K-6 Saudi Arabian Teachers' Implementation of Electronic Textbooks: Factors Associated with Behavioral intention

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ABSTRACT

K-6 SAUDI ARABIAN TEACHERS’ IMPLEMENTATION OF ELECTRONIC TEXTBOOKS: FACTORS ASSOCIATED WITH BEHAVIORAL INTENTION

Hamed Alghamdi, Ed.D.
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Northern Illinois University, 2020
Elizabeth A. Wilkins, Director

Teaching with digitized textbooks is a relatively new domain of education in general and is a completely new domain in Saudi Arabia. This study investigated the relationship between the Unified Theory of Acceptance and Use of Technology (UTAUT) constructs and the behavioral intention of K-6 elementary school teachers in Jeddah School District in Saudi Arabia to identify predictors of their behavioral intention toward using digitized books in their classrooms. The study employed a modified electronic UTAUT survey for data collection. The results of the study indicated a significant relationship between teachers’ behavioral intention and the variables of performance expectancy, effort expectancy, and social influence. The findings also indicated that the effect of gender on the relationships between K-6 teachers’ behavioral intention and the other UTAUT variables was insignificant. More research needs to be conducted on how behavioral intention as a construct of the UTAUT theory might help predict the behavioral intentions of the student and parent populations in the Saudi Arabian context.
K-6 SAUDI ARABIAN TEACHERS’ IMPLEMENTATION OF ELECTRONIC TEXTBOOKS: FACTORS ASSOCIATED WITH BEHAVIORAL INTENTION

BY

HAMED ALGHAMDI
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A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE DOCTOR OF EDUCATION

DEPARTMENT OF CURRICULUM AND INSTRUCTION

Doctoral Director:
Elizabeth A. Wilkins
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In the name of Allah, the most Gracious, the most Merciful

"Qul Rabbi Zdnni 'Ilmn.

"Say, O Lord, Increase my Knowledge."

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DEDICATION

This work is dedicated to my family: my father Khalaf, mother Azzah, brothers and sisters, my beloved wife Abrar, and my dear children: Aseel, Abdullah, and Ayah.

To all of my family members, I say may Allah bless you graciously.
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CHAPTER 1
INTRODUCTION

Since the late 20th century, technology has been revolutionizing the education sector. In addition to computers and other smart devices, digitized books have influenced classroom delivery and learning (Turner, 2005). Teaching with digitized textbooks is a relatively new domain of education in general and is a completely new domain in Saudi Arabia (Alawami, 2016). It depends heavily on technology in general and on e-books in particular (Weisberg, 2011). The most recent definition states that digitized textbooks “integrate the existing characteristics of a traditional printed textbook including the content, reference materials, exercises, and dictionaries into an electronic format” (Cartwright, 2015, p. 22). In the literature on this topic, there have been many attempts to define the e-book as a technological tool. Embong, Noor, Hashim, Ali, and Shaari (2012) stated that e-books have witnessed various stages of development until they have become defined as “any piece of electronic text regardless of size or composition (a digital object), but excluding journal publications, made available electronically (or optically) for any device (handheld or desk-bound) that includes a screen” (p. 1802). In addition, Al Saadi, Lane-Kelso, Al Hafeedh, Al Sheithani, and Al Wishahi (2017) stated that e-books have witnessed so much development that researchers are unable to agree on one definition. Therefore, the definition has ranged from viewing an e-book as digital format material to text that readers can access on technological devices (Al Saadi et al., 2017). The definition has also been approached through the idea of digital access and connection. Thus, a digitized textbook is defined as a textbook with electronic features that allow users to access
education materials using a digital appellation or internet assembly so learners can read and interact with the text via electronic devices (Aharony, 2014). Furthermore, Ongoz and Baki (2010) suggest that e-books can be defined in light of extra features that allow readers to interact with the text through the use of sound, visuals, and links. According to Al Saadi et al. (2017), “Regardless of all these different views, they all seem to agree that a digitized textbook involves the use of technology” (p. 12). This dissertation operationalizes the notion of e-books as an educational tool toward the replacement of curricular paper-based books by a digitized form of a book. In other words, the digitized textbook is an electronic tool that changes the textbook from its paper-based form into a digital material to be used in the educational curriculum (Lee, Messom, & Yau, 2013). This revolution of the textbook has caused educational systems around the world to shift their attention toward the evolution of curricula to include digitized textbooks.

Estevez-Menendez, An, and Strasser (2015) argue that nations can benefit from access to technological devices in their education systems by including e-books in curricula plans. An American study by Dobler (2015) concluded that educators and learners need to shift from paper-based to digitized textbooks because reading skills can be enhanced by including digital text. In addition, accessibility and ease of use are among the features that students and teachers favor most about shifting to digitized textbook (Alhammad & Ku, 2016; Ongoz & Baki, 2010).

According to Lee et al. (2013), although large countries such as the United Kingdom, United States, and Australia have been replacing paper-based textbooks with digitized materials, challenges can be expected in the curricula, pedagogy, and assessment levels, making it difficult to introduce this new technology into education systems. Although some countries need to realize the significances and challenges of shifting curricular systems to include digitized materials and textbooks, the Saudi government has ambitious plans for digitizing textbooks to

Because there are no previous studies in Saudi Arabia focusing on this shift, especially in elementary schools, this study sought to identify the factors that might predict teachers’ intention toward future implementation of e-textbooks (digitized textbooks). Integrating digitized books into Saudi Arabia’s educational system would benefit students, teachers, and their schools, as using e-textbooks has the potential to change both teaching and learning, if wisely implemented. Therefore, the word “intention” in this study was not used in its open sense but rather in its connotation limited to behavior captured in Venkatesh Morris, Davis, and Davis’s (2003) research. Behavioral intention is used to refer to conscious plans of individuals’ desires to perform something in the future (Warshaw & Davis, 1985). According to Venkatesh et al. (2003), intention is a significant factor affecting the implementation of new technologies such as e-textbooks. Thus, this research explored the behavioral intention of Saudi Arabian teachers who teach elementary school children.

Problem and Purpose Statements

In a country like Saudi Arabia, K-12 teachers have traditionally used paper-based textbooks provided by the Ministry of Education to guide classroom content and activities. With advancements in technology, the Saudi government wants to infuse technology into the curriculum by digitalizing the textbook along with associated teaching materials to help children learn using digital tools (Eidaroos & Alkraiji, 2015; Korat & Shamir, 2012). School children who belong to the digital generation are an important dimension for overcoming barriers of e-learning curriculum in Saudi Arabia (Quadri et al., 2017). Incorporating the digitized textbook
into the classroom instruction is one aspect of making the children part of a successful e-learning system in the country. With no previous studies in Saudi Arabia focusing on this change, especially at the elementary school, intention may be a factor that predicts workers’ (i.e., defined as K-6 teachers in this study) use of specific technology (Davis, Bagozzi, & Warshaw, 1989; Venkatesh et al., 2003).

According to Al-Awidi and Aldhafeeri (2017), shifting from the traditional method to a digital system is a process that requires teachers to spearhead the change process. This shift requires understanding teachers’ intentions to use e-textbooks along with the traditional paper-based textbook. The importance of understanding the teachers’ intention is based on the fact that the teachers are directly responsible for successful implementation of innovation such as e-textbooks. For educators, the issue of teachers’ intention is considered essential because the implementation of any future digitalizing plans will certainly depend on the teachers’ understanding and participation (Korat & Shamir, 2012). Therefore, the purpose of this study was to investigate the behavioral intention of K-6 elementary school teachers in the Jeddah School District to use e-textbooks in their classrooms by applying selected constructs of the UTAUT model (performance expectancy, effort expectancy, and social influence).

Research Questions

This study used two research questions to investigate K-6 elementary teachers’ behavioral intention to use e-textbooks in their classrooms:

1. To what extent do performance expectancy, effort expectancy, and social influence predict K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?
2. Does gender moderate the relationships among performance expectancy, effort expectancy, social influence, and K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?

The study variables drew from the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which included performance expectancy (PE), effort expectancy (EE), and social influence (SI), with gender as a moderator variable.

Significance of the Study

Saudi Arabia has started to respond to changes driven by recent advancements in technology. As a result, there is a shift in school curricula to digitized textbooks. However, the current literature about using e-textbooks in Saudi Arabian has largely focused on higher education (Lee et al., 2013). As a result, K-12 teachers have been overlooked by research efforts in Saudi Arabia; thus, the need to study that particular unit of analysis is timely and necessary. This study aimed to examine the behavioral intention of elementary school teachers regarding their use of e-textbooks. As a result, the findings of this study adds to the body of literature from the Middle East in general and in Saudi Arabia in particular. Finally, K-6 teachers in the Jeddah School District might use the findings of this study to better understand their position in implementing e-textbooks.

Definitions of Terms

The following definitions guided the study:

**Behavioral intention**: “The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior” (Warshaw & Davis, 1985, p. 214).
Effort expectancy: “The degree of ease associated with the use of the system” (Venkatesh et al., 2003, p. 450).

E-textbooks: “Integrates the existing characteristics of a traditional printed textbook including the content, reference materials, exercises, and dictionaries into an electronic format; types of interactive activities that are organized into a multimedia learning environment that could include videos and virtual world functionality” (Cartwright, 2015, p. 22).

Performance expectancy: “The degree to which an individual believes that using the system helps him or her to attain gains in job performance (Venkatesh et al., 2003, p. 477).

Social influence: “The degree to which an individual perceives that important others believe he or she should use the new system” (Venkatesh et al., 2003, p. 451).

Methodology

This study utilized a quantitative design. The data were randomly collected from K-6 teachers currently working in the Jeddah School District using a survey method. The survey targeted responses about factors associated with the UTAUT model. Once the data were collected, the responses were analyzed using SPSS.

Organization of Study

This first chapter provides an overview of the study. Chapter 2 includes synthesis of the literature about the use of e-textbooks in the classroom, teachers’ behavioral intentions toward using e-textbooks in the K-6 school curricula, and the theoretical framework. Chapter 3 details the methodology used to conduct the study. The results of the statistical analyses are presented in Chapter 4, with discussion and recommendations in Chapter 5.
CHAPTER 2
LITERATURE REVIEW

This chapter presents a review of literature related to the use of e-textbooks to contextualize a case study of Saudi Arabian e-textbook users. Due to a lack of studies that examine the topic at the elementary school level (Lee et al., 2013), this study focused on e-book adoption at different education levels. It starts with literature related to the Unified Theory of Acceptance and Use of Technology (UTAUT) constructs, including 1) teachers’ behavioral intention, 2) performance expectancy, 3) effort expectancy, 4) social influence, and 5) conceptual framework as well as gender as the moderator variable. In addition, the chapter covers related topics such as adoption of e-textbooks as a technological tool, calls for use of e-textbooks in classrooms, and teachers leading a shift toward the use of e-textbooks.

Teachers’ Behavioral Intention

According to research, behavioral intention is a significant predictor of acceptance, as it mediates the effect of the UTAUT main determinants on behavior (Rahi et al., 2019; Venkatesh et al., 2003; Xia et al., 2019). For the last two decades, people’s behavioral intentions have been the subject of debate, causing the literature to include many views. As a result, the definition ranges from “instructions that people give to themselves to behave in certain ways” and “people’s decisions to perform particular actions” (Sheeran, 2002, p. 2) to the degree of a person’s expected choice toward behaving consciously while planning to use technology in the
present and future (Warshaw & Davis, 1985). In more recent study, Hameed and Qayyum (2018) used a definition stated as “an individual’s subjective probability of performing specific conducts [as] a major determinant of actual usage behavior” (p. 35). According to Sheeran (2002), behavioral intentions are planned innate actions based on prior decisions. For the purpose of this study, Warshaw and Davis’s definition was used to clarify the concept of intention. The definition is, “The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior” (Warshaw & Davis, 1985, p. 214). This definition sheds light on behavioral intention as used in this dissertation to conceptualize teachers’ behavior toward using digitized books.

Researchers have found a relationship between intentions and behavior. Sheeran (2002) explained that intentions can predict an impressive range of behaviors, including consumer and leisure decisions, physical activities, weight loss, smoking, academic activities and achievement, drug use, gambling, driving behavior, whether to have a child, and other behaviors such as blood donation. In such cases, intentions are innate decisions that inform us about what to do, which is reflected in our behavior. For example, teachers’ behavioral intention is associated with the relationship of real plans and predictors of behavior with respect to the adoption of technology in educational contexts. Dwivedi, Rana, Jeyaraj, Clement, and Williams (2019) investigated the UTAUT, aiming to revise and validate it as a theoretical model for technology acceptance and behavioral intention. The study was a meta-analysis of 162 prior studies with 1,600 observations on 21 themes regarding acceptance and use. The results of the study showed that behavioral intention was significantly predicted by users’ expectancy and attitude toward technology adoption. Also, moderators, such as experience and gender, had effects on the relationship between the UTAUT main constructs (i.e., performance expectancy, effort expectancy, social
influence) and behavioral intention. Previous research (e.g., Alshaya & Oyaid, 2017; Smeda, Shiratuddin & Wong, 2015) investigated the significance of implementing e-books in education and revealed a positive relationship between the faculty members’ students and their behavioral intentions toward using e-books.

Intentions of both institutions and teachers may be related to usefulness, experience, and users’ needs for e-textbooks in education. The findings of studies by Alahmari and Kyei-Blankson (2016), Alshaya and Oyaid (2017), and Arkorful and Abaidoo (2015) have indicated that participants’ intentions to use e-books were related to their learning needs and environments. Also, a recent literature review by Williams, Rana, and Dwivedi (2015) found that independent variables such as performance expectancy and behavioral intention were the most significant predictors of users’ behavior. Moreover, Alshaya and Oyaid (2017) found that variables of effectiveness of use, self-efficacy, and the usefulness of the intended behavior showed high coefficient scores indicating users’ intention toward plans about introducing e-books in Saudi schools. Consequently, the relationship investigating this UTAUT and construct requires the relationship between performance expectancy and behavioral intention be identified to predict the behavior patterns K-6 teachers might take toward e-textbooks and their implementation in classrooms.

Performance Expectancy

Performance expectancy refers to the degree to which adopters believe technology is useful for them because it will enable them to accept innovations quickly (Venkatesh et al., 2003). For example, research has indicated that the effects of performance expectancy on behavioral intention were significant (Lee, Lee, & Rha, 2019; Rahi et al., 2019; Wang & Wang,
behavioral factors that influence users’ acceptance of technological tools include performance expectancy (Xia et al., 2019). Previous research recommended technology providers should “develop valuable functions and a variety of services that could help to fulfill potential users’ needs” (Wang & Wang, 2010, p. 422). For example, in the context of mobile learning, Wang et al. (2009) examined the relationship between users’ behavioral intention toward technology and performance expectancy and identified the significance of performance expectancy as a predictor of behavioral intention to use technology. The positive relationship between behavioral intention and performance expectancy can be employed to predict users’ behavior toward learning with technology. This finding by Wang et al. (2009) explains that factors such as intention and performance expectancy should encourage technology users regarding their need to learn something new while using technology.

