Saudi College Students' Attitudes towards Online Collaborative Learning

By

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Abstract

Online learning has the potential to expand collaborative learning and teaching. It has tremendous potential in the educational field, as it allows people to access computing services to share and edit data over the Internet. Yet few studies investigate the growing impacts of online learning on students' learning skills, such as collaborative learning. This study investigates attitudes, factors, and challenges to adopt online applications by Saudi students at King Abdul-Aziz University to support collaborative learning. The hypothesized model was developed through the Technology Acceptance Model of Davis, and the Diffusion of Innovation model of Rogers. Three hundred and six students participated in an electronic survey (138 female and168 male). The findings reveal the students have positive attitudes toward collaborative learning with their classmates (M = 4.07, SD = .78), and have positive attitudes toward adopting online collaborative learning, (M = 3.96, SD = .77). Of the participants, 60.1% use online applications for their learning, and 69.9% preferred the learning style that mix between collaborative and individual learning style. There was a significant relationship between the overall attitudes of the students (M = 3.96, SD = .77), and perceived usefulness of online applications in collaborative learning (M = 4.09, SD = .68), with r (306) = .774, p = .00. Students reported facing three major barriers to adopt online collaborative learning, which are data concerns (M = 3.86, SD = 1.01), privacy issues (M = 3.64 and SD = 1.22), and security issues (M = 3.47 and SD = 1.19). Of three predictors: age, gender, and education major, none were significant predictors of student attitudes towards adopting online collaborative learning (F (3,302) = 1.32, p > .05). Given that the online applications can be a very useful solution for education, as it may reduce the costs incurred for the purchase of computers, other equipment, and for employing IT people, it is urgent that universities and administrators start implementing this solution.

Dedication

This work is dedicated to my wife, Hanan, who has been a constant source of support, sacrifice, patience, and encouragement during the challenges of graduate school and life. I am truly thankful for having you in my life. This work is also dedicated to my kids, Mohammad, Ahmad, and Ayman, who have been a source of joy, happiness, and enthusiasm. Also, I would like to dedicate this work to my parents who have always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve.

Acknowledgment

In the Name of Allah, the Beneficent, the Merciful

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Chapter 1

Introduction

Technology has tremendous impacts on the educational field as well as in people's daily life. In the educational field, it has been proven that emerging technologies contribute to the enhancement of students' learning skills and achievements. Although there are some challenges to the adoption of technology in the learning environments such as costs, installing the latest software, and or poor technology infrastructure, other technologies are free and do not require the installation of the software on the user's' computer. One of these technology trends is what is called "Cloud Computing Technology" which allows people to access computing services and to share and edit data over the Internet. Cloud computing has tremendous potential in the educational field, especially in supporting learners' collaborative learning. Some institutions began incorporate cloud computing into the learning environments. According to Casap (2010) and Dessoff (2010), the Oregon Department of Education began to offer Google Apps for educators, staff, and students in 2010. In New York State Google Apps were offered for educators to reach two hundred thousand teachers and three million students, according to Claburn (2010). In Saudi institutions, instructors also began to adopt cloud computing but this adoption still slow and in its first stage. Alshwaier et al. (2012) conducted a study at one of Saudi universities and found that students, researchers and faculty are very satisfied with the variety and consistency of service offerings by Google Apps Education. Yet, few studies investigate the growing impacts of cloud computing on students' collaborative learning, especially in Saudi educational institutions. Studying how can educational cloud computing applications support collaborative learning become vital question that researchers need to investigate. Denton (2012) states that "an important

question, which researchers are beginning to investigate, is how educational theories, such as constructivism and collaborative learning, are enhanced through cloud computing" (p. 36). In addition, investigating the attitudes of students towards the adoption of cloud applications to support their collaborative leaning is important. Therefore, the current study intends to investigate attitudes, factors, and challenges that come with adopting cloud computing to support students' collaborative learning.

Collaborative Learning

Collaborative Learning is an approach or a concept that implies a group of people, or students working together to learn. According to (Gokhale, 1995) collaborative learning is grouping students to work together to achieve their academic goals. It has also been defined as being when two or more students pair together to work in small group to achieve goals or learn something (Pierre, 1999). In 1992, Smith & MacGregor defined "Collaborative Learning" as a term for a variety of educational approaches including combined intellectual effort by students, or students and teachers together. In this type of learning, students work in groups of two or more, to mutually search for understanding, solutions, meanings, and/or to create a product. In addition, these processes depend on students' discussions and active work with the objectives, more so than focusing on lectures, listening or note taking. Collaborative Learning means learning and understanding in concert with others to produce a community of learners where everyone is welcome to join, participate, and grow. Collaborative Learning is an important aspect of learning skills. Students work in small groups according to their common interests to complete their projects, and to learn from and with each other. According to Liaw, Chen, and Huang (2008), Collaborative Learning is a social interaction that involves a community of learners and teachers, where members acquire and share experience or knowledge.

However, students can work collaboratively not only face-to-face but also online, using different technologies. Harasim, Hiltz, Teles, and Turoff (1995) defined online Collaborative Learning as “a learning process where two or more people work together to create meaning, explore a topic, or improve skills.” Learners work collaboratively and learn from and with each other to finish their projects and assignments using the Internet and it applications.

Collaborative Learning and Cooperative Learning

The terms collaborative learning and cooperative learning are often used interchangeably when it comes to students who are working together. Myers (1991) points out that the dictionary definitions of "collaboration", derived from its Latin root, focuses on the process of working together; the root word for "cooperation" stresses the product of such work. Co-operative learning has largely American roots from the philosophical writings of John Dewey stressing the social nature of learning. Included is the work on group dynamics, by Kurt Lewin.

The National Council of Teachers of Math (NCTM) has defined cooperative learning as "Cooperative learning involves a small group of learners, who work together as a team to solve a problem, complete a task, or accomplish a common goal”, as presented in the book of Alice Artzt and Claire Newman (1990). Cooperative learning has five basic elements necessary for a procedure to be considered cooperative as Johnson, Johnson & Holubec (1991) identify them. These five elements include:

1. Positive Interdependence: Students perceive that they need each other to complete the group's task.
2. Face-to-Face Promotive Interaction: Students promote each other's learning by helping, sharing, and encouraging efforts to learn.

3. Individual Accountability: Each student's performance is frequently assessed and the results are given to the group and the individual.
4. Interpersonal and Small group Skills: Groups cannot function effectively if students do not have and use the needed social skills.
5. Group Processing: Groups need specific time to discuss how well they are achieving their goals and maintaining effective working relationships among members.

Collaborative learning is also based on five fundamental principles, according to Orr (1997), which are:

1. Working together results in a greater understanding than would likely have occurred if one had worked independently.
2. Spoken and written interactions contribute to this increased understanding.
3. Opportunity exists to become aware, through classroom experiences, of relationships between social interactions and increased understanding.
4. Some elements of this increased understanding are idiosyncratic and unpredictable.
5. Participation is voluntary and must be freely entered into.

However, there are differences between the two concepts known as collaborative learning and cooperative learning. According to Rockwood (1995), who describes the differences between collaborative learning and cooperative learning, the major difference lies in the fact that cooperative deals exclusively with traditional knowledge, while collaborative ties into the social constructivist movement. However, Rockwood argues that both use groups, both assign specific tasks, and both have the groups share and compare their procedures and conclusions in plenary class sessions. Rockwood claims that in the collaborative learning environment, the authority for

testing and determining the appropriateness of the group product rests with the small group, then the whole class, and finally the requisite knowledge of the community (i.e. the discipline: geography, history, biology etc.). In the cooperative learning environment, the authority remains with the instructor and students are not empowered, while in a collaborative environment, the instructor transfers all authority to the group once the task is set, and it empowers and braves all the risks of empowerment for students.

Cloud Computing

Cloud computing refers to the usage of computer resources through the Internet provided as a service for users. According to Mell and Grance (2011), the National Institute of Standards and Technology (NIST) defines cloud computing as "…a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model is composed of five essential characteristics, three service models, and four deployment models" (p. 2). DelSiegle (2010) defines cloud computing as a computing technology that uses the Internet and central remote servers to maintain data and applications. Del Siegle states that, "The term cloud computing is used because the services and storage are provided over the Internet (or cloud)" (p. 41).

According to Armbrust (2009), Vaqueroet al. (2009), and Toby, et al. (2009) cloud computing is a new paradigm that provides efficient network login to an appropriate pool of computing resources which can be provided and released with just nominal assiduity and service providers' reciprocity. These computing resources include network servers, applications, platforms, and infrastructure segments and services. Also, according toAlshwaier et al. (2012),

cloud computing delivers services separately based on demand and provides adequate network access, data resource environment and effective flexibility.

Cloud Computing refers to both the applications delivered as services over the Internet, and the hardware and systems software in the datacenters that provide those services (Armbrust et al, 2009). Armbrust et al. state that:

> "The services themselves have long been referred to as *Software as a Service (SaaS)*, so we use that term. The datacenter hardware and software is what we will call a *Cloud*. When a Cloud is made available in a pay-as-you-go manner to the public, we call it a *Public Cloud*; the service being sold is *Utility Computing*. Current examples of public Utility Computing include Amazon Web Services, Google App Engine, and Microsoft Azure. We use the term *Private Cloud* to refer to internal datacenters of a business or other organization that are not made available to the public. Thus, Cloud Computing is the sum of SaaS and Utility Computing, but does not normally include Private Clouds" (p.4).

Some of the cloud computing productive tools include: word processing, spreadsheet, presentation, drawing, and conferencing programs. However, Google Docs is the best known of these (Del Siegle, 2010). Sclater (2009) argues that today's "cloud" platforms such as "Microsoft" and "Google" are providing free services to students and staff at educational institutions which include email, contact lists, calendars, document storage, creation and sharing documents and the ability to create websites.

An example of a free cloud computing tools made available to colleges, universities, and educationally focused groups is Google Apps Education (GAE). According to Alshwaier et al. (2012), GAE includes the following applications: Google Mail (Gmail), Google Sites, Google

Video for education, Google Calendar, Google Talk, and Google Docs Package (Documents, Spreadsheets and Presentations). Herrick (2009) argues that Google applications are web-based inherently across platforms. A modern cloud computing web browser might be supported by the computing platform to provide compatibility, scalability and essentially virtualized models. Google has improved these programs through its own development teams and by acquiring other companies with innovative additions over the past 4 years (Del Siegle, 2010). According to Google Apps Education Edition, as cited in Alshwaier et al. (2012).

Cloud computing applications have potentials in education in general, and with learning in particular. Thus, studying how cloud computing applications can support and enhance collaborative learning is crucial in order help students utilize these tools to develop their collaborative learning. This study investigates the potential of cloud computing applications to enhance students' collaborative learning.

Theoretical Framework

To frame this study and to describe the variables and the ideology of important elements, two theories were used, the Technology Acceptance Model (TAM), and the Theory of Diffusion of Innovations (TDI).

Technology Acceptance Model (TAM)

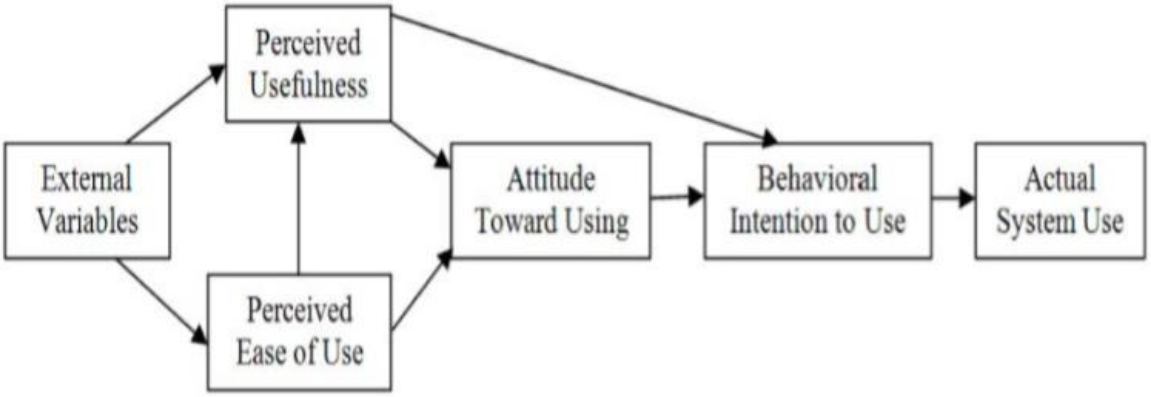
Technology Acceptance Model (TAM) TAM, developed by Davis in 1989, is an information systems theory that models how users come to accept and use a computer-based technology. This theory is one of the influential extensions of Ajzen and Fishbein's (1980) TRA and is based on principles originally articulated by Ajzen and Fishbein. TAM suggests that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it (Masrom & Hussein, 2008). TAM states that an individual's

adoption of information technology depends on two main factors, which are Perceived Usefulness (PU), and Perceived Ease-of Use (PEO) of the technology.

