concerned about revising my use of the Future Gate LMS." which mean that teachers has a desire to revise the use of the Future Gate LMS to improve and develop their implementation. The lowest average score is 2.89 with Question 2: "I now know of some other approaches that might work better than the Future Gate LMS."

Table 4.13
Item Averages for Stage 6: Refocusing

Question	Average	Question Text
Q 2	2.89	I now know of some other approaches that might work better than the Future Gate LMS/
Q 9	4.98	I am concerned about revising my use of the Future Gate LMS.
Q 20	4.16	I would like to revise the Future Gate LMS approach.
Q 22	4.22	I would like to modify our use of the Future Gate LMS based on the experiences of our students.
Q 31	4.73	I would like to determine how to supplement, enhance, or replace the Future Gate LMS.
Mean	4.19	

Inferential Statistics

This section presents the statistical analysis of research questions two, three, and four. To answer the research questions, a series of Multivariance Analysis of Variance (MANOVA) tests were used. The analysis met the assumption of linearity, homogeneity of variance-covariance, and normality. When Levene's test of equality of error variances among dependent variables revealed a significance of less than .05, then Pillai's Trace statistic was used. Pillai's Trace statistic is used because it is robust when the assumptions of homogeneity of variance-covariance matrices and equal cell sizes are violated (Field, 2013). When MANOVA shows a result to be statistically significant, then the Analysis of Variance (ANOVA) test was used to identify the

value of significance. In addition, independent *t*-test was used to compare the mean between the male and female group.

Research Question Two

What is the relationship between Middle/Secondary grade teachers' demographic characteristics (gender, age, years of teaching experience, grade level, subject taught, and type of degree) and their concerns in adopting Future Gate LMS?

Gender. The relationship between teachers' gender and their concerns in adopting Future Gate LMS was assessed using an independent-sample *t* test. In general, the result of *t* test showed a significant difference t (1043) = -3.075, p = .002 between the mean scores for females (M=4.40, SD=1.01) and males (M=4.21, SD=1.05), indicating that female teachers expressed more concerns about the implementation of Future Gate LMS than did male teachers. The seven stages of concerns toward implementing Future Gate LMS showed more specifics about statistical differences between the mean score of females and males; these were found in Stage 0 Unconcern t (1043) = -3.656, $p < .001$ (revealing that females express more unconcern), Stage 2 Personal t (1043) = -2.250, p = .025, Stage 3 Management t (1043) = -3.607, p = .000, and Stage 6 Refocusing t (1043) = -2.140, p = .034. Therefore, the null hypothesis is rejected that there is significant difference between teachers' gender and their concerns in adopting Future Gate LMS.

Results of MANOVA on Stages of Concern by Demographic Characteristics

Age. The relationship between teachers' age and their concerns in adopting Future Gate LMS was assessed using a one-way MANOVA test. Pillai's Trace test showed no significant differences between teachers' ages and their concerns in adopting Future Gate LMS, as depicted in Table 4.14. This indicates that the concerns of the respondents about adopting Future Gate LMS were not influenced by age. Therefore, the null hypothesis H0 2.2 was accepted.

Teaching Experience. Pillai's Trace test showed no significant differences between teachers' teaching experience and their concerns about adopting Future Gate LMS (p = .312), as depicted in Table 4.14. This indicates that the concerns of the respondents about adopting Future Gate LMS were not influenced by years of teaching experience. Therefore, the null hypothesis H0 2.3 was accepted.

Grade of Teaching Level. Pillai's Trace test showed no significant differences between teachers' grade level of teaching and their concerns about adopting Future Gate LMS as depicted in Table 4.14. Therefore, the null hypothesis *Ho 2.4* was accepted.

Subject Area Taught. Pillai's Trace test showed no significant differences between teachers' subject area taught and their concerns about adopting Future Gate LMS as depicted in Table 4.14. Therefore, the null hypothesis *Ho 2.4* was accepted.

Type of Degree. Pillai's Trace test showed significant differences between teachers' highest degree and their concerns about adopting Future Gate LMS (p = .029), as depicted in Table 4.15. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by their highest degree. Therefore, the null hypothesis *Ho 2.6* was rejected.

To determine the exact differences and find out which stage of concern has differences, an ANOVA test was conducted. The significance values and the corresponding stages of concern based on the teachers' highest degree are depicted in Table 4.14.

Table 4.14
One-Way ANOVA of Participants' Type of Degree on SoC

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	15.383	3	5.128	2.849	.036
	Within Group	1873.706	1041	1.800		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	7.722	3	2.574	1.468	.22
	Within Group	1825.390	1041	1.753		
	Total	1833.112	1044			

Dependent Variable		SS	df	MS	F	Sig.
Stage 2: Personal	Between Group	5.629	3	1.876	.860	.46
	Within Group	2270.740	1041	2.181		
	Total	2276.370	1044			
Stage 3: Management	Between Group	17.128	3	5.709	1.996	.11
	Within Group	2977.099	1041	2.860		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	9.303	3	3.101	1.435	.23
	Within Group	2249.875	1041	2.161		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	2.499	3	.833	.298	.82
	Within Group	2908.213	1041	2.794		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	17.929	3	5.976	3.199	.023
	Within Group	1944.597	1041	1.868		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq 0.05$ level

The results from the ANOVA test showed that significant values were found in Stages 0 Unconcern F (3,1041) = 2.849, p = .036, and Stage 6 Refocusing F (3,1041) = 3.199, p = .023, as depicted in Table 4.14. Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by ANOVA. The result showed that there is no difference between groups in Stage 0 and Stage 6.

Table 4.15

Results Summary of Pillai's Trace Test of MANOVA on Stages of Concern by Demographic Characteristics

Independent Variables	Value	*F*	*df*	Error *df*	Sig	Partial Eta Squared
Age	.21	1.037	21	3111.000	.413	
Teaching Experience	.03	1.112	28	4148	.312	
Grade Teaching Level	.015	1.1156	14	2074	.304	
Subject Taught	.013	.63	21	3111	.895	
Type of Degree	.033	1.66	21	3111	.029	.011

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq .05$ level

Research Question Three

Research Question #3: What type of relationship exists between Middle/Secondary grade teachers' technographic characteristics (prior experience with instructional technology use, type

of professional development in instructional technology use, duration of instructional technology related professional development, type of professional development in LMS use, and duration of LMS-related professional development) and their concerns in adopting Future Gate LMS?

Results of MANOVA on Stages of Concern by Technographic Characteristics

Prior Experience with Instructional Technology Use. Pillai's Trace test showed significant differences between teachers' prior experience with instructional technology use and their concerns about adopting Future Gate LMS ($p = .002$), as depicted in Table 4.21.

Thus, the concerns of respondents about adopting Future Gate LMS were influenced by their prior experience with instructional technology use. Therefore, the null hypothesis *Ho 3.1* was rejected.

To determine the exact differences and find out which stage of concern has differences, ANOVA test was conducted. The significance values and the corresponding stages of concern based on the teachers' prior experience with instructional technology use were in Stage 0 $F(5, 1039) = 2.257$, $p = .047$, Stage 1 $F(5,1039)= 3.504$, $p = .004$, Stage 2 $F(5,1039)= 4.004$, $p = .001$, Stage 4 $F(5,1039) = 6.634$, $p < .001$, Stage 5 $F(5,1039) = 6.339$, $p < .001$, and Stage 6 $F(5.1039) = 5.772$, $p < .001$, as depicted in Table 4.16.

Table 4.16
One-Way ANOVA of Participants' Prior Experience in Instructional Technology Use

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	20.296	5	4.059	2.257	.047
	Within Group	1868.793	1039	1.799		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	30.394	5	6.079	3.504	.004
	Within Group	1802.717	1039	1.735		
	Total	1833.112	1044			
Stage 2: Personal	Between Group	43.028	5	8.606	4.004	.001
	Within Group	2233.341	1039	2.150		
	Total	2276.370	1044			

Dependent Variable		SS	df	MS	F	Sig.
Stage 3: Management	Between Group	11.746	5	2.349	.818	.537
	Within Group	2982.481	1039	2.871		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	69.891	5	13.978	6.634	.000
	Within Group	2189.287	1039	2.107		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	86.166	5	17.233	6.339	.000
	Within Group	2824.547	1039	2.719		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	53.038	5	10.608	5.772	.000
	Within Group	1909.488	1039	1.838		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq .05$ level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by the ANOVA test. The results showed that in Stage 0 there is no difference between groups. In Stage 1, teachers who have one year prior experience in technology use were significantly different than teachers who have five years or more experience. ($p = .001$). In Stage 2, teachers who used technology for one year of experience were significantly different than teachers who used technology for two years ($p = .03$) and different than teachers who used technology for five years or more ($p < .001$). In Stage 4, teachers who have one year experience in using instructional technology were significantly different than teachers who used it for two years ($p = .002$), different than teachers who used it for three years or more ($p = .031$), and different than teachers who used it for five years or more ($p < .001$). In Stage 5, teachers who have one year of experience in using instructional technology were significantly different than teachers who used it for two years ($p = .011$) and different than teachers who used it for five years or more ($p < .001$). In Stage 6, teachers who have one year of experience in using instructional technology were significant different than teachers who used it for five years or more ($p < .001$).

Type of Professional Development in Instructional Technology Use. Pillai's Trace test showed significant differences between teachers' type of professional development in instructional technology and their concerns about adopting Future Gate LMS ($p < .001$), as depicted in Table 4.21. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by their type of professional development in instructional technology use. Therefore, the null hypothesis *Ho 3.2* was rejected.

To determine the exact differences and find out which stage of concern has differences, an ANOVA test was conducted. The significance values and the corresponding stages of concern based on the teachers' type of professional development in instructional technology were in Stage 2 Personal $F(3, 1041) = 3.722$, $p = .011$, Stage 3 Management $F(3, 1041) = 3.377$, $p = .018$, Stage 4 Consequences $F(3, 1041) = 9.872$, $p < .001$, Stage 5 Collaboration $F(3, 1041) = 10.734$, $p < .001$, and Stage 6 Refocusing $F(3, 1041) = 8.429$, $p < .001$, as depicted in Table 4.17.

Table 4.17
ANOVA Type of Personal Development in Instructional Technology Use

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	10.389	3	3.463	1.919	.125
	Within Group	1878.700	1041	1.805		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	13.643	3	4.548	2.602	.051
	Within Group	1819.469	1041	1.748		
	Total	1833.112	1044			
Stage 2: Personal	Between Group	24.157	3	8.052	3.722	.011
	Within Group	2252.213	1041	2.164		
	Total	2276.370	1044			
Stage 3: Management	Between Group	28.856	3	9.619	3.377	.018
	Within Group	2965.371	1041	2.849		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	62.492	3	20.831	9.872	.000
	Within Group	2196.686	1041	2.110		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	87.335	3	29.112	10.734	.000

Dependent Variable		SS	df	MS	F	Sig.
	Within Group	2823.377	1041	2.712		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	46.540	3	15.513	8.429	.000
	Within Group	1915.986	1041	1.841		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq 0.05$ level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by the ANOVA test. The result showed that in Stage 2, teachers who had theory-based seminar, lecture, or program professional development were significantly different than teachers who had both theory and practice-based seminar ($p = .006$).

In Stage 3 there was not any significant difference between the type of professional development in using technology in education. In Stage 4 there was a significant difference between teachers who did not receive professional development in using technology for education and teachers who received both theory and practice-based seminars ($p < .001$). Also, there was a significant difference between teachers who received only theory-based seminar with teachers who received both theory and practice-based seminars ($p < .001$).

In Stage 5, there was a significant difference between teachers who did not receive professional development in using technology in education with teachers who had both theory and practice-based seminars ($p < .001$). Also, teachers who had theory-based seminars, lectures, or programs were significantly different than teachers who had both theory and practice-based seminars ($p = .001$). Finally, teachers who had practice-based workshops were different than teachers who had both theory and practice-based seminars in professional development ($p = .027$).

In Stage 6, teachers who did not receive professional development in using technology in education were significantly different than teachers who received both theory and practice-based

seminars for professional development (p < .001). Also, in Stage 6, teachers who had practice-based workshops were significantly different than teachers who had both theory and practice-based seminars and workshops (p < .001).

Duration of Instructional Technology Related Professional Development. Pillai's Trace test showed significant differences between the duration of professional development in instructional technology and teachers' concerns about adopting Future Gate LMS ($p < .001$) as depicted in Table 4.21. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by the duration of professional development in instructional technology use. Therefore, the null hypothesis *Ho 3.3* was rejected.

To determine the exact differences and find out which stage of concern had differences, an ANOVA test was conducted. The significance values and the corresponding stages of concern based on the duration of professional development in instructional technology were in Stage 4 Consequences $F(4,1040) = 7.028$, $p < .001$, Stage 5 Collaboration $F(4,1040) = 7.540$, $p < .001$, and Stage 6 Refocusing $F(4,1040) = 6.916$, $p < .001$, as depicted in Table 4.18.

Table 4.18
ANOVA Duration of Professional Development in instructional Technology Use

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	11.457	4	2.864	1.586	.176
	Within Group	1877.632	1040	1.805		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	7.285	4	1.821	1.037	.387
	Within Group	1825.827	1040	1.756		
	Total	1833.112	1044			
Stage 2: Personal	Between Group	10.818	4	2.704	1.241	.292
	Within Group	2265.552	1040	2.178		
	Total	2276.370	1044			
Stage 3: Management	Between Group	27.196	4	6.799	2.383	.050
	Within Group	2967.031	1040	2.853		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	59.457	4	14.864	7.028	.000

Dependent Variable		SS	df	MS	F	Sig.
	Within Group	2199.721	1040	2.115		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	82.036	4	20.509	7.540	.000
	Within Group	2828.677	1040	2.720		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	50.848	4	12.712	6.916	.000
	Within Group	1911.678	1040	1.838		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq .05$ level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by the ANOVA test. The results showed that in Stage 3 there is no difference between groups. In Stage 4, teachers who did not receive professional development in using technology in education were significantly different than teachers who received professional development for more than one day and less than one week ($p = .01$); there were also significant differences with teachers who received professional development in a one semester long course or more ($p = .001$). A significant difference was also found in Stage 4 for teachers who received professional development for a full day or less than teachers who received it for more than one day and less than one week ($p = .036$), and there was a significant difference from teachers who received professional development in a one semester long course or more ($p = .002$).

In Stage 5, teachers who did not receive professional development in using technology in education were significantly different than teachers who received professional development for more than one day and less than one week ($p = .017$), who received it for one week or longer but less than one semester ($p = .033$), and who received it in a one semester long course or more ($p < .05$).

In Stage 6, teachers who did not receive professional development in using technology in education were significantly different than teachers who received for one week or longer but less than one semester (p = .014) and with those who received it in a one semester long course or more (p = .003). Teachers who received professional development in a full day or less were significantly different than teachers who received it for one week or longer but less than one semester (p = .004) and significantly different than teachers who received it in a one semester long course or more (p = .001).

Type of Professional Development in Future Gate LMS Use. Pillai's Trace test showed significant differences between the type of professional development in Future Gate LMS use and teachers' concerns about adopting Future Gate LMS ($p < .05$), as depicted in Table 4.21. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by the type of professional development in Future Gate LMS use. Therefore, the null hypothesis *Ho 3.4* was rejected.

To determine the exact differences and find out which stage of concern has differences, an ANOVA test was conducted. The significance values and the corresponding stages of concern based on the type of professional development in LMS use were in Stage 0 Unconcern $F(3, 1041) = 3.107$, $p = .026$, Stage 3 Management $F(3, 1041) = 3.862$, $p = .009$, Stage 4 Consequence $F(3, 1041) = 8.732$, $p < .05$, Stage 5 Collaboration $F(3, 1041) = 11.010$, $p < .001$, and Stage 6 Refocusing $F(3, 1041) = 5.625$, $p = .001$, as depicted in Table 4.19.

Table 4.19
ANOVA Type of Professional Development in Future Gate LMS Use

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	16.766	3	5.589	3.107	.026
	Within Group	1872.323	1041	1.799		
	Total	1889.089	1044			
	Between Group	9.940	3	3.313	1.892	.129

Dependent Variable		SS	df	MS	F	Sig.
Stage 1: Informational	Within Group	1823.172	1041	1.751		
	Total	1833.112	1044			
Stage 2: Personal	Between Group	3.662	3	1.221	.559	.642
	Within Group	2272.707	1041	2.183		
	Total	2276.370	1044			
Stage 3: Management	Between Group	32.959	3	10.986	3.862	.009
	Within Group	2961.268	1041	2.845		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	55.452	3	18.484	8.732	.000
	Within Group	2203.726	1041	2.117		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	89.518	3	29.839	11.010	.000
	Within Group	2821.195	1041	2.710		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	31.304	3	10.435	5.625	.001
	Within Group	1931.221	1041	1.855		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the p≤.05 level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by the ANOVA test. The result showed that in Stage 0, teachers who received practice-based workshops or program personal development in using Future Gate LMS were significantly different than teachers who receive it in both theory and practice-based seminars, lectures, programs or workshops (p = .035).

In Stage 3, people who did not receive professional development in using Future Gate LMS were significantly different than teachers who received it in both theory and practice-based seminars, lectures, programs, or workshops (p = .014). Also, teachers who received professional development in practice-based workshops or programs were significantly different than teachers who received it in both theory and practice-based seminars, lectures, programs, or workshops (p = .013).

In Stage 4, teachers who did not receive professional development in using Future Gate LMS were significantly different than teachers who had both theory and practice-based seminars, lectures, programs, or workshops ($p < .05$). Teachers who had theory-based seminars, lectures, or programs were significantly different than teachers who had both theory and practice-based seminars, lectures, programs, or workshops professional development ($p = .002$). Teachers who had professional development that was practice-based workshops or programs were significantly different than teachers who received both theory and practice-based seminars, lectures, programs, or workshop professional development ($p = .004$).

In Stage 5, there was a significant difference between teachers who did not receive professional development in using Future Gate LMS with teachers who received both theory and practice-based seminars, lectures, programs, or workshop professional development ($p < .05$). Teachers who received only theory-based seminars, lectures, or programs were significantly different than teachers who received both theory and practice-based seminars, lectures, programs, or workshop professional development ($p < .05$). Also, teachers who had practice-based workshops or programs were significantly different than teachers who had both theory and practice-based seminars, lectures, programs, or workshop professional development ($p = .001$).

In Stage 6, there was a significant difference between teachers who did not receive professional development in using Future Gate LMS with teachers who received both theory and practice-based seminars, lectures, programs, or workshop professional development ($p = .010$). Teachers who had theory-based seminars, lectures, or programs were significantly different than teachers who had professional development that was both theory and practice-based seminars, lectures, programs, or workshop professional development ($p = .001$).

Duration of Future Gate LMS-Related Professional Development. Pillai's Trace test showed significant differences between the duration of professional development in Future Gate LMS use and teachers' concerns about adopting Future Gate LMS ($p < .05$), as depicted in Table 4.21. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by the duration of professional development in Future Gate LMS use. Therefore, the null hypothesis *Ho 3.4* was rejected.

To determine the exact differences and find out which stage of concern has differences, an ANOVA test was conducted. The significance values and the corresponding stages of concern based on the duration of professional development in LMS use were in Stage 4 Consequences $F(4, 1040) = 4.950$, $p = .001$, Stage 5 Collaboration, $F(4, 1040) = 6.845$, $p < .05$ and Stage 6 Refocusing $F(4, 1040) = 3.844$, $p = .004$, as depicted in Table 4.20.

Table 4.20
ANOVA Duration of Professional Development in LMS Use

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	11.345	4	2.836	1.571	.180
	Within Group	1877.744	1040	1.806		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	4.652	4	1.163	.661	.619
	Within Group	1828.460	1040	1.758		
	Total	1833.112	1044			
Stage 2: Personal	Between Group	16.228	4	4.057	1.867	.114
	Within Group	2260.142	1040	2.173		
	Total	2276.370	1044			
Stage 3: Management	Between Group	14.722	4	3.680	1.285	.274
	Within Group	2979.505	1040	2.865		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	42.205	4	10.551	4.950	.001
	Within Group	2216.973	1040	2.132		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	74.669	4	18.667	6.845	.000
	Within Group	2836.044	1040	2.727		
	Total	2910.713	1044			

Dependent Variable		SS	df	MS	F	Sig.
Stage 6: Refocusing	Between Group	28.589	4	7.147	3.844	.004
	Within Group	1933.937	1040	1.860		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq .05$ level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by ANOVA test. The result showed that in Stage 4, teachers who did not receive professional development in using Future Gate LMS were significantly different than teachers who had one week or longer but less than one semester of professional development ($p = .002$). Teachers who had professional development that was a full day or less were significantly different than teachers who received it in one week or longer but less than one semester ($p = .011$).