Research also investigated UTAUT roots in eight technology acceptance models and how their frameworks and variables related to the UTAUT constructs (Rana, Dwivedi, Williams, & Weerakkody, 2016). Liu, Wang, and Koehler (2019) conducted a mixed-methods study in the context of foreign-language teaching in China to examine the intention-behavior gap in the technology acceptance model. The findings revealed one of the technology acceptance model (TAM) constructs (perceived ease of use) and attitude toward e-book adoption in teaching and learning were the strongest factors connected with real actions in behavioral intention (Smeda, Shiratuddin, & Wong, 2017). The literature of the UTAUT has discussed the relationship between perceived usefulness and performance expectancy because perceived usefulness is measured as one of the root constructs of performance expectancy in the UTAUT framework.
Based on this, it seems reasonable that performance expectancy will have a significant impact on users’ intention toward adopting the e-book technology program.

Al-Gahtani, Hubona, and Wang (2007) investigated the cultural context of accepting and using information technology in Saudi Arabia. The study was consistent with Venkatesh, Thong, and Xu (2012) in that performance expectancy had a positive effect on intention. The study revealed that the effect of experience on the relationship between effort expectancy and intention “indicated that with increased years of experience with computers, ease of use becomes less important in predicting Saudi’s behavioral intentions” (Al-Gahtani et al., 2007, p. 690). According to the findings of the study, more experience with computers had less effect on intention despite its interaction with the factor of ease of use. This means that in the case of Saudi workers, ease of use is not a predictor of behavioral intentions because the relationship between effort expectancy and intention is negatively affected by interaction between experience and effort expectancy. In other words, users with more experience with technology are likely to have less effort expectancy with less effect on intention.

Performance expectancy has been the focus of research for its role as a predictor of users’ decisions to adopt technology in various contexts. In the internet banking adoption context, Rahi et al. (2019) used the UTAUT model to investigate the role of performance expectancy in accepting technology and found that performance expectancy was a significant predictor of users’ intention to adopt internet banking with a variance of 80%. The study indicated that performance expectancy was a positive and significant variable in determining the relationship among website design, customer service, and customers’ intention in the context of internet banking adoption. A number of studies in e-textbook adoption (e.g., Liebenberg, Benade, & Ellis, 2018; Maduku, 2015; Williams et al., 2015) and the e-government context (Venkatesh et
al., 2011) support the positive and significant impact of performance expectancy on users’ behavioral intention.

Researchers have investigated performance expectancy in the context of higher education. Soliman, Karia, Moeinzadeh, Islam, and Mahmud (2019) investigated factors that affect users’ intention to use technology in an Egyptian higher education context, and Liebenberg et al. (2018) researched a South African higher education context. The studies were consistent in that factors affecting the users’ motivation to utilize technology in education include performance expectancy. Soliman et al.’s study recommended that stakeholders in countries such as Egypt should focus on the level of technological innovation within the organization before adopting technological systems. Some researchers recommended that future research should investigate more factors, such as students’ level of satisfaction, stages of implementation, and geographical locations in different contexts (Liebenberg et al., 2018; Soliman, et al., 2019).

Previous research found performance expectancy was a positive and significant determinant of users’ intention. The UTAUT model was utilized and validated in research studies (e.g., Alalwan, Dwivedi, & Rana, 2017; Alrawashdeh, Muhairat, & Alqatawnah, 2012; Alshehri & Rutter, 2019; Dwivedi et al., 2019; Garone et al., 2019; Liebenberg et al., 2018; Liu et al., 2019; Venkatesh et al., 2011). These studies explored the effects of UTAUT constructs, including performance expectancy on intention to use and adopt technology. Williams et al. (2015) reviewed the literature of using the Unified Theory of Acceptance and Use of Technology (UTAUT). The study aimed to analyze 174 existing articles on the UTAUT model. The authors collected “data including demographic details, methodological details, limitations, and significance of relationships between the constructs from the available articles based on the UTAUT” (Williams et al., 2015, p. 443). The study also found that researchers who used the
UTAUT adopted cross-sectional and survey method approaches in addition to using SPSS for the analysis in most of the studies. The findings indicated that performance expectancy is a positive and significant determinant of users’ intention toward adopting or using the different innovations in technology.

The literature shows that it is essential to investigate the relationship between performance expectancy and behavioral intention and between effort expectancy and behavioral intention because the extent to which e-textbook adoption is useful and consistent with performance expectations as well as easy to use can influence the adopters’ behavioral intention leading to implementing this type of technology. Therefore, the following hypothesis was posited for the purpose of this study:

H1. Performance expectancy will have a positive and significant influence on K-6 Saudi teachers’ behavioral intention.

Effort Expectancy

According to Venkatesh et al. (2003), effort expectancy refers to how easily consumers associate with technology, i.e., the degree of ease associated with the use of a technological tool such as e-textbooks. As found in Maduku’s (2015) study, users’ acceptance of e-textbooks was related to their effort expectancy – the way they believe the use and adoption of e-books would be easy and without pain. Also, the concept of effort expectancy explains that teachers’ intentions toward use of technology can provide stakeholders and school districts with valuable information about the teachers’ ability to perform in the implementation programs (Alshrari, 2018).

In the Saudi Arabian context, identifying the relationships between effort expectancy and
intention supports how Saudi teachers might benefit from plans to enhance e-textbook adoption. According to Rana et al. (2016) and Venkatesh et al. (2003), effort expectancy can be traced back to the literature on technology acceptance models, as it is derived from two constructs: ease of use and complexity. The significance of effort expectancy, as established in prior research (Alrawashdeh et al., 2012; Dwivedi et al., 2019; Gruzd, Staves, & Wilk, 2012; Liebenberg et al., 2018; Rahi et al., 2019), lies in the fact that it can be used to predict users’ behavioral intention. Using extended UTAUT and structural equation modeling, Alrawashdeh et al. (2012) investigated factors affecting acceptance of a web-based training system to examine the behavioral intention of 290 employees in Jordan. Based on the findings of the study, effort expectancy was a significant factor of users’ intention toward the adoption of web-based learning.

In a similar study, Rahi et al. (2019) used the UTAUT model to investigate the role of effort expectancy in accepting technology in internet banking adoption. The findings showed that the UTAUT constructs had significant influence on users’ intention to adopt the technology utilized in internet banking, specifically that effort expectancy was a significant predictor with a variance of 80%. The study indicated that effort expectancy was found to be positive and significant regarding website design and customer service. Similarly, prior research has recommended that stakeholders should consider users’ expectations regarding the service feasibility, quality, and availability to enhance adopters’ levels of confidence toward using technology in workplaces (Alrawashdeh et al., 2012; Dwivedi et al., 2019; Gruzd et al., 2012; Liebenberg et al., 2018; Maduku, 2015; Rahi, et al., 2019; Soliman, et al., 2019). Yoo and Han (2013) used UTAUT to identify the effect of factors influencing employees’ intention to use e-learning in the workplace. Data were collected from 261 employees in a food service company in
South Korea. Their findings revealed that attitudes of employees and their perceptions about technology had a significant impact on their decisions regarding the use of e-learning in the workplace. The South Korean employees’ attitudes toward workplace training programs were related to their performance expectancy, effort expectancy, and social influence factors. The study showed that utilizing e-learning in training of employees positively impacts employees’ attitudes toward e-learning in the workplace.

While much research suggests the significance of effort expectancy, not all research findings support that effort expectancy is a factor of adoption (Ali & Arshad, 2018; Isaias, Reis, Coutinho, & Lencastre, 2017; Khechine et al., 2014; Lee et al., 2019; Mohammadyari & Singh, 2015; Tarhini et al., 2016). For example, Rana et al. (2016) investigated adoption of technology in the context of a public online grievance redressal system in India. The study aimed to develop and validate a unified model of e-government system adoption by collecting data from 419 participants who were citizens from different cities in India. Rana et al. were able to measure “the positive and significant impact of effort expectancy on performance expectancy” (p. 279). Lee et al.’s (2019) findings were consistent with previous studies in that the effect of effort expectancy on the other constructs of the UTAUT model was not significant.

Although the behavioral intention to use technology can be influenced by consumers’ experiences or by recommendations from others, perceived ease of users’ association with technology was negatively related to intention. Therefore, curricular strategies should be developed to help promote the benefits of technology adoption not only to individual users but also to stakeholders who may affect adoption programs (Gruzd et al., 2012; Lee et al., 2019; Liebenberg et al., 2018; Maduku, 2015; Rahi et al., 2019; Williams et al., 2015). Thus, based on the above discussion and evidence regarding the positive impact of effort expectancy on
intention, the following hypothesis was posited for the purpose of this study:

H2. Effort expectancy will have a positive and significant impact on the Saudi K-6 teachers’ intention.

Social Influence

The literature defines social influence as the impact of those who are important to the individual and who think individuals’ behavior toward technology (in this case e-books) is beneficial or not beneficial for the person influenced by such impact (Maduku, 2015; Venkatesh et al., 2003; Venkatesh et al., 2012). Therefore, social influence is the overall level of perception consumers have toward how other people, family, and friends believe they should acquire a given technology (Venkatesh et al., 2012). The fact that social influence is associated with the degree to which technology users perceive the influence of the social circles in their lives (Maduku, 2015) makes it the most critical factor regarding behavioral intention toward use of technology.

Most recent studies (e.g., Alrawashdeh et al., 2012; Dwivedi et al., 2019; Garone et al., 2019; Peek et al., 2014) have investigated technology adoption and concluded that social influence is positively a significant predictor of users’ behavioral intention. For example, applying the UTAUT model to the context of integrating a new learning management system (LMS), Garone et al. (2019) found that social influence had a positive and significant impact on both early and late starters, as support from family and friends and superior colleagues encouraged using more technology through increased social influences. Garone et al. concluded that social influence and ease of use played a significant impact on the experience of participants whose demographics included early use of technology in their life. These research results indicate that when implementing technology adoption programs, there is a good chance the
institutions will benefit from the social influence available to their users.

The importance of social influence is that it comes in many forms of encouragement. Previous researchers (e.g., Peek et al., 2014) have indicated that social influence includes support from people such as family, friends, and work colleagues as well as alternatives to technology such as help from family members and/or influence from adults with technology experience. These factors tend to impact the behavioral intention toward making decisions to use a technology system like e-books. A Jordanian study (Alrawashdeh et al., 2012) found that different types of social influence positively influenced employees’ intention toward using a web-based training system. Similarly, Peek et al. (2014) concluded that social influence was among 27 factors that affected technology acceptance in the pre-implementation stage. Based on the above discussions and empirical support for this relationship, the following hypothesis was posited:

H3. Social influence will have a positive and significant impact on Saudi K-6 teachers’ intention.

Finally, UTAUT identifies experiences, voluntariness, gender, and age as additional factors that influence technology adoption. In the current study, gender served as the socio-cultural dimension that affects how adopters use a technology innovation or system (Venkatesh et al., 2012). Gender differences can define the basis by which an individual chooses to act in a particular way pertaining to technology acceptance levels and perceptions toward adoption. Research on use of e-books (Marston, Thrasher, & Ciampa, 2014) tends to support that men’s intentions to use technology are significantly higher compared to women users mainly because of gender differences. However, it is helpful to consider culture differences across countries and regions to understand how gender measures affect behavior and intention to use technological
tools. For example, Al-Gahtani et al. (2007) recommended collecting more information related to cultural dimensions to fully understand individual-level gender effect on intention.

Gender as a Moderator Variable

Related research on the UTAUT is numerous (e.g., Chen & Jang, 2013; Lai, 2016; Marston et al., 2014; Nel & King, 2015; Smeda et al., 2017; Sun & Flores, 2012; Wang & Shih, 2009). All these studies utilized gender as a moderating variable along with UTAUT constructs and/or technology acceptance models such as TAM. The effect of gender on students’ acceptance of e-textbooks was researched in Marston et al. (2014). The researchers surveyed 250 male and female undergraduate students who had used e-textbooks and found a significant difference between users in terms of gender among the students regarding whether to use or reuse e-textbooks.

Gender has been the moderating variable for performance expectancy and effort expectancy in several studies that used the UTAUT model (Chen & Jang, 2013; Lai, 2016; Maduku, 2015). For example, Maduku (2015) investigated the moderating effect of gender on the relationship between the UTAUT constructs and students’ behavioral intention toward using e-books in South Africa. Lai (2016) examined pre-service elementary school teachers’ readiness to integrate e-books into science teaching. Chen and Jang (2013) examined Taiwanese elementary mathematics and science teachers’ use of electronic books. While Maduku (2015) concluded there was no moderating effect of gender on the relationship between performance expectancy, effort expectancy, or social influence and behavioral intention, Chen and Jang’s study and Lai’s study found that gender was an influencing moderator with a significant effect on the relationship between the UTAUT constructs and behavioral intention. In particular, two of
these studies (i.e., Chen & Jang, 2013; Lai, 2016) concluded that gender differences significantly predicted the relationship between teachers’ intention and teachers’ use of e-books among the participants.

The effect of gender differences on technology acceptance was also the focus of research by Sun and Flores (2012) and Wang and Shih (2009). Sun and Flores (2012) examined the direct and moderating effects of gender on students’ e-textbook acceptance compared to the effect of technology savvy. The results and statistical analyses indicated that the moderating effect of gender on the relationships among the participants’ e-textbook experiences was insignificant. Similarly, Wang and Shih (2009) investigated the factors that influence behavior intention of information kiosk users and examined the moderating effect of gender and age differences on the relationships between the determinants and behavioral intention. The findings of both these studies contribute implications and recommendations for the practice and future research on information technology acceptance in many contexts. For example, Wang and Shih (2009) revealed that empirical findings worked to validate a useful framework for e-government authorities to develop, implement, and promote better user-accepted kiosk systems, but Sun and Flores (2012) reported that gender is not a significant moderator on e-textbook experiences. According to Wang and Shih (2009), “Additional research efforts should be conducted to validate the proposed model and findings in other settings” (p. 162), but Wang and Shih warned against generalizing findings because their study did not examine the acceptance of kiosk systems and cultural areas other than the Taiwanese.