Perceived Usefulness PU is "the degree to which an individual believes that using a particular system would enhance his/her job performance" (Davis 1989, p. 320). Whereas perceived ease of use is defined as "the degree to which an individual believes that using a particular system would be free of real and mental efforts" (Davis 1989, p. 323). Davis argues that perceived usefulness and perceived ease of use determine the user‘s intention to use the system or the technology.

According to TAM, the behavioral intention to use the system is determined directly by the person‘s attitude towards using the system and the subjective probability that using a specific application will increase his or her job performance (PU). Attitude and PU also depend on the degree to which the user expects a system to be free of effort (PEOU). Thus, PU and PEOU affect the use of a system, according to Masrom and Hussein (2008). (See figure 1)

Figure 1. Technology Acceptance Model (TAM)



Source: Davis, 1989

In the TAM Model, attitude towards a behavior (using the system) is a central feature of TAM. According to Masrom and Hussein (2008), TAM believes that when people perceive any technology as easy to use and useful they would hold positive attitudes toward this technology. These positive attitudes would result in accepting and using this technology (e.g., cloud computing applications) (p. 52)

Variable Definitions

Attitude Towards Behavior (ATT): An individual‘s positive or negative feelings (evaluative affect) about performing the target behavior. Attitude is determined through an assessment of one‘s beliefs regarding the consequences arising from a behavior and evaluation of the desirability of these consequences (Masrom & Hussein, 2008).

Perceived Usefulness (PU): The degree to which a person believes that using a particular system would enhance his or her job performance.

Perceived Ease of Use (PEOU): The degree to which a person believes that using a particular system would be free from effort.

Behavioral Intention: A measure of the strength of one‘s intention to perform a specific behavior (e.g., use an information system).

Subjective Norm (SN): An individual‘s perception of whether or not people important to the individual think that the behavior should be performed. The contribution of the opinion of any given referent is weighted by the motivation that an individual has to comply with the wishes of that referent (Masrom & Hussein, 2008).

Innovation Diffusion Theory (IDT)

IDT was developed by Rogers (1995), and it sees innovations as being communicated through certain channels over time among the members of a social system. IDT suggests that there are four fundamental elements that influence the spread of a new idea and the adoption of technological innovations: the innovation, communication channels, time, and a social system.

Rogers (1995) concludes that users of this theory judge an innovation based on their perceptions in regard to five attributes of the innovation. These attributes are: relative advantage, compatibility, complexity, feasibility, and observability. The theory holds that an innovation will experience an increased rate of diffusion if potential users perceive that the innovation: 1) Can be tried on a limited basis before adoption; 2) Offers observable results; 3) has advantages relative to other innovations; 4) is not overly complex; and 5) is compatible with existing practices and values (Masrom & Hussein, 2008, p. 96,)

Significance of the Study

This study is investigating impacts of cloud computing applications on students' collaborative learning. Cloud computing is new trend of technology that facilitates sharing of data and experiences over the Internet. Although there is evidence that cloud computing technology can improve collaborative learning of students, yet few studies have been conducted to investigate the adoption of cloud applications by students to support collaborative learning, especially in Saudi educational institutions. Five years ago, I conducted several observations at some Saudi educational institutions. I found that most of the instructors do not apply the collaborative learning strategy in their teaching and there was rare usage of technology as well. I investigated how cloud computing applications can improve learning skills such as collaborative learning. Recently, cloud computing became more dominant in the field of education. Thus, this

study explores the attitude of Saudi students toward cloud computing applications to support their collaborative learning. Investigating the adoption of cloud computing applications by Saudi students to support collaborative learning will provide results for instructors to better understand what their students' perspectives are towards cloud collaborative learning, as well as potential benefits of these tools. This might help instructors at King Abdul-Aziz University change their attitudes towards the adoption of cloud computing applications to enhance students' collaborative learning. Bauer & Kenton (2005) argue that promoting the usage of innovative technologies such as cloud computing by instructors to enhance students' learning is a challenge. Also, findings of the current study will encourage institutions to start facilitating more cloud computing technology for instructors and students as most of these tools are free, and do not require installation of the software on the users' computers.

Research Questions

1. Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?
2. Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?
3. What are Saudi students' attitudes toward adopting cloud collaborative learning?
4. Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?
5. What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?
6. Do variables such as age, gender, and academic major affect students' attitudes towards the adoption of cloud collaborative learning?

Hypotheses of the Research

H1: Saudi students at King Abdul-Aziz University utilize cloud computing applications for learning.

H2: Saudi students at King Abdul-Aziz University are learning collaboratively with their classmates.

H3: Saudi students have positive attitudes toward cloud collaborative learning.

H4: There is a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes.

H5: There are some difficulties that students encounter when they are utilizing cloud computing applications to support collaborative learning.

H6: Variables such as age, gender, and academic major are related to students' attitudes towards the adoption of cloud collaborative learning.

Purpose of the Study

The purpose of the study is to investigate Saudi students' attitudes towards adopting cloud computing applications to support collaborative learning. It also examines factors that affect the students' attitudes to adopt cloud collaborative learning. In addition, the study investigates challenges to utilize cloud computing to support students' collaborative learning. Also, it examines if there is a relationship between perceived usefulness of cloud computing applications and students' attitudes. Finally, studying the impacts of factors such as age, gender, and academic major on students' attitudes towards the adoption of could collaborative learning is another purpose of the study.

Chapter Summary

Chapter 1 is an introduction to this study and its purposes. The researcher in this chapter explained the need, the purpose, and the significance of the study. The researcher also described the research questions and hypotheses in detail. In addition, the theoretical framework on which the study relies was provided. Finally, the researcher defined the operational definitions of this study.

Chapter 2

Literature Review

This chapter reviews the literature reviewed in previous studies related to the current study such as cloud computing (definition, history, and examples), advantages and disadvantages of cloud computing, challenges to use cloud computing for learning purposes, etc. It also covers theoretical frameworks that support the study's hypotheses such as Technology Acceptance Model (TAM), and Diffusion of Innovation Theory. However, to cover all variables of the study, the researcher tries to make a connection between the previous studies and the purpose of the current study.

Early Research in Online Collaborative Learning

Educational researchers began exploring with computer-supported collaborative learning. According to Scardamalia and Bereiter (1991) Computer-Supported Intentional Learning Environments (CSILE) can support asynchronous collaborative work on students' own knowledge and understanding. CSILE is a database system which facilitates classroom learning in such a distributed manner. Scardamalia and Bereiter argue that CSILE is designed to support students' intentional learning as progressive problem solving. In these collaboratieve learning environments, students store different types of knowledge representations as texts or graphics in the database. Students can make use of CSILE as a tool for controlling their executive processes in learning. All ideas and knowledge produced by students on a CSILE network go into a single public database, where they are available to the other students. In these environments, students share interpersonal representations of knowledge. Furthermore, students can provide comments and feedback to others'. Sharing and exchanging comments and ideas facilitate learning as

problem solving at the interpersonal level. Students participate in problem-solving activity with the other and reflect on the other's knowledge and perspectives.

In addition, students can cooperate with one another by means of comments on one another's notes-by comments that raise questions, suggest information sources, provide constructive criticism or counter- arguments, or that simply provide praise and encouragement. In a larger sense, they can cooperate the way people who are doing related work in a scholarly discipline cooperate to advance knowledge-by paying attention to what one another has found out and by trying to extend it or go beyond it. More directly, they can work together off-line preparing material that eventually goes into CSILE as notes.

Synchronous versus Asynchronous Learning

According to Hrastinski (2008) asynchronous learning supports work relations among learners and with teachers, even when participants cannot be online at the same time. Asynchronous e-learning commonly facilitated by media such as e-mail and discussion boards and it is a key component of flexible e-learning. Synchronous e-learning, on the other hand; has the potential to support e-learners in the development of learning communities. It commonly supported by media such as videoconferencing and chat.

There are some differences between synchronous and asynchronous learning. Hrastinski (2007) argues that asynchronous e-learning makes it possible for learners to log on to an e-learning environment at any time and download documents or send messages to teachers or peers. Students may spend more time refining their contributions, which are generally considered more thoughtful compared to synchronous communication. On the other hand, in synchronous environments discussions were limited by time; the participants had to make sure they did what was expected during the scheduled three hours. Synchronous e-learning makes it possible for

learners and teachers to experience synchronous e-learning as more social and avoid frustration by asking and answering questions in real time. It helps e-learners feel like participants rather than isolates, while in asynchronous sessions students might feel isolated and not part of learning communities, which is essential for collaboration and learning (Haythornthwaite and Kazmer, 2002). Asynchronous communication increases a person's ability to process information. The receiver has more time to comprehend a message because an immediate answer is not expected (Robert and Dennis, 2005). Synchronous communication increases motivation according to Robert and Dennis (2005). Learners felt more psychologically aroused and motivated, since this type of communication more closely resembles face-to-face communication.

However, in this research, as students use online tools to learn collaboratively, this type of learning is considered as asynchronous learning. Students can work in groups any time and search, chat, work, edit, or and modify their project or pages. This asynchronous learning using online tools enable learners to learn collaboratively in their convenient time. Learners can gather information, pictures, videos, or audios and post them to their group pages. Also, they can go to their pages any time to edit, add, or delete any content. In addition, they can exchange ideas, perspectives, or experiences with the other people who they are working with. This asynchronous learning also enables learners to go at their convenient time to read and discuss the teacher or the peers' feedback and think thoughtfully to respond as they have enough time as opposed to the synchronous learning.

Cloud Computing

Cloud computing can be described as on-demand computing, for anyone with a network connection. Access to applications and data anywhere, anytime, from any device is the potential outcome. The consumer-level cloud is a good starting point for this – sites like

Flickr and Facebook act as digital repositories for data and we can access this data from any internet-enabled device. (Powell,2009).

Cloud computing can be defined as a service, platform, or infrastructure according to Lis & Paula (2015). These definitions are the extension of concepts such as SaaS (Software as a System), PaaS (Platform as a system) and IaaS (Infrastructure as a System) (Tabor, 2011). Cloud Computing as a platform, is defined as the primary computer system, which includes the hardware, operating systems, and in some cases, applications, and tools together with user interfaces, through which applications can be run. Regarding infrastructure, cloud computing can be defined as the physical components, that are required by the system in order to provide the full functionality. These components are the processors, databases, network hardware or operating system. According to Kot et al (2013), the essence of cloud computing is moving data and information far beyond the computer (PC, laptop or netbook) to large data centers.
There are some benefits that cloud computing offers for users. Uhlig et al. (2005) and Perez et al. (2008) mentioned some of these benefits including: cost, flexibility, accessibility, on-demand computing, storage to host, scale, and the ability to manage applications and services. In addition, Michael (2008) argues that cloud computing technology is important for both developers and users for many reasons:

A. Cloud Computing for Developers

- Offers more amounts of storage and processing power to run their applications.
- Provides different and new ways to access information; connects people and resources from different locations worldwide; processes and analyze data.
- Developers feel free from the physical constraints.

B. Cloud Computing for End Users

- User is not restricted to single computer, location, or network.
- User can access his/her applications and documents hosted in the cloud from anywhere at any time.
- The fear of losing data if the computer crashes is gone.
- Benefit of group collaboration, users worldwide can access, share, update, the same documents or applications in real time. It an an entire new world of collaborative computing, all enabled by the concept of cloud computing.

Cloud Computing for Educational Purposes

Cloud computing has tremendous potential in the education field in general and for learning in particular. In a study by Lis and Paula (2015), students who know and use the cloud were chosen at Technical University of Czestochowa. A survey was distributed containing issues related to: the length of use of the cloud, the most frequently used applications, opportunities that cloud offers in educational dimension and the reasons, and why universities should implement this solution. It was found that 89% of the students responded that they had a positive willingness to use cloud computing offered by the university for educational purposes.

Cloud computing can support education institutions to resolve some of the common challenges such as cost reduction, quick and effective communication, security, privacy, flexibility and accessibility (Justin, et al (2009); ShanthiBala (2010); Al Noor (2010); & Thomas (2011).

Katz et al. (2009) define the most common features that cloud computing offers to universities as follows:

1. Increases access to scarce IT expertise and talent.

2. Scales IT services and resources.

3. Promotes further IT standardization.

4. Accelerates the time to market through IT supply (i.e., bottleneck reductions).

5. Channels or counters the ad-hoc consumer of enterprise IT services.

6. Facilitates the transparent matching of IT costs, demand, and funding.

7. Increases interoperability.

8. Supports a model of a 24 x 7 x 365 environments.

9. Enables the sourcing of cycles and storage powered by renewable energy.

10. Drives down capital and total costs of IT in higher education.

In Lis and Paula's (2015) study, students reported many reasons to introduce the cloud into the university setting. The highest percentage of students (61%) agree with the statement that the use of the cloud may contribute to the decreased consumption of printers, toners and papers, as well as the fact, that the cloud would improve productivity and efficiency.