In Stage 5, teachers who did not receive professional development in using Future Gate LMS were significantly different than teachers who received it for more than one day and less than one week ($p = .041$) and significantly different than teachers who received it for one week or longer but less than one semester ($p = .001$). Teachers who received professional development in a full day or less were significantly different than teachers who received it for more than one day but less than one week ($p = .008$) and significantly different than teachers who received it for one week or longer but less than one semester ($p < .001$).

In Stage 6, teachers who received professional development in using Future Gate LMS were significantly different than teachers who received it for one week or longer but less than one semester ($p = .024$) and significantly different than teachers who received it for one week or longer but less than one semester ($p = .006$).

Table 4.21

Results Summary of Pillai's Trace Test of MANOVA on SoC by Teachers' Technographic Characteristics

Independent Variables	Value	*F*	*df*	Error *df*	Sig	Partial Eta Squared
Experience in Technology use	.062	1.848	35	5185	.002	.012
Type of PD in IT use	.058	2.916	21	3111	.000	.019
Duration of PD in IT use	.070	2.646	28	4148	.000	.018
Type of PD in LMS use	.070	3.527	21	3111	.000	.023
Duration of PD in LMS use	.076	2.869	28.000	4148.000`	.000	.019

Note. Findings that approach statistical significance depend on the p-value: Significant at the p≤.05 level

Research Question Four

Research Question #4: Is there any relationship between teachers' concerns in adopting Future Gate LMS and the school technology (technology in the classroom and Internet access in the classroom)?

Results of MANOVA on Stages of Concern by Technographic Characteristics

Technology in the Classroom. Pillai's Trace test showed significant differences between the technology availability in the classroom and teachers' concerns about adopting Future Gate LMS (p = .016), as depicted in Table 4.24. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by the availability of technology equipment in the classroom. Therefore, the null hypothesis *Ho 4.1* was rejected.

To determine the exact differences and find out which stage of concern has differences, ANOVA test was conducted. The significance values and the corresponding stages of concern based on the availability of technology equipment in the classroom were in Stage 3 Management F(2, 1042) = 5.164, p = .006, as depicted in Table 4.22.

Table 4.22
ANOVA Test of Technology in the Classroom

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	4.536	2	2.268	1.254	.286
	Within Group	1884.553	1042	1.809		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	8.594	2	4.297	2.454	.086
	Within Group	1824.518	1042	1.751		
	Total	1833.112	1044			
	Between Group	4.863	2	2.432	1.115	.328

Dependent Variable		SS	df	MS	F	Sig.
Stage 2: Personal	Within Group	2271.506	1042	2.180		
	Total	2276.370	1044			
Stage 3: Management	Between Group	29.384	2	14.692	5.164	.006
	Within Group	2964.843	1042	2.845		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	10.762	2	5.381	2.494	.083
	Within Group	2248.416	1042	2.158		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	14.992	2	7.496	2.697	.068
	Within Group	2895.721	1042	2.779		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	2.431	2	1.215	.646	.524
	Within Group	1960.095	1042	1.881		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the p≤.05 level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by the ANOVA test. The result showed that in Stage 3 Management, teachers who teach in classrooms that have technology rich environments were different than teachers who teach in classrooms that have a smaller amount of technology equipment (p = .031) and were significantly different than teachers who teach in classrooms that have no instructional technology in the classroom (p = .006).

Internet Access in the Classroom. Pillai's Trace test showed significant differences between the Internet access in the classroom and teachers' concerns about adopting Future Gate LMS (p = .018), as depicted in Table 4.24. Thus, the concerns of respondents about adopting Future Gate LMS were influenced by Internet access in the classroom. Therefore, the null hypothesis *Ho 4.2* was rejected.

To determine the exact differences and find out which stage of concern has differences, ANOVA test was conducted. The significance values and the corresponding stages of concern

based on the Internet access in the classroom were in Stage 0 Awareness F(3, 1041) = 2.716, p = .044) and Stage 3 Management F(3, 1041) = 6.308, $p < .05$, as depicted in Table 4.23.

Table 4.23
ANOVA Test for Teachers' SoC and Internet Access in the Classroom

Dependent Variable		SS	df	MS	F	Sig.
Stage 0: Unconcern	Between Group	14.674	3	4.891	2.716	.044
	Within Group	1874.415	1041	1.801		
	Total	1889.089	1044			
Stage 1: Informational	Between Group	3.483	3	1.161	.661	.576
	Within Group	1829.629	1041	1.758		
	Total	1833.112	1044			
Stage 2: Personal	Between Group	7.311	3	2.437	1.118	.341
	Within Group	2269.059	1041	2.180		
	Total	2276.370	1044			
Stage 3: Management	Between Group	53.460	3	17.820	6.308	.000
	Within Group	2940.767	1041	2.825		
	Total	2994.227	1044			
Stage 4: Consequence	Between Group	6.936	3	2.312	1.069	.361
	Within Group	2252.242	1041	2.164		
	Total	2259.178	1044			
Stage 5: Collaboration	Between Group	17.123	3	5.708	2.053	.105
	Within Group	2893.590	1041	2.780		
	Total	2910.713	1044			
Stage 6: Refocusing	Between Group	1.000	3	.333	.177	.912
	Within Group	1961.525	1041	1.884		
	Total	1962.526	1044			

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq .05$ level

Further analysis was conducted through Tukey HSD post hoc test because of the significant difference indicated by the ANOVA test. The results showed that in Stage 0 there was not any significant difference between groups. In Stage 3 Management, teachers who teach in classrooms that have high-speed Internet were significantly different than teachers who teach in classrooms that have slow-speed Internet (p = .030) and significantly different than teachers who teach in classrooms that have no Internet service in the classroom (p = .016). Teachers who teach

in classrooms that have medium-speed Internet were significantly different than teachers who teach in classrooms that have slow-speed Internet (p = .024) and significantly different than teachers who teach in classrooms that have no Internet service in the classroom (p = .004).

Table 4.24

Results Summary of Pillai's Trace Test of MANOVA on Stage of Concerns by Technology in the Classroom

Independent Variables	Value	*F*	*df*	Error *df*	Sig	Partial Eta Squared
Technology in the classroom	.026	1.977	14	2074	.016	.013
Internet access in the classroom	.035	1.758	21	3111	.018	.012

Note. Findings that approach statistical significance depend on the p-value: Significant at the $p \leq .05$ level

Table 4.25

Null Hypothesis Summary

RQ	Statement	Action
RQ 1	**Highest Stage of Concern**	
Ho 1.	The most intense stage of concern of Middle/Secondary grade teachers in Saudi Arabia about the Future Gate LMS adoption, as measured by the stages of concern questionnaire (SoCQ), is not the personal stage.	Rejected
RQ 2	**Stage of Concern and Teachers' Demographic Characteristics**	
Ho 2.1.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' gender.	Rejected (p = .007)
Ho 2.2.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' age.	Accepted
Ho 2.3.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' years of teaching experience.	Accepted
Ho 2.4.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' grade level.	Accepted
Ho 2.5.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' subject taught.	Accepted
Ho 2.6.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' type of degree.	Rejected (p = .029)
RQ 3	**Stage of Concern and Teachers' Technographic Characteristics**	
Ho 3.1.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by teachers' prior experience with instructional technology use.	Rejected (p = .002)
Ho 3.2.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by the type of professional development in instructional technology use.	Rejected (p < .001)
Ho 3.3.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by duration of instructional technology related professional development.	Rejected (p < .001)
Ho 3.4.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by the type of professional development in LMS use.	Rejected (p < .001)

RQ	Statement	Action
Ho 3.5.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by duration of LMS-related professional development.	Rejected (p <. 001)
RQ 4	**Stage of Concern and Instructional Technology in the Classrooms**	
Ho 4.1.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by the technology in the classroom.	Rejected (p = .016)
Ho 4.2.	There are no statistically significant differences in Middle/Secondary grade teachers' concerns in adopting Future Gate LMS by the Internet access in the classroom.	Rejected (p = .018)

Phase II: Qualitative Phase

Research Question #5. What are the top three concerns of teachers that are related to implementing Future Gate LMS?

The qualitative phase in this section was informed by the results that were found in the quantitative phase for this explanatory sequential mixed-method study. Therefore, analyzing the qualitative data in this section will provide better interpretation and explanation of the quantitative data in phase I, so the findings will be triangulated.

This research question has two different qualitative data sets that were collected during the data collection process. The first part of the qualitative data was an open-ended question that was in the SoCQ (George et al., 2013) survey that were sent to teachers. A total of 920 teachers responded to the open-ended question on the SoCQ that considered the concerns regarding implementing Future Gate LMS. The second part of the qualitative data was through a semi-structured interview from selected participants. Two participants were randomly selected based on a specific criterion found on their answers from the SoCQ that they answered. Participants that were selected for the interview were chosen based on their highest and lowest SoC that were the same as the SoC of the group concerns. The two participant's highest level of concern was in Stage 0 Unconcern and their lowest level of concern was in Stage 4 Consequences, which was

the same as the group SoC. The analysis of the qualitative data in the research question was based on the lens of the significant variables that was found in the quantitative phase.

Open-ended Question

The results of analyzing the quantitative data revealed that teachers' concerns were statistically significant different due to gender, highest degree, prior experience with instructional technology use, type of professional development in instructional technology use, duration of instructional technology related professional development, type of professional development in Future Gate LMS use, duration of Future gate LMS-related professional development, the availability of instructional technology in the classroom, and Internet access in the classroom. Therefore, all the previous independent variables will be considered in analyzing the qualitative data from the open-ended question and the interview.

Dedoose software (Dedoose, Version 8.3.17) was used, which is a computer-assisted mixed-methods data analysis software (CAQDAS) to organize and manage the content of the qualitative section. First, the survey information and the transcripts of the interviews were uploaded with a protected password. Dedoose is reliable software that is useful for mixed-methods research because of its electronic system for analyzing the responses of the survey as well as the themes from the transcripts. After discovering the themes and the subthemes, the codes were tagged with the appropriate themes.

Eighteen themes emerged for the open-ended question, which consisted of different concerns reflecting teachers' concerns regarding the implementation of Future Gate LMS. Many themes emerged from open-ended questions that reflect teachers' concerns, such as Internet in the school, devices and equipment in the school, concern regarding how students deal with Future Gate, teachers' time management, students' interaction, activating Future Gate,

professional development for teachers, training for students, communication, delivering information, paper cancelation, and Internet and devices for students at home. Following are the top three concerns that emerged after excerpting and coding with Dedoose software. Excerpts from participants' answers in the open-ended question were coded to themes of the teachers' concerns. For example, a participant answered that their school have a slow-speed Internet, then this excerpt is highlighted and attached to the theme that is called Internet in the school. A total of 18 themes were found and coded with 1172 excerpts from participants answers in the open-ended question. From the Dedoose software, the analysis of each variable shows the numbers and the percentage of counting excerpts to themes. The top three concerns were in the lens of the statistically significant variables that were found in the quantitative phase.

Top Three Concerns by Teachers' Gender

The data from Phase I showed that gender was statistically significant t (1043) = -3.075, p = .002. Therefore, analyzing teachers' concerns will use teachers' gender bands. As depicted in Table 4.26, the top three concerns were listed for the gender category. The table also includes the percentage of the excerpts that were coded from the individual concerns by gender out of the total excerpts of individual concerns that were coded for all participants who answered the open-ended question.

Table 4.26
Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by Teachers' Gender Band

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS by Gender		Code Excerpts Count	Percent out of the total excerpts (1172)
Male	1. Internet in school	91	7.8%
	2. Devices and equipment in school	98	8.4%
	3. Concerns about students using FG LMS	92	7.8%
Female	1. Internet in school	146	12.5%
	2. Devices and equipment in school	115	9.8%
	3. Concerns about students using FG LMS	71	6.1%
Top three concerns by gender	1. Internet in school (20.3%) 2. Devices and equipment in school (18.2%) 3. Concerns about students using FG LMS (13.9%)		

The three top concerns by the gender category was Internet in the school, (20.3%) with 12.5% for females and 7.8% for males. Devices and equipment in school was the second top concern (18.2%), with 9.8% for the females and 8.4% for males. The third top concern by gender was concerns regarding students using Future Gate LMS (13.9%), with 7.8% for males and 6.1% for females.

Top Three Concerns by Type of Degree

The list of top concerns by the type of degree are in Table 4.27. Since the majority of participants were teachers with a bachelor's degree, most of the excerpts were for this category. Internet in the school was the top concern (20.2%), with 17.8% for teachers with bachelors, 1.7% for teachers with masters, and .70% for others. The second top concern by the type of degree was devices and equipment in school (18.2%), with 15.7% for teachers with bachelors, 2% for teachers with masters, and .50% for others. The third top concern was the concern of students using Future Gate LMS (12.5%), with 12.5% for bachelors and .01% for doctorates.

Table 4.27
Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by Teachers' Type of Degree

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS By Type of Degree		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
Bachelor	1. Internet in school	209	17.8%
	2. Devices and equipment in school	184	15.7%
	3. Concerns about students using FG LMS	147	12.5%
Master's	1. Devices and equipment in school	23	2.0%
	2. Internet in school	20	1.7%
	3. Student interaction	13	1.1%
Doctorate	1. Time management for teacher	1	0.1%
	2. Concerns about students using FG LMS	1	0.1%
	3. Tasks completion for students takes a long time	1	0.1%
Other	1. Internet in school	8	0.7%
	2. Devices and equipment in school	6	0.5%
	3. Student interaction	6	0.5%
Top three concerns by type of degree	1. Internet in school (20.2%) 2. Devices and equipment in school (18.2%) 3. Concerns about students using FG LMS (12.5%)		

Top Three Concerns by Teachers' Prior Experience with Instructional Technology Use

Table 4.28 shows the top three concerns of teachers by their prior experience with instructional technology use. Internet in the school was the top concern (20%), with 14.4% for teachers who have five years or more experience, 1.7% for teachers with one year experience, .80% for teachers with two years' experience, 1.6% for teachers with three years' experience, and 1.5% for teachers with four years' experience. The second top concern was devices and equipment in school (17.5%), with 13.6% for teachers with five years' experience or more, 1.7% for teachers with one year experience, .90% for teachers with two years' experience, 1% for teachers with three years' experience, and .30% for teachers who do not use technology in teaching. The third top concern was students dealing with Future Gate LMS (12.5%), with 8.7% for five years or more experience, 1.9% for teachers with one year experience, .7% for teachers with two years' experience, 1.3% for teachers with three years' experience, 1.1% for teachers with four years' experience, and .3% for teachers who do not use technology in teaching.

Table 4.28

Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by Teachers' Prior Experience with Instructional Technology Use

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS By the Prior Experience with Instructional Technology Use		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
1 year	1. Concerns about students using FG LMS	22	1.9%
	2. Devices and equipment in school	20	1.7%
	3. Internet in school	20	1.7%
2 years	1. Devices and equipment in school	10	0.9%
	2. Internet in school	9	0.8%
	3. Concerns about students using FG LMS	8	0.7%
3 years	1. Internet in school	19	1.6%
	2. Concerns about students using FG LMS	15	1.3%
	3. Devices and equipment in school	12	1.0%
4 years	1. Internet in school	18	1.5%
	2. Concerns about students using FG LMS	13	1.1%
	3. Teachers self-concern regarding using FG LMS	12	1.0%
5 years or more	1. Internet in school	169	14.4%
	2. Devices and equipment in school	159	13.6%
	3. Concerns about students using FG LMS	102	8.7%
I don't use tech	1. Concerns about students using FG LMS	3	0.3%
	2. Devices and equipment in school	3	0.3%
	3. Teachers self-concern regarding using FG LMS	3	0.3%
Top three concerns by teachers' prior experience with instructional technology use	1. Internet in school (20%) 2. Devices and equipment in school (17.5%) 3. Concerns about students using FG LMS (14%)		

Top Three Concerns by the Type of Professional Development in Instructional Technology Use

The top three concerns by the type of professional development are depicted in Table 4.29. The top concern was Internet in the school (10.4%), with 5.2% for teachers who received both theory and practice professional development, 3.9% for teachers who had practice-based professional development, and 1.3% for teachers who had theory-based professional development. The second top concern was devices and equipment in school (9%), with 5.1% for teachers who received both theory and practice professional development, 3.1% for teachers who had practice-based, and .80% for teachers who had theory based. The third top concern was students using Future Gate LMS (6.1%), with 4% for teachers who received both theory and

practice professional development and 2.1% for teachers who had practice-based professional development.

Table 4.29

Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by the Type of Professional Development in Instructional Technology Use

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS By the Type of Professional Development in Instructional Technology Use		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
Practice-based workshops or programs	1. Internet in school	46	3.9%
	2. Devices and equipment in school	36	3.1%
	3. Concerns about students using FG LMS	25	2.1%
Theory-based seminars, lectures, or programs	1. Internet in school	15	1.3%
	2. Devices and equipment in school	9	0.8%
	3. Student interaction	6	0.5%
Both theory and practice-based seminars, lectures, programs, or workshops	1. Internet in school	61	5.2%
	2. Devices and equipment in school	60	5.1%
	3. Concerns about students using FG LMS	47	4.0%
Top three concerns by teachers' type of professional development in instructional technology use	1. Internet in school (10.4%) 2. Devices and equipment in school (9%) 3. Concerns about students using FG LMS (6.1%)		

Top Three Concerns by the Duration of Instructional Technology-Related Professional Development

Table 4.30 shows the top three concerns by the duration of instructional technology-related professional development. The first top concern was Internet in the school (10.3%), with 4.9% for participants who had professional development more than one day but less than one week, 2.2% for participants who had a full day or less, 2.2% for participants who had one week or longer but less than one semester, and 1% for participants who had a one semester long course. The second top concern was devices and equipment in school (9%), with 4.2% for participants who had more than one day but less than one week, 1.9% for participants who had a full day or less, and 1.9% for participants who had one week or longer but less than one semester. The third top concern was students using Future Gate LMS (5.7%), with 2.8% for participants who had more than one day but less than one week, 1.7% for participants who had

one week or longer but less than one semester, and 1.2% for participants who had a one semester long course of professional development.

Table 4.30

Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by the Duration of Instructional Technology Related Professional Development

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS by the Duration of Instructional Technology-Related Professional Development.		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
A full day or less	1. Internet in school	26	2.2%
	2. Devices and equipment in school	22	1.9%
	3. Student interaction	12	1.0%
More than 1 day but less than 1 week	1. Internet in school	57	4.9%
	2. Devices and equipment in school	49	4.2%
	3. Concerns about students using FG LMS	33	2.8%
One week or longer but less than 1 semester	1. Internet in school	26	2.2%
	2. Devices and equipment in school	22	1.9%
	3. Concerns about students using FG LMS	20	1.7%
One semester long course	1. Concerns about students using FG LMS	14	1.2%
	2. Devices and equipment in school	12	1.0%
	3. Internet in school	12	1.0%
Top three concerns by teachers' duration of professional development in instructional technology use	1. Internet in school (10.3%) 2. Devices and equipment in school (9%) 3. Concerns about students using FG LMS (5.7%)		

Top Three Concerns by the Type of Professional Development in Future Gate LMS Use

The top three concerns by the type of professional development in Future Gate LMS use is depicted in Table 4.31. The top concern was Internet in the school (9.8%), with 4.4% for participants who had practice-based professional development, 3.9% for participants who had both practice and theory, and 1.5% for participants who had theory-based professional development use. The second top concern was in devices and equipment in school (9.3%), with 4.4% for participants who had practice-based theory, 1.4% for participants who had theory-based professional development, and 3.5% for participants who had both theory and practice-based professional development. The third top concern was concern about students dealing with using Future Gate LMS, with 2.6% for participants who had practice-based professional development,

1.2% for participants who had theory-based professional development, and 2.2% for participants who had both theory and practice-based professional development.