Moreover, studies support that the relationship between social influence and gender is significantly positive in the context of the technology adoption literature in general (e.g., Chen & Jang, 2013; Maduku, 2015; Nel & King, 2015). Nel and King (2015) examined the effect of cost
and gender on factors that determine user resistance to e-textbooks compared to paper textbooks. The researchers collected data from 193 students who were studying at a higher education institution. Nel and King argued that students’ regularity in using paper textbooks was a factor that enhanced e-textbook resistance. According to the results of the study, gender was a positive moderator of the effect on the relationship between user resistance and cost (another moderator variable). Chen and Jang (2013) also revealed significant differences based on gender. Sun and Flores (2012) recommended that educational institutions, libraries, and educators should provide learning opportunities and technical support so that students improve their e-textbook experience.

Based on this literature, performance expectancy, effort expectancy, and social influence can be used as independent variables and gender as a moderating variable. These variables were considered determinant variables and predictors of teachers’ behavioral intention toward adopting e-books and/or e-textbooks in K-6 educational settings in Saudi Arabia. Therefore, the following hypothesis was posited for the purpose of this study:

H4. Gender will moderate the relationships between performance expectancy, effort expectancy, social influence and the Saudi K-6 teachers’ intention.

Adoption of E-books as a Technological Tool

Institutions’ attempts in technology adoption need to be supported by teachers’ and students’ positive perceptions. Adeyinka, Dare, Adebisi, and Lawal (2018) explored the perception and use patterns of e-books among students at five universities. A survey was used to collect data from the participants to answer the five research questions. The findings of the study indicated that undergraduate students reported the use of e-books more in their study activities
because they preferred them to print books. The results also revealed students had positive perceptions of e-books because they enhanced learning effectiveness, helped students finish course content/outline, and made reading faster and easier when coupled with clear graphical illustrations. The students also reported they mainly used e-books for research purposes and showed high levels of satisfaction toward reading from e-books. However, levels of satisfaction and students’ perceptions toward studying with e-books were not the only factors affecting the implementation of such a technology tool.

Hwang, Tu, and Wang (2018) stated that because of the widespread use of technology, accessibility, and ease of use of devices, e-books have become accepted as a learning tool in the educational systems of many countries. Hwang et al. conducted an experiment in which the students were divided into two groups: an experimental group and a control group. The intervention required the experimental group to learn using e-books and guided peer feedback on the e-books. On the other hand, the control group was only given a conventional e-book development approach. The findings revealed that integrating guided peer feedback and e-book development strategies positively impacted the students’ learning outcomes. The students’ cognitive load was lowest while their innovative thinking skills increased as a result of using an e-book integration design and feedback process. Among other factors, accessibility and ease of use may cause e-book adoption programs to be successful.

Similarly, Gazzali (2018) conducted a study to investigate the e-book phenomenon and its relationship with enhancement of learning. Gazzali developed materials with specific knowledge for pharmacy graduate students in an e-book format so they could study practical skills related to their major, such as compounding and dispensing medications.
Using e-books in classroom instruction has an effect on students’ self-learning habits, as shown in Shemy’s (2017) quasi-experimental study. Shemy collected data from 24 students enrolled in the 11th grade in a public school in Muscat Governorate in the 2016/2017 academic year. As instrumentation for the study, the researcher used interactive e-books, achievement tests, and measurement of attitude toward interactive e-books. The results indicated significant differences between the scores of the two experimental groups in favor of directed control in the attitude toward interactive e-books. Factors of Libyan University students’ acceptance were investigated to examine effects of using e-books (Smeda et al., 2015). The researchers utilized five factors (i.e., accessibility, e-reader self-efficacy, technical support, cost, and social influence) that could affect the acceptance of e-books by mathematics and statistics students. According to the researchers, three of the five factors were related to external variables (i.e., university infrastructure and characteristics of e-books such as accessibility, technical support and cost). The other two factors were derived from variables related to the inherent traits of users, such as self-efficacy and social influence. Despite the existence of printed books in many educational environments, students all over the world tended to prefer studying with e-books. Due to the fast-growing spread of technology and the availability of cheaper handheld devices, if e-books can be provided at lower cost, they could prevail as a form of study materials for all types of students, as they are easier to use and need less physical storage space.

Call for Use of E-textbooks in Classrooms

Classroom instruction is dependent on reading activities in many of its aspects. Both the cost and availability of electronic personal devices are reasons for switching to e-books to create better learning opportunities through integration with the face-to-face classroom instruction
(Connor et al., 2019). However, use of e-textbooks remains a matter of individual teaching efforts, and most teachers reported preference of paper textbooks for reader materials (Al Saadi et al., 2017), despite calls from empirical research papers that confirmed the value of e-book integration as a benefit of education systems, K-12 education in particular (Fardani, Ertikanto, Suyatna, & Rosidin, 2019; Komarudin, Rustaman, & Hasanah, 2017; Li, 2019; Yee & Zainuddin, 2018). Using e-textbooks in the classroom can help school children improve reading comprehension skills. Yee and Zainuddin (2018) investigated the use of e-textbooks to improve reading comprehension among fourth-grade pupils in Malaysia and concluded that the participants’ mean scores on the posttest increased from 45.83 to 93.33, showing positive progress in the students’ reading comprehension after using e-textbooks. According to the findings, “the research participants had participated actively in the learning process and their level of motivation was also increased” (p. 23). The study recommended that e-textbooks should be used in the teaching of reading comprehension to help school children achieve better reading results in their academic work. According to the authors, students would benefit from reading tasks in e-textbooks to improve their skills of reading for comprehension and classroom participation.

Integrating e-textbooks is beneficial for classroom instruction to improve mastering concepts, recalling knowledge, and thinking critically, as school children are in love with technological devices (Adeyinka et al., 2018; Gazzali, 2018; Hwang et al., 2018; Komarudin et al., 2017; Smeda et al., 2015). Komarudin et al. (2017) found that using STEM-based e-books for teaching eighth-grade students was a learning advantage that motivated students to employ learned knowledge in STEM projects. The findings support that because the students are used to technology in their daily lives, teaching them through key technologies such as e-books helps
them recall their science and math knowledge more effectively. Students who have experience using technology will be more confident in their abilities to use digitized textbooks and benefit from the curriculum content contained in these books.

Implementing e-books in classrooms can improve their mastery of concepts and help students learn the curriculum materials better, as e-books can facilitate and enhance students’ conceptual understanding (Komarudin et al., 2017). Another recent study by Fardani et al. (2019) used a quasi-experimental method with pretest-posttest and control group design to examine the practicality and effectiveness of e-book-based science classes in fostering students’ critical-thinking skills. Fardani et al. concluded that using e-book-based materials for teaching students garnered excellent teacher responses as well as positive student responses. Additionally, the critical-thinking skills of the students in the experimental class who were taught using e-book were better than those in the control class.

Li’s (2019) research found that students benefit from implementing e-textbooks to enhance individualized learning, interactive instruction, and gaining knowledge. Li (2019) analyzed the functionality of a current e-book program in 20 elementary and middle schools in Changchun, China, using video analysis with four dimensions: situation creation, knowledge construction, collaborative communication, and evaluation feedback. Li found that e-textbooks are “resources and toolkits,” “teaching interaction,” and “teaching evaluation.” The study concluded that the e-textbooks satisfied the students’ individualized learning, supported communication and cooperation between teachers and students, and helped students construct knowledge in depth. On the contrary, use of e-textbooks remains restricted to individual teaching efforts, especially in K-12 education. Despite scientific evidence from empirical research, classroom instruction is generally connected to paper textbook usage (Adeyinka et al., 2018; Lee
et al., 2013; Shemy, 2017). Perhaps, teachers have an answer to this issue if they can lead the change and create a learning environment in which e-books are the focus.

Can Teachers Lead a Shift Toward the Use of E-textbooks?

Teachers are important stakeholders in the education sector. They are in the position of communicating curriculum information and offering guidance to the students. However, the nature of this profession is changing as well due to the technological wave sweeping across the education sector. The appropriate integration of digitalized textbooks is entirely dependent on the full support of teachers (Al-Awidi & Aldhafeeri, 2017; Korat & Shamir, 2012; Shemy, 2017) as well as the positive perceptions and knowledge (Chen & Jang, 2013; Lai, 2016; Picton & Clark, 2015) of technological tools relevant to the implementation of modern curriculum. Al-Awidi and Aldhafeeri (2017) explain that the overall readiness of teachers to use technology has a massive impact on how students respond to the technology. This implies that teachers should have knowledge about the functionality of various technological tools they intend to use, key among these being the e-books. The readiness of the teacher to use the technology has a direct impact on the students’ participation in the learning process.

Teachers’ beliefs about functions of e-books can help both students and teachers create positive and interactive classroom learning and teaching. Lai (2016) studied pre-service elementary school teachers’ integration of e-books into science teaching. The study used a mixed-methods research design to collect both qualitative and quantitative data from 24 pre-service elementary school teachers. The results showed the participant teachers were able to produce e-books that were easy for the students to comprehend, which means that involving teachers in the process of planning the textbook will help to produce more valuable textbooks. In
addition, the study revealed that pre-service teachers showed a strong desire to teach with e-textbooks. In a similar study, Chen and Jang (2013) examined the reasons for using electronic books in relation to the technological, pedagogical, and content knowledge of Taiwanese elementary mathematics and science teachers. The study revealed significant differences based on the gender of the participants. Also, teaching experience proved a positive predictor of teachers’ perceptions of e-books for increasing interactive student participation in the class.

Students’ willingness to adopt e-textbooks can be enhanced by teachers’ ability to create technological materials for application in the classroom (Gronlund, Wiklund, & Boo, 2018; Korat & Shamir, 2012; Lai, 2016; Martinez-Estrada & Conaway, 2015; Picton & Clark, 2015; Sackstein, Spark, & Jenkins, 2015; Shemy, 2017). Lai (2016) backs this argument by explaining that the fundamental role teachers are playing in the contemporary education landscape is primarily dependent on ensuring successful curriculum delivery. According to Lai (2016), “The pre-service elementary school teachers were satisfied with the processes of e-book production and demonstrated excellent performance in e-book production while the elementary school students were happy to use e-books” (p. 56). Shemy (2017), who investigated the difference between teacher-directed control and self-learning by students through the use of interactive e-books, recommended that teachers require appropriate preparation on software applications as well as the advantages of interactive teaching materials. Such a step is essential for ensuring that technology meets the expectations as well as the needs of the students. The teacher cannot ascertain whether the technology reaches that threshold if he or she has no idea how the system works in the first place (Korat & Shamir, 2012). In addition, Martinez-Estrada and Conaway (2015) support that the future integration of e-books depends mostly on the teacher, so the administration has to ensure the teachers are using e-books based on their individual
understanding of the advantages of the digital curriculum. Together with teachers’ intention, teachers’ ability to use technology for educational purposes can be a key factor of successful integration of e-book in classroom practices.

Gronlund et al. (2018) investigated how teachers used digital tools in school and classroom practice to improve students’ learning. The study collected data from 370 seventh and eighth-grade students in addition to qualitative data from 30 teachers in five Swedish secondary schools. The instruments included questionnaires, classroom observations and interviews with teachers and students. According to Gronlund et al. (2018), teachers and students reported that they were not even aware of the existence of technology tools in their daily academic practice. Students reported they did not get help when they were working on the digital materials, as they were asked to read or listen to the text without guidance or help from the teachers. On the other hand, teachers reported they did not actively use the material to help students understand and learn, as they did not know how to apply technology practices such as checking student results on automated tests. Scientific research points to a direct relationship between reading e-books and excellent academic performance. Children as well as young people who frequently read using the e-books post better grades than their counterparts who rely on the traditional texts only (Picton & Clark, 2015). Sackstein et al. (2015) support this contention by explaining that students who read on an iPad tend to read faster than those reading traditional text. Therefore, teachers’ willingness to adopt e-textbooks can be a matter of changing the levels of comprehension, which has so far remained challenging (Sackstein et al., 2015). If teachers lead such a change (Gronlund, et al., 2018; Korat & Shamir, 2012), the use of e-books in the curriculum will benefit students as well as the academic institutions and the system as a whole (Martinez-Estrada & Conaway, 2015; Shemy, 2017). In conclusion, as scientific research has
acknowledged the positive relationship between reading e-books and academic performance, both teachers and students need to be encouraged to use the e-books (Picton & Clark, 2015).

Theoretical Framework

This study used the Venkatesh et al. (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) as its framework. Also, key elements that influence this acceptance while evaluating teachers’ level of technology intention toward utilizing e-textbooks at the elementary level (Gruzd, Staves, & Wilk, 2012) was used to guide this dissertation. UTAUT encompasses four main constructs (effort expectancy, performance expectancy, facilitating conditions, and social influence) and four moderators such as experience, voluntariness, gender, and age (Venkatesh et al., 2003; Venkatesh et al., 2012).

According to Williams, Rana, and Dwivedi (2015), effort expectancy refers to how easily consumers associate with technology. Performance expectancy is the extent to which using given technology benefits various consumers as they carry out different activities with the aid of that technology (Williams et al., 2015). Facilitating conditions refers to the various perceptions consumers adopt toward available resources and how they consider their abilities to perform a certain task (Venkatesh et al., 2012). Finally, social influence is the overall level of perception that consumers hold about how other people, family, and friends believe they should acquire a given technology (Venkatesh et al., 2012). Collectively, these four factors influence one’s behavioral intention to use technology as they determine the user’s potential and acceptance to use technological developments.

Research indicates that performance expectancy is the strongest indicator of how behavioral intention influences the adoption of technology (Venkatesh et al., 2012). In other
words, performance is a crucial element that defines whether people and even organizations adopt a given technology. In general, users’ attitudes affect behavioral intentions, and they are significantly related to the four main constructs of the theory, especially performance and effort expectancy (Williams et al., 2015). In regard to e-textbook implementation in the educational setting, it is essential to investigate teachers’ intentions and how the constructs of the UTAUT model and its four moderators (see Figure 1) might influence the behavioral intentions in the learning process (Williams et al., 2015).

![UTAUT model](image)

Figure 1: UTAUT model (Venkatesh, et al., 2003).

This study utilized an adapted model from the one initially applied in Venkatesh et al.’s (2003) research. The original model by Venkatesh et al. included four main constructs (i.e., effort expectancy, performance expectancy, facilitating conditions, and social influence) and four moderators (i.e., experience, voluntariness, gender, and age) as well as two outcome variables (i.e., behavioral intention and use behavior). For the purpose of this study, the model consisted of only three constructs (i.e., effort expectancy, performance expectancy, and social influence) and one moderator (i.e., gender). Additionally, there was one outcome variable (i.e., behavioral intention). However, the construct facilitating conditions and use behavior were excluded.
because they do not contribute to predicting intention. Additionally, three moderators (i.e., experience, voluntariness, and age) were excluded because my study focused on gender.