To investigate if cloud computing is suitable for educational purposes, several studies have been conducted to examine usability of cloud computing for educational purposes. One of these studies was Lis and Paula's (2015) study. Findings of the study showed that the most commonly used cloud applications by students is Dropbox, which is mainly used for storing and sharing files. It's great popularity is determined by the available space and ease of use. The second most used tool is that which is offered by Google, called Google Apps for Business; a package that includes word processing, spreadsheets, presentation software, e-mail programs, calendar, and disk space, etc. It can be said that this package is able to fully satisfy all the needs of the average user of computers and the Internet. Also, Facebook and Twitter are common mainly due to their social dimension, and the role they play in modern society. At the far end was

a copy application offered by Microsoft, which is an application that acts similar to Drive, offered by Google, but much less powerful.

Other educational advantages of cloud computing reported by students at the Technical University of Czestochowa includes: cloud computing offers the opportunity to work from anywhere and at any time; the availability of the software offered by the university; and the possibilities of cooperation between individuals using the same cloud.

In addition, González-Martínez at al. (2015) identify the main benefits and affordances of cloud computing for education. These main affordances and benefits include: availability of online applications flexibility to create learning environments, support for mobile learning, computing intensive support, scalability, and cost savings in hardware and software.

Cloud Computing and Collaborative Learning

Collaborative learning is an important pedagogy used in learning and teaching environments. Dillenbourg (1999) defines collaborative learning as follows: “Collaborative learning describes a variety of educational practices in which interactions among peers constitute the most important factor in learning, although without excluding other factors such as the learning material and interactions with teachers.” Collaborative learning can be organized through both traditional face-to-face group work, or through online learning using e-collaboration via various cloud services and applications.

In this digital era, technology has a tremendous impact on developing learning aspects such as collaborative learning skills. Calvo et al. (2011) and Huang et al. (2013) argue that cloud services and applications have a big potential for expanding collaborative learning through both real time collaboration and social interaction. Resta (2007) states that, “Globally, the growth in the use of technology to support collaborative learning in higher education has attracted a rapidly

growing number of research studies focused on some aspect of technology-supported collaborative learning examined from different theoretical perspectives" (p. 66).

Learning collaboratively using computer and cloud services is called Computer-Supported Collaborative Learning (CSCL). According to Lipponen et al. (2004), the term computer-supported collaborative learning was used as early as 1989 by O'Malley and Scanlon, and was recognized by Koschmann (1996) as an important area. CSCL is an emerging field of research focused on how technology can facilitate the sharing and creation of knowledge and expertise through peer interaction and group learning processes (Resta, 2007).

Kirchner and Razmerita (2014) state that a new set of collaborative tools available in the cloud supporting different collaborative/cooperative or learning processes includes:

- multi-user collaborative writing like Wikis (e.g., Wikipedia, Wikiversity, Wikimedia,), Google Docs or editing simultaneous notes, lists and ideas using Pads (e.g., TitanPad, SimplePad)
- communicating, sharing, and social interaction using social networking (e.g., Twitter, Facebook, Podio) or instant messaging (e.g., WhatsApp)
- file sharing or document sharing (e.g., Dropbox or Google Drive)
- brainstorming and structuring of ideas like Mindmaps (e.g., Mindmeister, Freemind)
- sharing links and bookmarks using Social Bookmarking (e.g., Delicious, Digg)
- media sharing including video streaming or presentations using content communities (e.g., Slideshare, YouTube)
- computer-intensive e-learning services (e.g., Massive Open Online Courses (MOOCS), virtual worlds, simulations)

Collaborative services are the most potential applications for achieving collaborative learning that can be used to assist students in accomplishing a collaborative or cooperative learning task (Huang et al. (2013). Findings of Lis and Paula's (2015) study concluded that cloud computing facilitates cooperation possibility between students and teachers as well as between students only, as reported by students.

However, although most of the studies which have been conducted were western, a few Arabic and Saudi studies were conducted to investigate growing impacts of Cloud Computing on students' achievements. One study by Alshwaier, Youssef, and Emam (2012) investigates how cloud competing can benefit e-learning education in KSA. Alshwaier et al. discussed the cloud computing environment and explored how universities and institutions may take advantage of clouds not only in terms of cost, but also in terms of efficiency, reliability, portability, flexibility, and security. Alshwaier et al. (2012) argued that students, researchers, and faculty are very satisfied with the variety and consistency of service offerings by Google Apps Education.

Although there is evidence that cloud computing technologies contribute to the enhancement of learning aspects, researchers have concluded that promoting the usage of innovative technologies such as cloud computing by instructors to enhance students' learning is a challenge (Bauer & Kenton, 2005). Therefore, as there are few studies which investigate the impact of integrating cloud learning as a method for improving students' learning. Thus, more research done to investigate how instructors can use cloud computing to improve students' learning is needed. Also, investigating in depth factors, challenges, and attitudes of students and instructors toward the adoption of cloud computing applications to improve students' learning is crucial, in order to utilize these technologies effectively to develop

learning and teaching outcomes. Thus, this study is investigating factors, challenges, and attitudes of Saudi students towards using cloud computing technologies to support collaborative learning.

Attitude Towards Collaborative Learning

Research conducted on students' attitude towards cooperative learning in both face-to-face and online environments indicates that students have positive attitudes towards collaborative learning. Studies conclude that students have positive attitudes towards cooperative learning (face-to-face environments) (Al-Dawoud, 2001; Armstrong, Chang, & Brickman, 2007; Griffin, 2008; Velez-Caraballo, 2008).

Hagen (1996) conducted a study for students' introductory human services course to explore their attitudes towards cooperative learning. The findings revealed that students had a positive attitude towards cooperative learning. The results also showed that all of the participants enjoyed cooperative learning and would like to be involved again. Phipps et al. (2001) surveyed 210 students from four different disciplines and found that students had a positive attitude towards cooperative learning. Also, Gottschall (2006) investigated student attitudes towards group work, and found that education students had a more positive attitude towards cooperative learning when compared to business students. This result may be due to the different experiences with group work amongst the majors and also due to the nature of the group projects in each major. This result is an indication to the fact that academic major has a potential impact on students' attitudes towards collaborative learning.

In addition, Griffin (2008) examined the effect of using cooperative learning with computer-assisted instruction (CAI) on mathematics achievement, as compared to working alone using computer-assisted instruction. The study also investigated student attitudes towards

cooperative learning after working in cooperative learning groups using CAI as compared to groups working alone using CAI. The findings showed that using cooperative learning and computer-assisted instruction improved mathematic achievement scores to a greater degree. It also indicated that differences were found in group attitude towards the instructional method in favor of cooperative learning groups.

Some other studies conducted in Middle Eastern all-female institutes conducted by Al-Dawoud (2001) and Alharbi (2008) concluded that females have a positive attitude towards cooperative learning especially in single-sex settings.

Attitude Towards Online Collaborative Learning

Studies also have demonstrated a positive attitude towards collaborative learning in the online environment. Johnson et al. (2002) concluded that online collaborative learning environments increase the online learning interactions between students. According to Jung et al. (2002), students' satisfaction with online learning environments was strongly related to the amount of active interaction with their peers. Another study by Bouras (2009) indicated that peer interaction was related to learning and satisfaction.

Neo et al. (2009) examined the impact of online collaborative learning environments on students' learning, perception, and learning experience. The results showed that the students had very positive experiences when learning in the online collaborative learning environment. The students were able to learn in this environment, and showed positive attitudes toward using blogs, such as web 2.0 technology, in their learning process.

Although cloud computing technology appears to be a perfect solution for many universities that struggle with issues related to information technology, complexity, and cost. Few studies have been done in this topic in Saudi Arabia. According to Alfifi (2015),

cloud computing in Saudi Arabia is still in the early stages of use. Two years ago, I conducted a qualitative study which focused on teaching methods in the university. I investigated fifty faculty members at King Abdul-Aziz University, by interviewing and observing their class' teaching method. More than 70% of the faculty adopt a traditional way of teaching, which is based on lecturing.

Collaborative methods where students work together to achieve mutual goals are widely ignored in Saudi Schools. The culture and society construction are obstacles to adopting collaborative learning in Saudi universities. Trips and ethnicity are the main factors in societal relationships among students, that make students' collaborative learning difficult (Alqurashi, 2008).The low performance of students in Saudi Arabia has been explained in terms of the pedagogy used in the classroom which is teacher centered, expressing the dominance of the teacher (Alhodithy,2007).

However, few studies have been conducted in Saudi Arabia to investigate the acceptance and use of cloud computing in Saudi universities by faculty. One of these studies was conducted by Alhazzani (2014), at King Saud University, to examine the advantages and disadvantages of cloud computing in Saudi education from the perspective of faculty, and to analyze the extent of using cloud computing tools by surveying 200 faculty members. The results of his study revealed that 56.7% of the participants were familiar with the concept of cloud computing, 6.7% were neutral on the concept of cloud computing, and 3.3% are strongly familiar with the concept of cloud computing. The findings showed that the vast majority of the participants (96.7%) agreed that the idea of cloud computing education is certainly a huge step towards the development of a higher education system in Saudi Arabia. In addition, most of the participants reported some advantages of cloud computing, such as

providing access to applications from anywhere at any time. The participants also agreed that cloud computing is easy to use, and involves low maintenance. On the other hand, the findings showed that there is an agreement among the participants of the study regarding the disadvantages of cloud computing. Concerns about data storage on other servers was one of these disadvantages. Furthermore, concerns about publishing policy and property rights, and on the stability and security of essential data were other disadvantages, which was reported by many of the participants. Additional disadvantages were administrative, infrastructure, and financial constraints.

Another study was done by Alfifi et al. (2015), who studied views of 40 faculty members in the Computer and Information Systems (CIS) departments of two American and Saudi universities, one university is located in Pennsylvania, and the other university is located in the Southwest region of Saudi Arabia. Results of the study revealed that the CIS faculty from the Saudi-based university felt that they would derive greater benefits from the use of cloud computing than the U.S.-based CIS faculty. The Saudi-based CIS faculty also felt that they had a greater knowledge of cloud computing (were in the discovery level of adoption) than their U.S.-based counterparts (were in the planning level of adoption). In addition, the CIS Saudi faculty made slower progress in technology adoption despite the optimistic views on the technology, due to the high uncertainty and avoidance in Saudi Arabian culture. On the other hand, the CIS American faculties had more diverse views because of the high individualism in the United States culture. However, the findings showed that both groups are concerned about security risks of proprietary data and applications when adopting cloud computing technology.

Also, Alzahrani (2015), at one of Saudi universities; Albaha University, has conducted a study to explore the reality of using CCT in learning at the higher education level. He found that more than 50% of his sample study either did not know about cloud computing, or had poor experiences. However, after a short training for students on how to use CCT in learning, he realized that the students had a high desire to adopt this new technology to enhance their learning. However, there were some barriers that prevented adoption of this new technology in education like requirements of use and bad infrastructure.

Alanazy (2011) also conducted a study to examine Saudi students' attitudes and beliefs toward applying coeducational online collaborative learning in Saudi Arabia. The findings of the study revealed that Saudi students generally have positive attitudes toward applying coeducational online collaborative learning. Saudi students in the United States who have had experience in a coeducational online collaborative learning environment believe that it is possible and appropriate to apply this environment in Saudi Arabia, and they further believe that this environment will be effective if it is applied in Saudi Arabia.

However, as cloud computing globally appears to be an excellent solution to many universities, and as few studies have been conducted in Saudi Arabia to understand the acceptance and utilization of this new trend to enhance learning, the aim of this study will go deep to investigate students' attitudes towards using cloud computing technology to support collaborative learning in Saudi higher education institutions. Also, factors and challenges which stand behind the lack of adapting collaborative learning and cloud computing in learning, is another purpose of this study. In addition, this study will try to prove if there is a significant difference between Saudi male and female students in their attitudes toward using cloud computing to support collaborative learning.

Factors Affecting Students' Attitudes Towards Online Learning

There are factors which affect students' attitude toward online collaborative learning. One of these factors is age. Sahin (2006) investigated the relationships between students' characteristics and their perception of web-based learning and satisfaction with online learning. The findings revealed a significant difference in students' perception in relation to gender, age, and academic major. The results showed that students were satisfied with their online courses. The study also found that students over 21 were significantly more positive with respect to instructor feedback and personal relevance in an online environment, than were students between the ages of 18 and 21. Frederickson et al. (2000) also concluded that age has a significant effect on learners' perception towards web-based learning. The results indicated that the older students perceived the most learning and satisfaction, while the younger students perceived the least learning and satisfaction. In addition, the findings of Alanazy's study revealed that the older group reported the most positive attitudes, while the younger group reported the least positive attitudes.

However, a Saudi study by Alugab (2007) investigated factors affecting Saudi students' attitude towards online learning in a Saudi college. The study showed that factors such as age, marital status, academic major, student status, and location have been shown to have no effect on students' attitude towards online instruction.