Table 4.31

Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by Type of Professional Development in Future Gate LMS Use

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS by the Type of Professional Development in LMS Use.		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
Practice-based workshop or program	1. Devices and equipment in school	52	4.4%
	2. Internet in school	52	4.4%
	3. Concerns about students using FG LMS	30	2.6%
Theory-based seminar, lecture, or program	1. Internet in school	18	1.5%
	2. Devices and equipment in school	16	1.4%
	3. Concerns about students using FG LMS	14	1.2%
Both theory and practice-based seminar, lecture, program or workshop	1. Internet in school	46	3.9%
	2. Devices and equipment in school	41	3.5%
	3. Concerns about students using FG LMS	26	2.2%
Top three concerns by teachers' type of professional development in Future Gate LMS use	1. Internet in school (9.8%) 2. Devices and equipment in school (9.3%) 3. Concerns about students using FG LMS (6%)		

Top Three Concerns by the Duration of Future Gate LMS Related-Professional Development

The top three concerns by the duration of Future Gate LMS-related professional development are depicted in Table 4.32. The top concern was Internet in the school (10%), with 4.4% for participants who had more than one day but less than one week professional development, 3.1% for participants who had a full day or less professional development, and 2.5% for participants who had one week or longer but less than one semester. The second top concern was devices and equipment in school (9.3%), with 3.8% for participants who had more than one day but less than one week, 3% for participants who had a full day or less, and 2.5% for participants who had one week or longer but less than one semester. The third top concern was concern about students dealing with Future Gate LMS (5.9%), with 2.4% for a full day or less,

2.3% for more than one day but less than one week, and 1.2% for one week or longer but less than one semester.

Table 4.32

Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by the Duration of the Future Gate LMS-Related Professional Development

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS by the Duration of LMS-related Professional Development		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
A full day or less	1. Internet in school	36	3.1%
	2. Devices and equipment in school	35	3.0%
	3. Concerns about students using FG LMS	28	2.4%
More than one day but less than one week	1. Internet in school	52	4.4%
	2. Devices and equipment in school	45	3.8%
	3. Concerns about students dealing with FG LMS	27	2.3%
One-week ore longer but less than one semester	1. Devices and equipment in school	29	2.5%
	2. Internet in school	29	2.5%
	3. Concerns about students dealing with FG LMS	14	1.2%
One semester long	1. Teachers concerns regarding dealing with FG LMS	4	0.3%
	2. Student interaction	2	0.2%
	3. Communication	1	0.1%
Top three concerns by the duration of professional development in Future Gate LMS use	1. Internet in school (10%) 2. Devices and equipment in school (9.3%) 3. Concerns about students using FG LMS (5.9%)		

Top Three Concerns for Technology in the Classroom

The top concerns for technology in the classroom are in Table 4.33. The top concern was Internet in school (20.2%), with 9.9% for participants who answered that they have a limited amount of technology, 6.5% for participants who answered that they do not have instructional technology in the classroom, and 3.8% for participants who answered that they have a technology rich environment. The second top concern was devices and equipment in the classroom (15.7%), with 9% for a limited amount of technology and 6.7% for no technology in the classroom. The third top concern was students dealing with Future Gate LMS (14%), with 7.3% for a limited amount of technology in the classroom, 3.8% for a technology rich environment, and 2.9% for no technology in the classroom.

Table 4.33
Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by Technology in the Classroom

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS by Technology in the Classroom		Code Excerpts Count	Percent Out of the Total Excerpts (1172)
Technology rich environment	1. Internet in school	45	3.8%
	2. Concerns about students dealing with FG LMS	44	3.8%
	3. Student interaction	36	3.1%
A limited amount	1. Internet in school	116	9.9%
	2. Devices and equipment in school	106	9.0%
	3. Concerns about students dealing with FG LMS	85	7.3%
No technology in the classroom	1. Devices and equipment in school	79	6.7%
	2. Internet in school	76	6.5%
	3. Concerns about students dealing with FG LMS	34	2.9%
Top three concerns by the instructional technology in the classroom	1. Internet in school (20.2%) 2. Devices and equipment in school (15.7%) 3. Concerns about students using FG LMS (14%)		

Top Three Concerns for Internet Access in the Classroom

The top three concerns for Internet access in the classroom are depicted in Table 4.34. The top concern was having Internet in the classroom (18%), with 11.9% having no Internet in the classroom and 6.1% having only slow-speed Internet. The second top concern was devices and equipment in school (17.8%), This concern was 10.8% for participants who answered that they do not have Internet in the classroom, 4.6% for participants who answered that they have slow-speed Internet, and 2.4% for participants who answered that they have medium-speed Internet. The third top concern was students dealing with Future Gate LMS (14%%), This concern was 6.2% for participants who answered that they do not have Internet in the classroom, 3.8% for participants who answered that they have slow-speed Internet, 3.2% for participants who answered that they medium-speed Internet, and .80% for high-speed Internet. The top concern was teachers who do not have Internet access in the classroom.

Table 4.34
Code Analysis: The Top Three Concerns of Adopting Future Gate LMS by Internet Access in the Classroom

Top Three Themes of Teacher Concerns on Adopting Future Gate LMS by the Internet Access in the Classroom		Code excerpts Count	Percent Out of the Total Excerpts (1172)
High-speed	1. Concerns about how students use FG LMS	9	0.8%
	2. Student interaction	6	0.5%
	3. Teachers concerns regarding dealing with FG LMS	5	0.4%
Medium-speed Internet	1. Concerns about how students use FG LMS	37	3.2%
	2. Teachers concerns regarding dealing with FG LMS	33	2.8%
	3. Devices and equipment in school	28	2.4%
Slow-speed Internet	1. Internet in school	72	6.1%
	2. Devices and equipment in school	54	4.6%
	3. Concerns about how students use FG LMS	44	3.8%
No Internet in the classroom	1. Internet in school	139	11.9%
	2. Devices and equipment in school	127	10.8%
	3. Concerns about students dealing with FG LMS	73	6.2%
Top three concerns by the Internet access in the classroom	1. Internet in school (18%) 2. Devices and equipment in school (17.8%) 3. Concerns about how students use FG LMS (14%)		

In general, the top three concerns of teachers about adopting future Gate LMS identified from the open-ended question were centered around Internet in the school, devices and equipment in school, and concerns about how students use and deal with Future Gate LMS, as depicted in Table 4.35.

Table 4.35

Top Three Concerns Identified from the Open-ended Question

Top Three Themes of Teachers' Concerns on Adopting Future Gate LMS	
Open-ended Question from SoCQ	1. Internet in the schools 20.22% 2. Devices and equipment in School (18.17%) 3. Concerns about students using and dealing with FG LMS (13.90%)

Regarding concerns about the Internet in the school, participants complained that they need the Internet to do required schoolwork. For example, participant 182 said that we need "to provide the internet inside the classroom so that the technology can be combined with education." Participant 902 said that "The Internet is the first obstacle for me and my students." Participant 191 said, "The Internet is very slow." Participant 219 answered that schools need to "provide Internet for teachers and students inside the school." Participant 959 said, "There are

many problems, including poor Internet inside the school. That caused the disruption of the Future Gate system, which distracts teachers and students and wastes class time."

Devices and equipment in the school was the second top concern that participants noted in the open-ended question. They complained that schools need devices that teachers and students can use. For example, participant 17 said that schools have a *"*lack of interest in providing technology like iPads for students and that impedes our work in the portal." Participant 556 said, his concern is "the lack of devices that help you to do tasks such as the Internet and projectors." Providing technology devices for instructional purpose leads to an attractive learning environment, as participant 626 explained, "providing the equipment is necessary for the Future Gate's success, including the Internet, devices, and a desirable learning environment." When devices are available for teachers and students in the school, that helps teachers to do tasks such as the exams that are in Future Gate, as participant 1017 stated, "providing computers for every student in the school and high-speed internet is needed, especially with our application of electronic tests that require device for each student."

The third concern was about students using and dealing with Future Gate LMS, as 13.90% of the excerpts from teachers' answers were about students using the Future Gate, not about their learning outcomes. For example, participant 867 answered, "What concerns me is the status of students, their dealing with technology." Another answer supports this such as participant 38, "I am interested in how students know to interact with Future Gate in the right way." Participant 121 explained she is interested in "the ability of all students to enter Future Gate and respond to me." Participant 778 explained his concern is "the ability of all students to enter the program."

Semi-structured Interviews

In explanatory sequential mixed-methods study, the qualitative data is informed by data from the quantitative phase. Therefore, the semi-structured interviews provide in-depth information as a foundation for the second phase. Participants were randomly selected based on a specific criterion and who willing to participate in the interview section. Participants were in the same higher SoC of the group (Stage 0 Unconcern) and in the same lower SoC of the group (Stage 4 Consequences). The demographic and technographic data for the participants who were interviewed are depicted in Table 4.36. Two participants were randomly selected for the interview section based on their highest and lowest SoC. The interviews were held online through Zoom platform software, audio recorded, and transcribed 48 hours after each interview. The transcripts were sent to participants to review and add or delete any information for member checks. Once the transcripts were reviewed, the interviews were coded into themes and then sub-codes.

Table 4.36

Demographic and Technographic Information and Technology in the Classroom

		Pseudonym: Ahmed	**Pseudonym: Sara**
Demographic Characteristics	Gender	Male	Female
	Age	30 - 39	40 - 49
	Teaching Experience	6 - 10	16 - 20
	Highest Degree	Master	Bachelor
	Grade Teaching Level	Secondary	Secondary
	Subject Taught	Computer Science	Biology
Technographic Characteristics	Experience in Technology use	5 years or more	5 years or more
	Type of PD in IT use	Did not receive	Both, theory and practice-based workshop
	Duration of PD in IT use	Did not receive	One week or more but less than a semester
	Type of PD in LMS use	Did not receive	Both, theory and practice-based workshop
	Duration of PD in LMS use	Did not receive	One week or more but less than a semester
Technology in the Classroom	Technology equipment	Some technology in the classroom	Some technology in the classroom
	Internet Access	Slow-speed Internet	Medium-speed Internet

Ahmed

Ahmed's age was between 30 –39 years old He is a male with 6 –10 years' experience in teaching secondary school in computer science; and holds master's degree. He did not receive professional development in using technology because he thinks that his specialty in computer science makes him a professional in using technology in education. He teaches computer science in his school and also works as the digital transformation coordinator in his school, so the professional development that he received in using Future Gate LMS was as the school's digital transformation coordinator to help other teachers in his school to use Future Gate LMS and to learn digital transformation. His school was selected in the second part of the first phase, but the start of implementing Future Gate in his school was in the second phase. His classroom has a limited amount of educational technology such as projector and smart board. The Internet in his school is not fast but he thinks the good thing is that TETCO provided access points only for classrooms and teachers' rooms to help using the Internet without issues.

The SoC profile of Ahmed in Figure 4.16 Shows that the highest SoC for him was Unconcern with percentile score with 87%. The second highest SoC was Stage 2 Personal with percentile score of 85%. The lowest SoC was Stage 4 Consequences with percentile score of 11%.

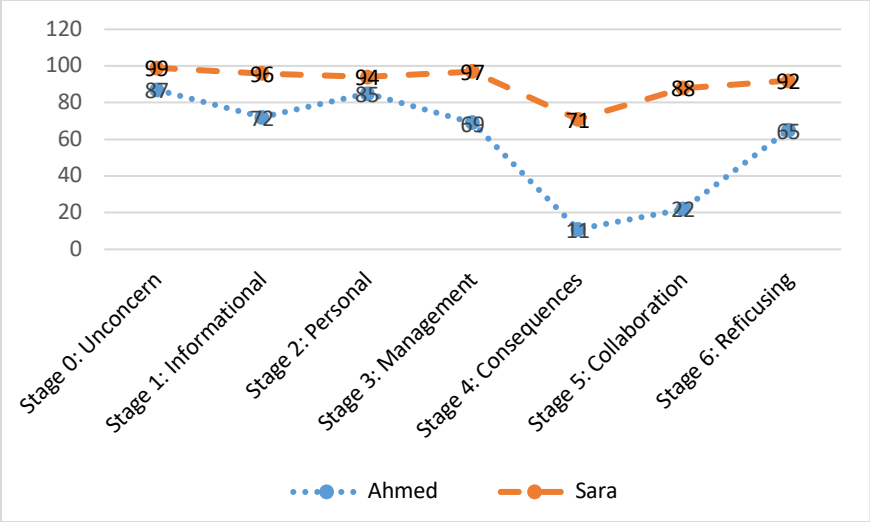

Figure 4.16 The SoC of the Interview Participants

Sara

Sara's age was between 40 – 49 years old. She is a female teacher with 16 – 20 years' experience teaching biology. She teaches in a secondary school and holds a bachelor's degree in biology. She is a professional in using a computer in education as she is a Microsoft Innovative Educator (MIE), so she has used technology in education for more than five years. She received theory- and practice-based workshop professional development in using technology in education for more than one week but less than one semester. Her school was selected in the second part of the first phase of implementing Future Gate LMS. She teaches in a classroom that has a limited amount of educational technology, such as interactive projector and smart board. She and other teachers in the school have computers in the classroom, but students do not, so they can only use the resources room that has many computers. The Internet in her classroom is medium-speed, and if there are technical issues with the Internet, she uses her own Internet that she brings in on a special device to school.

The SoC profile of Sara in Figure 4.16 Shows that the highest SoC for her was Unconcern with percentile score with 99%. The second highest SoC was in Stage 3 Management

with percentile score of 97%. The lowest SoC was Stage 4 Consequences with percentile score of 71%.

Findings from the Interviews

After reading the interview transcripts several times, themes emerged that represent the concerns of teachers regarding the adoption of Future Gate LMS. Those themes are technology in schools, Internet problems, concerns regarding students' using Future Gate, time management for teachers and students, Future Gate activation, and a shortage of students' time to finish all the work. In addition, each of the participants were asked to tell about their biggest concerns for Future Gate adoption.

The Top Three Themes that Emerged from the Interview Section

The top three concerns that were found from themes that emerged from the interview section are as follows.

1. Concerns Regarding School Technology

School technology was one of the main concerns that participants discussed during the interviews. Their concerns included the Internet in the classroom and devices in the school. Participants supported their ideas and explained how important technology in the school is to implement Future Gate LMS. The subthemes that emerged from this concern are concerns regarding Internet in school and concerns regarding devices in school:

Concerns Regarding Internet in School. There is no doubt that the speed of the Internet is one of the most important factors that helps teachers and students to use Future Gate LMS perfectly. Teachers need to use the Internet during class without wasting time with Internet problems. Participants discussed the Internet problems many times, as Ahmed explained that "one of the obstacles to using the Future Gate is internet problems. Sometimes you are ready to

record lesson on the Future Gate inside the classroom to upload it on the FG, but you face an internet problem that prevents you to do it."

Sara also shared the same concern regarding Internet problems: "Technology has its disadvantages, for example, sometimes the Internet doesn't work." However, she takes matters in her own hands to fend off Internet problems: "I bring my own Internet to school as an alternative."

Concerns Regarding Devices in School. Providing adequate devices to implement Future Gate LMS is vital for a successful transformation to digital learning. Both of the participants indicated that their school has a limited number of devices, such as smart boards and projector. While the schools have only a few devices, the two participants in the interview indicated that the classrooms themselves do not have devices such as computers or tablets. Ahmed explained, "Students have eight devices in the resource room, but they have no devices in the classroom." He added, "Students usually use these devices if they have time to finish some tasks if they missed some instead of doing it at home." One of the main goals of the digital transformation plan is that each student should have his or her own device in the classroom, but at the time this study was conducted, participants complained that students did not have their own devices in the classroom. Sara explained, "at this moment only teachers have computers in the classroom, but students still do not have it." This finding explains how lack of the devices in the school makes it difficult to implement Future Gate during the class time.

2. Concerns Regarding Future Gate Activation

Activating Future Gate is a requirement for teachers and students. Participants were concerned about this issue. Reasons for the concerns include that teachers have to finish tasks in order to get 100% activation, which help them obtain points for coupons and awards. School

principals usually ask teachers to activate Future Gate to help their school receive awards at the level of the Department of Education at the end of each semester. This makes teachers concerned about activating the Future Gate LMS, and therefore they put pressure on students to activate the tasks on Future Gate. Ahmed explained, "there is support on using points, as you get points for discounts in certain areas, these are very excellent, and everyone is trying to get these points." Sara explained,

> Statistics on the Future Gate tells the highest teachers activated on Future Gate in the school as well as the highest students in the school and also in the Department of Education, but I don't like to do this kind of competition because as I explained I like quality, not quantity. I mean I usually upload things with quality, I rarely use video links, I chose good videos, I cut it and download it then I write questions about it. I care that I upload something that serves students because there are some teachers who care that they upload too much to help them get points in activation.

Sara also explained that the conditions of activating Future Gate may have an effect on students' concentration because it would include too much work. She said,

> Teachers started filming and uploading the videos on the Future Gate. So, the section she was uploading became the lesson so the students would follow it, and then the teacher gets so many points. Here, the problem has become competition between teachers for those who get higher points, possibly at the expense of the students.

Activating Future Gate is still optional, so in case some teachers did not activate it, they will not get a penalty for that. This also concerned Ahmed, as he thought *that* might lead to the failure of Future Gate:

> I fear the portal will not succeed for several reasons. The first thing that I fear is that the teacher who is not enthusiastic about the portal will harm a teacher who is enthusiastic. Because there is a teacher [who is] activating the portal well and other teachers [do] not activate the portal, the actions taken on them are zero. For this, the benefits, for example, are that he achieved satisfaction from the school principal and the Department of Education or achieved a set of points that he can benefit from in replacing them with discounts (this is for the one who activated the portal). As for who did not do the gate completely, let's say he refused for any reason whatsoever, even though from my experience from the teachers that we contacted, they are few, we do not say that they are not existent, but they are present, this did not take any action to make him activate [Future] Gate.

3. Concerns Regarding Students Dealing with Future Gate LMS

The SoC for the interviewees was Stage 4 Consequences, as the teachers were not aware at this time of a change for students' outcomes. The interviewees expressed concerns about having students deal with Future Gate LMS as an innovation but that does not have an impact on students' outcomes. These concerns were explained as the following subthemes.

Students' Acceptance of Technology. Accepting changes to digital learning could face obstacles. Teachers explained their concerns regarding how some students are enthusiastic about the chance to use Future Gate LMS as a new learning innovation. In this case, Ahmed explained that some students accepted it at the beginning and some will accept it later: "It is possible for the student to start complaining about it, but within days he will get used to it and will find that he can have a great benefit." This kind of concern makes Sara think she needs to start

collaboration with eLearning between students in order to help those who struggle with Future Gate. She said,

> I honestly do not like to put pressure on a student if she has problems with a computer. She can write on the notebook and take a picture and attach it, because Future Gate accepts the attachment as a picture. I also directed students, for example, that they can work together in a cooperative work, that they can enter via Google applications, and that PowerPoint in Google and Word can be shared.

Concern of Students' Time Management. Participants also were concerned that there was more work than students could finish. This concern was explained by Ahmed: "I am concerned about some students who face problems like the time that teachers set for the test. Future Gate might not open for him or he might have Internet problems in his house." The same issue was explained by Sara about how this has affected her son at home: "My son in the secondary school has an exam, he started doing the exam then the Internet stopped, after that the time ended and he couldn't finish the exam." This makes some teachers feel remorseful about asking students to do too much work in their classrooms and from other teachers as they do not have time to finish all their tasks. As Ahmed said, "Sometimes I have remorse because of the students' short time."

Concern of Students' Searching for Information. Many features in Future Gate require students to search the Internet to get information such as participating in class discussions. Participants were concerned about students dealing with Future Gate if the students were to get information from the wrong source. Ahmed explained, "I'm concerned that a student might get the wrong information from the wrong source because you cannot limit him to the Future Gate library to only search from it or from the portal videos." This leads teachers to be more

concerned about how students get the right information from a trusted site. Sara explained, "Students search under the teacher's supervision, the Internet in the school is filtered and some sites were blocked." Teachers can supervise students' searches inside the school. However, students need to do some tasks after school without teachers' supervision, and that could lead to getting incorrect information from the Internet.

The interview also included a direct question about participants' top three concerns in adopting the Future Gate LMS. Ahmed ranked his top concerns: (1) if they impose the portal without an additional bonus, (2) technical problems, and (3) if Future Gate fails, then they might decide to cancel it. Sara ranked her top concerns: (1) full dependence on technology in the educational process, (2) Internet problems, and (3) relying on the portal as a final evaluation instead of using paper tests. Table 4.37 shows the top three concerns from the Interview section.