Chapter Summary

This chapter reviewed the literature related to e-textbook use to contextualize a case study of Saudi Arabian users. Utilizing the UTAUT constructs and gender as a moderator variable, previous research on implementing technology focused on the relationship between behavioral intention and variables associated with adoption and use. The current study focused on the themes constructed in the research questions. These themes included the following: 1) behavioral intention, 2) performance expectancy, 3) effort expectancy, 4) social influence, 5) gender, 6) adoption of e-books as a technological tool, 7) use of e-textbooks in classroom, and 8) teachers’ shift toward the use of e-textbooks. This chapter presented a synthesis of the literature that informed this research on adoption of e-textbooks by Saudi Arabian K-6 teachers. The following chapter presents the methods used in the study guided by the framework and research questions.
CHAPTER 3
METHODOLOGY

Guided by the literature and the UTAUT conceptual framework, the purpose of this study was to investigate the behavioral intention of K-6 elementary school teachers in the Jeddah School District to use e-textbooks in their classrooms by applying selected constructs of the UTAUT model (performance expectancy, effort expectancy, and social influence).

Research Questions

This study used two research questions to investigate K-6 elementary teachers’ behavioral intention to use e-textbooks in their classrooms.

1. To what extent do performance expectancy, effort expectancy, and social influence predict K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?

2. Does gender moderate the relationships among performance expectancy, effort expectancy, social influence, and K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?

The study variables, drawn from the Unified Theory of Acceptance and Use of Technology (UTAUT), are performance expectancy (PE), effort expectancy (EE), and social influence (SI), with gender as a moderator variable.
Research Design

This descriptive study used a quantitative survey method to collect cross-sectional data about a K-6 teacher population in Saudi Arabia. A survey design study is an empirical research method that allows researchers to collect quantitative data using existing survey questionnaires or developing surveys to obtain statistical data that can be used in descriptive analyses of such trends and opinions about the study population and the hypotheses. Such a design fits this study well because it allowed obtaining and analyzing data about an existing population within the real-world context through administrating surveys to the study population (Creswell, 2012). Thus, in the current study a survey design helped measure the teachers’ intentions to use e-textbooks in their classes. Since this study intended to measure teachers’ intention toward using an e-textbook in their classrooms, a survey research design was an appropriate research method for examining the participants’ beliefs and behaviors toward trends or issues and to test for relationships among some variables (Creswell & Creswell, 2018). In this study, the independent variables (performance expectancy, effort expectancy, and social influence) were related to behavioral intention and gender acted as a moderator at one point in time.

The survey instrument in this study was used to collect quantitative data, making the research design a quantitative cross-sectional survey study. According to Creswell and Creswell (2018), survey research is needed when a researcher wants to collect quantitative numerical data using questionnaires or electronic surveys (e.g., Qualtrix, Google) and reach statistical analyses to describe trends relevant to the phenomenon and context under study. Surveys collect data from the individuals who are considered participants and who voluntarily agree to participate and provide data related to the context of study. Therefore, this descriptive study explored Saudi
Arabian teachers’ intentions toward implementing e-textbooks in K-6. Quantitative research often involves instruments, such as surveys and tests, to measure specific variables, such as the students’ source of disenchantment, from large groups of people. These instruments typically produce useful data in short time periods with a reasonable level of investment of personnel and materials.

Study Context and Participants

The Ministry of Education is the largest centralized system in the country. It was established in 1953, has been responsible for all K-12 education in the country, and includes the planning and supervision of the entire learning process (Alrashidi & Phan, 2015). The curriculum has undergone several initiatives to improve learning outcomes. Hence, school districts all over the country work to facilitate the jobs of the teachers and the students through provision of school buildings, furniture, logistics, and above all, curricula that guide everyone toward achieving the educational goals of the system in general. One of the services they provide is the textbook for each school subject. At the moment, all the school textbooks are paper and print-based materials. The implementation of e-textbooks depends on the educational system and curricula authorities adopting more decisions.

This study took place in the Jeddah School District located on the eastern coast of the Red Sea in the Kingdom of Saudi Arabia. This district is located in Jeddah City and is comprised of 620 elementary schools (see Figure 2). The role of school districts in Saudi Arabia includes developing educational standards in the schools and evaluating performance to help the administration maintain, facilitate, and implement education goals and policies. There are approximately 15,000 K-6 teachers who work in the Jeddah School District and serve around
300,000 K-6 students. Formally, there are schools for boys and schools for girls, with elementary schools employing the largest number of teachers in the kingdom. Teacher employment is based on the single-gender education system, so teachers only teach children of their same gender (see Figure 3).

Figure 2: Percentage of school types.

Figure 3: Teacher gender.
Schools and school districts work under the same conditions and have to maintain policies and organizational legislation regarding entry requirements, implementation of curricula, assessment, and teacher qualification criteria. For example, all types of schools teach the same school subjects decided by the curricula authorities to maintain equal delivery of educational content to all citizens. Therefore, all schools strive to provide instructional input that is official and formal to avoid differentiating school materials at any level of education across all grades. This is another reason schools have to wait until the textbook implementation comes from the educational authorities at the national level. Schools need to work on teaching and learning classes and subjects of Islamic studies, Arabic studies, mathematics, science, computer, English language, social studies, and practical studies. Science classes include chemistry, biology, physics, and earth science; practical studies include physical education, art, and family studies. However, practical subjects and skills of life such as family studies are only implemented in girls’ schools. Whereas physical education subjects are only conducted in the boys’ schools. The most shared characteristic in the study population is the fact that Jeddah is one of the biggest cities in Saudi Arabia.

In general, the teacher population in Jeddah District is representative of Saudi K-6 elementary school teachers, and the study targeted participants who were currently teaching in this school district, which is typical of all urban school districts in the country. In this district, there are both male and female teachers who teach different subjects, who are of different levels of teacher qualification, and who have different levels of teaching experience. The demographics of the Jeddah School District K-6 teachers revealed that most of the participants were elementary school teachers, which consisted of 49% male teachers and 51% female teachers (see Figure 3). That is, the sample was almost equal portions by gender. According to the survey responses, the
ages of the K-6 teachers in the Saudi Arabian educational system ranged from 21 - 54 years old, with the majority being older than 42 years of age. Another characteristic of the setting was the participants’ socioeconomic status as public-school teachers, who are paid monthly salaries dependent on the legislation and regulations of the shared national system policies. It is another similarity among the teacher population of this study, which can make the socioeconomic status appear among factors related to teachers’ behavioral intention despite lack of research evidence. However, this study did not include it as a factor since it is a feature the participants have in common, and it was my conjecture that it would reveal little or no results.

The participants in this study were the K-6 elementary teachers. Using a convenience sampling (Creswell, 2012), the male and female teachers represented different academic majors, including Islamic, Arabic, English, science, and art. However, they had the following criteria in common: Saudi Arabian nationality, held at least a diploma degree, and all spoke Arabic. The needed sample size to carry out a multiple regression test analysis was 129 participants, which was based on a calculation using G Power software (see Appendix A). To increase the possible sample size and power, the survey was sent to all 15,000 elementary school teachers at Jeddah School District.

Data Collection

To conduct the study, I obtained permission from Northern Illinois University’s Institutional Review Board (IRB). After the study IRB was approved (Appendix B), I contacted the training center at the Jeddah School District for official approval to begin the study. Once I received permission, the survey was generated using Qualtrics. The online survey link was distributed to the K-6 elementary teachers through the Jeddah District’s social media platforms
(Appendix C). Once the teachers clicked on the survey link, the consent form appeared to explain the purpose of the study and remind them that their participation was completely voluntary. The survey collector remained open for three weeks. When the responses did not reach the proposed G Power minimum of 129 teachers, I requested another reminder email to be sent to the target population. As a result, the total number of participants became 388 at the end of the data collection period.

Survey Instrument

Existing literature was reviewed to identify a previously developed and validated survey for the current study. A survey instrument associated with the UTAUT model developed by Venkatesh et al. (2003) was located. Permission to use the instrument was obtained by contacting the author via email communication (Appendix D). Originally, the UTAUT model was developed to investigate factors that might influence users’ acceptance of technology innovations while adopting new technological tools (Venkatesh et al., 2003). The researchers evaluated eight older theories of technology acceptance and then unified them into one model. Consequently, the unified theory emerged after the combination of the technology acceptance model (TAM), the theory of reasoned action (TRA), the motivational model (MM), the theory of planned behavior (TPB), the combined technology acceptance model and theory of planned behavior (CTAM-TPB), the model of PC utilization (MPCU), the innovation of diffusion theory (IDT), and the social cognitive theory (SCT; Taherdoost, 2018; Venkatesh et al., 2003). Before that, a “large number of similar constructs offered by many theories” (Dwivedi et al., 2019, p. 724) had been unable to explain users’ intention. In fact, before the UTAUT model, the measurements obtained using the eight models to explain variance in users’ intention ranged from 17% to 53%
Venkatesh et al.’s (2003) UTAUT model consisted of the following constructs: 1) six main constructs, namely performance expectancy, effort expectancy, social influence, facilitating condition, behavioral intention, and use behavior, and 2) the four moderator variables of gender, experience, age, and voluntariness of use. However, only three of the main constructs were considered to determine factors of intention, whereas the other two (i.e., facilitating condition and behavioral intention) were applied to determine use behavior as a final outcome construct of the model. Table 1 shows the main constructs of the UTAUT used in the original model.

Based on the theory and the model, Venkatesh et al. (2003) developed “standard measures of intention” (p. 468) and called for modifying and revalidating their estimating UTAUT survey instrument to be extended to other contexts. In this regard, a number of studies stated that the UTAUT model can be used to explain 70% or more of users’ behavioral intention (Venkatesh et al., 2012; Williams et al., 2015; Yoo & Han, 2013). For example, the UTAUT model became a better predictor of behavioral intention due to its predictive powers in explaining about 70% of the variance in the relationship between behavioral intention and other constructs of the theory (Venkatesh et al., 2012). More details are provided in the Validity and Reliability section. Thus, the current study adopted Venkatesh et al.’s (2003) survey instrument while noting that some modifications were needed to meet the study’s context.
Table: 1

Survey Constructs of the UTAUT Model

<table>
<thead>
<tr>
<th>Survey Construct</th>
<th>Definition</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Performance Expectancy</strong></td>
<td>“The degree to which an individual believes that using the system will help him or her to attain gains in job performance” (Venkatesh et al., 2003, p. 447).</td>
<td>This construct refers to how a teacher thinks that using e-textbooks would increase his/her skills and knowledge for teaching students.</td>
</tr>
<tr>
<td><strong>Effort Expectancy</strong></td>
<td>“The degree of ease associated with the use of the system” (Venkatesh et al., 2003, p. 450).</td>
<td>This construct shows the extent to which a teacher thinks that using e-textbooks would be easy and flexible to adopt.</td>
</tr>
<tr>
<td><strong>Social Influence</strong></td>
<td>“The degree to which an individual perceived that important others believe he or she should use the new system” (Venkatesh et al., 2003, p. 451).</td>
<td>This construct refers to how a teacher thinks that his/her colleagues or management would support and encourage them to use e-textbooks in teaching and learning.</td>
</tr>
<tr>
<td><strong>Facilitating Condition</strong></td>
<td>“The degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system” (Venkatesh et al., 2003, p. 453).</td>
<td>This construct indicates the information and recourses about e-textbooks that are available to users. It consists of the hardware, software, IT support, and the knowledge required to use e-textbooks. This proposed study will not include this construct because e-textbooks have not yet been implemented, but this construct refers directly to the use behavior.</td>
</tr>
<tr>
<td><strong>Behavioral Intention</strong></td>
<td>“The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior” (Warshaw &amp; Davis, 1985, p. 214).</td>
<td>This construct refers to obtaining information about K-6 teachers’ behavioral intent to use e-textbooks in their instructional activities.</td>
</tr>
</tbody>
</table>
Instrument Modification

The UTAUT instrument has been used in many studies, and its items have been modified to meet the particularities of each study and to obtain measurements that can be framed by the model constructs (Alawadhi & Morris, 2008; Pullen, Swabey, Abdooz, & Ranjit Sing, 2015; Venkatesh et al., 2012; Wang & Shih, 2009; Williams et al., 2015; Yoo & Han, 2013). For example, Pullen et al. (2015) used a modified version of Venkatesh et al.’s (2003) UTAUT survey to make the questions more relevant to the context of mobile learning and the participant population. According to Pullen et al. (2015), modification included changes such as substituting the word “system” with “mobile learning” and converting the survey language from English to the Malay language.

For the purpose of the current study, I developed the first section of the survey and adopted the original UTAUT instrument in the second section. The first section included four items seeking demographic information, including the participants’ gender, age, years of experience, and educational level (see Appendix E). The second section of the modified survey included the original 15 UTAUT items that look at factors that might influence e-textbook usage: performance expectancy (4 items), effort expectancy (4 items), social influence (4 items), and behavioral intention (3 items). According to Venkatesh et al. (2003), the UTAUT model uses the three constructs of performance expectancy, effort expectancy, and social influence as determining predictors of intention (see Figure 1). In addition, two other constructs are the predictors of use behavior: intention and facilitating conditions. However, the construct facilitating conditions does not contribute to predicting intention; therefore, it was omitted from this study while the construct “intention” was used as a dependent variable.
The wording in the second section was modified to address the context of this study. Specifically, the word “system” was replaced by the word “e-textbook” throughout the survey to make it more appropriate for the study’s context. Moreover, the phrase “in my job” was replaced by “in my teaching” in item # 1 on the second section (see Appendix F). The two sections of the survey had a total of 19 items. Table 2 shows the four constructs of UTAUT with the 15 modified survey items adopted from the original Venkatesh et al. (2003) study.

All of the survey items of the modified UTAUT section (i.e., Section 2) were put into a five-point Likert-type response format instead of the 7-point Likert scale from the original instrument. The 5-point Likert response format was scaled as 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. This modification of the Likert scale (from 7 points to 5 points) was based on research that indicates a 5-point Likert response format provides more accuracy, reduces confusion, and increases the participants’ response rate (Bouranta, Chitiris, & Paravantis, 2009; Kohnke, Cole & Bush, 2014; Revilla, Saris, & Krosnick, 2014).