Another factor which affected students' attitude was academic major. In terms of academic major, Alanazy's findings revealed that the most positive attitudes were expressed by political science ($M = 3.91$, $SD = 0.85$), and science majors ($M = 3.74$, $SD = 0.81$), while art ($M = 3.48$, $SD = 0.82$) and education ($M = 3.59$, $SD = 0.88$) students showed the least positive attitudes. Business and engineering students, which made up the largest academic segment of the

participants, showed very comparable levels of attitude, with the result of (M = 3.68 and SD = 0.86) for business, and (M = 3.63 and SD = 0.85) for engineering. Also, Sahin's (2006) study revealed that students' academic major plays a role in student perception of online learning. For example, Family and Consumer Sciences students were significantly more positive with student interactions, collaborations, instructor feedback, when compared to Liberal Arts and Sciences students.

An additional factor affecting students' attitudes toward online learning was gender. The findings of Alanazy's study showed that male students' attitudes towards online cooperative learning (M = 3.67, SD = 0.87) was more positive than that of female students. Anderson and Haddad (2005) also studied attitudes of online students at a Midwestern university. The study aimed to compare the expression of voice, control over learning, and perceived deep learning outcomes in face-to-face versus online course environments. The findings revealed that females experienced greater perceived deep learning in online courses when compared to face-to-face courses, and that expression of voice appeared to contribute to this outcome. This effect of expression of voice did not occur for male students. In addition, Sahin's (2006) study concluded that female students were significantly less positive about instructors' feedback than males when learning online.

However, other studies concluded that gender has no effect on student attitude towards learning in online environments. A study by Witowski (2008) investigated the effect of gender on student satisfaction in an online learning environment using the Distance Education Learning Environments Survey (DELES). The findings of this study stated that gender did not play a role in determining student satisfaction with online learning.

Technology Acceptance Model and Innovation Diffusion Theory

The first theory that the current study depends on is Technology Acceptance Model (TAM). Studies of people's attitudes towards using technology in general and particularly in the field of education are built on Davis' (1989) Technology Acceptance Model (TAM). This theory models how users come to accept and use computer-based technology. TAM suggested that when users are presented with a new software package, a number of factors influence their decision about how and when they will use it. TAM states that individual's adoption of information technology depends on two main factors, which are perceived usefulness (PU) and perceived ease-of-use (PEO) of the technology.

Another theory that the study depends on is the Innovation Diffusion Theory (IDT), which was developed by Rogers (1995). This theory suggests that there are four fundamental elements that influence the spread of a new idea and the adoption of technological innovations, which are the innovation, communication channels, time, and the social system. Rogers defined innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (p. 11). However, in this current research, the innovation being studied is cloud computing applications used as learning tools by Saudi students to support collaborative learning.

Studies have been conducted to understand factors that influence people when adopting and using various forms of technology. Davis (1989) concluded that perceived usefulness had a significant and strong effect on attitude, while ease of use had a smaller, but also significant effect on attitudes towards utilizing electronic mail. Rogers (2003) conducted a study to investigate factors that affect users' attitudes towards utilizing new forms of technology. The results showed that the higher the perceived usefulness, ease of use, and compatibility of the technology, then the more positive the attitude towards using the technology. Masrom and

Hussein (2008) also conducted a study to investigate factors that influence the likelihood of users to adopt electronic collaboration technology. Findings of the study revealed that perceived ease of use of the electronic collaboration technology has a positive impact on users' attitudes. In addition, the results showed that perceived usefulness of this technology had a significant impact on the electronic collaboration technology usage. In addition, Hartshorne and Ajjan (2008) conducted a study to explore students' attitudes to adopt web 2.0 technologies. Results of the study revealed that students' attitudes to use web 2.0 technologies were influenced by perceived usefulness, ease of use, and compatibility. Another study by Shittu et al. (2011) has been conducted to understand what influences people to use emerging technology. This study revealed that perceived ease of use, perceived usefulness, and subjective norm are significant predictors of students' having positive attitudes regarding the use of social software. Also, a study by Hanan Aifan (2015) was conducted at King Abdul-Aziz University to examine Saudi students' attitudes towards adopting social media technologies to support students' learning. The study revealed that the perceived usefulness of social media for learning was the strongest predictor of the average attitudes of Saudi students towards using social media to support their learning among all of the other predictors in the model, which are perceived ease of use, subjective norm, age, and experience with Skype.

Challenges to Cloud Collaborative Learning

Although cloud computing has tremendous advantages in the educational field, it is also argued that cloud computing comes with some disadvantages. One of the challenges to adopting cloud computing is security and privacy threats. According to Sravan and Saxena (2011), some of the security threats include tampering or leakage of sensitive data on the cloud, loss of privacy, and unauthorized use of data by cloud providers. Another obstacle to cloud computing is

the selling of data by cloud providers to third parties, according to Alshwaier et al. (2012). Also, Lis and Paula (2015) concluded that a large percentage of participants disagree that the cloud ensures data stability and security. Most of it is treated as an additional storage options, but almost no one understood the clouds as being the only storage option

Additional challenges to cloud computing is the concept of being "locked-in", as cited in Alshwaier et al. (2012). As Google and Microsoft allow institutions to comingle their cloud products, there is an unavoidable risk that the closeness between the institutions and these technology companies will make the institutions products to be locked-in by specific providers. Other challenges as Tashkandi and Al-Jabri (2015) concluded are limited Internet bandwidth, communication means, and the high-cost. As cited in the study of Tashkandi and Al-Jabri (2015), one participant responded, "The issue is not with cloud computing but rather with the communication means."

Data concern is another factor that affects the adoption of cloud computing. According to Oliveria et al. (2014), data concern refers to concerns about the leakage of confidential data, unauthorized access to student and research data, and a loss of other sensitive data. Tashkandi and Al-Jabri (2015) state that, "In general data concern is considered a barrier for the adoption of cloud computing" (p.1530). Tashkandi and Al-Jabri (2015) argue that there are concerns related to the exposure of the system to the Internet, due to sharing physical resources with different customers, and the management of data by the service provider, since public cloud computing is based on sharing.

Traxler (2010) argues that another obstacle that might prevent educators from the adoption of cloud computing to enhance learning is the belief that digital technologies are more of a distraction, rather than an aid to learning. Additional obstacles to the adoption of online

technologies such as cloud applications include language. According to Al-Kahtani, Julie, & Jefferson (2006), Saudi women reported that proficiency in the English language is necessary for effective use of the Internet. They also emphasized that they need to learn specific skills associated with the use of the Internet. Also, Alaugab (2007) found that the greatest barrier to online instruction for female faculty and students at Al-Imam Muhammad Bin Saud Islamic University is the lack of use of the English language. Given that one of his study predictors was language, the findings showed that the better the students' English language skills were, the more willing they were to take courses online. Also, the findings revealed that the highest mean of barriers both Saudi female faculty and students faced was the lack of using English since most of the online technologies, the studies, and the research available on the Internet are in English. Additionally, findings of his study revealed that female students who had better English language skills, had a more positive attitude toward online instruction.

Moreover, instructors' negative attitudes toward the adoption of technology in general and in particular online applications, such as cloud applications to support students' learning, can be a major barrier. According to Greenhow et al. (2010), Tan and Libo (2009), and Warschauer (2007), although well-designed research studies support the incorporation of online applications into the teaching environments, few educators have blended online social media into their instructional planning.

However, there is benefit to studying other challenges, and their impact on the likelihood of faculty adopting cloud computing to enhance the educational experience. For example, there are cultural, gender, and/or religious factors, especially in conservative societies such as Saudi Arabia, which need more investigation in order to understand these challenges, overcome such obstacles, and improve students' learning.

Educational System in Saudi Arabia

Saudi's educational policy purpose is to support education in general and higher education, particularly in order to ensure that education meets the religious, economic, and social needs of the country as well as to eliminate illiteracy among Saudi adults (Saudi Cultural Mission to the United States of America (2015). The Ministry of Education sets fundamental standards for the educational system for both public and private schools and oversees special education for handicapped. Also, the Ministry of Education took over the functions of the General Presidency for Girls' Education in 2003. It administers the girls' schools and colleges, supervises kindergartens and nursery schools, and sponsors literacy programs for females. In 1975, the Ministry of Higher Education was established to implement Saudi Arabia's higher education policy in the rapidly expanding sphere of post-secondary education. Prior to 1975, higher education was under the supervision and administration of the Ministry of Education. In the same year, part of the Ministry of Education become a separate entity and was renamed the Ministry of Higher Education with the purpose of dealing exclusively with higher education according to the Ministry of Higher Education. In 1980, The General Organization for Technical Education and Vocational Training (GOTEVT) was established to coordinate and implement Saudi Arabia's manpower development plans and supervise all related training centers and institutes.

Over the last five decades, higher education in Saudi Arabia has undergone significant improvements. According to the Ministry of Higher Education (2014), higher education has expanded to include the following: 24 government universities, 18 primary teachers' colleges for men, 80 primary teacher's colleges for women, 37 colleges and institutes for health, 12 technical colleges, and 29 private colleges and universities.

The Ministry of Higher Education supervises the execution of Saudi Arabia‘s policy in the field of higher education, and it supervises the universities through a University Council. In Saudi education, most universities accept both males and females except the University of Petroleum and Minerals and the Islamic University; these two universities admit men only. All subjects are taught in Arabic except in the technological and science fields, where English is used as the medium of instruction. Stages of higher education at the Saudi universities include offering Bachelor’s, Master’s, and PhD degrees. 24 government universities in addition to the other 24 private universities and colleges are distributed in all regions of Saudi Arabia.

Universities in Saudi Arabia

Over the last five years, the number of participants in Saudi universities has increased. According to the Higher Education Statistic Centre (2016), government universities have 65,404 faculty members and 1,308,899 students. One of these universities is King Abdul-Aziz University that breaks down as follows: 412 professors, 852 associate professors, 2,037 assistant professors, 1,026 lecturers, 2,426 teaching assistants, 275 teachers, and 44 other staff. The total number of faculty members at King Abdul-Aziz University is 8,115, while the total number of students studying there is 200.000 male and female student (Higher Education Statistic Centre, 2017). King Abdul-Aziz University at Jeddah (Table 1) shows a summary of King Abdul-Aziz University information.

***T**able 1: A Summary of King Abdul-Aziz University Information*

Location	Jeddah City, Saudi Arabia
Year of Establishment	1972
Number of Colleges	30
Number of Students	200.000
Number of Faculty Members	8,115
Number of Agencies	6
Number of Deanships	9
Number of Research Institutes and Centers	9
Number of Supported Research Centers	4

Number of Research Chairs	29
Number of Associations	28
Number of Journals	10

Source: Higher Education Statistic Centre (2016)

King Abdul-Aziz University involves 24 colleges, 15 of them on campus and 9 off campus.

These colleges include:

Table 2: Colleges at King Abdul-Aziz University

College of Arts and Human Sciences	Jeddah Community College
College of Meteorology and Environment	College of Medicine at Rabigh
College of Economic and Administration	College of Engineering at Rabigh
College of Home Economics	College of Arts and Humanities
College of Applied Medical Sciences	College of Engineering Studies Girls' Branch
College of Business at Rabigh	College of Computer and Information Technology
College of Earth Sciences	College of Medicine
College of Education at King Abdul-Aziz University	College of Marine Sciences
College of Pharmacy	Girls' College of Sciences
College of Medical Sciences	College of Marine Sciences
College of Dentistry	College of Pharmacy
College of Arts and Design	
College of Environmental Design	

Electronic Learning in King Abdul-Aziz University

Several projects have been established by the Saudi Ministry of Higher Education to foster a more perfect system of E-learning among Saudi universities. According to the University of King Abdul-Aziz (2015), the Deanship of Electronic Learning and Distance Education has developed several electronic services that facilitate electronic learning. One of the electronic services that the Deanship of Electronic learning and Distance Education provides is the CENTRA system. The CENTRA system is a tool that assists in providing lectures online via the Internet. This system consists of virtual smart classrooms that provide important components of interaction between both learners and instructors. The CENTRA system is considered one of the many different techniques in distant, open, and interactive learning according to the Deanship for

E-learning and Distance Education, Projects, 2014. The CENTRA system also facilitates dual and multiple connections among students and instructors., vocal and visual tools to facilitate direct interaction, has recording tools for assessments and evaluations, live virtual classes, real-time interaction, blended learning, rich multimedia, application sharing, voice-over IP, teleconferencing and videos, global and multi-lingual support, and live electronic meetings according to the Deanship of Electronic Learning and Distance Education at King Abdul Aziz University (2014).

Another service is the Electronic Management Education System (EMES). EMES is an electronic system that manages the distant learning process. It aims to facilitate interaction between students and instructors. According to King Abdul-Aziz University, Deanship of Electronic Learning and Distance Education (2014), the EMES system can be improved continuously, it is provided in Arabic, is easy to use, provides communication tools between the students and the instructors, has assessment methods, uses new technologies as educational tools, and enables instructors to manage and monitor the learning process.