Table 4.37
Top Three Concerns for Adopting Future Gate LMS of the Interview Participants

	Top Three Concerns for Adopting Future Gate LMS from the Interview
Concerns from Semi-structured Interviews	1. Concerns regarding technology in the school 2. Concerns regarding Future Gate activation 3. Concerns regarding students dealing with Future Gate LMS

Summary

The purpose of this explanatory sequential mixed-methods study was to examine the concerns of teachers in the Middle and Secondary schools that implemented Future Gate LMS in Saudi Arabia. The study also aimed to investigate the SoC of teachers and how the concerns differed by teachers' demographic characteristics, technographic characteristics, and technology and Internet in the classroom. This study started with a quantitative phase (SoCQ) (George et al., 2013), followed by a qualitative phase (open-ended questions that were at the end of the survey and semi-structured interview). The qualitative data were informed by the quantitative data in the

first phase. The quantitative and qualitative data were analyzed to examine the concerns of teachers regarding the adoption of Future Gate LMS. The information obtained from the quantitative data in SoCQ were used to answer research questions 1, 2, and 3. The information obtained from the open-ended questions and the semi-structured interviews were used to support the answers for research question 4.

The total number of participants in this study who answered all the survey questions were 1045. The descriptive analysis of the data showed that regarding gender, females (53.6%) outnumbered males (46.4%). The largest age group was those who were 40 to 49 years old (52.2%) and the group with the smallest number of members were from 20 to 29 years old (4.5%). Teachers who had been teaching for 20 years or more composed the largest group (30%), while the smallest group of teachers had 1 to 5 years (7.1%) of teaching experience Teachers with a bachelor's degree were the most populous group of participants (88%), while teachers with a master's degree were 7.8% and doctorates were only .4%. Most of participants were teaching Middle school (56%), while 41% taught in the Secondary school. The largest number of participants were teaching humanities (49.8%) while social science teachers were the smallest group at 8.7%. Most of teachers participating were in the second phase of implementing Future Gate LMS (47.6%), followed by teachers in the third phase (33.3%), and teachers in the first phase were at 19.1%.

The largest number of teachers had been teaching with technology for 5 years or more (69.8%), while 1.6% indicated that they do not use technology for instructional purpose. The largest group of participants (51.4%) indicated that they did not receive professional development to use technology for instructional purposes, 25.4% of participants indicated that they received both theory and practice-based seminars, lectures, programs, or workshops, and

only 6.5% indicated that they received theory-based seminars, lectures, or programs. Most of participants who received professional development had it more than one day but less than one week (21.2%). However, most of the teachers did not receive any professional development for using Future Gate LMS (55.2%). The largest group who had professional development had a practice-based workshop or program (19.3%). Teachers who had professional development for using Future Gate LMS had it more than one day but less than one week (18.5%), followed by teachers who had it a full day or less (16.2%). Most of participants indicated that they have a limited amount of technology equipment in the classroom (51.2%). Almost half of the participants indicated that they did not have Internet service in the classroom (49.8%).

Results from Research Question One indicated that the highest score of SoC of teachers was Stage 0 (Unconcern) with a percentile score of 87%. The second highest score was for Stage 1 Informational 84%, followed by Stage 2 Personal 83%. The lowest percentile score was in Stage 4 Consequences 54%. Other results were teachers in Stage 5 Collaboration were at 59%, in Stage 6 Refocusing 69%, and in Stage 3 Management 73%.

Results from Research Question Two indicated that two of the demographic characteristics were statistically significant (gender $p = .002$ and type of degree $p = 029$) with teachers SoC in adopting Future Gate LMS. Results from Research Question Three indicated that all technographic characteristics were statistically significant different with teachers' SoC in adopting Future Gate LMS. Results from Research Question Four indicated that two variables (technology in the classroom and Internet access in the classroom) were statistically significant with teachers' SoC in adopting Future Gate LMS.

Results from Research Question Five indicated that the top three concerns for teachers in adopting Future Gate LMS in the open-ended question were centered around Internet in the

school, devices and equipment in school, and concerns on how students use and deal with Future Gate LM. The top three concerns from the interview centered around concerns regarding technology in the school, Future Gate activation, and how students deal with Future Gate LMS.

Chapter 5 includes the following sections: (a) summary of the findings, (b) discussion and conclusions (c) implications (d) Recommendations for Implementing the Future Gate LMS, and (f) Recommendation for Future Research.

Chapter 5 - Discussion and Implications

The goal of this explanatory sequential mixed methods study was to investigate the concerns of teachers in middle and secondary schools in Saudi Arabia regarding the adoption of transformation to digital learning through implementation of Future Gate LMS. This study was conducted in two phases. The first phase consisted of quantitative measures assessed through the use of SoCQ. A total of 1045 teachers participated in this study from schools that were selected by the Ministry of Education in Saudi Arabia to implement Future Gate LMS in the first, second, and the beginning of the third phase of the transformation to digital learning in Saudi Arabia. The second phase of this study consisted of qualitative measures through an open-ended question in the SoCQ and semi-structured interviews with participants who were in the same highest and lowest stages of concern of the group. This chapter discusses the study problem, findings, implementation, and recommendations for future research.

Overview

This study was conducted to examine and investigate the concerns of teachers in the middle and secondary schools selected to implement Future Gate LMS. At the beginning of implementing Future Gate LMS, teachers' attitudes toward digital learning were overwhelmingly positive (Al Ohali et al., 2019). This attitude occurred because teachers thought there would be advantages that came from using LMSs in promoting effective teaching (Alghamdi & Bayaga, 2016), and that LMS would provide ease and comfort of use (De Smet, Bourgonjon, De Wever, Schellens, & Valcke, 2012; Dittoe, 2018). Teaching with LMS is a helpful way for teachers to design a course based on students' needs since it supports students' learning. However, institutions need a comprehensive plan that uncovers all factors that affect successful innovation implementation.

This study investigated teachers' SoC regarding adopting Future Gate LMS. Since teachers in this study generally taught with traditional methods before the implementation of Future Gate LMS, the transformation with the shift to digital learning was investigated. Change needs to be understood by the leaders in education before implementing innovation (Hall & Hord, 2015), and change through digital learning occurs when addressing the individual's concerns (Hall, 2013). Therefore, it was essential to address teachers' concerns regarding adopting and implementing Future Gate LMS in order to have success with the program. Studies are lacking about the adoption of LMS and how to address teachers' concerns regarding it, especially in K-12 classrooms; the studies that were found did not utilize mixed methods. Additionally, no studies were found that specifically address the concerns of teachers in Saudi Arabia regarding adopting Future Gate LMS. Therefore, this study was conducted to examine the concerns of middle and secondary school teachers in Saudi Arabia regarding the implementation and adoption of Future Gate LMS. The study also investigated the relationship between teachers' concerns in adopting Future Gate LMS and their demographic characteristics, technographic characteristics, and technology in the classroom. In addition, understanding teachers' concerns and their needs in adopting the transformation to digital learning would help stakeholders and policy makers to create an effective plan that would provide better implementation. Further, it would help universities to prepare teachers so that they can use modern technology and effectively integrate LMSs to produce more effective learning.

Summary and Findings

This chapter discusses major findings related to the literature on teachers' demographic characteristics, technographic characteristics, and the nature of the technology in their schools after the initial implementation of the transformation to digital learning through Future Gate

LMS in Saudi Arabia. This study also focused on identifying the top three concerns related to implementing the Future Gate LMS. CBAM (Hall, et al., 1979; Hall & Hord, 2015) is the framework for this study, which explains and predicts teachers' behaviors when implementing any change (Hall & Hord, 2011).

Summary of the findings from the Research Questions

The results for research question 1 indicated that most teachers in the middle and secondary schools were in the Awareness concern regarding the adoption of Future Gate LMS; this was a percentile score of 87%. It was followed by Stage 1 Informational at 84% and Stage 2 personal at 83%.

The lower SoC was Stage 4 consequences at 54%. Concern in Stage 4 is about the consequence and the effects the innovation will have on students (George et al., 2013). A low percentile score in this study in Stage 4 consequences means that teachers at this time have minimal concerns about the effects of Future Gate LMS on students.

In the second research question, the results in this study indicated the only two variables that showed a statistically significant difference in this question were gender and the type of degree. An analysis of independent-sample *t*-test was employed to examine gender variable. The result indicated there was a statistically significant difference between teachers' gender and their concerns in adopting Future Gate LMS. The difference between the mean scores for females (M=4.40, SD=1.01) and males (M=4.21, SD=1.05), indicating that female teachers expressed more concerns about the implementation of Future Gate LMS than did male teachers. The significant different was in Stage 0 Unconcern, Stage 2 Informational, Stage 3 Personal, and Stage 6 Refocusing. The results in this study indicated that there are no statistically significant differences between teachers' concerns in adopting Future Gate LMS and teachers' age, teaching

experience, grade of teaching level, and subject taught. There was a significant difference between teachers' concerns in adopting Future Gate LMS and teachers' type of degree in Stage 0 Unconcern and Stage 6 Refocusing.

In the third research question, teachers' technographic characteristics, there was a statistically significant difference between teachers' concerns in adopting Future Gate LMS and teachers' experience in instructional technology in Stage 0 Unconcern, Stage 1 Informational, Stage 2 Personal, Stage 4 Consequences, Stage 5 Collaboration, and Stage 6 Refocusing. The type of development in instructional technology was statistically significant with teachers' concerns in adopting Future Gate LMS in Stage 2 Personal, Stage 3 Management, Stage 4 Consequences, Stage 5 Collaboration, and Stage 6 Refocusing. The duration of professional development in instructional technology was statistically significant with teachers' concerns in adopting Future Gate LMS in Stage 3 Management, Stage 4 Consequences, Stage 5 Collaboration, and Stage 6 Refocusing. The type of professional development in using Future Gate LMS was significantly different with teachers' concerns in adopting Future Gate LMS in Stage 0 Unconcern, Stage 3 Management, Stage 4 Consequences, Stage 5 Collaboration, and Stage 6 Refocusing. Teachers' concerns in adopting Future Gate LMS was statistically significant with the duration of teachers' professional development in using Future Gate LMS in Stage 4 Consequences, Stage 5 Collaboration, and Stage 6 Refocusing.

In the fourth research question, the analysis indicated that the technology in the classroom was statistically significant with teachers' concern in adopting Future Gate LMS in Stage 3 Management. The Internet access in the classroom was statistically significantly different with teachers' concern in adopting Future Gate LMS in Stage 0 Unconcern and Stage 3 Management.

In the qualitative phase of the fifth research question, the results from the open-ended question indicated that the top three concerns for teachers in adopting Future Gate LMS were Internet in the school (20.22%), devices and equipment in school (18.17%), and concerns about students using Future Gate LMS (13.90%). In the semi-structured interview, after coding the interviews, the researcher found main themes that emerged regarding their top three concerns and subthemes. The first top concern was technology in the school. The subthemes that followed were concerns regarding Internet and instructional technology in the school. The second top concern was activating Future Gate LMS. The third top concern was how students deal with Future Gate LMS, which includes three subthemes: students' acceptance of technology, students' time, and students' searches for information.

Table 5.1
Summary of the findings of the relationship between the independent variables and teachers' concerns in adopting Future Gate LMS.

RQ 1	- The most intense SoC: Stage 0 Unconcern 87%, Stage 2 Informational 84%, Stage 3 Personal 83%. - The lower SoC: Stage 4 Consequences.		
RQ 2	**Independent Variables**	**Statistical tests**	**SoC significant with teachers' concerns (ANOVA test)**
	Gender (Independent t-test)	$p = .002$ (Independent *t*-test)	Stage 0, Stage 2, Stage 3, and Stage 6
	Age	Pillai's Trace test $p = .413$	
	Teaching experience	Pillai's Trace test $p = .312$	
	Grade teaching level	Pillai's Trace test $p = .304$	
	Subject taught	Pillai's Trace test $p = .895$	
	Type of degree	Pillai's Trace test $p = .029$	Stage 0 and Stage 6
	Experience in instructional technology	Pillai's Trace test $p = .002$	Stage 0, Stage 1, Stage 2, Stage 4, Stage 5, and Stage 6
	Type of professional development in instructional technology	Pillai's Trace test $p < .001$	Stage 2, Stage 3, Stage 4, Stage 5, and Stage 6

RQ 3	Duration of professional development in instructional technology	Pillai's Trace test $P < .001$	Stage 3, Stage 4, Stage 5, Stage 6
	Type of professional development in Future Gate LMS	Pillai's Trace test $p < .001$	Stage 0, Stage 3, Stage 4, Stage 5, Stage 6
	Duration of professional development in Future Gate LMS	Pillai's Trace test $p < .001$	Stage 4, Stage 5, Stage 6
RQ 4	Technology in the classroom	Pillai's Trace test $p = .016$	Stage3
	Internet in the classroom	Pillai's Trace test $p = .018$	Stage 0 and Stage 3
RQ 5	Top three concerns from open-ended question: 1. Internet in the school 2. Devices and equipment in school 3. Concerns about students dealing with Future Gate LMS		
	Top three concerns from the interview: 1. Technology in the school (a. Concerns regarding Internet in school, b. Concerns regarding devices in school) 2. Concerns regarding Future Gate activation 3. Concerns regarding students dealing with Future Gate LMS: (a) Students' acceptance to study with Future Gate LMS, (b) Concerns of students' time Management, and (c) Concerns of students searching for information.		

Discussion and Conclusion

The discussion in this section is based on the results from the research questions, and the organization of these results is based on the findings from the research questions.

Teachers' SoC

Teachers in this study scored the highest percentile of SoC in Stage 0 Unconcern or Awareness concern. The study was conducted at the beginning of the third phase of implementing Future Gate LMS. The results indicated that teachers at that time were in Stage 0, meaning that they had minor concerns about implementing Future Gate LMS. This result was expected since teachers were at the beginning of implementing the project. Teachers scored high also in Stage 1 Informational, indicating that they need to know more information about innovation, such as fundamental information about Future Gate LMS and what it will involve. A

high score in Stage 1 does not indicate how much information that teachers have about Future Gate LMS; it indicates that teachers want to know more about it. Teachers who scored high in Stage 2 Personal were more concerned about their status, rewards, and the effects that Future Gate LMS might have on them. The profile of teachers as a "non-user profile" as their higher SoC were in Stages 0, 1, and 2, which indicates teachers were at the beginning of implementing the program, but after they become experienced with Future Gate LMS, their concern profile will shift to become the higher concerns in Stages 4, 5, and 6. This move will occur when the innovation becomes appropriate and well designed and has adequate support for implementation (George et al., 2013). Since teachers at the time of the study were in early concerns as their higher SoC were in Stages 0, 1, and 2, it is important to provide ongoing support for teachers as they adopt Future Gate LMS. The results of teachers' profile in SoC was consistent with the literature in several studies that examined teachers' concerns regarding implementing innovations. Yoon and Kang (2018) and Gudyanga et al. (2018) found that teachers' highest SoC was in Stage 0 Unconcern of adopting the innovation. Teachers in the same study had a lower SoC in Stage 4 Consequences. The highest SoC occurred when they were implementing the innovation, which was also consistent with previous research (Barri, 2013; Gudyanga et al., 2018; Hadjipavli, 2011; Lochner et al., 2016; Walker, 2017; Yoon & Kang, 2018). These studies were conducted at the beginning of implementing innovations, and they reveal that teachers express the Awareness concern; participants in these studies also have minimal concerns about students' outcomes or consequence concerns in Stage 4 because they are more occupied with adopting to the Future Gate LMS. Concern in Stage 4 is about the consequence and the effects that the innovation will have on students (George et al., 2013). A low percentile score in this study in Stage 4 consequences means that teachers at this time have minimal concerns about the

effects of Future Gate LMS on students since they were occupied with adopting the innovation. The low percentile of teachers' concerns in Stage 4 Consequences is consistent with a study conducted by Barri (2013) who found that Saudi Arabian teachers did not have an opportunity at the time of implementing technology in the classroom to pay attention to the impact of the innovation on student learning. This concern may change after five years of implementing Future Gate LMS.

Teachers' Gender

Research question one shows that teachers' gender was statistically significantly different regarding teachers' concerns in implementing Future Gate LMS. Further analysis indicated that the mean of female teachers was higher than the mean of male teachers in Stage 0 Unconcern or Awareness concern, Stage 2 personal concern, Stage 3 Management concern, and Stage 6 Refocusing concern. Female teachers were more concerned than male teachers about implementing Future Gate LMS. The Awareness concern means that there are also other initiatives or activities that concern female teachers. Female teachers had more personal concerns, which indicates that they were more concerned about their status, rewards, and what effects the innovation might have on them (George et al., 2013). The rewards that teachers received when they reached 100% of activation for Future Gate LMS might have affected female teachers more as they likewise scored higher in the area of personal concern. Female teachers also had a higher mean score in Stage 3 Management, and this indicates that they have intense concerns about Management, time, and the logistical aspects of innovation (George et al., 2013). Females may be more concerned with the increased burden and tasks that they will need to undertake in order to successfully handle Future Gate LMS. The results from the open-ended question in the qualitative phase supported this concern, as it reported that females were more

concerned about time Management (65%) than male teachers (35%). Female teachers were also more concerned in Stage 6 Refocusing, indicating that they were considering how they needed to focus in order to explore ways to reap more universal benefits from Future Gate LMS (George et al., 2013). Results from the qualitative phase showed that females were more concerned about having Internet, devices, and equipment in the school, and they have also had more concerns regarding students' use of the Future Gate LMS.

Several studies from the literature found significant differences based on teachers' gender (Al-Sarrani, 2010; Cooper, 2006; Huang et al., 2013; Joiner et al., 2005; Omar, 2016; Whitley, 1997). This current study is in line with the Ong and Lai (2006) study, which found female teachers perceive instructional technology as more challenging to use, which is indicated in this current study as it found female teachers scored higher in Awareness concerns. In the case of Saudi Arabia where male and female school are gender segregated from fourth grade to higher education, several studies (Al-Sarrani, 2010; Barri, 2013; Omar, 2016) have found that there is a significant difference between teachers' gender and adopting technology. The results in this current study are consistent with a previous study conducted by Barri (2013), where he found female teachers have significantly higher concerns than do male teachers. The higher SoC for females in this study and in Barri (2013) were the same in the areas of Awareness concern, personal, and Refocusing concern. Studies conducted by Kamal (2013) and Omar (2016) indicated that in higher education in Saudi Arabia, most of the higher-level administrators are male, and usually the new technologies are introduced to male faculty first; female teachers' voices are not heard by the stakeholders. This might be why in K-12 education female teachers were more concerned than were male teachers regarding class technology environment. This also was supported by Al-Sarrani (2010) who indicated that most female campuses in higher

education have less technology and technical support. Another study conducted by Overbaugh and Lou (2009) found a significant difference between teachers' gender in adopting instructional technology, as they found male teachers had higher concerns than females, which is opposite of this study's findings. Hao and Lee (2015) found that female teachers had a significantly higher intensity of concern in the Awareness and Informational stages. Finally, Sarfo et al. (2017) found that female teachers were statistically different than males in Informational, Management, consequence, Collaboration, and Refocusing concerns, which is the same as the findings in this study in in Stage 3 Management.

Teachers' Type of Degree

Teacher's type of degree was statistically significantly different regarding teachers' concerns in adopting Future Gate LMS. The analysis indicated that the significant differences were in Stage 0 Unconcern and Stage 6 Refocusing. This was unexpected because the results in the literature review showed teachers' type of degree was not significant with teachers' concerns in adopting innovation (Alshammari, 2017; Asiri, 2019; Gudyanga & Jit, 2018). Teachers' level of degree was significant in this study regarding their concern in adopting Future Gate LMS; however, the post hoc test did not find a statistical difference between the level of degree (bachelor's, master's, doctorate, and other). The results from the qualitative phase indicated that most participants had a bachelor's degree, and their top concerns were Internet in the school and devices and equipment in the classroom; they also had concerns about students' use of Future Gate LMS. Participants with master's degrees shared concerns with those who had only a bachelor's degree, such as Future Gate LMS activation. This concern had an almost equal percentage of concern in the open-ended question segment, at 26% of bachelor's and 22.44% of master's degree teachers. An area where they did not have the same responses was the students'

interaction theme, where teachers who had master's degrees were more concerned at 37.8% as opposed to teachers with bachelor's degree who scored 27.4%. A possible interpretation of this result is that teachers who had master's degree had more teaching skills and also had a desire to apply teaching instructions in Future Gate.