Another modification was that translation from English to Arabic was required because Arabic is the native language of this study’s participants. Translation and back-translation procedures were adopted to provide the respondents with an easy understanding of the survey items in terms of linguistic and written text (Brislin, 1970), which helped to provide reliable responses throughout the survey.
### Modified UTAUT Survey Items

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>No of items</th>
<th>Type of scale</th>
</tr>
</thead>
</table>
| **Performance Expectancy** | I would find e-textbooks useful in my teaching.  
Using e-textbooks enables me to accomplish tasks more quickly.  
Using e-textbooks increases my productivity.  
If I use e-textbooks, I will increase my chances of getting a raise. | Four items  | 5-point Likert scale ranging from Strongly disagree to Strongly agree.  
Coded from 1 to 5 |
| **Effort Expectancy**   | My interaction with e-textbooks would be clear and understandable.  
It would be easy for me to become skillful at using e-textbooks.  
I would find e-textbooks easy to use.  
Learning to operate e-textbooks is easy for me. | Four items  | 5-point Likert scale ranging from Strongly disagree to Strongly agree.  
Coded from 1 to 5 |
| **Social influence**    | People who influence my behavior think that I should use e-textbooks.  
People who are important to me think that I should use e-textbooks.  
The senior management of the district has been helpful in the use of e-textbooks.  
In general, the organization has supported the use of e-textbooks. | Four items  | 5-point Likert scale ranging from Strongly disagree to Strongly agree.  
Coded from 1 to 5 |
| **Behavioral intention**| I intend to use e-textbooks in the future.  
I predict I would use e-textbooks in the future.  
I plan to use e-textbooks in the future. | Three items | 5-point Likert scale ranging from Strongly disagree to Strongly agree.  
Coded from 1 to 5 |
The online survey was created using Qualtrics to collect the participants’ information. Participants used a link to respond to the survey items. The K-6 elementary teachers started with the informed consent information attached to the survey. After reading the informed consent and agreeing to participate, they completed the rest of the survey sections. The demographic questions were in Section 1 of the survey, followed by the UTAUT construct as the second section. The expected time to complete the entire survey was six to nine minutes.

Validity and Reliability

Validity can be assessed by using validation procedures such as ratings on objective criteria by expert comparisons to determine whether the items are related to each other and to the context of the study. Content validity, criterion validity, and construct validity of the instrument were further maintained by means of evaluating the appropriateness, meaningfulness, correctness, and usefulness of the layout. First, the content and format of the instrument were tested by checking the appropriateness, linguistic comprehensiveness, and adequacy of the items or questions. According to Fraenkel, Wallen, and Hyun (2015), content validity is a matter of measuring the components of the instrument by means of having an expert revise the typing quality, the layout, and clarity of items. Second, criterion validity, which refers to the relationships among the obtained scores, was difficult to test, as it needed more than one instrument or measure. It involved using correlation coefficient (r) as a reference to obtain the degree of the relationships among the scores the pilot study participants achieved on two or more instruments (Fraenkel et al., 2015). Third, construct validity is related to the characteristics of each construct on the instrument, and measuring this validity involved collecting evidence previous studies reported about the construct measures of the instrument. To collect different
types of evidence, researchers need to conduct three steps: namely defining the construct, using
the theoretical framework hypotheses, and finally, testing those hypotheses. Therefore, the
validation procedures of this study included aspects such as clarity of survey instructions and
printing quality as well as evidence from prior studies about hypothesis tests for each of the
constructs of the instrument.

The instrument for this current study was adopted from Venkatesh’s (2003) research. However, some modifications were needed, so a validation procedure had to be conducted after the modifications were made. For the content validity, a check of the content was needed to maintain that the instrument was adequate and would measure what it was supposed to measure (Fraenkel et al., 2015). In this case, the instrument was sent to two professors who graduated from American education institutions and who both spoke Arabic and English languages to assess the clarity of “printing, size of type, adequacy of work space, appropriateness of language, clarity of directions” (Fraenkel et al., 2015, p. 151) and its logical and linguistic connections to the variables of the study. Also, they checked whether the instrument translation was appropriate to the cultural context.

For the construct validity, the instrument of this study was validated by relying on the scores obtained in Wang and Shih (2009); Oshlyansky, Cairns, and Thimbleby (2007); and Al-Gahtani et al. (2007). According to Litwin (1995), construct validity is the most difficult type of validation because it might only be determined after a long time using the same instrument, and it needs many investigators. Wang and Shih (2009) stated that in validating the UTAUT instrument, they found that a variance score greater than 0.70 was obtained for each of the squared multiple correlations between the items and their constructs. Similarly, Oshlyansky et al. (2007) found that the changes they made in cross-culture contexts had not affected its overall
validity, and according to Al-Gahtani et al. (2007), the construct validity scores of the modified UTAUT instrument on their study were higher than 0.50 for all the scale measures.

Reliability, on the other hand, is an important measure for examining the consistency of the constructs of the instrument items using Cronbach’s alpha coefficients. Field (2013) defined reliability as “whether an instrument can be interpreted consistently across different situations” (p. 12). Reliability can be measured by determining the reliability coefficient, which is the relationship between the scores of the same participant on the same test by administering internal consistency methods that require measuring the scores of the instrument once (Fraenkel et al., 2015). Therefore, for the purpose of this study, reliability coefficients were measured using the internal consistency method of Cronbach’s alpha coefficients. Cronbach’s alpha is a prominent index for measuring the internal consistency of survey instruments and is widely used by researchers to measure reliability (Streiner, 2003). An alpha coefficient higher than $\alpha = .70$ indicates that an instrument is reliable in terms of its internal consistency, which means that items on the instrument are expected to be consistent over time. Internal consistency also emphasizes the honesty and reliability of the responses, the participants, and the researcher (Fraenkel et al., 2015).

The UTAUT model has been tested for reliability by many studies to measure its internal consistency, and most of these studies showed a Cronbach’s alpha that exceeds 0.70 (Al-Gahtani et al., 2007; Venkatesh et al., 2012; Wang & Shih, 2009; Wang et al., 2009). For example, Venkatesh et al. (2012) assessed reliability and found that this instrument scored a Cronbach’s alpha greater than .70, with performance expectancy, 0.88; effort expectancy, 0.91; social influence, 0.82; and behavioral intention, 0.93. Another study, by Wang et al. (2009), reported that Cronbach’s alpha of the UTAUT instruments was above .70, with performance expectancy,
.94; effort expectancy, .94; social influence, .93; and behavioral intention, .95, which is considered reliable. However, a reliability test was needed for the current study because the original instrument was subject to some modifications, such as changing the word “system” to “e-textbooks” and translation from English to Arabic language to suit the Saudi Arabian context.

A survey instrument that is not valid in terms of format, printing quality, adequate space, or linguistics may result in data that are not reliable or usable. Normally, conducting a pilot study allows a researcher to detect errors and challenges that might subject the instrument to validity and reliability threats (Litwin, 1995). Therefore, to validate the content of the survey and check the reliability scales of the four constructs by using SPSS software, a pilot study with a small number of Saudi Arabian K-6 teachers was conducted. A representative sample of the target population (n= 20) was given the survey, and their responses were analyzed statistically to make sure the Cronbach’s alpha score was above .70. This procedure of analyzing the pilot testing data and outcomes will be further discussed in detail in Chapter 4. In addition, the pilot study participants were asked to share their comments and opinions about clarity of survey instructions as well as about the contextual meaning and length of linguistic phrases. The survey was revised to improve the items according to the pilot study feedback.

Data Analysis

After the data collection, SPSS version 24 was used for statistical analysis. An important step in dealing with the collected data was coding, which was specifically needed because this study used software to analyze the data (Creswell & Creswell, 2018). Then data were checked for missing values and cleaned. Cleaning data refers to the process of deleting any cases with a missing value from the data set (Field, 2013). Both descriptive (e.g., means, standard deviations,
and inferential (e.g., multiple regression) statistics were conducted. Descriptive analysis was used to create tables and figures to interpret the results; inferential statistics provided equations, histograms, scatterplots, and tables for making inferences related to the variables and the significance of effects and relationships (Gravetter, Wallnau, & Forzano, 2018).

First, the data were coded and entered into the computer system. The first step of coding the data was to assign all the cases an ID because “any data not in numerical form must be coded in some systematic way before they can be entered into the computer” (Fraenkel et al., 2015, p. 141). The Likert scale was coded from 1-5, with strongly disagree being 1 and strongly agree being 5. Gender was nominal and was coded 0-1. Coding not only assigns numerical values to literal or verbal data, but it also protects the privacy of the respondents, such as names, gender of the participants, and their ages (Fraenkel et al., 2015).

After coding the cases and the survey scales, the data set was checked to determine the return rate of the responses. The return rate shows in percentage the number of members in the sample who completed and returned the survey. This was reported by means of a table that had all the numbers and percentages of participants who completed the survey as well as those who failed to complete it (Field, 2013). Lower percentages of returned surveys would indicate that some data were missing, and it further meant that a step had to be taken to clean the data set by dealing with the missing cases, either by deleting or by pairwise/listwise excluding. Listwise exclusion means that the cases with missing values are excluded from the data set as a whole, whereas pairwise excluding means the analyses only excluded data with missing values related to certain analyses or tests (Field, 2013).
When some participants fail to complete the survey or miss any questions, a response bias is likely to exist in the data body. Response bias occurs when the collected data include errors of some type that can affect the statistical values of the analysis (Field, 2013). Dealing with bias at the beginning of data analysis is important because bias can affect research conclusions at the end of the study. To avoid such bias, the current study analyzed the data set statistically for each variable to find the percentages of the completed responses and looked for any missing values. After the data were checked for bias and cleaned to handle the missing values, the process of analyzing the data was started.

Descriptive results were one form of the data analysis for this study. Descriptive outputs can be obtained in SPSS by using options in the statistics dialogue box on the program. Eventually, SPSS descriptive statistics are presented in a tables, charts, and graphs to interpret the results in terms of the mean, the standard deviation, the mode, Pearson’s correlation coefficients, and r and p values of each variable in the data set (Gravetter et al., 2018). This analysis indicated the means, standard deviations, and range of scores for each variable of the study. Therefore, all cleaned data were included in the analysis hypothesis testing through SPSS statistical tests. Although descriptive analysis was enough to answer the research questions in quantitative procedures, this study also went a further step to conduct some inferential analyses. Field (2013) indicates that “in addition to the descriptive statistics, selecting this option produces a correlation matrix” (p. 334), which gives more details about the value of the Pearson’s correlation coefficient between pairs of variables as well as showing significance of each correlation.

Inferential analyses were needed to identify the statistical results related to inferential research questions or hypotheses in the study. Reliability checks were also conducted using
inferential statistics to address the internal consistency of the survey scales (i.e., the Cronbach’s alpha statistics). As mentioned in the previous section, reliability procedures and measures are needed to check for reliability threats to the survey items. Therefore, SPSS version 24 was used to test all the inferential research questions and hypotheses of the study. Inferential statistical results are needed when research questions and hypotheses involve the relationship between variables or comparing groups of variables to make inferences about the sample and the population (Creswell & Creswell, 2018). One form of inferential statistics is multiple regression, which was used as a statistical approach to answer the Research Questions 1 and 2. Multiple regression is used to “learn about the relationship between several predictors or independent variables and an outcome variable” (Creswell & Creswell, 2018, p. 159). Before this step, an additional diagnostic was employed to conduct the multiple regression tests to check for outliers, for independence of residuals, for normality of residuals, for homoscedasticity, and for influential values. This step helped to make sure the data indicated a normal distribution and were ready for the regression analysis.

Regarding the first research question, a multiple regression test was used to assess how teachers’ performance expectancy, effort expectancy, and social influence can be used to predict their behavioral intention to use e-textbooks. The relationships between the dependent variable (K-6 teachers’ behavioral intention) and each of the independent variables were measured in terms of statistical significance (p < .05). In other words, to assess the variables of RQ1, measurements were obtained to identify the statistical effects of the independent variables (performance expectancy, effort expectancy, and social influence) of the teachers’ behavioral intention.

To determine the statistical values of gender as a moderating factor (RQ2), multiple
regression was also used to measure the moderation effect of gender on the relationships between the three predictors (teachers’ performance expectancy, teachers’ effort expectancy, social influence) and the dependent variable (K-6 teachers’ behavioral intention; Figure 4). Moderation is defined as “the combined effect of two variables on another” (Field, 2013, p. 395).

According to Figure 4, gender is a moderator; therefore, its effect (if any) influenced the relationship between each of the predictors on one hand and dependent variable depending on whether the participant was a male or a female teacher.

Chapter Summary

This chapter presented the methodology of this study. First, the two research questions were identified and followed by justifications for choosing this type of research design. The participants were a convenience sample from the Jeddah School District K-6 elementary teachers. Additionally, details of the study instruments and the modifications were described along with the plan for data collection. The analytical approach process was explained in addition to the validity and reliability procedures. The results of this study are provided in Chapter 4.
Figure 4: Researcher-created model. (Adapted from Venkatesh et al., 2003.)
Note: IVs = independent variables, DV = dependent variables, MV= moderating variables
CHAPTER 4

RESULTS

The purpose of this descriptive study was to investigate K-6 elementary teachers’ behavioral intention to use e-textbooks in their classrooms. The variables were drawn from the Unified Theory of Acceptance and Use of Technology (UTAUT): performance expectancy (PE), effort expectancy (EE), and social influence (SI), with gender as a moderator variable. This chapter presents the results guided by the study’s two research questions:

1. To what extent do performance expectancy, effort expectancy, and social influence predict K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?
2. Does gender moderate the relationships among performance expectancy, effort expectancy, social influence, and K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?

This chapter presents the results of the study along with tables, figures and graphs of the SPSS outputs to demonstrate how each research question was handled. Both research questions were addressed, and quantitative data were statistically analyzed to obtain the results. Therefore, this chapter presents RQ 1 and RQ 2 in terms of descriptive and inferential computations with the related statistical SPSS results.
Instrument Reliability

A pilot study was conducted with a sample \((n = 35)\) from the target population to examine consistency of the constructs for the 15 instrument items modified from Venkatesh et al.’s (2003) UTAUT model using Cronbach’s alpha coefficients. An alpha coefficient higher than \(\alpha = .70\) indicates an instrument is reliable in terms of its internal consistency (Fraenkel et al., 2015). Also, the data analysis of the study revealed higher than \(\alpha = .70\) Cronbach’s alpha coefficients for all the study constructs. Table 3 provides the outcome of the instrument reliability test. As depicted by these data, the computed value of the Cronbach’s alpha for each construct was higher than \(\alpha = .70\), which indicates an acceptable level of internal consistency.