The Learning Management System (Blackboard) is another system used at King Abdul-Aziz University. According to the Deanship of Electronic Learning and Distance Education (2014), the Learning Management System (Blackboard) is an integrated e-learning solution that supports the learning process through a combination of synchronous and a-synchronous online instructions and communication. Instructors carry out the courses and lectures via multimedia usage (text, images, audio, video, or animation) using Blackboard. Students come together to browse through the content on a secure site according to their needs. Students also are free to communicate with each other without restriction of time and place via the various communication tools (e-mail, forums, etc.), or via the virtual classes that can be operated from

any smart device (Deanship for E-learning and Distance Education, Learning Management System, 2014).

Chapter Summary

Chapter 2 provides a review of related literature to cloud computing and learning. The researcher accordingly connected the previous studies that have been conducted and related them to the current study. Also, the researcher organized all topics and subtopics in order to be compatible with the purpose of this study and the research instrument variables. Additionally, to provide a better understanding of the use of cloud computing in education, the researcher described details related to cloud computing and learning, such as the cloud computing definition and examples, collaborative learning, advantages of cloud computing in learning, factors affecting cloud collaborative learning, and challenges to the adoption of cloud computing in learning. Chapter 3 describes the research procedures that were completed in order to design a reliable instrument for the current study, and the statistical procedures used to analyze the collected data.

Chapter 3

Methodology

Introduction:

The purpose of the current study is to investigate factors, challenges, and attitudes of Saudi students towards using cloud computing applications to support collaborative learning. The following describes the research procedures that are used to design a reliable instrument for this study, and the statistical procedures used to analyze the collected data. Informative descriptions of these procedures are explained in the following sections:

Research Design

Research Questions

Research Hypotheses

Description of the Variables

Research Procedures

Data Collection Procedures

Research Sampling

Data Analysis

Research Design

In this study, a quantitative method research design is used to investigate factors, challenges, and attitudes of Saudi students towards using cloud computing applications to support collaborative learning. A survey of questions were designed to measure the adoption of cloud collaborative learning and its effects of learning in higher education in Saudi Arabia.

Research Questions

1. Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?
2. Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?
3. What are Saudi students' attitudes towards adopting cloud collaborative learning?
4. Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?
5. What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?
6. Do variables such as age, gender, and academic major affect students' attitudes towards adoption of cloud collaborative learning?

Hypotheses of the Research

H1: Saudi students at King Abdul-Aziz University utilize cloud computing applications for learning.

H2: Saudi students at King Abdul-Aziz University are learning collaboratively with their classmates.

H3: Saudi students have positive attitudes toward cloud collaborative learning.

H4: There is a relationship between perceived usefulness of cloud computing applications to support collaborative learning and students' attitudes.

H5: There are some difficulties that students encounter when they are utilizing cloud computing applications to support collaborative learning.

H6: Variables such as age, gender, and major are related to students' attitudes toward adoption of cloud collaborative learning.

Description of the Study Variables

This study has several variables that can be described as independent variables or dependent variables. These variables can be illustrated as follows:

Dependent Variables (DVs).

The dependent variables of the study that were derived from the research questions are described as follows:

1. Attitudes of Saudi students toward cloud collaborative learning (DV1)

Independent Variables (IVs).

The independent variables of the study that were derived from the research questions are demographic variables and other variables described as the following:

1. Perceived Usefulness of cloud computing applications (IV1)
2. Students' age (IV2)
3. Students' gender (IV3)
4. Students' academic major (IV4) (See Table 3)

Table 3. Description of the Study Variables

Hs	**IVs**	**DVs**
H4	Perceived Usefulness (IV1)	Attitudes (DV1)
H6	Age (IV2) Gender (IV3) Major (IV4)	Attitudes

Research Procedures

Data Collection Procedures

This study examines factors, challenges, and attitudes of Saudi students, at King Abdul-Aziz University, towards using cloud computing applications to support collaborative learning. The researcher sent a request to the Institutional Review Board (IRB) at the University of Kansas to get their approval to start conducting the study, and to begin collecting the research data. After reviewing the study applications, the IRB issued the approval to start collecting the data. After getting the IRB approvals at the University of Kansas, the researcher will get King Abdul-Aziz University permission to conduct the study. Then, an electronic survey will be used to collect the data from the random sample of students. A consent form will be also attached to the questionnaire to inform the participants that their information and responses will be confidential. An email having the questionnaire link and the consent form will be sent to Saudi instructors at King Abdul-Aziz University asking them to forward it to their students using their students' email. The students' electronic questionnaire will take approximately 15-20 minutes to be completed. This survey consists of seven parts containing several items under each part measuring Saudi students' attitudes towards using cloud computing to support collaborative learning.

Back-Translation Technique

A back-translation can be defined as the translation of a target document *back* to the original source language. According to Chapman and Carter (1979) and Brislin (1970), back-translation is the most common and highly recommended procedure for translating especially in cross- cultural use of measurements. Back-translation is the process of translating a document or

survey items that have already been translated into a foreign language (e.g., Arabic) back to the original language (e.g. English). It is recommended that it is done by an independent translator. The back-translation technique includes translating from the target language (e.g., Arabic) back to the source language (e.g., English), so that the equivalence between the source and target versions can be evaluated.

Research Sampling

Participants of the study are graduate and undergraduate students (male and female) at King Abdul-Aziz University majoring in different departments and working in different academic levels (Bachelor's, Master's, and/or PhD). The number of participants in this study is N = 306 (168 male students, and 138 female students). The total number of the students at King Abdul-Aziz University is 200,000 according to Saudi Higher Education Statistical Centre (2017).

Instrumentation

The main instrument in the current study is the students' electronic survey. This survey aims to examine attitudes of Saudi students towards using cloud computing applications to support their collaborative learning.

In this survey, two types of questions were used, which are closed-ended questions and open-ended questions. Likert scale responses were used in most items to rate on a five-point Likert scale, the extent to which students agree or disagree with each item statement in the survey. Some of the items of the survey were developed by the researcher according to the instructors' and the students' responses to the interviews at King Abdul-Aziz University; other items were adapted from previous studies but modified to fit the model of this study. The

questionnaire packet was expected to take approximately 15-20 minutes for the participants to complete. The survey consisted of 63 items split into seven separate parts.

The following are the survey sections:

Part I: Usage of Cloud Computing by Students.

The first part of the survey consists of six questions (A, B, C, D, E, & F) involving 22 items as follows:

Question A: was created to collect information about students' learning styles.

Question B: was designed to collect information about whether students are using cloud computing applications or not.

Question C: was designed to collect information about purposes for which students are using cloud computing applications. This question was designed from the most common purposes for which students use cloud applications as mentioned in the previous studies. It consists of seven items answered on a five- point Likert scale, which are: 5 = always, 4 = often, 3 = sometimes, 2 = rarely, and 1 = never.

Question D: was created to examine how often students use some of each type of cloud computing application; such as Gmail, Google Drive, Google Docs, Google Slide, Google Sheet, Google Hangout, YouTube, and Google Form. It consists of nine items answered on a five-point Likert scale, which are: 5 = always, 4 = often, 3 = sometimes, 2 = rarely, and 1 = never.

Question E: was designed to ask the participants if they use other applications not mentioned in question D.

Question F: was created to collect information about how often students use each type of electronic device (personal computer, Tablet, Smartphone) in learning. It consists of three items

answered on a five-point Likert scale, which are: 5 = always, 4 = often, 3 = sometimes, 2 = rarely, and 1 = never.

Part II: Learning Through Using Collaborative Learning Strategy

The second part of the survey consists of three questions (A, B, & C) involving 11 items, as follows:

Question A: was designed to collect information about students' attitudes toward utilizing collaborative strategy in their learning. It involves five items answered on a five-point Likert scale {5 = SA (Strongly Agree), 4 = A (Agree), 3 = N (Neutral), 2 = D (Disagree), 1 = SD (Strongly Disagree)}. Items of this question were adapted from Masrom and Hussein's (2008) book on User Acceptance of Information Technology. The items were modified for the study. Items of this part were also adapted from Davis's (1993) published article on user acceptance of information technology: system characteristics, users' perception, and behavioral impact.

Question B: was created to collect information about actual practice of collaborative strategy in students' learning. It contains five items answered on a five-point Likert scale, which are: 5 = always, 4 = often, 3 = sometimes, 2 = rarely, and 1 = never.

Question C: was designed to collect information about the most important skills supported by collaborative learning. It involves this one item.

Part III: Attitudes of Using Cloud Computing Applications to Support Collaborative Learning

The third part of the survey consists of one question involving 6 items measuring students' attitudes toward utilizing cloud applications to support their collaborative learning answered on a five-point Likert scale {5 = SA (Strongly Agree), 4 = A (Agree), 3 = N (Neutral), 2 = D (Disagree), 1 = SD (Strongly Disagree)}.

Part IV: Perceived Usefulness of Cloud Computing Applications

This part of the survey involves one question measuring possible advantages of cloud applications by students. The question involves 8 items answered on a five-point Likert scale {5 = SA (Strongly Agree), 4 = A (Agree), 3 = N (Neutral), 2 = D (Disagree), 1 = SD (Strongly Disagree)}.

Part V: Challenges to Use Cloud Computing Applications in Learning

The fifth part of the survey contains one question involving 8 items answered on a five-point Likert scale {5 = SA (Strongly Agree), 4 = A (Agree), 3 = N (Neutral), 2 = D (Disagree), 1 = SD (Strongly Disagree)}. These items are measuring obstacles that the students encounter when utilizing cloud computing applications. Items on this question were designed according to the most common obstacles mentioned in the previous studies.

Part VI: Demographic Information

The sixth part of the survey consists of 6 questions asking about students' majors, academic degree, age, gender, GPA, and the university.

Part VII: Open Ended Questions

The last part of the survey was an open-ended question asking if the participants have other comments or suggestions.

Validity and Reliability

Validity

Validity is the extent to which the instrument measures what it is intended to measure (Frey, 2006, p. 136). So, if the test measures what is supposed to measure it is valid. Items of the survey of the current study were developed based on content validity. One of validity types is content validity. According to DeVellis (2003), measuring beliefs or attitudes can be examined

for content validity by having items reviewed by experts for relevance to the domain of interest. Frey (2006) defines content validity as the extent to which a specific set of items reflects a content domain. Items of the current study were developed according to content validity. To obtain content validity for the instrument of the current study, experts in research and survey design reviewed the survey items of the current study. Those experts had majors in Educational Leadership and Policy Studies, Educational Technology, and Psychology and Research in Education departments. The experts reviewed a pool of survey items to determine if they were relevant to the purpose of the study. After reviewing the survey, the experts provided the researcher with their feedback and suggestions. Accordingly, the researcher revised some of the survey items, removed, and /or kept other items or sections according to the experts' suggestions.

Reliability

The term *reliability* refers to if scores for items on an instrument are internally consistent, if they are stable over time, and if there is consistency in test administration and scoring (Creswell, 2009, p. 233). For the current study, Cronbach's Alpha will be computed to insure that the instruments are reliable and have internal consistency. Cronbach's Alpha will be calculated for four dimensions: students' attitudes toward adopting collaborative learning in classroom, students' attitudes toward adopting cloud applications to support collaborative learning, perceived usefulness of cloud applications, and challenges to the use of cloud applications. Using SPSS, the Cronbach's Alpha coefficient for students' attitudes toward adopting collaborative learning in classroom was .891; for students' attitudes toward adopting cloud applications to support collaborative learning it was .873; for the perceived usefulness it was .898; and for the challenges to use cloud applications it was .763. Thus, the researcher will make modifications and revisions according to the results of the reliability analysis of the four

dimensions. Also, as a five-point Likert scale was used for several parts of the instrument, and it ranged from Strongly Agree = 5 to Strongly Disagree = 1. This means that the higher the score, the more positive attitude that the students hold towards using cloud computing applications to support their learning. On the other hand, the lower the score indicates less positive attitudes that students have towards using cloud applications to support their collaborative learning.

Data Analysis

In this study, the research questions will be examined and hypotheses will be analyzed using various statistical methods based on the type of data being analyzed. The Statistical Package for Social Science (SPSS) program will be used to analyze the data according to the proposed questions and hypotheses of this study. All analysis of the study will be conducted using $p < .05$ as the level of statistical significance. According to the research questions, different statistical tests will be used in order to analyze the data. The following discusses how the research questions will be analyzed.

Research Questions Review

1. Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?
2. Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?
3. What are Saudi students' attitudes toward adopting cloud collaborative learning?
4. Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?
5. What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?

6. Do variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning?

*Question 1 & 2***:** these questions attempt to examine if the participants are using cloud computing applications, and if they are learning collaboratively with their classmates. A single simple *t* test will be computed to analyze these two questions. This type of analysis provides information about the frequencies, variance, and percentage of respondents per category.