Prior Experience with Instructional Technology Use

Regarding research question three, teachers' prior experience in technology use was statistically significantly different regarding teachers' concerns in implementing Future Gate LMS. The analysis showed that the significant differences were in Stage 0 Unconcern, Stage 1 Informational, Stage 2 personal, Stage 4 consequences, Stage 5 Collaboration, and Stage 6 Refocusing. The analysis indicated that there was no difference between groups in Stage 0.

Several studies investigated the relationship between teachers' prior experience in instructional technology use and their concerns in adopting innovation. Studies showed that the more that teachers had technology experience, the more they integrated it into the classroom (Alshmrany & Wilkinson, 2017; Liu et al., 2017). In this study, 69.8% of teachers had five years or more experience of using technology. However, these teachers had concerns in the following areas: early concern Awareness, Informational, and personal. The results from this study were consistent with a study conducted by Walker (2017) that found statistically significant differences between teachers' experience in using blended learning with their SoC concern. The significant differences were between teachers who used blended learning for five years or more and teachers who did not use it and teachers who implemented blended learning for one year. However, several studies from the literature were different than this study, with no significant differences between teachers' experience in using innovation and their concerns (Alfieri, 1998; Aziz, 2017; Hwu, 2011). When teachers have more experience in using technology, that helps

them to adopt Future Gate LMS as they can integrate their technology experience so they can utilize more of Future Gate LMS's features. On the other hand, teachers with no prior or limited experience in using technology need more practice and professional development to be able to utilize Future Gate LMS and integrate technology.

Type of Professional Development in Instructional Technology Use

The type of professional development in instructional technology use reported in this study was statistically significantly different regarding teachers' concerns in adopting Future Gate LMS. The statistically significant differences were in Stage 2 personal, Stage 3 Management, Stage 4 consequences, Stage 5 Collaboration, and Stage 6 Refocusing.

However, in opposition to this, the type of professional development in using Future Gate LMS in this study was statistically significant different in terms of teachers' concerns in adopting the Future Gate LMS. The statistically significant differences were in Stage 0 Unconcern, Stage 3 Management, Stage 4 consequences, Stage 5 Collaboration, and Stage 6 Refocusing.

In the qualitative phase, participants not only attended professional development in technology integration, but they were also helped by their colleagues in using Future Gate LMS and in integrating other applications to use in the platform. Participants in the interview section were at a high level of experience in using technology, so they did not ask for professional development in using either technology or Future Gate LMS. However, some participants in the open-ended questions asked for professional development in using Future Gate LMS. Those participants who need professional development listed as their top concerns Internet in schools, devices and equipment in schools, and students using Future Gate LMS. Practicing in a workshop on using Future Gate LMS along with providing technology and Internet in schools

will help teachers to adopt Future Gate LMS and in turn help their students to utilize the innovation through the optimal use of the platform.

The type of professional development influenced teachers' concerns and it helped them to address their concerns regarding adopting innovation (Hall & Hord, 2015). This study showed how important practice-based workshops for professional development were, as there were different responses from groups based on the amount of that support. The results from this study are broadly in line with the findings from Dobbs (2004), who found that combining classroom and laboratory training helped participants to move from an early stage of concern to a higher stage (impact). Teachers receive benefits and gain a better understanding from professional development when that consists of workshops; this leads to a positive attitude toward the innovation (Papadakis, 2012). Owston et al. (2008) found that having a higher level of satisfaction from professional development positively impacts their attitude and motivates them. When the Ministry of Education organizes professional development for implementing educational technology, it is important that it consists of workshops and practice so that participants can use it with more confidence. This process helps teachers to use the innovation in front of experts and peers and receive immediate feedback to their questions.

Duration of Professional Development

The duration of professional development in using instructional technology was statistically significant different when measured against teachers' concerns in adopting Future Gate LMS. The statistically significant differences were in Stage 3 Management, Stage 4 consequences, Stage 5 Collaboration, and Stage 6 Refocusing. Qualitative results indicated that teachers who had both theory and practice-based seminars, lectures, programs, or workshops had

concerns about Internet in the classroom, devices and equipment in the classroom, and students' use of the Future Gate LMS.

However, the duration of professional development in using Future Gate LMS was statistically significant different with teachers' concerns in adopting Future Gate LMS. The statistically significant differences were in Stage 4 consequences, Stage 5 Collaboration, and Stage 6 Refocusing.

In the qualitative phase, teachers who spent more than one day but less than one week in professional development listed as their top concerns having Internet in the school, devices and equipment in the school, and student use of Future Gate LMS. To overcome and decrease these concerns, when the Ministry of Education conducts professional development, they need to provide essential technology in the school before having teachers attend professional development.

The study showed that only a limited number of participants had taken a professional development course supporting the implementation of Future Gate LMS and this might affect their concerns about the innovation (Stage 0). Liu et al. (2018) suggested that the duration of professional development needs to be more than one year in order to see a significant change. While it may be difficult to conduct a full semester workshop for large number of teachers on using technology and Future Gate LMS and technology integration, it is nevertheless important to make those workshops concentrated; it is also important to have at least one participant from each school join in a semester-long course of professional development so they can lead other teachers in the school. However, all teachers need at a minimum a professional development program that is longer than one day in order for it to have a significant impact. The result from this study is broadly in line with findings from Sanders and Ngxola, (2009), who found

differences between concerns in the duration of workshop in the group of teachers that attended a workshop in one day, as their concerns were greater than the group of teachers who attended three days of workshops.

Technology in the Classroom

Technology in the classroom in this study was statistically significant different regarding teachers' concerns in adopting Future Gate LMS but only in Stage 3 Management. In this stage, teachers in classrooms that have technology rich environments responded differently than teachers in classrooms that have less technology equipment; the results were significantly different from teachers who teach in classrooms that have no instructional technology in the classroom. Their Stage 3 Management responses indicated intense concerns about Management, time, and logistical aspects of the innovation (George et al., 2013). This was because of the limited amount of technology in the classroom, plus the teachers' need to finish the tasks in the Future Gate LMS; they believed they were not able to manage their time due to lack of devices for students in the schools. The results from the qualitative phase indicated that teachers who had a limited amount of technology in the classroom listed as their top concerns the need for devices and equipment in the classroom, Internet in the classroom, and students' use of Future Gate LMS. Participants in the interview section explained that students do not have devices to use in the classroom activities. TETCO, in Collaboration with the Ministry of Education, started providing technology in the classroom, according to the two participants interviewed; however, technology needs to be provided before implementing the transformation to digital learning so that students have devices to use in the classroom. The results in this study were not a surprise since technology equipment is an underlying essential for using an online program. This result is consistent with a study conducted by Barri (2013), who found that Saudi Arabian schools lacked

technology equipment, and that this was an important factor regarding adopting innovation. The same results were also found by Alkahtani (2009) who found that one issue that impacts technology integration in the classroom is a lack of modern equipment and facilities in classrooms. Other studies such as Leung et al. (2005) and Alkahtani (2017) confirmed that school technology is an important factor to successfully implement innovation.

Internet Access in the Classroom

Internet access in the classroom in this study was statistically significantly different regarding teachers' concerns in adopting Future Gate LMS. The statistically significant differences were in Stage 0 Unconcern and Stage 3 Management. In Stage 0 there was no significant differences between groups. In Stage 3 Management, teachers in classrooms that have high-speed Internet were significantly different than teachers in classrooms that have slow-speed Internet; they were also significantly different than teachers in classrooms that have no Internet service in the classroom. Teachers in classrooms that have medium-speed Internet were significantly different than teachers in classrooms that have slow-speed Internet, and they were significantly different than teachers in classrooms that have no Internet service in the classroom. Teachers in Stage 3 Management had intense concerns about Management, time, and logistical aspects of the innovation (George et al., 2013). The difference between groups in this stage indicates how important it is to provide high-speed Internet in the classroom because slow or no Internet make it difficult for teachers to manage classroom time and lessons.

Results from the qualitative phase indicated that teachers' top concerns were from those who had no Internet in the classroom, and the other top concerns were Internet in the classroom, devices and equipment in the classroom, and students' use of Future Gate LMS. Although the two participants in the interview explained they have acceptable Internet in the classroom, a

large percentage of teachers in the survey (49.8%) and in the analysis through the open-ended questions indicated they do not have Internet in their classrooms. A possible interpretation of this result is that TETCO started the implementation of Future Gate LMS even if some schools were not prepared for a digital learning transformation; however, other schools had acceptable Internet access. The result from this study was not surprising since it is a basic need to have the Internet available in order to open Future Gate LMS website and use it for teaching. Concerns in the Management stage mean that the lack of Internet is causing problems in managing and organizing teaching tasks and handling the logistical aspects of Future Gate LMS. The lack of Internet in schools was found in a study conducted in Saudi Arabia by Alshmrany and Wilkinson (2017). They found that 75% did not have a computer or Internet access in the classroom for educational purposes, and these are essential in order to be able to use computers or laptops. Another study conducted by Alahmari and Kyei-Blankson (2018) found that public schools have limited Internet access. Internet access in all classroom is vital to implement Future Gate LMS.

Implications

The results from this study reveal that teachers had concerns regarding implementing Future Gate LMS in middle and secondary schools in Saudi Arabia. Several factors led to highest concern being in Stage 0 Unconcern, followed by Stage 1 Informational and Stage 2 Personal. The study was conducted at the beginning of implementing Future Gate LMS and the transformation to digital learning. One of the main issues is that many teachers reported they did not have technology and Internet in their classroom; 24.6% of teachers had no technology in the classroom while 51.2% of teachers answered they had a limited amount of technology in the classroom. The high percentage not expected was 49.8% of participants answered they do not have Internet in the classroom. The same results were found in the open-ended questions and in

the interviews, which was that the lack of technology and Internet was a top concern of teachers regarding their ability to implement Future Gate LMS and to transform to digital learning. Participants in the interview section indicated they only had computers for teachers in the classroom, an interactive projector, and a smart board. They also indicated that students did not have computers in the classroom. When implementing innovation, it is important stakeholders and policy makers create a plan that will lead to the success of the innovation. For schools, it is important that before they implement Future Gate LMS, all teachers are situated in a rich technology environment with modern technology that is ready to use when they make the transformation to digital learning. It is not easy for teachers to shift quickly from teaching in a traditional learning environment to teaching in digital learning environment. Providing a rich technology environment will help teachers to focus on using the technology instead of making them worry about providing technology.

However, it is a problem to provide technology without intensive professional development; it needs to cover both using technology and Future Gate LMS. The teachers' second concern area was Informational, which means they want to know more about the Future Gate LMS. The majority of participants, at 51.4%, did not receive professional development in using technology for education, and it is important that professional development includes technology courses useful for teaching such as Google, cloud, and Microsoft applications. Professional development that specifically covers how to use Future Gate LMS is very important before implementing Future Gate LMS. The majority of participants, 55.2%, answered that they did not receive professional development regarding Future Gate LMS itself before they were required to implement it. Teachers need more information about Future Gate LMS and how to use it in order to positively impact students' learning. Professional development should include

practice-based workshops that allow teachers to try out all the features in Future Gate LMS. This professional development should also include strategies about how to use the Internet to find appropriate information, as teachers indicated concerns about how to guide students to find this information.

One of the important factors that concerned teachers regarding the implementation of Future Gate LMS was its activation and how to help students to interact with the lessons. This concern was discussed in the open-ended questions and in the interview sections. Teachers reported they had too much work they needed to complete in order to achieve 100% activation. They explained this is difficult for both teachers and students. Reducing tasks that are required for Future Gate activation might lead to better implementation because teachers will have time to prepare for tasks, which is especially important as they are beginner users.

Regarding professional development, this study explained how it is important to conduct practice-based workshop professional development and how that will make a significant difference for teachers. As of November 2019, the government of Saudi Arabia launched the National Institute of Educational Professional Development (NIEPD) (Bureau of Experts at the Council of Ministers, 2019) that will have the responsibility to provide adequate professional development for teachers; it is important to focus on providing practice-based workshops for the use of technology in education so that Future Gate LMS will be able to achieve full implementation by prepared teachers.

This study provides information that educator, stakeholders, and policy makers can consider when implementing the transformation to digital learning, particularly when implementing Future Gate LMS. Change is a process that can start by solving problems in order to provide the best learning environment to implement innovations. Teachers in general want to

be at a high level of implementation so that they are able to create optimal learning opportunities for their students, so when introducing innovative programs, it is important to provide all the required technology and the Internet for students.

Teachers' Digital Transformation

Transformation to digital learning is essential to keep pace with technology development. As the Saudi Arabian Vision 2030 (Vision2030, 2017b) focused more on the transformation to digitization in all aspects of the government, now too it is essential that the Ministry of Education transform to digital learning. Change is a process, not an event, as people and organizations develop and move gradually as they learn and become more experienced and skilled about a particular innovation (Hall & Hord, 2015). It is not only for teachers; it is an integrated system that includes everyone related to the educational process. Transformation from traditional to digital learning needs a comprehensive plan that addresses all factors that have an effect on the learning process, such as school buildings and environment, technology equipment, professional development, devices and Internet for students, and student training on using Future Gate LMS.

Teachers in this study had their most intense concern in Stage 0 Unconcern or Awareness concern followed by Stage 1 Informational and Stage 2 Personal. To make teachers transform to digital learning and adopt Future Gate LMS, it is essential to find the reasons why teachers were in the early stage of concern. It is normal to be at early stages at the beginning of implementing an innovation; however, it is important to do all that is reasonable to improve the adaptation and assist them so that they move to Stages 4, 5, and 6. As Rogers (2003) explained in the Diffusion of Innovation Theory, when people are presented with new technology, they undergo the process of deciding whether to adopt it, which includes gathering information about the innovation,

testing the innovation, and evaluating whether the innovation deserves to be adopted. Providing the essential factors and the best learning environment to help teachers transform into digital learning are vital during this period of adaptation. Early adopters including teachers who were rewarded when they successfully activated Future Gate LMS can play an important role to help other teachers adopt it. Change facilitators are also responsible to provide a modern learning environment including modern educational technology to assist with improved adoption in a more attractive environment.

Stakeholders and administrators have a responsibility to provide the best learning tools for teachers, and teachers have a responsibility to provide the best learning for students by integrating technology through the transformation to the digital learning.

Recommendations for Implementing the Future Gate LMS

The purpose of this study was to examine teachers' concerns in adopting Future Gate LMS in Saudi Arabia as a project for a transformation to digital learning. The findings from this research is vital because other studies investigating Future Gate LMS adoption in the middle and secondary schools in Saudi Arabia are scarce or absent. Following are ten recommendations based on the study findings that key players, including the Ministry of Education in Saudi Arabia, TETCO, and others who plan to implement LMS, could consider utilizing.

1. Provide Adequate Educational Technology Devices for Schools

The lack of technology in schools is one of the main factors that impedes teachers in their implementation of Future Gate LMS. Technology needs to be provided before implementing the transformation to digital learning so that students have devices to use in the classroom. Providing technology in schools will help teachers to focus on implementing Future Gate LMS instead of being frustrated about a lack of it. The needed technology equipment includes

- Providing modern educational technologies in the classroom, such as interactive board, modern projectors, tablets, augmented reality devices, virtual reality devices, and 3D printing
- Providing devices for students in the school, such as laptops or tablets so each student can have their own device to use in the school.

These school technologies could be provided for teacher before implementing Future Gate LMS. For example, when the Ministry of Education conducts professional development, they need to provide essential technology in the school before they have teachers attend professional development programs.

2. Provide High-speed Internet in the Schools

The findings of this study showed that teachers who teach in a classroom with high-speed Internet were statistically significantly different from teachers who teach in classrooms with slow-speed Internet. The significant different was in Stage 3 Management concern that considered time Management and required tasks for Future Gate LMS. Thus, all classrooms should have high-speed Internet because teachers need it in order to use Future Gate LMS as well as other websites that require good Internet quality.

3. Professional Development for Teachers that Focus on the Effective Use of LMS

The National Institute of Educational Professional Development was established to provide adequate training for teachers to improve education. They need to collaborate with TETCO to select excellent trainers who have expertise using Future Gate LMS in order to make the training more effective. Professional development should include practice-based workshops so that teachers can rehearse the effective use of the different features in Future Gate LMS. When the Ministry of Education organizes professional development for implementing

educational technology, it is important that it consists of workshops and practice so that participants can use it with more confidence. This process helps teachers to use the innovation in front of experts and peers and receive immediate feedback to their questions.

4. **Collaborate with Colleges of Education in the Universities**

Departments of Education need to collaborate with universities to discuss how to assist educators; in turn, educators need to relay the major points they expect from teachers in order to draw up plans for training pre-service teachers to use Future Gate LMS. Creating a regular dialogue between Departments of Education and universities will make it possible to have a system ready to prepare pre-service teachers for the changes that are ongoing in classrooms.

5. **Create a Committee Composed of Distinguished Teachers Who Use Future Gate LMS**

At the end of each semester, each Department of Education should award distinguished teachers in the Future Gate LMS. In addition to the awards, discussions need to be held about how to transform the award-winners' expertise to other teachers in their schools as well as neighboring schools.

6. **Workshops for Students in Using Future Gate LMS**

Students' use of the Future Gate LMS was one of the concerns teachers had. They asked for workshops that would be available for students regarding Future Gate LMS, and they suggested that the workshops focus on the following:

- Workshops for students who are less experienced in using technology. Although they are not a large number, they still are a concern for teachers.
- Workshops for all students on the strategies of using the Internet safely and searching websites for information.

7. **Design Lessons with Less but More Effective Duties**

Many teachers in this study were concerned about how much work was required for teachers and students. Therefore, it is important that TETCO collaborates with experienced instructional designers in order to remake lessons in Future Gate LMS so there is a reduction in the overall amount of tasks while still focusing on the essential tasks. There can be optional tasks for students who want extra credit. This will help teacher to focus on the quality not the quantity of tasks and not be overly concerned about extra work.

8. **Pay Attention to the Digital Divide between Students**

Educators should pay attention to possible digital divides that could occur between students. Differences in economic status could lead to a digital divide for students that live in poverty or have a lower economic status who do not have outside access to devices. Also, a digital divide among students could occurs in rural areas that lack Internet access. Teachers are required to give homework tasks for students, so it is likely that some students will lose points because they lack their own devices or Internet service. Possible recommendations to solve this problem include providing programs for students with lower income status so that they can obtain devices and the Internet.

9. **Collaborating with Telecommunication Companies to Provide Internet in Rural Areas**

Internet is important to use Future Gate LMS for teachers and students. This study found that many teachers do not have Internet to use for Future Gate LMS and might number of them were from rural areas. Therefore, it is essential that the Ministry of Education need to collaborate with telecommunication companies to provide Internet in the rural areas for schools, teachers, and students so they can use Future Gate LMS without any Internet problems.

10. Reduce Required Tasks for Future Gate Activation

Since Future Gate LMS is an innovation and is new for teachers, it is important that TETCO consider at the time of implementing Future Gate LMS to minimize work on the platform. After the initial introduction and implementation of Future Gate LMS, they can increase the number of required tasks so that they start moving towards 100% activation.

Recommendations for Future Research

This study used mixed methods to investigate teachers' concerns in adopting Future Gate LMS. Following are several recommendations for future research.

First, more in-depth studies could be conducted. This study interviewed teachers from the highest and lower SoC, so interviewing more teachers in all SoC categories would lead to understanding more teachers' experiences and needs.

Second, another possible method for future studies could be studying teachers who were distinguished in implementing Future Gate LMS. Observing teachers during classes as they use Future Gate LMS could lead to understanding more regarding those teachers who were early, successful adopters of Future Gate LMS.

Third, future research could include all middle and secondary schools in the country after the full implementation of the Future Gate LMS occurs throughout all schools. This current study was conducted in only schools in the first phase, second phase, and beginning of the third phase. Therefore, conducting either a comprehensive or a cross section in education departments will provide more information about adopting Future Gate LMS.

Fourth, future research could include studying the coordinators of the transformation to digital learning in schools. They play an important role in implementing Future Gate LMS and providing workshops for teachers in schools. More in-depth studies that focus on their role

would provide valuable information that could lead to better implementation of the transformation to digital learning.

Fifth, CBAM (Hall, et al., 1979; Hall & Hord, 2015) has three dimensions or constructs, which are Stage of Concern (SoC), Level of Use (LoU), and Innovation Configurations (IC), and future studies could expand to investigate the adaptation of Future Gate LMS using all three dimensions and not only SoC as was done in this study.