Table 3

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cronbach’s Alpha</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectancy</td>
<td>0.93</td>
<td>4</td>
</tr>
<tr>
<td>Effort Expectancy</td>
<td>0.91</td>
<td>4</td>
</tr>
<tr>
<td>Social Influence</td>
<td>0.84</td>
<td>4</td>
</tr>
<tr>
<td>Behavioral Intention</td>
<td>0.93</td>
<td>3</td>
</tr>
</tbody>
</table>

Data Screening

The online survey link was distributed to the K-6 elementary teachers after receiving approval from Northern Illinois University’s Institutional Review Board. Jeddah School District’s email service and social media channels were used to reach the participants and to provide access to the survey. Out of the total participants who opened the survey link \((n=422)\), 338 agreed to participate. The collected data were screened and checked for missing values and
cleaned. Forty-eight teachers were excluded from the data set for two reasons: 1) the teachers left
the survey before finishing the first section or 2) their submitted surveys contained a lot of
missing values. In addition, a hot-deck imputation technique was used to handle the nine values
found in deferent cases. More specifically, this technique provided a procedure for me to handle
items with nonresponse slots. In other words, after detecting the missing values in the study’s
data set, the procedure was needed to replace cells that had a missing value by filling each cell
with the nearest mean. After the technique was used and cleaning the data set was finalized, 290
participant responses became the analytic sample. Based on a calculation using G Power
software (see Appendix A), the sample size needed to carry out a multiple regression test was
determined as \( n = 129 \).

Demographic Information

This section presents the participants’ demographic information, including gender, age,
years of experience, and educational level. Thus, the statistical analysis included running a
descriptive test to calculate the characteristics of the demographic variables.

Gender

The first survey item sought the participant’s gender. As shown in Table 4, a total of 141
participants (49%) were male, and 149 participants (51%) self-identified as female.
Table 4

Gender Distribution

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>141</td>
<td>49</td>
</tr>
<tr>
<td>Female</td>
<td>149</td>
<td>51</td>
</tr>
<tr>
<td>Total</td>
<td>290</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Age**

The second survey item sought the participant’s age. The item included four different categories. As shown in Table 5, the first category (22-29 years) had nine participants, which corresponds to 3% of the total age range. Furthermore, 95 participants (33%) were in the second age category (30-39 years), but the majority of the participants (47%) formed the third age category (i.e., 40-49 years). The remaining 49 participants (i.e., 17%) comprised the fourth category, 50-60 years.

Table 5

Age Distribution

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>22-29 years</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>30-39 years</td>
<td>95</td>
<td>33</td>
</tr>
<tr>
<td>40-49 years</td>
<td>137</td>
<td>47</td>
</tr>
<tr>
<td>50-60 years</td>
<td>49</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>290</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Years of Experience

The third survey item sought data regarding the participant’s teaching experience. The item included six different categories. As indicated in Table 6, years of experience were distributed across the participant sample in terms of frequency and percentage. Years of experience had six categories ranging from less than five years to more than 25 years of teaching experience. The table also indicates the total participants, the total frequencies, and the total percentages.

Table 6

<table>
<thead>
<tr>
<th>Years of Experience</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 year</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>5-10 years</td>
<td>66</td>
<td>23</td>
</tr>
<tr>
<td>11-15 years</td>
<td>57</td>
<td>20</td>
</tr>
<tr>
<td>16-20 years</td>
<td>37</td>
<td>13</td>
</tr>
<tr>
<td>21-25 years</td>
<td>56</td>
<td>19</td>
</tr>
<tr>
<td>More than 25 years</td>
<td>62</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>290</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Educational Level

The fourth survey item captured the participant’s educational level. Those data are captured in Table 7.
Table 7

Educational Level Distribution

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma</td>
<td>44</td>
<td>15</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>225</td>
<td>78</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Doctoral degree</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>290</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 7 presents the distribution of educational level. Educational level as a variable included the categories of diploma, bachelor’s degree, master’s degree, and doctoral degree. The frequency column shows that bachelor’s degree, which has been the minimum requirement for teaching in Saudi Arabia for the last two decades, scored the highest number of responses.

Descriptive Statistics

Descriptive outputs were obtained in SPSS by using options in the statistics dialogue box on the program. This section presents the means, standard deviations, skewness, and kurtosis of each construct of the UTAUT model used in this study.

As described in Chapter 3, the survey instrument uses a 5-point Likert scale ranging from strongly disagree to strongly agree coded from 1 to 5 for each item of UTAUT model constructs. I made composite scores for the items of each construct. As indicated in Table 8, the overall mean of composite scores of the four effort expectancy items had the highest mean (M= 3.93, SD= 0.77), which indicated the teachers agreed that e-textbooks are easy to interact with and use. Performance expectancy was the second highest score, with an overall mean of composite scores (M= 3.83, SD= 0.90), which showed that the teachers considered e-textbooks as one of the
practices that can be performed in their teaching. Similarly, the overall mean of the composite scores of the behavioral intention indicated the teachers intended to use e-textbooks in their classrooms (M= 3.82, SD= 0.88). Lastly, the overall mean of the composite scores of the four social influence items reflected the teachers’ agreement that the individuals around them may play a considerable role in regard to teaching with e-textbooks (M= 3.13, SD= 0.82).

Table 8
Descriptive Statistics of the UTAUT Model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectancy</td>
<td>3.83</td>
<td>0.90</td>
<td>-0.893</td>
<td>0.15</td>
</tr>
<tr>
<td>Effort Expectancy</td>
<td>3.93</td>
<td>0.77</td>
<td>-1.01</td>
<td>1.41</td>
</tr>
<tr>
<td>Social Influence</td>
<td>3.31</td>
<td>0.82</td>
<td>-0.091</td>
<td>-0.33</td>
</tr>
<tr>
<td>Behavioral Intention</td>
<td>3.82</td>
<td>0.88</td>
<td>-0.905</td>
<td>0.554</td>
</tr>
</tbody>
</table>

Figure 5 shows boxplots of the four constructs of the study variables (performance expectancy, effort expectancy, social influence, and behavioral intention). This result indicated some outliers for performance expectancy and behavioral intention. Additionally, the figure shows effort expectancy as a construct had some extreme outliers in cases #205, 204, 226, 234, 230, and 228.
To avoid issues when considering the assumptions of the regression model, the values of the extreme outliers (on EE) were transformed to the values of the nearest next most extreme cases. For example, the value of effort expectancy for case #205 was transformed to a value equal to that of case #88 (see Figure 6).
Inferential Statistics

Inferential statistics were obtained in SPSS by using linear regression options in the statistics dialogue box on the program. This section presents the equations, histograms, scatterplots, tables, and assumptions needed for making inferences related to the variables and the significance of effects and relationships of each construct of the UTAUT model used in this study.

Research Question 1 Findings

This section presents the findings related to Research Question 1: To what extent do performance expectancy, effort expectancy, and social influence predict K-6 teachers’ behavioral intention to use e-textbooks in their classrooms? A multiple regression test was used to assess the variables of RQ1 in terms of statistical significance ($p < .05$) between the dependent variable (K-6 teachers’ behavioral intention) and each of the independent variables (performance expectancy, effort expectancy, and social influence). As stated earlier, the analysis targeted the complete sample size, $n = 290$ K-6 teachers.

As shown in Table 9, the complete set of the regression model was statistically significant, $F(3, 286) = 359.10$, $p < .001$. Likewise, the model summary shown in Table 10 indicates that 79% of the variation in the teachers’ behavioral intention can be explained by the three predictors ($R^2 = .790, R_{adj}^2 = .788$).
Table 9
ANOVA Table RQ1

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>179.091</td>
<td>3</td>
<td>59.697</td>
<td>359.101</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>47.545</td>
<td>286</td>
<td>.166</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>226.636</td>
<td>289</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Dependent Variable: Behavioral Intention
Predictors: (Constant), Social Influence, Effort Expectancy, Performance Expectancy

Table 10
Model Summary RQ1

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.889a</td>
<td>.790</td>
<td>.788</td>
<td>.407725</td>
</tr>
</tbody>
</table>

Note: Predictors: (Constant), Social Influence, Effort Expectancy, Performance Expectancy
Dependent Variable: Behavioral Intention

Regression coefficients ($\beta$ values) were conducted to determine the significance of each predictor. As shown in Table 11, the three predictors were statistically significant with $p < .005$ for all of them. Performance expectancy scored $\beta = .565$, $p = .000$, which means performance expectancy is a significant predictor of Saudi K-6 teachers’ behavioral intention. Similarly, effort expectancy showed a value of $\beta = .298$, $p = .000$, which indicates that teacher behavioral intention may be predicted from the responses of the participant toward effort expectancy items on the survey. Social influence showed the value of $\beta = .117$, $p = .001$, and clearly reflects that teachers’ behavioral intention can be explained in light of these scores, as the participants responded to the social influence showing significant opinions.
Table 11

Regression Coefficients RQ1

<table>
<thead>
<tr>
<th>Model</th>
<th>Performance Expectancy</th>
<th>Effort Expectancy</th>
<th>Social Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>Std. E</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>.551</td>
<td>.044</td>
<td>.565</td>
</tr>
<tr>
<td></td>
<td>.335</td>
<td>.046</td>
<td>.298</td>
</tr>
<tr>
<td></td>
<td>.126</td>
<td>.037</td>
<td>.117</td>
</tr>
</tbody>
</table>

Note: Dependent Variable: Behavioral Intention

Because the three constructs were significant predictors of the teacher behavioral intention, it is typically important to know which of the three predictors was the most important prediction of the behavioral intention to use e-textbooks in teaching. A Pratt Index test was conducted, which multiplies the standardized regression coefficient of each predictor by its corresponding zero-order correlations. In this case, performance expectancy had the highest Pratt Index value (0.48), followed by effort expectancy (0.23) and then social influence with the lowest value of Pratt Index (0.07).

**Regression Assumptions**

Regression assumptions were checked before interpreting the multiple linear regression output for Research Question 1. The assumptions included normality of residual, homoscedasticity, multicollinearity, outliers, and influential value.

**Normality of Residual**

For testing the normality of residual, as shown in Figure 7, the standardized residuals histograms and the P-P plot were checked for normality relative to the normal distribution. The
histogram showed a distribution of symmetric curve around zero in which the P-P plot follows a close to straight line.

Figure 7: Histogram of standardized residuals and normal P-P plot of behavioral intention (RQ1).

Homoscedasticity

As shown in Figure 8, the scatterplot of the dependent variable (behavioral intention) points are randomly scattered around the horizontal line of zero, which indicates the assumptions of homoscedasticity have been met.
Figure 8: Scatterplot of residuals values (RQ1).

Multicollinearity

Collinearity is identified when at least two of the variables are perfectly correlated (Field, 2013). Thus, multicollinearity assumption is performed on SPSS outputs by looking at variance of inflation factor (VIF > .10) and tolerance less than 0.10 on the regression coefficients table. As shown in Table 12, there was no evidence for any violations against this assumption. Moreover, as shown in Table 13, there were no correlations among the predictors exceeding .90, which represents the lack of multicollinearity.
Table 12

Variance of Inflation Factor RQ1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tolerance</th>
<th>Variance of inflation factor (VIF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance Expectancy</td>
<td>.354</td>
<td>2.822</td>
</tr>
<tr>
<td>Effort Expectancy</td>
<td>.445</td>
<td>2.249</td>
</tr>
<tr>
<td>Social Influence</td>
<td>.605</td>
<td>1.656</td>
</tr>
</tbody>
</table>

Table 13

Correlations Among Variables RQ1

<table>
<thead>
<tr>
<th></th>
<th>Behavioral Intention</th>
<th>Performance Expectancy</th>
<th>Effort Expectancy</th>
<th>Social Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Intention</td>
<td>1.000</td>
<td>.861</td>
<td>.776</td>
<td>.619</td>
</tr>
<tr>
<td>Performance Expectancy</td>
<td>.861</td>
<td>1.000</td>
<td>.745</td>
<td>.628</td>
</tr>
<tr>
<td>Effort Expectancy</td>
<td>.776</td>
<td>.745</td>
<td>1.000</td>
<td>.491</td>
</tr>
<tr>
<td>Social Influence</td>
<td>.619</td>
<td>.628</td>
<td>.491</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Outlier and Influential Value

According to Figure 5, some outliers appeared on the variable boxplots that may cause influential values. To examine the influence of the outliers, standardized residuals were checked for any value that exceeded +/- 3.00; the column range was between -2.919 - 2.747. Additionally, Cook’s distance test, as shown in Table 14, showed no cases were equal or greater than 1.0, which indicates there is no evidence for outliers influentially.
Table 14
Residuals Statistics RQ1

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook’s Distance</td>
<td>.000</td>
<td>.097</td>
<td>.004</td>
<td>.010</td>
<td>290</td>
</tr>
</tbody>
</table>

Note: Dependent Variable: Behavioral Intention

Summary: Research Question 1

For analysis of RQ1, multiple linear regression was used to address this research question. The results indicated that teachers’ behavioral intention to use e-textbooks in their classrooms can be predicted by three UTAUT model constructs (performance expectancy, effort expectancy, social influence). Tables, graphs, and plots were used to present the analysis results. Table 15 summarizes RQ1 results.

Table 15
Summary Results RQ1

<table>
<thead>
<tr>
<th>Literature Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance expectancy will have a positive and significant influence on K-6 Saudi teachers’ behavioral intention.</td>
<td>Supported</td>
</tr>
<tr>
<td>Effort expectancy will have a positive and significant impact on the Saudi K-6 teachers’ intention.</td>
<td>Supported</td>
</tr>
<tr>
<td>Social influence will have a positive and significant impact on Saudi K-6 teachers’ intention.</td>
<td>Supported</td>
</tr>
</tbody>
</table>
Research Question 2 Findings

This section presents the results related to Research Question 2: Does gender moderate the relationships among performance expectancy, effort expectancy, social influence, and K-6 teachers’ behavioral intention to use e-textbooks in their classrooms?

Regarding the second research question, a multiple regression test was used to assess the variables of RQ2 in terms of statistical significance (p < .05) between the dependent variable (K-6 teachers’ behavioral intention) and each of the independent variables (performance expectancy, effort expectancy, and social influence). As stated earlier, the analysis targeted the complete sample size (n = 290 K-6 teachers) presented as 141 male participants (49%) and 149 female participants (51%).