Question 3: this question attempts to identify students' attitudes towards adopting cloud collaborative learning. A descriptive statistic will be used to analyze this question. This type of analysis provides information about the mean, standard deviation, the frequencies, variance, and percentage of respondents per category.

Question 4: this question attempts to examine the relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes. A person correlation coefficient analysis will be used to examine if there is a relationship between perceived usefulness of cloud computing apps and students' attitudes.

Question 5: this question attempts to identify the challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning. A descriptive statistic will be used to analyze this question. This type of analysis provides information about the mean, standard deviation, the frequencies, variance, and percentage of respondents per category

Question 6: this question attempts to identify if variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning. A linear regression will be used to examine if there are relationships among independent variables

(age, gender, major) and the dependent variable (students' attitudes towards using cloud computing to support collaborative learning).

Chapter Summary

In this chapter, the researcher explained in detail the research methodology. It provides information regarding the study design which examines the attitudes of Saudi students at King Abdul-Aziz University towards using cloud computing applications to support their collaborative learning. The chapter also discussed the research design, research questions, research hypotheses, study settings, procedures of data collection, description of the study variables, participants of the study, instrumentation, validity and reliability, and data analysis. However, Chapter 4 will provide the findings of the statistical analyses that have been conducted for each one of the research questions.

Chapter 4

Results

Introduction

The purpose of this study was to investigate Saudi students' attitudes towards adopting cloud computing applications to support their collaborative learning at King Abdul-Aziz University, which is in Jeddah, Saudi Arabia. This chapter presents and discusses the statistical analyses of the collected data. This chapter also discusses the descriptions of population and sampling, descriptive statistics of the data, research question results, results of the open-ended question, additional findings of the study, and the chapter summary.

Description of Population and Sampling

The participants of this study were both Saudi male and female students at King Abdul-Aziz University. The study was conducted the last week of August 2018 through September 2018. A total of 5,000 emails along with the consent letter form, and the electronic survey link were sent to faculty at King Abdul-Aziz University asking them to forward the email (having the consent letter, and the survey link) to their students. The actual size of the sample was three hundred and six participants (N = 306) selected from all of the university campuses whether male or female. The number of males was 168 while the number of female participants was 138 in the sample (See Table 4).

Table 4. Number of Participants Based on Gender

Gender	Frequency	Percent
Male	168	54.9
Female	138	45.1
Total	306	100

Research Questions

The current study is designed to investigate Saudi students' attitudes towards adopting cloud computing applications to support their collaborative learning. It aims to examine students' attitudes towards collaborative learning. In addition, factors that affect students' attitudes towards adopting cloud collaborative learning is another aim of the study. Also, challenges that might prevent the students from adopting cloud applications to support their collaborative learning is additional aim of the current study.

The data of the study was collected using an Arabic version of the electronic survey, which was distributed using Google Forms. A total of 306 students participated in this study (168 Male, and 138 Female). The research questions and hypotheses were analyzed using different statistical methods.

The statistical package for Social Science (SPSS) software version 20 was used to analyze the data in this study, and all of the analyses conducted using $p<.05$ as a level of statistical significance. Six research questions were in the study which are:

1. Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?
2. Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?
3. What are Saudi students' attitudes towards adopting cloud collaborative learning?
4. Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?
5. What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?

6. Do variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning?

Reliability Analyses

Cronbach's Alpha was calculated for the current study to evaluate the survey reliability and measure the consistency of scores across items. There were four dimensions in the study: attitudes of students towards adopting collaborative learning; attitudes of students towards adopting cloud computing applications to support their collaborative learning; perceived usefulness of cloud applications to support collaborative learning; and challenges to adopt cloud collaborative learning. The Cronbach's Alpha coefficient for the first dimension "attitudes of students toward adopting collaborative learning" was .891, for the second dimension "attitudes of students toward adopting cloud computing applications to support their collaborative learning" was .873; for the third dimension "perceived usefulness" it was .898; and for the last dimension "challenges to use cloud applications" it was .763. The Cronbach's Alpha coefficient values for each of the four dimensions were high, which indicates that there is adequate consistency among the survey items in each section (See Table 5).

Table 5. Calculated Cronbach's Alpha Coefficients for the Four Dimensions

Scales	**N of items**	**Cronbach's Alpha**
1. Attitudes towards collaborative learning	5	.891
2. Attitudes towards adopting cloud computing applications	6	.873
3. Perceived usefulness	8	.898
4. Challenges to use cloud applications	8	.763

In the survey, a five-point Likert scale was used for this instrument as follows: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. Participants'

responses were coded on this scale for the four dimensions: students' attitudes to adopt collaborative learning; students' attitudes towards adopting cloud applications; perceived usefulness; and challenges to adopt cloud collaborative learning. However, items1, 2, 3, 4, and 8 were reverse coded in the last dimension which is challenges to adopt cloud collaborative learning.

Demographic Description

In this section, the participants' demographic information will be described in details. This information includes: participants' gender, age, major, GPA, academic degree, and devices they use.

Participants' Gender

Participants in this study were Saudi male and female students at King Abdul-Aziz University, Jeddah. As shown in Table 4, there were 306 participants in this study, 168 of them male (54.9%) and 138 were female students (45.1%).

Participants' Ages

Participants' ages ranged from 18 to 60 years old. The statistical analyses showed that the average age is 23.73 (SD = 5.97). Due to the large variance in the participants' age, ages were recoded into six groups 18-20 years old, 21-25 years old, 26-30 years old, 31-35 years old, 36-40 years old, and 41 and above. As shown in Table 6, the most common age group was 21-25 years old. On the other hand, the least common age group was 36 years old and above.

Table 6. Participants' Age by Groups

Age group	Frequency	Percentage
18 – 20	100	32.67 %
21-25	144	47.05 %
26- 30	24	7.84 %
31-35	22	7.18 %
36-above	16	5.22 %

Total	**306**	**100 %**

Participants' Major

Participants were found to be in two main academic majors, which was either scientific or human studies majors. As demonstrated in Table 7, the results show that 202 of the students were majoring in scientific majors (66%), while 104 of the participants were majoring in human studies (34%).

Table 7. Participants' Majors

Major	**N**	**Percent**
Scientific Majors	202	66%
Human Studies	104	34%
Total	306	100%

Participants' Academic Degree

The results show that 220 students are working on their Bachelor's (71.9%), 60 of the participants are working on their Master's (19.6%), 24 of the participants are PhD students (7.8%), and 2 of the participants are working on their Diploma (.7%). See Table 8.

Table 8. Participants' Academic Degree

Academic Degree	N	Percent
Diploma	2	.7%
Bachelor's	220	71.9%
Master's	60	19.6%
PhD	24	7.8%
Total	306	100%

Used Devices by Participants

Participants were asked to rate their frequency of usage of laptops, tablets, or/and smart phones. For the laptops, the majority of the students,188 of the participants, reported that they

always use their laptop (61.4%), 58 of the participants reported that they rarely use it (19%), 50 students reported that they sometimes use it (16.3), and 10 of the participants reported that they often use their laptop (3.3%). See Table 9.

Table 9. Participants' Usage of Laptops

Frequency	**N**	**Percent**
Always	188	61.4%
Often	10	3.3%
Sometimes	50	16.3%
Rarely	58	19.0%
Never	0	0.0%
Total	306	100%

For the tablets, 76 of the participants reported that they rarely use their tablets (24.8%), 72 of the participants reported that they always use their tablets (23.5%), 62 students reported that they never use their tablets (20.3%), 48 of the participants reported that they sometimes use their tablets (15.7%), and 48 of the participants reported that they often use their tablets (15.7%) (see Table 10).

Table 10. Participants' Usage of Tablets

Frequency	**N**	**Percent**
Always	72	23.5%
Often	48	15.7%
Sometimes	48	15.7%
Rarely	76	24.8%
Never	62	20.3%
Total	**306**	**100 %**

For using smartphones, 234 of the participants reported that they always use their smartphones (76.5%), 40 of the participants reported that they often use their smartphones (13.1%), 18 of the students reported that they sometimes use their smartphones (5.9%), 10 of the

participants reported that they rarely use their smartphones (3.3%), and 4 participants reported that they never use their smartphones (1.3%). See Table 11.

Table 11. Participants' Usage of Smartphones

Frequency	N	Percent
Always	234	76.5%
Often	40	13.11%
Sometimes	18	5.9%
Rarely	10	3.3%
Never	4	1.3%
Total	306	100%

Findings of Research Questions

Research questions were analyzed and discussed in details in this section using different statistical tests and methods.

Research Question One

Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?

The first question was designed to collect data about Saudi students' utilization of cloud computing applications for their learning. Participants were asked whether they are using cloud computing applications for their learning or not. As shown in Table 12, the findings revealed that 184 of the participants (60.1%) are using cloud computing applications for their learning, while 122 of the participants (39.9%) reported that they do not use cloud applications for their learning.

Table 12. Using Cloud Applications for Learning

Using Cloud Applications for Learning	N	Percent
Yes	184	60.1%
No	122	39.9%
Total	306	100%

Research Question Two

Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?

The second question was aiming to collect data regarding whether Saudi students are learning collaboratively with their classmates or not. Students were asked to choose among three options of learning styles: 1 = collaboratively, 2 = individually, 3 = mixed between individual and collaborative learning.

The findings show that the majority of the participants (69.9%) prefer the learning style that mixes between collaborative and individual learning style. Also, 17.6% of the participants prefer learning collaboratively with their classmates. However, 12.4% of the participants prefer individual learning (See Table 13).

Table 13. Learning Styles Preferred by Students

Learning Style	N	Percent
Collaborative	54	17.6%
Individual	38	12.4%
Mixed	214	69.9%
Total	306	100%

Also, participants were asked to rate their agreement to five statements measuring whether they learn collaboratively with their classmates or not. The findings show that students agree that they are practicing and working collaboratively with their classmates (M = 3.47, SD = .799). As shown in Table 14, the most frequently mentioned were items number 2, “I collaborate with my friends out of the classroom to accomplish some study duties” (M = 3.88, SD = .998); item number 1, “I have done some of my assignment and project while working with my classmates” (M = 3. 76, SD = .94); item number 5, “My professors encourage me and my friends

to study in groups collaboratively" (M = 3.39, SD = 1.15), and item number 4, "My instructors apply collaborative learning strategies in my classes." (M = 3.30, SD = 1.07).

Table 14. Means and Standard Deviation of Students Practices with Collaborative Learning with Classmates

Statement	**M**	**SD**
1. I have done some of my assignment and project while working with my classmates	3.76	.94
2. I collaborate with my friends out classroom to accomplish some study duties	3.88	.998
3. I encourage my friends to study collaboratively	3.03	1.34
4. My instructors apply collaborative learning strategies in my classes	3.30	1.07
5. My professors encourage me and my friends to study in groups collaboratively.	3.39	1.15
Average	**3.47**	**.799**

Additionally, participants were asked to rate their degree of agreement by responding to five items determining their attitudes. Participants' responses were measured using a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. A high score indicates the more positive attitudes that the students hold towards collaborative learning, and a low score indicates a less positive attitudes that the participants hold. The overall attitude of Saudi students at King Abdul-Aziz University towards learning collaboratively with classmates was positive with a mean of = 4.07, and standard deviation of = .78.

As shown in Table 15, the most frequently mentioned attitudes were items number 1,3,4,5 and 2 respectively. These were some of the findings: "**C**ollaborative learning has many educational benefits." (M = 4.34, SD = .774), "Collaborative learning helps me understand the subject material more." (M = 4.16, SD = .93), "Students need to learn collaboratively." (M = 4.05, SD = .89), "Collaborative learning increases my academic achievement." (M = 3.97, SD = .99), and "I would like to study with my colleagues." (M = 3.80, SD = 1.01).

Table 15. Means and Standard Deviation of Students' Attitudes Towards Collaborative Learning

Statement	Mean	SD
1. Collaborative learning has many educational benefits	4.34	.774
2. I would like to study with my colleagues	3.80	1.01
3. Collaborative learning helps me understand the subject material more	4.16	.93
4. Students need to learn collaboratively	4.05	.89
5. Collaborative learning increases my academic achievement	3.97	.99
Average	**4.07**	**.78**

Research Question Three

What are Saudi students' attitudes toward adopting cloud collaborative learning?

The third question was designed to explore Saudi students' attitudes toward adopting cloud applications to support their collaborative learning. Students were asked to rate their degree of agreement by responding to six items determining their attitudes. Participants' responses were measured using a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. A high score indicates the more positive attitudes that the students hold toward using cloud applications to support learning, and a low score indicates the least positive attitudes that the participants hold. The overall attitude of Saudi students at King Abdul-Aziz University toward using cloud computing applications to support their collaborative learning was positive with a mean M = 3.96 (SD =.77).