This study is significant since it investigated the implementation of Future Gate LMS and the transformation to digital learning in Saudi Arabia. The scarcity or absence of studies regarding Future Gate makes this study important for educators so that they can determine the factors that will lead to successful implementation. It was important to understand teachers' concerns, their technology needs, and their desire for professional development by conducting research that measures their concerns in adopting Future Gate LMS. CBAM (Hall, et al., 1979; Hall & Hord, 2015) was an important theoretical framework to guide this study, as it helped to understand teachers' concerns regarding adopting the innovation. This study contributes to the literature to understand teachers' needs to be able to successfully implement innovations. Educators and stakeholders could access valuable information from the results in this study so that they can understand teachers' concerns regarding adopting the transformation to digital learning in Saudi Arabia as it is an important project for the Saudi Arabia 2030 vision.

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Appendix A - IRB Approval Letter

KANSAS STATE UNIVERSITY | University Research Compliance Office

TO: Dr. Kay Ann Taylor
Curriculum and Instruction
246 Bluemont Hall

Proposal Number: 9742

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 04/12/2019

RE: Approval of Proposal Entitled, "A mixed methods study of examining the concerns of Saudi Arabian middle and secondary school teachers in adopting the Future Gate Learning Management Systems: A transformation to digital learning."

The Committee on Research Involving Human Subjects has reviewed your proposal and has granted full approval. This proposal is **approved for three years from the date of this correspondence.**

APPROVAL DATE: 04/12/2019

EXPIRATION DATE: 04/12/2022

In giving its approval, the Committee has determined that:

☒ There is no more than minimal risk to the subjects.
☐ There is greater than minimal risk to the subjects.

This approval applies only to the proposal currently on file as written. Any change or modification affecting human subjects must be approved by the IRB prior to implementation. All approved proposals are subject to continuing review, which may include the examination of records connected with the project. Announced post-approval monitoring may be performed during the course of this approval period by URCO staff. Injuries, unanticipated problems or adverse events involving risk to subjects or to others must be reported immediately to the Chair of the IRB and / or the URCO.

203 Fairchild Hall, Lower Mezzanine, 1601 Vattier St., Manhattan, KS 66506-1103 | 785-532-3224 | fax: 785-532-3278
comply@k-state.edu | k-state.edu/comply

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Signature of Applicant: Abdullah

Printed Name:

Abdullah Masmali

Address: 2704 Maise Circle
Manhattan, KS 66502

Permission on the foregoing terms
American Institutes for Research

Date: February 6, 2019

By: Kim O'Brien

1120 East Diehl Road, Suite 200, Naperville, IL 60563-4899 | 630.649.6500 | www.air.org

Appendix C - Letter from the Ministry of Education to TETCO

المملكة العربية السعودية
وزارة التعليم
(٢٨٠)

وزارة التعليم
Ministry of Education

وزارة التعليم العالي
Ministry of Higher Education
إلى : شركة تطوير للخدمات التعليمية
الرقم الموحد : 4011612280094
رقم الصادر : 126607
التاريخ : 1440/09/11
المرفقات : 12

سعادة مدير شركة تطوير لتقنيات التعليم

سلمه الله

السلام عليكم ورحمة الله وبركاته وبعد ، ، ،

إشارة إلى كتاب سعادة الملحق الثقافي بأمريكا رقم ٩٧٤٢ وتاريخ ١٤٤٠/٠٨/١٤هـ ، بشأن تلقي الملحقية الثقافية بريداً إلكترونياً من طالب الدكتوراه / عبدالله عيسى مسلمي ، هوية وطنية رقم [redacted] في تخصص المناهج و طرق التدريس- تقنيات التعليم- والمتضمن تطبيق دراسة في إهتمام معلمي المرحلة المتوسطة و الثانوية في تبني نظام إدارة التعلم بوابة المستقبل و الذي يعتبر أحد برامج التحول نحو التعلم الرقمي ٢٠٢٠م. و فيه يرفق الطالب إستبانه مع الرسالة بخصوص تطبيق الدراسة على مدارس التعليم.

و بحسب رغبة الطالب ، نأمل من سعادتكم تسهيل مهمته قدر الإمكان في تطبيق الدراسة حسب المتبع نظاماً لديكم ، وتزويدنا بمرئياتكم حيال طلبه ؛ حتى يتسنى لنا إفادة الملحقية الثقافية في أمريكا.

ولسعادتكم فائق التحية و التقدير ، ، ،

المشرف العام
على الإدارة العامة لشؤون الإبتعاث

د. علي بن ماضي المجول

Appendix D - Questionnaire Used in the Study – English

In the Name of God, Most Gracious, Most Merciful
Peace, Mercy, and blessings of God be upon you,
Dear classroom teacher,

I would like to thank you in advance for your cooperation in completing this survey for the research title "A Mixed Methods Study of Examining the Concerns of Saudi Arabian Middle and Secondary School Teachers in Adopting Future Gate Learning Management Systems: A Transformation to Digital Learning." This research is being conducted by Abdullah Masmali, a doctoral candidate at Kansas State University. This survey is anonymous and no one, including the researcher will be able to connect your responses with your identity. The most important thing that I would like to notify you about is that your participation in this study is strictly voluntary: you can withdraw from the study at any time, participating in the study would not have any negative affect on your professional and professional status, and all data relating to you will be kept strictly confidential and private and will be used only for the purpose of the study. The materials that will be used during the process of the data collection will be destroyed at the end of the research study, and the data collected during this research is for educational research, so this research will not pose a threat to you.

Questions regarding the purpose or procedures of the research should be directed to the researcher, Abdullah Masmali at +12165754749 or +966503769148 or by email at masmali@ksu.edu or abmas13@gmail.com, or Dr. Kay Ann Taylor, major professor at ktaylor@ksu.edu. Also, you may contact the following if you have questions regarding your rights as a participant: Rick Schidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66502, (785) 532-3224

Thank you for taking time to complete this task and for your assistance.

Kind regards,

Abdullah Masmali
PhD Candidate
Department of Curriculum and Instruction
Kansas State University

By agreeing to participate, I confirm that I have read, or been informed of, the information about this study. I hereby consent to participate in the study.

☐ Yes, I agree

Section I: Concerns about the Innovation

Questions 1 – 35, reprinted with permission of the Southwest Educational Developmental Laboratory

The purpose of this questionnaire is to determine what people who are using or thinking about using various programs are concerned about at various times during the adoption process.

The items were developed from typical responses of school and college teachers who ranged from no knowledge at all about various programs to many years' experience using them. Therefore, **many of the items on this questionnaire may appear to be of little relevance or irrelevant to you at this time.** For the completely irrelevant items, please circle "0" on the scale. Other items will represent those concerns you do have, in varying degrees of intensity, and should be marked higher on the scale.

For example:

This statement is very true of me at this time.	0 1 2 3 4 5 6 (7)
This statement is somewhat true of me now.	0 1 2 3 (4) 5 6 7
This statement is not at all true of me at this time.	0 (1) 2 3 4 5 6 7
This statement seems irrelevant to me.	(0) 1 2 3 4 5 6 7

Please respond to the items in terms of *your present concerns***,** or how you feel about your involvement with **Future Gate Learning Management System**. We do not hold to any one definition of the innovation so please think of it in terms of your own perception of what it involves. Phrases such as "this approach" and "the new system" all refer to the same innovation. Remember to respond to each item in terms of your present concerns about your involvement or potential involvement with the innovation.

Thank you for taking time to complete this task.

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number for Each Item

1. I am concerned about students' attitudes toward the Future Gate LMS.	0 1 2 3 4 5 6 7
2. I now know of some other approaches that might work better than the Future Gate LMS.	0 1 2 3 4 5 6 7
3. I am more concerned about another program rather than the program of Future Gate LMS.	0 1 2 3 4 5 6 7
4. I am concerned about not having enough time to organize myself each day in which I use Future gate LMS.	0 1 2 3 4 5 6 7
5. I would like to help other faculty in their use of the Future gate LMS.	0 1 2 3 4 5 6 7
6. I have a very limited knowledge of the Future gate LMS.	0 1 2 3 4 5 6 7
7. I would like to know the effect of the Future gate LMS on my professional status.	0 1 2 3 4 5 6 7
8. I am concerned about conflict between my interests and my responsibilities when I am using Future gate LMS.	0 1 2 3 4 5 6 7
9. I am concerned about revising my use of the Future gate LMS.	0 1 2 3 4 5 6 7
10. I would like to develop working relationships with both our faculty and outside faculty using Future gate LMS.	0 1 2 3 4 5 6 7
11. I am concerned about how the Future gate LMS affects students.	0 1 2 3 4 5 6 7
12. I am not concerned about the Future gate LMS at this time.	0 1 2 3 4 5 6 7
13. I would like to know who will make the decisions in the Future gate LMS.	0 1 2 3 4 5 6 7
14. I would like to discuss the possibility of using the Future Gate LMS.	0 1 2 3 4 5 6 7
15. I would like to know what resources are available if we decide to adopt the Future gate LMS.	0 1 2 3 4 5 6 7
16. I am concerned about my inability to manage all that the Future gate LMS requires.	0 1 2 3 4 5 6 7
17. I would like to know how my teaching or administration is supposed to change.	0 1 2 3 4 5 6 7
18. I would like to familiarize other schools or teachers with the progress of the Future gate LMS.	0 1 2 3 4 5 6 7
19. I am concerned about evaluating my impact on students when I am using the Future gate LMS.	0 1 2 3 4 5 6 7
20. I would like to revise the Future gate LMS approach.	0 1 2 3 4 5 6 7
21. I am preoccupied with things other than the Future gate LMS.	0 1 2 3 4 5 6 7

0	1 2	3 4 5	6 7
Irrelevant	Not true of me now	Somewhat true of me now	Very true of me now

Circle One Number for Each Item

22. I would like to modify our use of the Future gate LMS based on the experiences of our students.	0 1 2 3 4 5 6 7
23. I spend little time thinking about Future gate LMS.	0 1 2 3 4 5 6 7
24. I would like to excite my students about their part in the Future gate LMS.	0 1 2 3 4 5 6 7
25. I am concerned about time spent working with nonacademic problems related to the Future gate LMS.	0 1 2 3 4 5 6 7
26. I would like to know what the use of the Future gate LMS will require in the immediate future.	0 1 2 3 4 5 6 7
27. I would like to coordinate my efforts with others to maximize the effects of the Future gate LMS.	0 1 2 3 4 5 6 7
28. I would like to have more information on time and energy commitments required by the Future gate LMS.	0 1 2 3 4 5 6 7
29. I would like to know what other faculty are doing in the area of Future gate LMS.	0 1 2 3 4 5 6 7
30. Currently, other priorities prevent me from focusing my attention on the Future gate LMS.	0 1 2 3 4 5 6 7
31. I would like to determine how to supplement, enhance, or replace the Future gate LMS.	0 1 2 3 4 5 6 7
32. I would like to use feedback from students to change the Future gate LMS program.	0 1 2 3 4 5 6 7
33. I would like to know how my role will change when I am using the Future gate LMS.	0 1 2 3 4 5 6 7
34. Coordination of tasks and people is taking too much of my time when I use Future gate LMS.	0 1 2 3 4 5 6 7
35. I would like to know how the Future gate LMS is better than what we have now.	0 1 2 3 4 5 6 7

Section II: Demographic Characteristics

(Gender, age, years of teaching experience, content area/specialization, school type)

Please tick your gender, age, years of teaching, subject area, grade level of teaching, and type of degree.

36.	Gender: ☐ Male ☐ Female
378.	Age (years): ☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50 years or more
38.	Years of teaching experience: ☐ 0-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ More than 20 years

39.	Highest degree: ☐ Bachelor's ☐ Master's ☐ Doctorate ☐ Other: ……
40.	Grade of teaching level: ☐ Middle school ☐ Secondary school ☐ both
41.	Subject Area Taught: ☐ Science (Mathematics, Physics, Biology, Chemistry, Geology, Ecology) ☐ Humanities (Social Studies, Islamic Studies, Arabic Language, English Language, Sociology) ☐ Social Science (Health & Physical Education, Art Education, Family Education, Vocational Education, National Education, Educational Psychology, Life Skills, Library and Search, Special Education, Accounting, Principles of Economics, Principles of Administration) ☐ Other: …….

Section III: Technographic Characteristics

(Prior instructional technology and LMS use, type and total length of professional development training received on instructional use of technology and LMSs)

Please tick only one box next to the statement that best represents your situation.

42.	How long have you been **using technology for instructional** purposes? ☐ Never ☐ 1 year ☐ 2 years ☐ 3 years ☐ 4 years ☐ 5 years or more ☐ I don't use technology for instructional purpose
43.	Have you received any formal training in **using instructional technology?** ☐ Yes ☐ No
44.	If yes, what **type of professional development** did you receive regarding **instructional use of technology?** ☐ Theory-based seminar, lecture, or program ☐ Practice-based workshop or program ☐ Both theory and practice-based seminar, lecture, program, or workshop ☐ Never received professional development in using instructional technology
45.	What is the **approximate total of professional development** training that you have received to date on **instructional use of technology**? None ☐ A full day or less ☐ More than 1 day but less than 1 week ☐ 1 week or longer but less than 1 semester ☐ 1 semester long course ore more ☐ Never received professional development in using instructional technology
46.	When did your school was selected to implement Future Gate LMS?

	☐ First phase (2017/2018) ☐ Second Phase (2018/2019) ☐ Third Phase (2019/2020)
47.	Have you received any formal training in **using Future Gate Learning Management Systems (LMSs)** for instructional purposes? ☐ Yes ☐ No
48.	If yes, what **type of professional training** did you receive regarding the use of **Future Gate LMS**? ☐ Theory-based seminar, lecture, or program ☐ Practice-based workshop or program ☐ Both theory and practice-based seminar, lecture, program, or workshop ☐ Never received professional development in using Future Gate LMS
49.	What is the **approximate total of professional development training** that you have received to date regarding instructional **use of Future Gate LMS**? ☐ A full day or less ☐ More than 1 day and less than1 week ☐ 1 week or longer but less than 1 semeste ☐ 1 semester long course or more ☐ Never received professional development in using Future Gate LMS

Section IV: Technology environment in the classroom
(Technology equipment in the classroom and Internet access in the classroom)

Please tick only one box next to the statement that best represents your situation.

50.	How is the technology availablity in the classroom? ☐ Technology rich environment ☐ A few numbers of technology equipment ☐ There is no instructional technologies in the classroom
51.	How is the Internet access in the classrooms that you teach your courses? ☐ Strong speed internet and signal ☐ Medium Internet speed and signal ☐ Slow Internet speed and weak signal ☐ There is no internet service in the classroom

52. When you implement Future Gate Learning Management System with your students, what are you concerned about? (Please do not say what you think others are concerned about, but only what concerns you now.)

THANK YOU PAGE

Thank you for participating in this study. It is hoped that your responses will aid in understanding teacher concerns with the implementation of Future Gate Learning Management System and how to support teachers as they go through this fundamental change in pedagogy through the digital transformation program 2020.

Please enter your email address below if you are willing to participate in an interview to provide additional information about implementing Future Gate LMS.

Please do not hesitate to contact me with any questions or concerns.

Many thanks,

Abdullah Masmali
masmali@ksu.edu
(216)575-4749 (Cell)

Appendix E - Questionnaire Used in the Study – Arabic

بسم الله الرحمن الرحيم

السلام عليكم ورحمة الله وبركاته

عزيزي المعلم/عزيزتي المعلمة

أود شكرك مقدما على تعاونك في إكمال هذه الاستبانة البحثية بعنوان "دراسة اهتمامات معلمي ومعلمات المدارس المتوسطة والثانوية في المملكة العربية السعودية في تبني نظام إدارة التعلم بوابة المستقبل: التحول إلى التعلم الرقمي." يجرى هذا البحث الباحث عبد الله مسملي، مرشح الدكتوراه في جامعة ولاية كانساس. نظرا لاختيار مدرستك لتطبيق مشروع بوابة المستقبل، فأنت أفضل مزود للمعلومات لهذه الدراسة. لا توجد إجابات صحيحة أو خاطئة للأسئلة. يرجى الرد على كل بند من بنود الأسئلة. أود إشعارك أنه لن يتمكن أي شخص، بما في ذلك الباحث، من ربط إجاباتك بهويتك. كما أود إشعارك أن مشاركتك في هذه الدراسة تطوعية، حيث يمكنك الانسحاب من الدراسة في أي وقت، والمشاركة في الدراسة لن يكون لها أي تأثير سلبي على وضعك المهني، وسيتم الاحتفاظ بجميع البيانات المتعلقة بك بسرية تامة وخصوصية وسيتم استخدامها فقط من قبل الباحث لغرض الدراسة. البيانات التي يتم جمعها خلال هذا البحث مخصصة للبحث التعليمي، لذلك لن يشكل هذا البحث أي خطر عليك

يمكنك توجيه الأسئلة المتعلقة بالبحث أو الإجراءات الخاصة بالبحث إلى الباحث، عبد الله مسملي، على الرقم ٠٠٩٦٦٥٠٣٧٦٩١٤٨ أو ٠١٢١٦٥٧٥٤٧٤٩
أو عن طريق البريد الإلكتروني abmas13@gmail.com OR masmali@ksu.edu
كما يمكنك توجيه استفساراتك إلى مشرف البحث Dr. Kay Ann Taylor عبر البريد الإلكتروني: ktaylor@ksu.edu

إذا كانت لديك استفسارات بخصوص حقوقك كمشارك فيمكنك التواصل مع:
Rick Scheidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66502, (785) 532-3224

شكرًا لك مقدما على الوقت الذي ستستغرقه لإكمال هذه المهمة وشكرا لمساعدتك

أطيب التحيات،

عبد الله مسملي
مرشح الدكتوراه
قسم المناهج وطرق التدريس
جامعة كانساس الحكومية
الولايات المتحدة الأمريكية

بالموافقة على المشاركة، أؤكد أنني قد قرأت أو أبلغت بالمعلومات حول هذه الدراسة. أوافق بموجبه على المشاركة في الدراسة

☐ نعم أوافق

<u>المحور الأول</u>: الاهتمام تجاه مشروع بوابة المستقبل
الأسئلة (١-٣٥):

إنَّ الهدف من هذه الاستبانة هو تحديد كيفية تقبل المعلمين لنظام إدارة التعلم "بوابة المستقبل" وشعورهم نحو هذا التغيير، تم تطوير هذه الأسئلة بناءً على الإجابة المعتادة لمعلمي المدارس وأساتذة الجامعات التي تتفاوت خبراتهم من معرفة تامة بالموضوع إلى عدم معرفة نهائياً؛ لذا فإنَّ جزءاً كبيراً من الأسئلة قد يبدو لكم من أول وهلةٍ أنَّه لا علاقة له بالموضوع حالياً أو العكس.
الرجاء الإجابة على هذه الأسئلة، أن تعطيها علامات تتطابق مع شعورك في الوقت الحاضر. تتراوح الإجابة على هذه الأسئلة من **(0)** إلى **(7)**، حيث يمثل الرقم **(0)** عدم اهتمام كلي، أو معرفة بالسؤال المطروح، والرقم **(7)** يمثل معرفة تامة وتطابق كلي، بينما تشكل الأرقام ما بينهما نسبة معرفتك وشعورك تجاه الموضوع؛ **<u>لذا يرجى اختيار الإجابة المناسبة على المقياس المدرج المعطى</u>**

مثلا:

إن هذا التعبير صحيح جداً في الوقت الحاضر.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**(7)**
إن هذا التعبير ينطبق عليّ بعض الشيء.	**0**	**1**	**2**	**3**	**(4)**	**5**	**6**	**7**
إن هذا التعبير لا ينطبق عليّ في الوقت الحاضر.	**0**	**(1)**	**2**	**3**	**4**	**5**	**6**	**7**
إن هذا التعبير لا يعني لي شيئاً.	**(0)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**

يهدف هذا الاستبيان إلى التعرف على اهتماماتك الحالية نحو استخدامك لمشروع بوابة المستقبل. الرجاء قراءة كل عبارة بتمعن كامل ومن ثم اختيار الرقم الذي تراه مناسباً في تحديد درجة اهتمامك لها. تذكر أن تكون اختياراتك تعبَر عن وضعك الحالي