In regard to testing gender as a moderator, each of the independent variables is statistically centered by use of the center mean aggregated SPSS option. Then centered (IV) variables were multiplied by the gender demographic variable in terms of interaction (PE * gender, EE * gender, SI * gender). As indicated in Table 1, the combined set of regression models, including the seven predictors, was statistically significant, $F(7, 282) = 155.37, p < .001$. Also, the model summary shown in Table 17 indicates that 79% of the variation in teachers’ behavioral intention can be explained by the seven predictors, including the moderating effect of the gender variable ($R^2 = .794, R_{adj}^2 = .789$).
Table 16

ANOVA Table RQ2

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>179.972</td>
<td>7</td>
<td>25.710</td>
<td>155.373</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>46.664</td>
<td>282</td>
<td>.165</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>226.636</td>
<td>289</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Dependent Variable: Behavioral Intention
Predictors: (Constant), Social Influence, Effort Expectancy, Performance Expectancy, Gender, PE_centered *gender, EE_centered *gender, SI_centered *gender

Table 17

Model Summary RQ2

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.891a</td>
<td>.794</td>
<td>.789</td>
<td>.406786</td>
</tr>
</tbody>
</table>

Note: Predictors: (Constant), Social Influence, Effort Expectancy, Performance Expectancy, Gender, PE_centered *gender, EE_centered *gender, SI_centered *gender
Dependent Variable: Behavioral Intention

Regression coefficients ($\beta$ values) were conducted to determine the significance of each predictor. As shown in Table 18, none of three predictors were statistically significant.

Performance expectancy scored $\beta = -.100$, $p = .113$, which means that performance expectancy with gender as a moderator had no effect on predicting teachers’ behavioral intention in this study. Similarly, effort expectancy showed the value of $\beta = .026$, $p = .653$, which indicates that teachers’ behavioral intention with gender as a moderator had no effect that can be predicted from the participant responses to the effort expectancy survey items. Likewise, social influence showed a value indicating that teachers’ behavioral intention cannot be explained in light of
these scores, as the participants responded to the social influence based on gender as a moderator variable ($\beta = .008, p = .872$).

Table 18

<table>
<thead>
<tr>
<th>Model</th>
<th>$B$</th>
<th>Std. E</th>
<th>Beta</th>
<th>$t$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Performance Expectancy</td>
<td>.661</td>
<td>.060</td>
<td>.626</td>
<td>10.254</td>
</tr>
<tr>
<td></td>
<td>Effort Expectancy</td>
<td>.321</td>
<td>.062</td>
<td>.285</td>
<td>5.188</td>
</tr>
<tr>
<td></td>
<td>Social Influence</td>
<td>.123</td>
<td>.054</td>
<td>.115</td>
<td>2.271</td>
</tr>
<tr>
<td></td>
<td>PE_centered*gender</td>
<td>-.143</td>
<td>.90</td>
<td>-.100</td>
<td>-1.591</td>
</tr>
<tr>
<td></td>
<td>EE_centered *gender</td>
<td>.042</td>
<td>.093</td>
<td>.026</td>
<td>.450</td>
</tr>
<tr>
<td></td>
<td>SI_centered *gender</td>
<td>.012</td>
<td>.075</td>
<td>.008</td>
<td>.161</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>-.045</td>
<td>.048</td>
<td>-.025</td>
<td>-.928</td>
</tr>
</tbody>
</table>

Note: Dependent Variable: Behavioral Intention

Regression Assumptions

Regression assumptions were checked prior to interpreting the multiple linear regression output for Research Question 2. The assumptions included normality of residual, homoscedasticity, multicollinearity, outliers, and influential value.

Normality of Residual

For testing the normality of residual, as shown in Figure 9, the standardized residuals histograms and the P-P plot were checked for normality relative to the normal distribution. The histogram showed distribution of a symmetric curve around zero in that the P-P plot follows close to a straight line.
Figure 9: Histogram of standardized residuals and normal P-P plot of behavioral intention (RQ2).

**Homoscedasticity**

As shown in Figure 10, the scatterplot of the dependent variable (behavioral intention) points are randomly scattered around the horizontal line of zero, which indicates that the assumptions of homoscedasticity have been met.

Figure 10: Scatterplot of residuals values (RQ2).
Multicollinearity

The rule to check the multicollinearity between variables is by looking to the variance of inflation factor (VIF > .10) and tolerance less than 0.10 in the regression coefficients table. As shown in Table 19, there is no evidence for any violations against this rule. Moreover, as shown in Table 20, there are no correlations among the predictors exceeding .90, which represents a lack of multicollinearity.

Table 19
Variance of Inflation Factor RQ2

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tolerance</th>
<th>Variance of inflation factor (VIF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE_ centered*gender</td>
<td>.184</td>
<td>5.449</td>
</tr>
<tr>
<td>EE_ centered *gender</td>
<td>.211</td>
<td>4.749</td>
</tr>
<tr>
<td>SI_ centered *gender</td>
<td>.288</td>
<td>3.478</td>
</tr>
</tbody>
</table>

Table 20
Correlations Among Variables RQ2

<table>
<thead>
<tr>
<th>Pearson Correlation</th>
<th>Behavioral Intention</th>
<th>PE_ centered *gender</th>
<th>EE_ centered *gender</th>
<th>SI_ centered *gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral Intention</td>
<td>1.000</td>
<td>.567</td>
<td>.540</td>
<td>.418</td>
</tr>
<tr>
<td>PE_ centered*gender</td>
<td>.567</td>
<td>1.000</td>
<td>.785</td>
<td>.623</td>
</tr>
<tr>
<td>EE_ centered *gender</td>
<td>.540</td>
<td>.785</td>
<td>1.000</td>
<td>.541</td>
</tr>
<tr>
<td>SI_ centered *gender</td>
<td>.619</td>
<td>.623</td>
<td>.541</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Outlier and Influential Value

As shown in Figure 5, some outliers appear on the variables boxplots, which may cause influential values. To examine the influence of the outliers, the range of standardized residual
output columns was checked for any value that exceeded +/- 3.00. The column showed scores between -2.919 to 2.714. Additionally, a Cook’s distance test showed none of the cases was equal to or greater than 1.0, which implies there is no evidence for outliers influentially. See Table 21.

Table 21
Residuals Statistics RQ2

<table>
<thead>
<tr>
<th></th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cook’s Distance</td>
<td>.000</td>
<td>.086</td>
<td>.004</td>
<td>.010</td>
<td>290</td>
</tr>
</tbody>
</table>

Note: Dependent Variable: Behavioral Intention

Summary: Research Question 2

Results for RQ2 indicate that the relationship between the dependent variable, which was teachers’ behavioral intention, and the independent variables (performance expectancy, effort expectancy, social influence) is not affected by gender as a moderator variable. SPSS statistical analysis showed the insignificance of gender as a moderator. Table 22 summarizes the insignificant results.
Table 22

Summary Results RQ2

<table>
<thead>
<tr>
<th>Literature Hypothesis</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender will moderate the relationships between performance expectancy and the</td>
<td>Not Supported</td>
</tr>
<tr>
<td>Saudi K-6 teachers’ intention.</td>
<td></td>
</tr>
<tr>
<td>Gender will moderate the relationships between effort expectancy and the Saudi K-6</td>
<td>Not Supported</td>
</tr>
<tr>
<td>teachers’ intention.</td>
<td></td>
</tr>
<tr>
<td>Gender will moderate the relationships social influence and the Saudi K-6 teachers’</td>
<td>Not Supported</td>
</tr>
<tr>
<td>intention.</td>
<td></td>
</tr>
</tbody>
</table>

Chapter Summary

The purpose of this descriptive study was to investigate K-6 elementary teachers’ behavioral intention to use e-textbooks in their classrooms in the Jeddah School District in light of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. The study variables were performance expectancy (PE), effort expectancy (EE), and social influence (SI), with gender as a moderator variable. This chapter detailed the findings of the descriptive and inferential statistical analyses. The next chapter presents a discussion of the findings.
CHAPTER 5  
DISCUSSION

This chapter presents a discussion of the results, followed by implications of the study, recommendations, and limitations. The first section provides readers with the findings of the two RQs discussed in the light of previous literature. Based on the results, implications are presented in the second section to urge Jeddah School District policy makers, practicing teachers, educational authorities, and the community to embrace the adoption of digitized textbooks. The recommendations section relates to K-6 education’s future use of digitized textbooks. Finally, the limitations section presents the concerns regarding the study with future research suggestions to promote continued investigation of the aspects in which this study was limited. The chapter concludes by consolidating thoughts about what the study contributes to the existing research.

Results Discussion

Based on assessments of RQ1 and RQ2, the discussion in this chapter is an evaluation of the findings to show how the results add to existing literature. Teacher behavioral intention was the dependent variable of this study, and thus its relationship with other variables formed the investigation in both research questions.
Research Question 1

Analysis of RQ1 revealed the results of the current study parallel the majority of the existing studies. For example, the relationship between performance expectancy and behavioral intention was also identified in studies by Lee et al. (2019), Maduku (2015), Rahi et al. (2019), Wang and Wang (2010), Wang et al. (2009), Williams et al. (2015), and Venkatesh et al. (2003). These studies show that performance expectancy and behavioral intention are significantly related. In addition, this study is in line with previous studies (Alrawashdeh et al. 2012; Dwivedi et al., 2019; Gruzd et al., 2012; Liebenberg et al., 2018; Rahi et al., 2019; Venkatesh et al., 2003) that found the relationship between teachers’ behavioral intention and effort expectancy is significantly positive. Moreover, the relationship between social influence and teachers’ behavioral intention was found to be significant in previous literature (e.g., Alrawashdeh et al., 2012; Dwivedi, et al., 2019; Garone et al., 2019, Maduku, 2015; Peek et al., 2014; Venkatesh et al., 2012). These studies investigated technology adoption and concluded that social influence was a positive significant predictor of users’ behavioral intention. Therefore, this study is consistent with previous research regarding the significance of the relationship between social influence and teachers’ behavioral intention.

In contrast, while the current study found that effort expectancy showed a positive significant relationship with behavioral intention, the relationship between effort expectancy and behavioral intention was insignificant in studies conducted by Ali and Arshad (2018), Isaiias et al. (2017), Khechine et al. (2014), Lee et al. (2019), Mohammadyari and Singh (2015), and Tarhini et al. (2016). Moreover, regarding the relationship between social influence and behavioral intention, the literature review presented studies with findings of an insignificant relationship.

Accordingly, the current study is inconsistent with those studies in that social influence significantly predicted K-6 teachers’ behavioral intention.

The discussion focused on variables addressed in RQ1 (performance expectancy, effort expectancy, social influence) concerning conformity with literature findings in terms of the relationships of these variables with teachers’ behavioral intention. Both consistencies and inconsistencies with the reviewed literature are identified in the section.

**Research Question 2**

For RQ2, gender was used as a moderator to assess its effect on the relationship among the study’s variables. Regarding consistency with findings of previous research, the current findings on the gender effect agreed with results in contexts other than Saudi Arabian. For example, Maduku (2015) and Sun and Flores (2012) reported that gender had no effect on the interaction among the studied variables. However, Saudi Arabian studies by Al-Gahtani et al. (2007), Alshehri et al. (2013), and Alshrari (2018) concluded that gender had no moderating effect on the relationship between the UTAUT variables in the context of IT use. Being consistent with these findings regarding the effect of gender is remarkable, especially when we know that all the latter three studies investigated a Saudi population, which was also the target of this study.

On the other hand, the results were also inconsistent with previous research that showed gender was a significant moderator of the relationship of behavioral intention and the other variables of the UTAUT model. For example, the effect of gender on students’ acceptance of e-textbooks was researched in Marston et al. (2014) and was found to be statistically significant. A
A study by Chen and Jang (2013) also indicated that the effect of gender as a moderator was significant for male Taiwanese users of e-textbooks. The findings of the current study are inconsistent with Chen and Jang’s (2013) results because the Saudi e-textbook users did not differ in terms of being male or female. Moreover, the literature showed that Lai (2016), Venkatesh et al. (2003), and Wang and Shih (2009) reported findings with a significant moderation effect for gender on the study variables. In conclusion, the discussion of the RQ2 results included findings related to the effect of moderation on the relationships among performance expectancy, effort expectancy, social influence, and teachers’ behavioral intention (i.e., the study variables). Clearly, this study was inconsistent with the reviewed literature, as gender did not have significant moderating effects.

Implications

To embrace the advancements of technology, the findings of the study suggest five implications for the Saudi Arabian education system.

First, one implication of this study is that K-6 teachers in the Jeddah School District can benefit from their positive intention once the digitized textbooks are implemented. The results of this study emphasize a positive behavioral intention toward the implementation of new digital materials in education and the significant relationships among the UTAUT variables (Venkatesh et al., 2003). This study suggests that the K-6 teachers have a positive intention; therefore, the district should strongly consider capitalizing on the teachers’ expectation by beginning adoption programs related onboarding e-textbooks. This step will be essential because it will gain the district and its teachers many advantages. For example, the district will benefit from implementing e-textbooks by saving a lot of money that they are currently spending on paper-
based text materials. Also, the teachers will be able to use the e-textbooks for solving problems such as large number of students in the classes or classroom management issues by assigning various parts of the e-textbooks to smaller groups depending on students’ individual differences. In this way, students with different learning styles can benefit from the visual and audio qualities of the e-textbooks.

Second, the results of this study can be guidelines for understanding patterns of future e-textbook implementation. This is another implication for the Jeddah School District for making future decisions and improvements. Since the study investigated the K-6 teachers of this district, the results will help the district to understand how the teachers feel about using e-textbooks. Of course, to develop its educational system standards for improving teachers’ performance and students’ outcomes, the district needs to realize the teachers’ intention as a factor for implementing such an innovation (e-textbooks). The results of this empirical quantitative study can contribute statistical evidence based on research data associated with instructional technology to meet the district’s education goals.

Third, using digitized textbooks as part of the district’s pedagogical practices requires teachers to become aware of challenges that might occur during implementation. This study found that effort expectancy and social influence are significant, as the teachers tend to have positive expectations toward using e-textbooks. However, the teachers need to be guided through district-level programs to develop their skills for teaching with e-textbooks (Nel & King, 2015). This current study indicated a high level of the teachers’ effort expectancy and the teachers’ exhibited tendency toward future implementation. Therefore, it is important to act on the tendency and intention the district teachers have. For example, the Saudi K-6 teachers need to own technology devices to gain digital experience, so the district may need to provide plans and
policies to make adopting and using e-textbooks easier. One way of doing this, the district might consider purchasing these devices for all teachers. Therefore, everyone has the same device, which would help streamline the onboarding of the e-textbooks.