As shown in Table 16, the most frequently mentioned attitudes were items number 4, 1, 2, 5, 3 and 6 respectively. Here are some of the findings: "In my opinion, using cloud computing applications to support collaborative learning is a good idea" (M = 4.17, SD = .84); "I like to use cloud computing applications for collaborative learning purposes" (Mean = 4.14, SD = .85); "Cloud computing applications are important tools to support collaborative learning" (M = 4.12, SD = .92); "I like to engage myself with my classmates in collaborative projects using cloud

computing applications" (M = 3.96, SD = 96); and "I found learning collaboratively by using cloud computing applications is enjoyable" (M = 3.88, SD = 1.01). However, the lowest frequently mentioned attitude was, "Once I started using cloud computing applications to support my collaborative learning, I found it difficult to stop." (M = 3.50, SD = 1.24).

Table 16. Means and Standard Deviation of Students' Attitudes Towards Using Cloud Computing Applications to Support Collaborative Learning

Statement	Mean	SD
1. I like to use cloud computing applications for collaborative learning purposes.	4.14	.85
2. Cloud computing applications are important tools to support collaborative learning.	4.12	.92
3. I found learning collaboratively by using cloud computing applications is enjoyable	3.88	1.01
4. In my opinion, using cloud computing applications to support collaborative learning is a good idea.	4.17	.84
5. I like to engage myself with my classmates in collaborative projects using cloud computing applications.	3.96	.96
6. Once I started using cloud computing applications to support my collaborative learning, I found it difficult to stop.	3.50	1.24
Average	**3.96**	**.77**

The scale was: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Research Question Four

Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?

The fourth research question of this study examines if there is a relationship between perceived usefulness of cloud computing applications and students' attitudes toward cloud collaborative learning. To analyze this question, a Pearson Correlation Coefficient Analysis was conducted.

As shown in Table 16, the correlation between the overall attitudes (M = 3.96, SD = .77) of Saudi students at King Abdul-Aziz University and perceived usefulness of cloud applications

in collaborative learning (M = 4.09, SD = .68) is significant, r (306) = .774, p = .00. Therefore, there is a significant relationship between the overall attitudes of the students and perceived usefulness of cloud application to support collaborative learning at $p < .05$.

Table 17. Correlation between Students' Attitudes Towards Cloud Collaborative Learning and Perceived Usefulness of Cloud Applications

		Perceived Usefulness	Students' Attitudes
Students' Attitudes	Pearson Correlation	.774**	1
	Sig. (2-tailed)	.000	
	N	306	
Perceived Usefulness	Pearson Correlation	1	.774**
	Sig. (2-tailed)		.000
	N		306

Note: **Correlation is significant at the 0.01 level (2-tailed)

However, participants were asked to rate their degree of agreement by responding to eight items determining the perceived usefulness of cloud applications to support collaborative learning. Participants' responses were measured using a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. A high score indicates more perceived usefulness of cloud applications by students to support collaborative learning, and a low score indicates lower perceived usefulness of cloud applications to support collaborative learning by the participants. The overall perceived usefulness of cloud applications to support collaborative learning by students was positive with mean = 4.08, SD = .68.

As shown in Table 18, the most frequently mention perceived usefulness of cloud applications were item numbers 1, 4, 8, 2, 5, 6, 7, and 3 respectively. Here are some of the findings: "My assignments and projects would be easy to perform with cloud computing applications." (M = 4.25, SD = .84); "Using cloud computing applications saves my time and

effort" (M = 4.17, SD = .94); "Overall, I found cloud computing applications to be a useful tool in collaborative learning" (M = 4.12, SD = .87); "Using cloud computing applications gives me greater control over my work" (M = 4.10, SD = .85); "Using cloud computing applications enhances my collaborative learning skills" (M = 4.07, SD = .87); "Using cloud computing applications improves the quality of the work l do" (M = 4.07, SD = .87); "Using cloud computing applications increases my work team productivity" (M = 4.05, SD = .91); and "Using cloud computing applications improves my performance" (M = 3.87, SD = .95).

Table 18. Perceived Usefulness of Cloud Applications by Students to Support Collaborative Learning.

Statements	**Mean**	**SD**
1. My assignments and projects would be easy to perform with cloud computing applications	4.25	.84
2. Using cloud computing applications gives me greater control over my work.	4.10	.85
3. Using cloud computing applications improves my performance.	3.87	.95
4. Using cloud computing applications saves my time and efforts.	4.17	.94
5. Using cloud computing applications enhances my collaborative learning skills.	4.07	.87
6. Using cloud computing applications improves the quality of the work l do.	4.07	.87
7. Using cloud computing applications increases my work team productivity.	4.05	.91
8. Overall, I found cloud computing applications a useful tool in collaborative learning.	4.12	.87
Average	**4.08**	**.68**

Research Question Five

What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?

The fifth question of this study was designed to investigate the challenges that might

affect attitudes of Saudi students at King Abdul-Aziz University towards adopting cloud collaborative learning. Participants were asked to rate their degree of agreement with eight statements. Participants' responses were measured using a five-point Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. However, items 1,2,3,4, and 8 were reverse coded.
A high score indicates the factor is considered an obstacle for Saudi students at King Abdul-Aziz University to adopt cloud applications to support collaborative learning, and a low score indicates the factor is not an obstacle for Saudi students at King Abdul-Aziz University to adopt cloud applications to support collaborative learning.

Descriptive statistics were computed to analyze this question by calculating the means of the items and standard deviations to report the students' responses. The overall challenges that Saudi students at King Abdul-Aziz University faced in using cloud applications to support collaborative learning were positive and moderate (M = 2.82, SD = .55).

As shown in Table 19, the most frequently mentioned challenge were items 7, 6, 5, and 3 (loss of data, privacy concerns, security issues, and training programs provided by the university). Here are some of the findings: "I am concerned about losing my data when I use cloud computing applications" (M = 3.86, SD = 1.01); "I am concerned about privacy problems related to using cloud computing applications" (M = 3.64, SD = 1.22); "I am concerned about security problems related to using cloud computing applications" (M = 3.47, SD = 1.19); and "I get enough training in the university about how to use cloud computing applications in learning" (M = 2.87, SD = 1.30).

For item 7, 104 0f the participants (34%) agree that they are concerned about losing data when they use cloud computing applications. For item 6, 94 of the participants (30.7%) strongly

agree that they are concerned about privacy problems related to using cloud computing applications. For item 5, 95 of the participants (31%) agree that they are concerned about security problems regarding using cloud computing applications. And for item 3, 82 of the participants were neutral, and 70 participants (22%) reported that they disagree that they get enough training in the university about how to use cloud computing applications in learning. However, the lowest frequently mentioned challenges reported by the students were items 4, 8, 1, and 2 respectively. Here are some of the findings: "I use cloud computing applications because the internet is affordable" (M = 1.97, SD = .99); "I can understand cloud computing applications that use the English language." (M = 2.07, SD = 1.10); "My instructors encourage students to study collaboratively by using cloud applications." (M = 2.31, SD = 1.11); and "My instructors use cloud computing applications in their teaching" (M = 2.39, SD = 1.12) (See Table 19).

For item 4, 118 of the participants (38.6%) strongly agree that they use cloud computing applications because the internet is affordable. For item 8, 114 of the participants (37.3%) strongly agree that they can understand cloud computing applications that are in English. For item 1, 114 of the participants agree that their instructors encourage students to study collaboratively using cloud applications. And for item 2, 106 of the participants (34.6%) agree that their instructors use cloud computing applications in their teaching.

Table 19. Means and Standard Deviation of Challenges to Adopt Cloud Collaborative Learning by Students

Statement	**Mean**	**SD**
1. My instructors encourages students to study collaboratively.	2.31	1.11
2. My instructor uses cloud computing Applications in their teaching.	2.39	1.12
3. I get enough training in the university about how to use cloud computing applications in learning.	2.87	1.30
4. I use cloud computing applications because the internet is affordable	1.97	.99
5. I am concerned about security problems related to using cloud computing applications.	3.47	1.19

6. I am concerned about privacy problems related to using cloud computing applications.	3.64	1.22
7. I am concerned about losing my data when I use cloud computing applications.	3.86	1.01
8. I can understand cloud computing applications that use the English language.	2.07	1.10
Average	**2.82**	**.55**

Research Question Six

Do variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning?

The last question of this study was designed to examine if variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning. Participants were asked to type their age, mention their gender, and select among two majors (scientific or Human studies majors).

Descriptive statistics were used to analyze this question. A multiple regression analysis was conducted to evaluate if the three predictors are related to students' overall attitudes toward cloud collaborative learning. The results show no problems with multicollinearity as is was checked to test if two or three predictors variables in a multiple regression model were highly correlated.

The findings show that the average age of the participants was 23.73 (SD = 5.97); 54.9% of the participants were male, while 45.1% were female students; and 66% of the participants were majoring in scientific majors, while 34% of the participants were majoring in human studies.

As shown in Table 20, the linear combination of the three variables was not significantly predictive of the overall attitudes of Saudi students at King Abdul-Aziz University towards cloud collaborative learning, with F (3,302) = 1.32,

P > .05. The sample multiple correlation coefficient was R = .114, and the adjusted R2 for the overall multiple regression analysis was .003. This indicated that approximately 3% of the variance in attitudes of Saudi students at King Abdul-Aziz University towards adopting cloud collaborative learning can be accounted for by the linear combination of the three variables entered in the model: age, gender, and major.

Table 20. Analysis of Variance and Regression Results of Saudi Students' Attitudes towards Cloud Collaborative Learning and Age, Gender, and Major

Source of Variation	**Df**	**MS**	**F**	**Sig.**	**R**	**R2**	**Adjusted R2**	**Std. Error of the Estimate**
Regression	3	.77	1.32	.27	.114	.013	.003	.764
Residual	302	.58						
Total	305							

Note: Dependent Variable is attitudes toward cloud collaborative learning.

As shown in Table 21, none of the three predictors was found to be a significant predictor of the attitude of the students in the model. Some of the results found age to be with a standardized beta coefficient of .02, p = (.76), gender with a standardized beta coefficient of .104, (p = .08), or major with a standardized beta coefficient of .07, (p = .26).

Table 21. Regression Coefficients: Relationship between Saudi Students' Attitudes towards Cloud Collaborative Learning and Age, Gender, and Major

Predictors	**Unstandardized Coefficients Beta (β)**	**Std. Error**	**Standardized Coefficients Beta (β)**	***t***	**Sig.**
(Constant)	3.500	0.281		12.47	.000
Age	0.002	0.001	0.018	0.311	0.76
Gender	0.16	0.089	0.104	1.777	0.08
Major	0.11	0.094	0.066	1.134	0.26

Note: Dependent Variable is Attitude toward Cloud Collaborative Learning

Qualitative Results from The Open-Ended Question.

The current study questionnaire also asked the participants an open-ended question which is, "Do you have other comments or thoughts regarding using cloud computing applications as

an educational tool to support collaborative learning? The open-ended question, "Do you have other comments or thoughts regarding using social media as educational tools to support learning?"

Participants response were categorized into two axes:

a. Challenges to use cloud computing applications from students' view of point.
b. Suggestions to utilize cloud computing applications effectively into the learning environments.

For the first category, students mentioned some challenges that prevent the effective integration of cloud applications into the learning environment. A participant mentioned that, "One of these obstacles is that although our instructors have positive attitudes towards adopting these tools, they lack the required skills and experience to how to use these applications to support students' learning skills." One of the participants reported, "instructors would like to incorporate cloud computing applications into their teaching to help students improve their learning, but they need to improve their knowledge on how to utilize these tools to support students' learning." Another student reported, "we as students need somebody who can teach us how to use cloud applications to support learning." Additional participants claimed that one of the challenges is the lack of awareness about what collaborative learning is. He reported that, "instructors first need to improve students' collaborative learning skills using technologies such as cloud applications."

Another concern the participants mentioned were security issues related to using online applications such as cloud applications. One of the participants mentioned, "Cloud computing applications lack proper security features, so they are not safe to use."

Another category is participants' suggestions regarding using cloud applications effectively to help students support their collaborative learning. Some of the participants suggested that instructors need to increase their usage of cloud applications in their teaching and for all of their courses they teach and apply collaborative learning strategies in the learning environments. Other students thought it is urgent to apply cloud collaborative learning in early stages of learning starting from first grade to higher education to help students improve their awareness and knowledge regarding how to utilize such tools effectively for students' learning. On the other hand, other participants reported that the need is to increase instructors' adoption and actual usage of cloud applications to support higher education students in all of the Saudi universities. However, few students mentioned that it is necessary that adopting cloud applications to support students' collaborative learning is not a substitute to the main and important role of the instructors. They believe that the instructors-role cannot be avoided by technologies such as cloud computing, but these tools can be used as aids that help the instructors accomplish some of the learning goals and support students' learning skills such as collaborative learning.

Chapter Summary

This study was aiming to investigate attitudes of Saudi students at King Abdul-Aziz University towards adopting cloud collaborative learning. This chapter presents the findings of the statistical analyses of the data collected in the study from 306 Saudi male and female students at King Abdul-Aziz University. The chapter covered descriptive statistics of the data, descriptions of populations and samplings, research questions, reliability analyses, demographic descriptions, findings of the research questions, results of the open-ended question, and a chapter summary.