0		**1**	**2**	**3**	**4**	**5**	**6**	**7**
لا تنطبق عليّ البتة		لا تنطبق عليّ الآن		تنطبق عليّ إلى حد ما الآن			تنطبق عليّ تماما الان	

ضع دائرة حول رقم واحد فقط

١. أهتم بمواقف الطلاب نحو بوابة المستقبل	0	1	2	3	4	5	6	7
٢. أعرف حاليا أساليب أخرى قد تعمل بشكل أفضل من بوابة المستقبل	0	1	2	3	4	5	6	7
٣. أنا مهتم كثيرا ببرنامج آخر غير برنامج بوابة المستقبل	0	1	2	3	4	5	6	7
٤. أنا قلق لعدم وجود وقت كاف لتنظيم نفسي في كل يوم استخدم فيه بوابة المستقبل	0	1	2	3	4	5	6	7
٥. أرغب في مساعدة المعلمين الآخرين في استخدام بوابة المستقبل	0	1	2	3	4	5	6	7
٦. لدي معلومات محدودة جدا حول بوابة المستقبل	0	1	2	3	4	5	6	7
٧. أرغب في معرفة أثر استخدام بوابة المستقبل في التعليم على وضعي المهني	0	1	2	3	4	5	6	7
٨. أنا قلق بخصوص التعارض بين اهتماماتي ومسؤولياتي عندما استخدم بوابة المستقبل في التعليم	0	1	2	3	4	5	6	7
٩. أنا مهتم بتعديل استخدامي لبوابة المستقبل	0	1	2	3	4	5	6	7
١٠. أرغب في إقامة علاقات عمل مع طاقم التعليم الخاص بنا وطاقم تعليم من خارج المدرسة يستخدم بوابة المستقبل	0	1	2	3	4	5	6	7
١١. أنا مهتم بكيفية تأثير استخدام بوابة المستقبل في التعليم على الطلاب	0	1	2	3	4	5	6	7
١٢. أنا لا أهتم باستخدام بوابة المستقبل في الوقت الحالي	0	1	2	3	4	5	6	7
١٣. أرغب في معرفة من سيضع القرارات بخصوص بوابة المستقبل	0	1	2	3	4	5	6	7
١٤. أرغب في المناقشة حول إمكانية استخدام بوابة المستقبل في التعليم	0	1	2	3	4	5	6	7

7 6 5 4 3 2 1 0	
تنطبق عليّ تماما الان	لا تنطبق عليّ البتة
7 6 5 4 3 2 1 0	١٥. أرغب في معرفة مصادر التعلم المتوفرة في حال قررنا استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	١٦. أنا قلق لعدم قدرتي على إدارة كل متطلبات بوابة المستقبل
7 6 5 4 3 2 1 0	١٧. أرغب في معرفة كيف سيتغير تدريسي أو إدارتي عند استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	١٨. أرغب في إلمام المدارس الأخرى أو المعلمين الآخرين بآخر تطورات بوابة المستقبل
7 6 5 4 3 2 1 0	١٩. اهتم بتقييم أثري على الطلاب عندما استخدم بوابة المستقبل
7 6 5 4 3 2 1 0	٢٠. أرغب في تعديل أسلوب استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	٢١. أنا مشغول بأشياء علاوة على استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	٢٢. أرغب في تعديل استخدام بوابة المستقبل بناءً على خبرات طلابنا
7 6 5 4 3 2 1 0	٢٣. أقضي وقتا قليلا للتفكير حول بوابة المستقبل
7 6 5 4 3 2 1 0	٢٤. أرغب في استشارة طلابي حول دورهم في بوابة المستقبل
7 6 5 4 3 2 1 0	٢٥. أنا قلق بالنسبة للوقت المبذول في العمل مع المشكلات الغير تعليمية المتعلقة ببوابة المستقبل
7 6 5 4 3 2 1 0	٢٦. أرغب في معرفة ما سيتطلبه استخدام بوابة المستقبل في المستقبل العاجل
7 6 5 4 3 2 1 0	٢٧. أرغب في تنسيق جهودي مع الآخرين لزيادة آثار بوابة المستقبل
7 6 5 4 3 2 1 0	٢٨. أرغب في الحصول على المزيد من المعلومات عن الالتزامات الخاصة بالوقت والجهد الذين يتطلبهما استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	٢٩. أرغب في معرفة ما يفعله المعلمون الآخرون في بوابة المستقبل
7 6 5 4 3 2 1 0	٣٠. حاليا أولويات أخرى تمنعني من تركيز انتباهي على استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	٣١. أرغب في تحديد كيفية إتمام أو تعزيز استخدام بوابة المستقبل أو كيفية استبداله بشكل أفضل
7 6 5 4 3 2 1 0	٣٢. أرغب في استخدام التغذية الراجعة من الطلاب لعمل تغييرات في برنامج استخدام بوابة المستقبل
7 6 5 4 3 2 1 0	٣٣. أرغب في معرفة كيف سيتغير دوري عندما استخدم بوابة المستقبل
7 6 5 4 3 2 1 0	٣٤. تنسيق المهام والأشخاص يأخذ الكثير من وقتي عندما استخدم بوابة المستقبل
7 6 5 4 3 2 1 0	٣٥. أرغب في معرفة كيف يكون استخدام بوابة المستقبل أفضل مما لدينا حاليا

المحور الثاني: بيانات ديموغرافية (تعريفية)
(الجنس، العمر، سنوات الخبرة في التعليم، التخصص، مرحلة التدريس، آخر شهادة تم الحصول عليها)

يرجى وضع علامة على المربع المناسب

36	الجنس:	☐ ذكر ☐ أنثى
37	العمر:	☐ 20 – 29 ☐ 30 – 39 ☐ 40 – 49 ☐ 50 سنة أو أكبر
38	سنوات الخبرة في التعليم:	☐ 1 – 5 ☐ 6 – 10 ☐ 11 – 15 ☐ 16 – 20 ☐ أكثر من 20 سنة
39	آخر مؤهل تم الحصول عليه:	☐ بكالوريوس ☐ ماجستير ☐ دكتوراه ☐ أخرى .....
40	المرحلة الدراسية التي تقوم بتدريسها حاليا:	☐ المتوسطة ☐ الثانوية ☐ كلاهما
41	المنهج الدراسي الذي تقوم بتدريسه:	☐ العلوم الطبيعية (رياضيات، فيزياء، أحياء، كيمياء، جيولوجيا، علم البيئة) ☐ العلوم الإنسانية (الدراسات الإجتماعية، الدراسات الإسلامية، اللغة العربية، اللغة الإنجليزية، علم الإجتماع ☐ العلوم الإجتماعية (الصحة والتربية البدنية، التربية الفنية، التربية الأسرية، التعليم المهني، التربية الوطنية، علم النفس التربوي، مهارات الحياة، المكتبة والبحث، التربية الخاصة، المحاسبة، مبادئ الاقتصاد، مبادئ الإدارة) ☐ أخرى: .....
	إدارة التعليم التي تتبع لها مدرستي	اختر من القائمة: .....

المحور الثالث: بيانات الخصائص التقنية للمعلم
(الاستخدامات السابقة لتكنولوجيا التعليم ونظام إدارة التعلم، نوع وإجمالي مدة التطوير المهني في تقنيات التعليم ونظام إدارة التعلم بوابة المستقبل)
يرجى اختيار الإجابة المناسبة التي توضح حالتك:

42	منذ متى وأنت تستخدم التقنية لأغراض تعليمية؟ ☐ سنة ☐ سنتين ☐ ثلاث سنوات ☐ أربع سنوات ☐ خمس سنوات أو أكثر ☐ لا أستخدمها
43	في أي مرحلة تم اختيار مدرستك لتطبيق بوابة المستقبل؟ ☐ المرحلة الأولى (العام الدراسي ١٤٣٨\١٤٣٩) ☐ المرحلة الثانية (العام الدراسي ١٤٣٩\١٤٤٠) ☐ المرحلة الثالثة (العام الدراسي ١٤٤٠\١٤٤١)
44	هل تلقيت أي تدريب رسمي في **استخدام التقنية في التعليم** (غير بوابة المستقبل)؟ ☐ نعم ☐ لا
45	إذا كانت الإجابة بنعم، ما هو نوع التطوير المهني الذي تلقيته بشأن **استخدام التكنولوجيا في التعليم**؟ ☐ ندوة او محاضرة أو برنامج نظري ☐ ورشة عمل أو برنامج عملي ☐ كليهما، برنامج نظري قائم على ندوة، محاضرة، برنامج تدريبي أو ورشة عمل ☐ لم أتلق تطوير مهني لاستخدام التكنولوجيا في التعليم

46	ماهي المدة التقريبية للتدريب والتطوير المهني الذي تلقيته حتى الآن على **استخدام التقنية في التعليم؟** ☐ يوم كامل أو أقل ☐ أكثر من يوم كامل وأقل من أسبوع ☐ أسبوع أو أكثر ولكن أقل من فصل دراسي ☐ فصل دراسي كامل أو أكثر ☐ لم أتلق تطوير مهني لاستخدام التكنولوجيا في التعليم
47	هل تلقيت أي تدريب رسمي في **استخدام بوابة المستقبل؟** ☐ نعم ☐ لا
48	إذا كانت الإجابة بنعم، ماهو نوع التطوير المهني الذي تلقيته بشأن **استخدام بوابة المستقبل؟** ☐ ندوة او محاضرة أو برنامج نظري ☐ ورشة عمل أو برنامج عملي ☐ كليهما، برنامج نظري قائم على ندوة، محاضرة، برنامج تدريبي أو ورشة عمل ☐ لم أتلق تطوير مهني لاستخدام بوابة المستقبل
49	ماهي المدة التقريبية للتدريب والتطوير المهني الذي تلقيته حتى الآن على استخدام **بوابة المستقبل؟** ☐ يوم كامل أو أقل ☐ أكثر من يوم كامل وأقل من أسبوع ☐ أسبوع أو أكثر ولكن أقل من فصل دراسي ☐ فصل دراسي كامل أو أكثر ☐ لم أتلق تطوير مهني لاستخدام بوابة المستقبل

المحور الرابع: البيئة التقنية في الصفوف الدراسية:
(الأجهزة التقنية وإمكانية الوصول للإنترنت داخل حجرة الدراسة)
يرجى اختيار الخيار المناسب الذي يمثل حالتك:

50	ماهو مستوى توفر الأجهزة التقنية داخل حجرة الدراسة؟ ☐ بيئة صفية غنية بالأجهزة التقنية ☐ عدد قليل من الأجهزة التقنية ☐ لا يوجد أجهزة تقنية داخل حجرة الدراسة
51	ما هو مستوى قوة إشارة الإنترنت في داخل الفصول الدراسية التي تدرس فيها؟ ☐ انترنت عالي السرعة ☐ انترنت متوسط السرعة ☐ انترنت بطيئ السرعة ☐ لا توجد خدمة انترنت داخل الفصل الدراسي

52. عند تطبيقك نظام إدارة التعلم بوابة المستقبل مع طلابك، ما الذي يهمك؟ (يرجى عدم ذكر رأيك حول الآخرين، ولكن فقط ما يقلقك الآن).

عزيزي المعلم، عزيزتي المعلمة: سيقوم الباحث بعمل مقابلة بحثية مع بعض المعلمين المعلمات، وذلك لتوفير معلومات إضافية حول استخدام لبوابة المستقبل في العملية التعليمية. لذلك إذا كنت مستعدا لإجراء المقابلة يرجى إدخال بريد الإلكتروني أدناه:

شكرا لك على المشاركة في هذه الدراسة. آمل أن تساعد إجابتك في فهم اهتمامات المعلمين من خلال تطبيق بوابة المستقبل وكيفية دعم المعلمين أثناء قيامهم بهذا التغيير في طرق تدريسهم.
إذا كان لديك أي استفسار، لا تتردد بالتواصل معي عبر البريد الإلكتروني: masmali@ksu.edu

Appendix F - Email to Participants in Qualitative Phase (Interview) – English

Subject: Research Interview

Dear participant,

I would like to thank you so much for taking the time to complete the Stages of Concern Questionnaire regarding the implementation of Future Gate Learning Management System. Thank you as for showing interest in being interviewed. Before we can chat, I will need to have the consent form for the interview (attached) returned electronically. When I receive it, I will schedule the interview.

Sincerely,
Abdullah Masmali
PhD Candidate
Kansas State University
masmali@ksu.edu
+1(216)575-4749

الموضوع: مقابلة بحثية

عزيزي المعلم/ة

السلام عليكم ورحمة الله وبركاته

تحية طيبة وبعد،

أود أن أشكرك كثيرًا على الوقت الذي أمضيته في استكمال استبيان مراحل اتجاهات المعلمين المتعلقة بتطبيق نظام إدارة التعلم بوابة المستقبل. شكرًا لك على اهتمامك بإجراء المقابلة البحثية. قبل أن نتمكن من إجراء المقابلة، سأرسل لك نموذج الموافقة للمقابلة (مرفق) وأرجو منك إعادة إرسالها إلكترونيًا موقعة. بعد استلام نموذج الموافقة موقعا، سأقوم بتحديد موعد المقابلة.

تحياتي
عبدالله مسملي
مرشح دكتوراه
جامعة كانساس الحكومية
masmali@ksu.edu
+1(216)575-4749

Appendix G - A Second Email to Participants in Qualitative Phase (Interview) – English

Subject: Research Interview

Dear participant,

I would like to schedule your interview. I can completely accommodate your schedule so please let me know what days and times work best for you. The interview should last around 30 minutes or less. We can meet via Zoom or Skye depending on your preference.
I look forward to speaking with you.

Sincerely,
Abdullah Masmali
PhD Candidate
Kansas State University
masmali@ksu.edu
+1(216)575-4749

الموضوع: مقابلة بحثية

عزيزي المعلم/ة

السلام عليكم ورحمة الله وبركاته

تحية طيبة وبعد،

أود تحديد موعد إجراء المقابلة الخاصة ببحثي. أستطيع الموافقة على جدول مواعيدك تمامًا، لذا اسمحوا لي أن أعرف ما هي الأيام والأوقات التي تناسبك. الوقت المقدر لاستكمال المقابلة حوالي 30 دقيقة أو أقل. يمكن أن نلتقي عبر Skype أو Zoom وفقًا لما تراه مناسبا لك
أتطلع إلى التحدث معك

تحياتي

عبدالله مسملي
مرشح دكتوراه
جامعة كانساس الحكومية
masmali@ksu.edu
+1(216)575-4749

Appendix H - Letter of Consent for Qualitative Phase

Project Title: A Mixed Methods Study of Examining Saudi Arabian Middle and Secondary School Teachers' Concerns in Adopting Future Gate Learning Management Systems: A Transformation to Digital Learning.

Researcher: Abdullah Masmali, Doctoral Candidate in Curriculum and Instruction at Kansas State University.

Faculty sponsor and Principal Investigator: Dr. Kay Ann Taylor, PhD/Associate Professor and the Director of Curriculum and Instruction Graduate Programs at Kansas State University, Manhattan, Kansas, The United States of America.

Purpose:
The purpose of this explanatory sequential mixed-methods is to investigate middle and secondary school teachers' concerns in adopting Future Gate Learning Management Systems.

Introduction:
Thank you for your willingness to participate in the interview for a research study conducted by Abdullah Masmali for his doctoral dissertation under the supervision of Dr. Kay Ann Taylor. The duration time of the interview is about 20 to 30 minutes regarding adopting Future Gate Learning Management System. Please read this form carefully before agreeing to participate in this study. Please feel free to ask any question by contacting the researcher Abdullah Masmali at masmali@ksu.edu

Procedures: The following procedure will occur after the agreement of participating:

- Online meeting through either audio or video communication by Skype or Google Hangout for conducting the interview.
- The interview will be recorded.

Voluntary Participation:
Your participation in this interview is voluntary and you have the right to withdraw at any time during your participation.

Confidentiality:
The interview will be transcribed and numerically coded and your identification will be secure. The researcher will be the only have access to the data. Participants will be presented in the research by a pseudonym.

Risk/Benefits:
There will be no risk regarding participating in this research. To ensure confidentiality, all participants will be coded numerically. Participants can ask for a copy of the research results and they will receive benefits to understand adopting the project of Future Gate Learning Management System. The results of the study will contribute to change facilitators and administrators in the Ministry of Education in Saudi Arabia and TETCO for benefits of the study's results in developing the implementation of Future Gate Learning Management System

project and design a professional development programs that address teachers' needs based on their level of concerns.

Contact and Questions:

Please feel free to contact the researcher if you have any questions regarding this research:

Abdullah Masmali, email: masmali@ksu.edu

Dr. Kay Ann Taylor at: ktaylor@ksu.edu

Also, you may contact the following if you have questions regarding your rights as a participant:

- Rick Schidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66502, (785) 532-3224
- Cheryl Doerr, Associate Vice President for Research Compliance, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66502, (785) 532-3224

Participant Name:
Participant Signature:
Date:

Appendix I - Letter of Consent for Qualitative Phase - Arabic

عنوان البحث: بحث مختلط لدراسة اهتمامات معلمي المدارس المتوسطة والثانوية في المملكة العربية السعودية في تبني نظام إدارة التعلم بوابة المستقبل: التحول نحو التعلم الرقمي.

الباحث: عبد الله مسملي، مرشح دكتوراه في المناهج وطرق التدريس – تقنيات تعليم في جامعة ولاية كانساس

مشرف البحث: الدكتورة كاي آن تايلور، دكتوراه / أستاذ مشارك ومدير برامج الدراسات العليا في المناهج وطرق التدريس في جامعة ولاية كانساس، مانهاتن، كانساس، الولايات المتحدة الأمريكية.

الغرض من البحث:
الغرض من هذا البحث هو دراسة اهتمامات معلمي ومعلمات المدارس المتوسطة والثانوية نحو تبني نظام إدارة التعلم بوابة المستقبل.

المقدمة:
نشكرك على رغبتك في المشاركة في المقابلة من أجل إجراء دراسة بحثية يجريها الباحث عبد الله مسملي في رسالة الدكتوراه تحت إشراف الدكتور كاي آن تايلور. تستغرق مدة المقابلة حوالي 30 دقيقة فيما يتعلق بتبني نظام إدارة التعلم بوابة المستقبل. يرجى قراءة هذا النموذج بعناية قبل الموافقة على المشاركة في هذه الدراسة. لا تتردد في طرح أي سؤال عن طريق الاتصال بالباحث عبد الله مسملي على البريد الإلكتروني masmali@ksu.edu

الإجراءات: سيحدث الإجراء التالي بعد موافقة المشارك
- اجتماع عبر الإنترنت من خلال الاتصالات الصوتية أو المرئية عبرSkype أو Zoom لإجراء المقابلة
- سيتم تسجيل المقابلة

المشاركة التطوعية:
مشاركتك في هذه المقابلة تطوعية ولك الحق في الانسحاب في أي وقت أثناء مشاركتك

السرية:
سيتم نسخ المقابلة وترميزها رقميًا وستكون هوية المستخدم آمنة. سيكون الباحث هو الشخص الوحيد الذي لديه حق الوصول إلى البيانات. سيتم تقديم المشاركين في البحث عن طريق اسم مستعار.

المخاطر / الفوائد:
لن يكون هناك خطر فيما يتعلق بالمشاركة في هذا البحث. لضمان السرية، سيتم ترميز جميع المشاركين عن طريق اسم مستعار. يمكن للمشاركين طلب نسخة من نتائج البحث كما أن مشاركة المعلم أو المعلمة ستفيده\ها في فهم أكثر عن تبني مشروع نظام إدارة التعلم بوابة المستقبل. ستساهم نتائج الدراسة في فهم أكثر من قبل المسؤولين في وزارة التعليم في المملكة العربية السعودية وشركة تطوير لتقنيات التعليم لواقع مستويات المعلمين في تنفيذ مشروع نظام إدراة التعلم بوابة المستقبل وتطوير وتصميم برامج التطوير المهني التي تلبي احتياجات المعلمين بناء على مستوى مخاوفهم واتجاهاتهم.