A fourth implication is that the schools and the district can utilize the positive performance expectancy of the teachers once they make decisions to incorporate e-textbooks (Sun & Flores, 2012). The teachers who participated in this survey showed positive behavioral intention and high levels of performance expectancy. This result indicates the teachers are willing to adopt and teach using digitalized textbooks. Thus, the district needs to utilize their teachers’ inclination, which will improve the students’ academic achievements. The teachers of the district showed positive readiness related to teaching with e-textbooks. In the survey, the Jeddah District K-6 teachers responded that they are inclined to use e-textbooks to increase their teaching outcomes. For example, a useful initiative for the district in this respect is to equip the classrooms with technology. In this way, the teachers will utilize the available materials to engage their students in more learning activities. According to the findings of this study, teaching with digitized textbooks needs to be considered in classroom instruction.

The fifth implication is that decision makers in the Jeddah School District need to be aware that gender did not affect the teachers’ intention to teach with e-textbooks. This implication is important because single-gender education is the formal school structure in Saudi Arabia. Based on the results of this study, future implementation of digitized textbooks and the challenges of onboarding that new approach with K-6 elementary teachers will not be different because of gender. This derives the implication that in the Saudi education system gender will not be a factor when making decisions related to the implementation of e-textbooks. If decision makers in the Ministry of Education and the Jeddah School District want to apply the
digitized textbooks to all types of schools equally, they can benefit from these findings.

Recommendations

This study provides some recommendations for implementing e-textbooks in Saudi Arabian K-6 schools, Jeddah School District in particular. First, the structure of the educational system and school curricula in Saudi Arabia is formally designed to share the same practices and regulations. Therefore, decision makers in the Ministry of Education, Jeddah School District, Saudi teacher mentors, Saudi school principals, and Saudi teacher professional development centers are recommended to use the results of this study as a source of information. For example, the teachers of the district may be involved in courses for using technology to improve their abilities to start e-textbooks in the classroom. Also, the school principals may be encouraged to create technical support sessions in their schools so that the teachers will be provided with ideas for the use of e-textbooks in real practices. Thus, the Saudi K-6 teachers’ positive intention toward using the e-textbooks may be exploited by the ministry for making successful future implementation.

Second, the Jeddah School District, in particular, should help the teachers of the district improve their practices of adopting e-textbooks for teaching. For example, the district needs to provide its schools with policies that would enhance classroom instruction through encouraging their schools to utilizing digitalized reading materials and e-textbooks. Specifically, the district decision makers need to issue policies and enhance recruiting of IT technicians to support schools with technical challenges. These challenges might discourage school principals and teachers from adopting e-textbooks. The district can start the digitized textbook implementation with recruiting and training of IT technicians in each school. Schools in the district need to
initiate technician positions in their staff to meet the new concerns that may occur along with implementing this new technology. In this way, the e-textbook onboarding initiative will avoid difficulties and drawbacks that might result from such challenges.

A third recommendation is that the Jeddah School District may want to start with a pilot project to see if the district is ready for implementing digitized textbooks. The pilot can be done by choosing a few schools in the district and starting a program of e-textbook adoption for the teachers in those schools. The results of the project would then provide empirical data that could be added to the findings of this study to establish a national-level adoption program. Given that the educational system is known for its formal structure of similarities across school districts, the K-6 teacher populations across the country are similar (Alrashidi & Phan, 2015; Dakhiel, 2017; Oyaid, 2009). Jeddah District is one of the biggest districts in Saudi Arabia, and this makes it possible to generalize the results to other school districts in the kingdom. Thus, the results of the study could be replicated in other school districts of the national system. Finally, challenges are expected in such cases. Therefore, a practical suggestion is to blend both formats in one trial program, i.e., the paper-based textbook blended with the digitized format to begin the onboarding process. These pilots could also help the kingdom identify teachers who could become trainers in other districts. Eventually, Jeddah could become a model district where people from other school organizations could visit to learn and attend professional development.

Limitations and Future Research

As in many studies, the current research experienced some limitations. The research design was mainly quantitative, which limited it to statistical and survey data analyses. Future research may need to apply other research designs such as a mixed-methods sequential design, a
case study design, or qualitative ethnographic types of research. Therefore, this study recommends conducting further studies using qualitative research designs to collect in-depth participant details for understanding K-6 teachers’ adoption of digitized textbooks.

Second, the study was also limited by the percentages of the participants’ gender. The percentage in the sample was 50% males and 50% females, which does not represent the actual gender distribution of the Saudi Arabian school teacher population. In fact, the teacher gender distribution consists of far more females than males. This limitation needs to be realized so future research might benefit from using more realistic percentages in the sample sizes.

Additionally, the effect of gender as a moderator was found to be insignificant in this study. This finding did not confirm previous research in which gender had significant moderating effects. A recommendation can be made here to suggest further investigation of the effect of gender, especially if gender is examined with different moderators (e.g., age, teaching experience) to measure its effect on behavioral intention relationships with other constructs of the UTAUT. For example, years of experience as a moderator variable may prove very important for determining teachers’ behavioral intention. Since this study showed that the large percentage of the district teachers in the categories were teachers with more than 15 years of experience, future studies can investigate years of experience as a variable to understand its moderating effect on Saudi K-6 teachers’ intention. Further research may need to examine this variable or other similar moderators to expand the literature on using e-textbooks in Saudi Arabia. Moreover, the study did not collect data regarding the socioeconomic status of the participants, as it was not designed to do so. The socioeconomic statuses of the Saudi K-6 teachers may provide valuable data for research, and so future studies should also include items targeting socioeconomic data.

Another limitation was the method of data collection used by this study. Clearly, the
survey instrument had originally been developed in the English language and translated into Arabic to help Saudi Arabian K-6 teachers provide reliable responses. Translation of the instrument may have limited the study in that some of the participants’ responses were subject to cultural and contextual mismatching. In particular, some translation issues may have caused the loss of some linguistic or phrasal structures and therefore lack total conformity with the original meaning in the English context. Therefore, future research should develop an instrument in the Arabic language to obtain responses with the participants’ intended meaning. Finally, because this study only focused on teachers, future research could measure the behavioral intention of the student and parent populations in Saudi Arabia. Investigation of factors that might control behavioral intention of populations other than the teachers will expand the literature of using e-textbooks in the country.

Conclusion

This study investigated the relationship between the UTAUT constructs and the behavioral intention of K-6 elementary school teachers in the Jeddah School District. Based on the results, the studied Saudi K-6 teachers exhibited a high level of positive intention toward using digitized textbooks in their teaching. Given that the school district has not decided to include this technological tool in its curricula, the teachers in the district are prevented from using e-textbooks in their classrooms. On the other hand, the Saudi government’s educational policies want to infuse technology into the curriculum by digitalizing textbooks. Therefore, in addition to the recommendations from this study, this conclusion argues for the district and its K-6 teachers to adopt the kingdom’s educational policies for implementing digitized textbooks. The K-6 teachers’ positive intention, as indicated in the findings of this study, is a good opportunity
for the district to invest in technology adoption. In this respect, Saudi teacher professional development centers may need to play a role in creating development programs to enhance K-6 teachers’ practices. These centers could create programs designed and implemented based on the K-6 teachers’ positive behavioral intention.
REFERENCES


Shemy, N. S. (2017). Impact of the different control styles (externally directed and self-directed) in interactive ebooks design on students’ cognitive achievement and attitude towards it. *International Journal of Internet Education, 16*(1), 34-60.


APPENDIX A

G POWER SOFTWARE SCREENSHOT
Critical $F = 2.4448$

Test family: F tests
Statistical test: Linear multiple regression: Fixed model, $R^2$ deviation from zero

Type of power analysis: A priori: Compute required sample size - given $\alpha$, power, and effect size

Input parameters:
- Effect size $f^2$: 0.15
- $\alpha$ err prob: 0.05
- Power (1- $\beta$ err prob): 0.95
- Number of predictors: 4

Output parameters:
- Noncentrality parameter $\lambda$: 10.3500000
- Critical $F$: 2.4447662
- Numerator df: 4
- Denominator df: 124
- Total sample size: 129
- Actual power: 0.0605747
APPENDIX B

IRB APPROVAL
Exempt Determination

06-Jan-2020
Hamed Alghandi
Curriculum and Instruction

RE: Protocol # HS20-0212 "Saudi Arabian teachers' intention toward the implementation of the e-textbook in K-6"

Dear Hamed Alghandi,

Your application for institutional review of research involving human subjects was reviewed by the Office of Research Compliance, Integrity, and Safety on 06-Jan-2020 and it was determined that it meets the criteria for exemption 7.

Although this research is exempt, you have responsibilities for the ethical conduct of the research and must comply with the following:

Amendments: You are responsible for reporting any amendments or changes to your research protocol that may affect the determination of exemption and/or the specific category. This may result in your research no longer being eligible for the exemption that has been granted.

Record Keeping: You are responsible for maintaining a copy of all research related records in a secure location, in the event future verification is necessary. At a minimum these documents include: the research protocol, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to participants, all correspondence to or from the IRB, and any other pertinent documents.

Please include the protocol number (HS20-0212) on any documents or correspondence sent to the IRB about this study.

If you have questions or need additional information, please contact the Office of Research Compliance, Integrity, and Safety at 815-753-8588.
APPENDIX C

EMAIL TEXT
Dear K-6 Teacher:

Thank you for choosing to participate in this survey. My name is Hamed Alghamdi; I am a doctoral candidate in the Department of Curriculum and Instruction, at Northern Illinois University. I am conducting a research study, which is titled *K-6 Saudi Arabian Teachers’ Implementation of Electronic Textbooks: Factors Associated with Behavioral Intention*.

The purpose of this study is to investigate the behavioral intention of K-6 elementary school teachers in the Jeddah School District to use e-textbooks in their classroom by applying selected constructs of the UTAUT Model (performance expectancy, effort expectancy, and social influence). This research is a partial fulfillment of the requirement for a doctoral degree in Curriculum and Instruction at Northern Illinois University.

You will be asked to complete an online survey. The survey consists of 19 questions and will take approximately 6-9 minutes of your time. The survey consists of two sections. First section asks about demographic information, which consists of four questions. Section two focuses on your intention regarding the future use of e-textbooks for teaching purposes. This section has 15 items.

Participation in this study is voluntary. You have the right to withdraw at any time without penalty. There are no risks or threats linked to participating in this study. You will not receive any type of incentive for sharing your perspectives related to the scope of this study.

All data will be kept confidential and will be reported as group data. In addition, the obtained data will be kept in a secure place.

If you have any questions or concerns, please contact the dissertation chair or researcher.

Dissertation Chair: Professor Elizabeth Wilkins, Department of Curriculum and Instruction, Co-Coordinator of Graduate Career and Professional Development, Northern Illinois University. Email address: ewilkins@niu.edu

Researcher: Hamed Alghamdi, Department of Curriculum and Instruction, Northern Illinois University. Email address: halghamdi1@niu.edu
APPENDIX D

UTAUT INSTRUMENT PERMISSION
Gordon Davis <gordon.davis@northernillinois.edu>
Sat 9/28/2019 11:28 AM
Hamed Alghamdi

The instrument is in the public domain. You have permission to use it.
Gordon B Davis

Thank you!  Great, thanks!  Thank you so much!

☐ Are the suggestions above helpful?  Yes  No

Hamed Alghamdi
Sat 9/28/2019 1:31 AM

Dear Dr. Davies,

Greetings and I hope this email finds you well.

My name is Hamed Alghamdi. I am a doctoral candidate at Northern Illinois University in Dekalb, IL. First, I would like to take your permission to use the survey items that develop by you and your colleagues (Venkatesh, Morris, Davis, & Davis, 2003). I am planning to conduct my study in the near future about Teachers’ Intention Toward the Implementation of E-Textbook.
APPENDIX E

DEMOGRAPHIC INFORMATION
<table>
<thead>
<tr>
<th>Demographic Section</th>
<th>English Version</th>
</tr>
</thead>
</table>
| **What is your gender?** | Male (1)  
Female (2) |
| **What is your age?** | 22 - 29 years  
30 - 39 years  
40 - 49 years  
50 - 60 years |
| **How many years of teaching experience do you have?** | Less than 5 years  
5-10 years  
11-15 years  
16-20 years  
21-25 years  
More than 25 years |
| **What is your educational level?** | Diploma (2 Years)  
Bachelor’s degree  
Master’s degree  
Doctoral degree |
APPENDIX F

ORIGINAL SURVEY ITEMS AND MODIFIED ITEMS
<table>
<thead>
<tr>
<th>Construct</th>
<th>Original Items</th>
<th>Modified Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td>I would find the system useful in my job.</td>
<td>I would find e-textbooks useful in my teaching.</td>
</tr>
<tr>
<td>Expectancy</td>
<td>Using the system enables me to accomplish tasks more quickly.</td>
<td>Using e-textbooks enables me to accomplish tasks more quickly.</td>
</tr>
<tr>
<td></td>
<td>Using the system increases my productivity.</td>
<td>Using e-textbooks increases my productivity.</td>
</tr>
<tr>
<td></td>
<td>If I use the system, I will increase my chances of getting a raise.</td>
<td>If I use e-textbooks, I will increase my chances of getting a raise.</td>
</tr>
<tr>
<td>Effort</td>
<td>My interaction with the system would be clear and understandable.</td>
<td>My interaction with e-textbooks would be clear and understandable.</td>
</tr>
<tr>
<td>Expectancy</td>
<td>It would be easy for me to become skillful at using the system.</td>
<td>It would be easy for me to become skillful at using e-textbooks.</td>
</tr>
<tr>
<td></td>
<td>I would find the system easy to use.</td>
<td>I would find e-textbooks easy to use.</td>
</tr>
<tr>
<td></td>
<td>Learning to operate the system is easy for me.</td>
<td>Learning to operate e-textbooks is easy for me.</td>
</tr>
<tr>
<td>Social</td>
<td>People who influence my behavior think that I should use the system.</td>
<td>People who influence my behavior think that I should use e-textbooks.</td>
</tr>
<tr>
<td>influence</td>
<td>People who are important to me think that I should use the system.</td>
<td>People who are important to me think that I should use e-textbooks.</td>
</tr>
<tr>
<td></td>
<td>The senior management of this district has been helpful in the use of the system.</td>
<td>The senior management of this district has been helpful in the use of e-textbooks.</td>
</tr>
<tr>
<td></td>
<td>In general, the organization has supported the use of the system.</td>
<td>In general, the organization has supported the use of e-textbooks.</td>
</tr>
<tr>
<td>Behavioral</td>
<td>I intend to use the system in the future.</td>
<td>I intend to use e-textbooks in the future.</td>
</tr>
<tr>
<td>intention</td>
<td>I predict I would use the system in the future.</td>
<td>I predict I would use e-textbooks in the future.</td>
</tr>
<tr>
<td></td>
<td>I plan to use the system in the future.</td>
<td>I plan to use e-textbooks in the future.</td>
</tr>
</tbody>
</table>