الاتصال والاستفسارات:
لا تتردد في الاتصال بالباحث إذا كان لديك أي استفسارات بخصوص هذا البحث
الباحث: عبد الله مسملي، البريد الإلكتروني: masmali@ksu.edu
مشرف البحث:
Dr. Kay Ann Taylor at: ktaylor@ksu.edu
أيضًا إذا كانت لديك استفسارات تتعلق بحقوقك كمشارك فيمكنك التواصل مع:

- Rick Schidt, Chair, Committee on Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66502, (785) 532-3224
- Cheryl Doerr, Associate Vice President for Research Compliance, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66502, (785) 532-3224

اسم المشارك:
توقيع المشارك:
التاريخ:

Appendix J - Interview Protocol – English

Time of Interview:
Beginning Time:
Ending Time:
Date:
Place:
Interviewer:
Interviewee Pseudonym:

Introduction: Hello …… It is a good chance to meet with you. I want to thank you first for agreeing to and accepting this interview. As you utilized Future Gate LMS, I will ask you some questions about implementing it in your teaching. The information that you will provide through this interview is important because it will provide a better understanding of teachers' concerns in adopting Future Gate LMS and the kind of support that teachers need to make the implementation more effective and helpful for students' learning. The information from this interview will be secure and kept confidential. Your name and your school name will not be used in this research. If you need a break during the interview or you are not comfortable with this interview, please feel free to let me know. This interview will be recorded, and then I will transcribe it myself for the analysis section of the research. The information will be kept secure and only I will be able to access it; I will destroy it after 5 years.

- Before beginning this interview, do you have any questions?

Interview Questions:

1. Based on the availability of technology in your school, did you expect it would be selected with the early schools to implement Future Gate LMS?
2. How did you feel when your school was selected to implement Future Gate LMS?
   a. How ready were you for the digital learning transformation?
3. What professional development did you receive in using technology for instruction in the years before implementing Future Gate LMS?
4. Please describe the implementation of Future Gate LMS, what professional development (PD) did you receive?
5. If you received a PD program, please describe it.
6. Tell me more about the PD regarding Future Gate LMS? Who provides your PD?
7. How do you describe your ability to use Future Gate LMS? How helpful is it?
8. What other ways might be better and more effective for PD regarding Future Gate LMS?
9. What support do you prefer that can help you to use Future Gate LMS effectively?
10. Tell me about your experience in using Future Gate LMS in your teaching.
11. What is the technology equipment that you use for Future Gate LMS in your classroom?
12. How is the digital learning environment in your classroom in terms of the availability of technology equipment that you think should be in the classroom?
13. How is the Internet service in your classroom?
14. What issues regarding using the Internet did you face when you used Future Gate LMS in your classroom during class time?
15. What do you do when you face issues using Future Gate LMS?

16. What are the top three concerns you have about implementing Future Gate LMS in your classroom? Which one is the top concern? Why?
17. How has implementing Future Gate LMS affected you as a teacher?
18. Tell me about the effect of Future Gate LMS on your students.
19. What work did you do with other teachers in your school to effectively use Future Gate LMS?
20. Is there anything else you want to say?

Conclusion:

Thank you for participating in this interview and my research. Again, all information in this interview will be remain confidential, and I will not use your name and your school's name with this research.

Appendix K - Interview Protocol – Arabic

وقت المقابلة:
وقت بداية المقابلة:
وقت نهاية المقابلة:
التاريخ:
المكان:
مقدم المقابلة:
الاسم المستعار للمشارك:

مقدمة: السلام عليكم ورحمة الله وبركاته ..... إنها فرصة جيدة لمقابلتك. أود أن أشكرك أولاً على موافقتك على هذه المقابلة وقبولها. بما أنك تستخدم بوابة المستقبل في تدريسك، سأطرح عليك بعض الأسئلة تتعلق بتطبيقك لهذه البوابة في تدريسك. المعلومات التي ستقدمها خلال هذه المقابلة مهمة جدا لأنها ستوفر فهما أفضل لاهتمامات المعلمين والمعلمات في تبني بوابة المستقبل مما يجعل تنفيذها أكثر فاعليه وأكثر فائدة لتعلم الطلاب. المعلومات التي ستقدمها في هذه المقابلة ستكون خاصة وسرية. لن يتم استخدام اسمك ولا اسم مدرستك في هذا البحث. في حالة حاجتك إلى استراحة أثناء المقابلة أو إذا لم تكن راضيا عن هذه المقابلة، فلا تتردد في إخباري بذلك. سيتم تسجيل هذه المقابلة، كما سأقوم شخصيا بكتابتها وتحليلها في القسم الخاص بذلك في البحث. سيتم الاحتفاظ بهذه المعلومات في مكان آمن ولن يتمكن أحد من الاطلاع عليها غيري، كما أنها سوف تتلف بعد خمس سنوات من تاريخ هذا اليوم.
هل لديك أي استفسارات قبل البدء بالمقابلة؟

اسئلة المقابلة:
١ هل توقعت بأن تكون مدرستك من المدارس التي اختيرت مبكرا لتطبيق بوابة المستقبل؟
٢ كيف كان شعورك عندما تم اختيار مدرستك لتطبيق بوابة المستقبل؟
أ ما مدى استعدادك للتحول نحو التعلم الرقمي؟
٣ قبل تطبيق بوابة المستقبل، ماهو التدريب الذي حصلت عليه في استخدام التكنولوجيا للتعليم؟
٤ فضلا صف تطبيقك لبوابة المستقبل في تدريسك؟ ماهو التدريب الذي حصلت عليه لتطبيق بوابة المستقبل؟
٥ إذا كنت قد حصلت على تدريب يتعلق باستخدام بوابة المستقبل، يرجى منك وصفه.
٦ أخبرني عن التدريب الذي حصلت عليه، من الذي وفر وقام بهذا التدريب؟
٧ كيف تصف قدرتك على استخدام بوابة المستقبل؟ كيف أفادتك في تدريسك؟
٨ ماهي طرق التدريب الأخرى التي ترى أنها أفضل وأكثر فاعلية فيما يتعلق ببوابة المستقبل؟
٩ ما هو الدعم الذي تفضله والذي يمكن أن يساعدك في استخدام بوابة المستقبل بشكر أكثر فعالية؟
١٠ أخبرني عن تجربتك في استخدام بوابة المستقبل في التدريس.
١١ ماهي التجهيزات التقنية التي تستخدمها لتطبيق بوابة المستقبل داخل الفصل الدراسي؟
١٢ كيف هي بيئة التعلم الرقمي داخل الصف الدراسي الذي تقوم بالتدريس فيه من حيث توفر التجهيزات التقنية التي تعتقد ضرورة توفرها في الصف الدراسي؟
١٣ كيف هي خدمة الانترنت داخل الفصل الدراسي الذي تقوم بالتدريس فيه؟
١٤ ماهي المشكلات المتعلقة باستخدام الانترنت التي واجهتها عند استخدام بوابة المستقبل داخل الفصل الدراسي؟
١٥ ماذا تفعل عندما تواجه مشاكل متعلقة باستخدام بوابة المستقبل؟
١٦ ماهي أهم ثلاثة مخاوف لديك حول تطبيق واستخدام بوابة المستقبل؟ أيها أكثر؟ لماذا؟
١٧ كيف أثر تطبيق بوابة المستقبل عليك كمدرس؟
١٨ أخبرني عن تأثير بوابة المستقبل على طلابك؟
١٩ مالعمل الذي قمت به مع المعلمين الآخرين في مدرستك لاستخدام بوابة المستقبل بفعالية؟
٢٠ هل لديك شيء آخر تريد قوله؟

خاتمة:
شكرا لك على المشاركة في هذه المقابلة الخاصة ببحثي. مرة أخرى، أود تذكيرك بأن جميع المعلومات في هذه المقابلة ستبقى سرية، ولن أستخدم اسمك الحقيقي واسم مدرستك في هذا البحث.

Appendix L - Dr. Barri's Permission

DB

Dr. Moatasim Barri <m_barri@hotmail.com>
Mon 2/25/2019 2:33 PM
Abdullah Masmali; Kay Ann Taylor

وعليكم السلام ورحمة الله وبركاته

Hello Abdullah,

I'm honoured that you would like to employ my Arabic version of the SoCQ in your project. Please, let me konw if you need any further information with respect to the SoCQ and good luck with your study.

Best regards.

Moatasim A. Barri, Ph.D.
Assistant Professor in Curriculum and Teaching
Dept. Curriculum and Teaching
Faculty of Education
Taibah University

-------- Original message --------
From: Abdullah Masmali <masmali@ksu.edu>
Date: 2/25/19 9:32 PM (GMT+03:00)
To: m_barri@hotmail.com
Cc: Kay Ann Taylor <ktaylor@ksu.edu>
Subject: Re: Asking for permission

السلام عليكم ورحمة الله وبركاته
Dear Dr. Barri,

I am Abdullah Masmali, a PhD candidate in the department of Curriculum & Instruction at Kansas State University. I am preparing for my dissertation proposal meeting in February 2019. My tentative dissertation title is, "A Mixed Methods Study of Examining the Concerns of Saudi Arabian Middle and Secondary School Teachers in Adopting Future Gate Learning Management Systems: A Transformation to Digital Learning"
I read your PhD dissertation titled "The integration of technology into school curriculum in Saudi Arabia: Factors affecting technology implementation in the classroom." You used SoCQ in this research and you did a workshop to translate the questionnaire into the Arabic language. I am asking for your permission to use your translation of the questionnaire in my dissertation.
I am copying my major professor in this email correspondence. Contact me if you have questions.

Thank you for giving my request your thoughtful consideration.

Abdullah Masmali
PhD Candidate
Department of Curriculum & Instruction
Kansas State University
Manhattan, KS 66502
masmali@ksu.edu

Appendix M - The 35 Stage of Concern Questionnaire Items Grouped by Stage

Statements on the Stages of Concern Questionnaire Arranged According to Stage

Stage	Item	Statement
Stage 0: Awareness	3	I am more concerned about another program rather than the program of Future Gate LMS
	12	I am not concerned about the Future gate LMS at this time.
	21	I am preoccupied with things other than the Future gate LMS
	23	I spend little time thinking about Future gate LMS.
	30	Currently, other priorities prevent me from focusing my attention on the Future gate LMS.
Stage 1: Informational	6	I have a very limited knowledge of the Future gate LMS.
	14	I would like to discuss the possibility of using the Future gate LMS.
	15	I would like to know what resources are available if we decide to adopt the Future gate LMS.
	26	I would like to know what the use of the Future gate LMS will require in the immediate future.
	35	I would like to know how the Future gate LMS is better than what we have now.
Stage 2: Personal	7	I would like to know the effect of the Future gate LMS on my professional status.
	13	I would like to know who will make the decisions in the Future gate LMS
	17	I would like to know how my teaching or administration is supposed to change.
	28	I would like to have more information on time and energy commitments required by the Future gate LMS.
	33	I would like to know how my role will change when I am using the Future gate LMS
Stage 3: Management	4	I am concerned about not having enough time to organize myself each day in which I use Future gate LMS.
	8	I am concerned about conflict between my interests and my responsibilities when I am using Future gate LMS.
	16	I am concerned about my inability to manage all that the Future gate LMS requires.

	25	I am concerned about time spent working with nonacademic problems related to the Future gate LMS.
	34	Coordination of tasks and people is taking too much of my time when I use Future gate LMS
Stage 4: Consequences	1	I am concerned about students' attitudes toward the Future Gate LMS.
	11	I am concerned about how the Future gate LMS affects students.
	19	I am concerned about evaluating my impact on students when I am using the Future gate LMS.
	24	I would like to excite my students about their part in the Future gate LMS.
	32	I would like to use feedback from students to change the Future gate LMS program.
Stage 5: Collaboration	5	I would like to help other faculty in their use of the Future gate LMS
	10	I would like to develop working relationships with both our faculty and outside faculty using Future gate LMS.
	18	I would like to familiarize other schools or teachers with the progress of the Future gate LMS.
	27	I would like to coordinate my efforts with others to maximize the effects of the Future gate LMS.
	29	I would like to know what other faculty are doing in the area of Future gate LMS.
Stage 6: Refocusing	2	I now know of some other approaches that might work better than the Future Gate LMS.
	9	I am concerned about revising my use of the Future gate LMS.
	20	I would like to revise the Future gate LMS approach.
	22	I would like to modify our use of the Future gate LMS based on the experiences of our students.
	31	I would like to determine how to supplement, enhance, or replace the Future gate LMS.

Appendix N - The Stages of Concern Quick Scoring Device

Part A:

Stages of Concern Quick Scoring Device

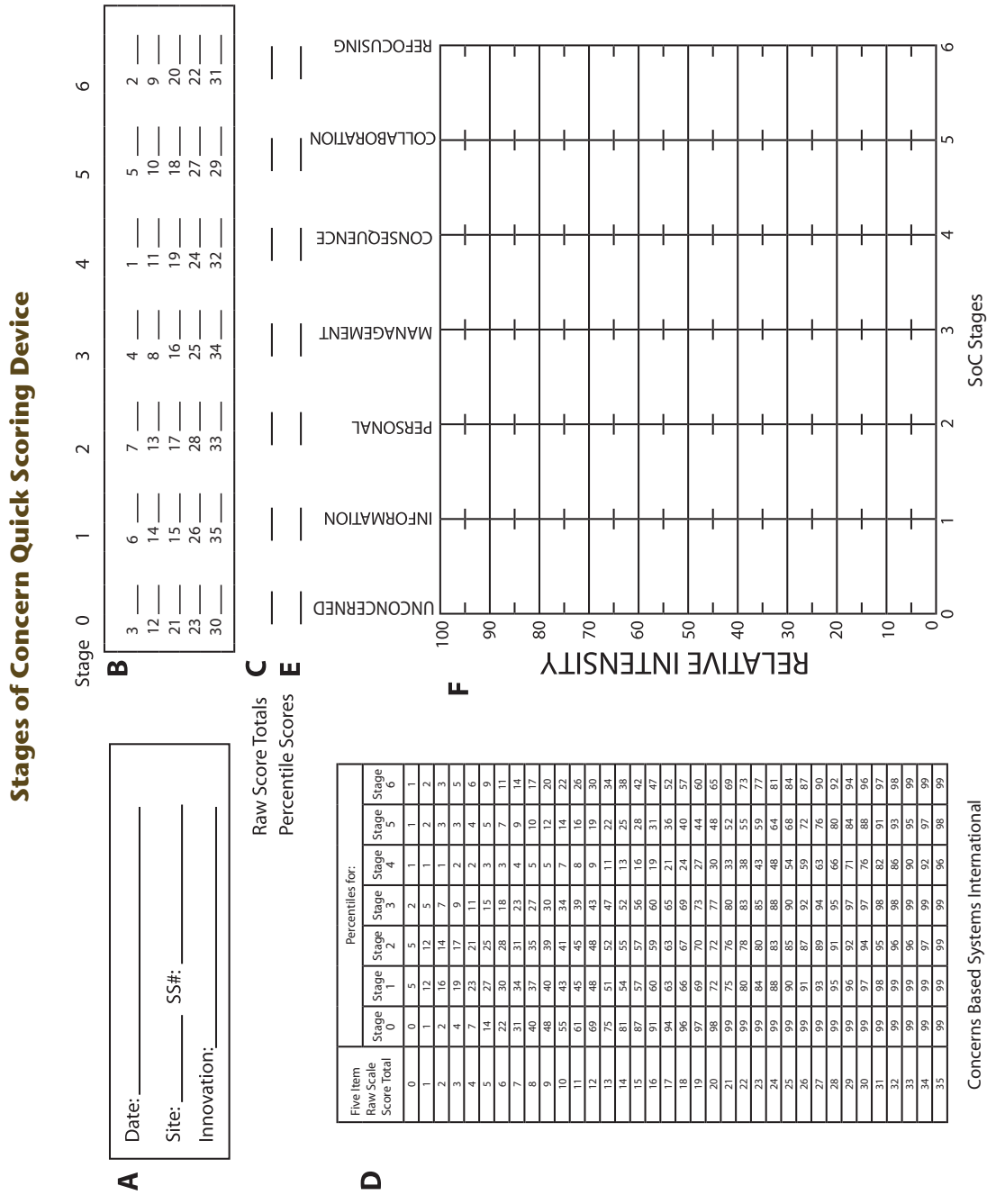
The Quick Scoring Device can be used to hand score the Stages of Concern Questionnaire (SoCQ) responses and to plot an individual profile. It is especially useful when only a small number of questionnaires need to be processed or when computer processing is not available. By following the step-by-step instructions, the SoCQ responses are transferred to the device, entered into seven scales, and each scale is totaled. Then the seven raw scale score totals are translated into percentile scores and plotted on a grid to produce the individual's SoCQ profile.

Instructions

1. In the box labeled A, fill in the identifying information taken from the cover sheet of the SoCQ.
2. In the table labeled B on the Scoring Device, transcribe each of the 35 SoCQ circled responses from the questionnaire (raw data). Note that the numbered blanks are not in consecutive order.
3. Row C contains the Raw Scale Score Total for each stage (0–6). Take each of the seven columns (0–6) in Table B, add the numbers within each column, and enter the sum of each column (0–6) in the appropriate blank in Row C. Each of these seven Raw Scale Score totals is a number between 0 and 35.
4. Table D contains the percentile scores for each Stage of Concern. For example, find the Raw Scale Score Total for Stage 0 from Row C ("12" from the example) in the left-hand column in Table D, then look in the Stage 0 column to the right in Table D and circle that percentile rank ("69" in the example). Take the raw score for Stage 1 ("31" in the example) to Table D and locate that numeral in the left hand Raw Score Total column. Move across in the percentile table to the Stage 1 column and circle the percentile value ("98" in the example). Do the same for Stages 2 through 6.
5. Transcribe the circled percentile scores for each stage (0-6) from Table D to Box E. Box E now contains seven numbers between 0 and 99.
6. Box F contains the SoCQ grid. From Box E, take the percentile score for Stage 0 ("69" in the example) and mark that point with a dot on the Stage 0 vertical line of the SoCQ grid. Do the same for Stages 1–6. Connect the points to form the SoCQ profile.

You can now check your own scoring by using the blank profile sheet (see Appendix C). You will want to make copies of the blank scoring device before writing on it. Reproduce the data in the example by recording the original data from the completed SoCQ.

Part B:



Appendix O - King Abdul Aziz Support Education

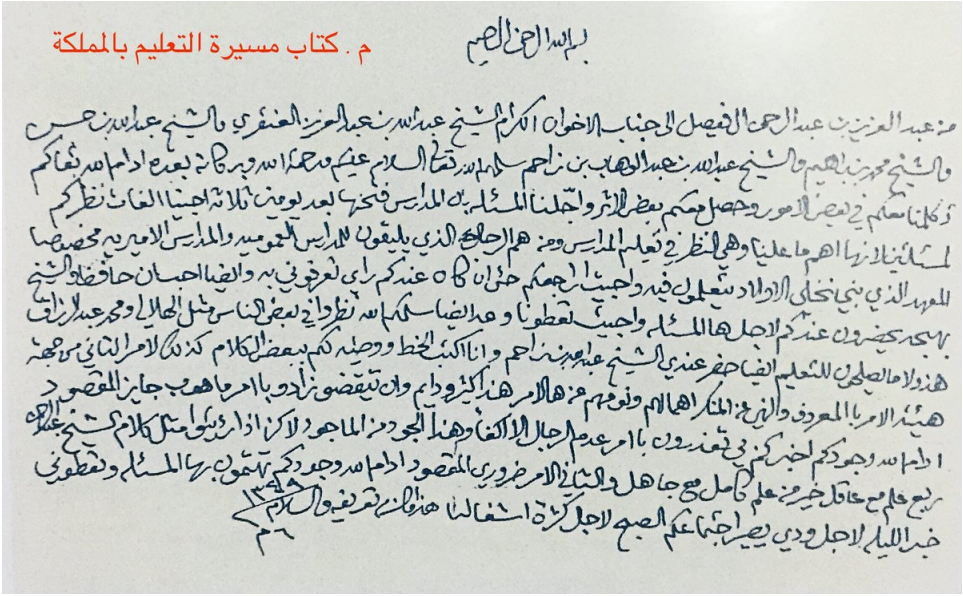


Figure R.1. 1930 letter written in Arabic in which King Abdul Aziz asked to open more schools in the country. Source: https://twitter.com/smsnak12/status/911514584439250944

Figure R.2. King Abdul Aziz talk with some scholars in Najd about some issues such as open more schools. Source: https://twitter.com/smsnak12/status/911514584439250944

Appendix P - Practicing Future Gate LMS

Figure B1. Students had a 1:1 ration of computers in some schools that implement Future Gate in the school year 2017-2018 (first phase). Source: https://sabq.org/5ZpPLJ