Chapter 5 discusses the findings obtained from the research questions. In addition, it covers the limitations, implications of the current research study, and recommendations for future research.

Chapter 5

Discussion

Introduction

Chapter five discusses the purpose of the current study, a description of participants, a review of the research hypotheses, and includes a discussion of the results obtained from the research questions. It also presents the study limitations, implications of the results, conclusions, and recommendations for future research.

Purpose of the Study

The purpose of the current study is to investigate attitudes of Saudi students at King Abdul-Aziz University towards adopting cloud computing applications to support their collaborative learning. The study also examines factors that affect students' attitudes towards adopting cloud collaborative learning. Challenges that might face the students when they adopt cloud collaborative learning is another aim of the current study. The research was conducted to answer the following research questions:

1. Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?
2. Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?
3. What are Saudi students' attitudes towards adopting cloud collaborative learning?
4. Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?
5. What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?

6. Do variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning?

Research Hypotheses

In order to test the research questions, the following hypotheses were created according to the research questions:

H1: Saudi students at King Abdul-Aziz University utilize cloud computing applications for learning.

H2: Saudi students at King Abdul-Aziz University are learning collaboratively with their classmates.

H3: Saudi students have positive attitudes towards cloud collaborative learning.

H4: There is a relationship between perceived usefulness of cloud computing applications to support collaborative learning and students' attitudes.

H5: There are some difficulties that students encounter when they are utilizing cloud computing applications to support collaborative learning.

H6: Variables such as age, gender, and major are related to students' attitudes towards the adoption of cloud collaborative learning.

Participants

Saudi male and female students at King Abdul-Aziz University are the participants in this study. The total sample size for the study is 306 participants. In this study, there are 168 male participants who represent 54.92% of the total participants, and 138 female participants who represent 45.11% of the total participants. An electronic survey was collected containing the participants' responses (See Appendix A). The survey involved two types of the questions: close-ended questions and open-ended questions. It was expected to take approximately 15-20

minutes to be completed. The survey consists of 63 items split into seven separate parts. The following are the survey sections:

Part I: Usage of Cloud Computing by Students (22 items)

Part II: Learning Through Using Collaborative Learning Strategy (11)

Part III: Attitudes of Using Cloud Computing Applications to Support Collaborative Learning (6 items)

Part IV: Perceived Usefulness of Cloud Computing Applications (8 items)

Part V: Challenges to Use Cloud Computing Applications in Learning (8 items)

Part VI: Demographic Information (6 items)

Part VII: Open-Ended Question (1 item)

Discussion of the Findings of the Research Questions

Research Question One

Are Saudi students at King Abdul-Aziz University utilizing cloud computing applications for their learning?

The findings revealed that 184 of the participants (60.1%) were using cloud computing applications for their learning, while 122 of the participants (39.9%) reported they don't use cloud applications for their learning. This is consistent with some previous studies conducted at Saudi universities, such as, Alanazy (2011), Alzahrani (2015), and Tashkandi and Al-Jabri (2015) who concluded that Saudi students use cloud applications for learning purposes. Also, this is consistent with the study of Alshwaier et al. (2012) who concluded that Saudi students use cloud applications and were very satisfied with the variety and consistency of service offerings by Google Apps Education. The finding of this research question is also consistent with Lis and Paula's (2015) study at the Technical University of Czestochowa. Findings of the Lis and Paula

study revealed that 89% of the students use cloud computing applications for educational purposes.

The findings of question one support the previous studies, which is that students use cloud computing applications for learning purposes. I think this is because cloud computing applications have become dominant in peoples' lives during the past five years. So there is no wondering about the usage by students for these tools for learning purposes and to support their learning.

Research Question Two

Are Saudi students at King Abdul-Aziz University learning collaboratively with their classmates?

The findings of this question showed that students agreed that they are working collaboratively with their classmates (M = 3.47, SD = .799). This is consistent with the findings of Hagen (1996), Al-Dawoud (2001), Armstrong, Chang, & Brickman (2007), Griffin (2008), Gottschall (2006), Griffin (2008), Al-Dawoud (2001) Alharbi (2008), and Velez-Caraballo (2008) which revealed that students are working collaboratively and prefer working cooperatively in groups more than alone. The findings also support students' responses when they were asked about the learning style they prefer. The majority of the participants (69.9%) reported that they prefer the learning style that mixes between collaborative and individual learning style, and 17.6% of participants reported they prefer learning collaboratively.

The findings of the current study also showed that Saudi students have positive attitudes towards collaborative learning with their classmates (M = 4.07, SD = .78). This is consistent with the findings of studies conducted by Al-Dawoud (2001), Phipps et al. (2001), Armstrong et al. (2007), Gottschall (2006), Griffin (2008) Velez-Caraballo (2008) that showed positive attitudes

of students toward cooperative learning. These results also support the findings of Hagen (1996), which revealed that students of introductory human services course had a positive attitude towards cooperative learning, enjoyed cooperative learning, and would like to be involved again. I think participants have a positive attitude towards collaborative learning as the findings revealed because of the advantages that the participants get when working in groups. Benefits of working collaboratively might include that learning is more enjoyable and students become more engaged when working with the other. Also, the participants understand better when working in groups, and are able to solve the problem better as a team rather than as individuals.

Additionally, the participants develop their social and communication skills as they interact with each other. Another reason is that educational institutions in Saudi Arabia started incorporating collaborative learning strategies into the teaching environments and encourage instructors to integrate this strategy into their learning environments.

Research Question Three

What are Saudi students' attitudes towards adopting cloud collaborative learning?

The findings showed that students' attitudes towards using cloud computing applications to support their collaborative learning was positive with a mean M = 3.96 (SD = .77), students like to use cloud computing applications for collaborative learning. The findings of this research question are consistent with Alshwaier et al. (2012) study, which revealed that students are very satisfied with the variety and consistency of service offerings by Google Apps Education. Moreover, the findings support the results of Alzahrani's (2015) study, which revealed that Saudi students at Al-Baha University have a high desire to adopt cloud computing technologies to enhance their learning. Additionally, the findings support Alanazy's (2011) study, which reflected that Saudi students generally have positive attitudes towards applying coeducational

online collaborative learning. I think one reason behind this finding is that as we live in the digital era, and people have become more attached to various forms of technology, especially the youth. They are experts and digital natives who spend most of their time working, learning, chatting, and socializing with the other emerging online using technologies such as the cloud applications. So, it is clear that they have positive attitudes toward these tools, and as shown in the findings, and they also have positive attitudes towards collaborative learning. Thus, they use the cloud applications to support their collaborative learning. In addition, I think students' attitudes are positive because of the advantages that cloud applications offer. Cloud computing applications are tools that facilitate collaborative learning since these tools depend on the idea of active, interaction, and collaboration factors. These tools provide learners with the ability to manage, update, edit, and share their work and files easily from anywhere, every time using different devices. This is consistent with the participants' responses (M = 4.08, SD = .68.) for the perceived usefulness of the cloud applications to support collaborative learning as the participants reported many advantages of cloud applications such as: assignments and projects would be easy to perform with cloud computing applications, saving time and effort, obtaining greater control over work, enhancing collaborative learning skills, improving the quality of the work, increasing work team productivity, and improving performance.

Research Question Four

Is there a relationship between perceived usefulness of cloud computing to support collaborative learning and students' attitudes?

The findings showed that the correlation between the overall attitudes of Saudi students at King Abdul-Aziz University (M = 3.96, SD = .77) and perceived usefulness of cloud applications in collaborative learning (M = 4.09, SD = .68) was significant, r (306) = .774, p =

.00. This is consistent with Davis's (1989) Technology Acceptance Model (TAM), which states that individual's adoption of information technology depends on two main factors, which are perceived usefulness (PU), and perceived ease-of-use (PEO) of the technology. In addition, the findings of this research question support the findings of Masrom and Hussein (2008), which revealed that perceived ease of use of the electronic collaboration technology has a positive impact on users' attitudes, and perceived usefulness of this technology has a significant impact on the electronic collaboration technology usage. Also, the findings of this research question support Davis's (1989) findings that perceived usefulness had a significant and strong effect on attitude, while ease of use had smaller but also significant effect on attitudes towards adopting electronic mail. Additionally, the results of this research question are consistent with Rogers' (2003), which concluded that the higher the perceived usefulness, ease of use, and compatibility of the technology, the more positive the attitude towards using the technology. Also, the results support the findings of Hartshorne and Ajjan (2008), who concluded that students' attitudes towards using web 2.0 technologies were influenced by perceived usefulness. The results also support the findings of Shittu et al. (2011) who revealed that perceived usefulness was a significant predictor of students' attitude towards the use of social software. Furthermore, the findings are consistent with Aifan's (2015) study, which concluded that perceived usefulness of social media for learning was the strongest predictor of the average attitudes of Saudi students towards using social media to support their learning among all of the other predictors in the model.

In this research, I used Google Education Apps as example of cloud applications. When we apply Technology Acceptance Model on Google Education Apps, we found that both factors are applied on Google Education Apps. For example, regarding the first factor perceived-ease-of

use PEOU, users can log into all apps by Gmail account rather than creating account in each app. The other factor is perceived usefulness PU, which applied very well in Google apps. For example, users can present Google slides through the Google HangOut app. Or they can work on Google Docs through Google Drive. Users of Google apps are rapidly increasing every year. The number increased by 41.26 % from 2010 to 2015, to become 40 million users. The company expects 110 million users of Google education apps by 2020.

Research Question Five

What are some challenges and obstacles that could prevent the students from using cloud computing applications to support collaborative learning at King Abdul-Aziz University?

The findings of this question showed that the overall challenges that Saudi students at King Abdul-Aziz University have in adopting cloud computing applications to support their collaborative learning were positive and moderate (M = 2.82, SD = .55).

As shown in Table 19 in Chapter 4, the findings showed that Saudi students are concerned about losing their data while using cloud computing applications (M = 3.86, SD = 1.01). This is consistent with the previous studies that concluded data concerns is one of the challenges to using cloud computing applications by users. This was the case mentioned in the findings of Oliveria et al. (2014), who revealed that data concerns refers to concerns about the leakage of confidential data, unauthorized access to the students and research data, and the loss of other sensitive data. Also, this finding supports the results of Tashkandi's and Al-Jabri's (2015) study who stated that, "In general data concern is considered a barrier for the adoption of cloud computing" (p. 1530). Also, the findings revealed that participants are concerned about privacy issues related to the usage of cloud computing applications (M = 3.64, SD = 1.22).

In addition, participants reported that they are concerned about security issues related to the usage of cloud computing applications (M = 3.47, SD = 1.19). This is consistent with the findings of Justin, et al (2009), ShanthiBala (2010), Al Noor (2010), and Thomas (2011), which revealed that privacy and security are two main major issues related to the adoption of cloud computing applications. It was also consistent with the findings of Sravan and Saxena (2011) who concluded that privacy and security are two challenges to the usage of the cloud. They reported that some of the security and privacy threats include tampering or leakage of sensitive data on the cloud, loss of privacy and the unauthorized use of the data by cloud providers. Additionally, the findings support Alshwaier et al. (2012) and Lis and Paula's (2015) findings, which concluded that privacy and security are obstacles to cloud computing as a large percentage of participants disagrees that the cloud ensures data stability and security. One of these issues is the potential for selling of data by the cloud providers to third parties. Participants reported that most of it is treated as an additional cloud storage option, but almost no one takes the cloud as the only place for storage.

Regarding concerns about the loss of data, I think that the concerns exist because of the message that pops up warning users they could lose their data when using cloud applications. Regarding privacy and security issues, I think the concerns emerge from that fact that users' information becomes exposed to others, which is what Google plus recently experienced. After Google plus discovered that private data of 500,000 users was exposed, the company clarified that it will shut down soon because of this security and privacy issues.

Moreover, participants reported that they disagree with the statement that they get enough training in the university regarding how to use cloud applications to support learning, with a mean of 2.87 and SD = 1.30. This result is consistent with the findings of Alzahrani (2015) who

found that after a short training program for students teaching them how to use CCT in learning, he arrived at the conclusion that the students have a high desire to adopt the new technology to enhance their learning, whereas before the training program more than 50% of his sample study either they did not know about the cloud, or had a poor experience.

I think the lack of training programs exists is because it costs the university a lot to be applied. The number of the university's students at King Abdul-Aziz is around 160,000 students. So, providing a training programs for this number is difficult. However, universities could offer training programs through online and distance learning programs for the students.

Research Question Six

Do variables such as age, gender, and major affect students' attitudes towards the adoption of cloud collaborative learning?

The findings revealed that the average age of the participants was 23.73 (SD = 5.97); 54.9% of the participants were male, while 45.1% were female students; and 66% of the participants were majoring in scientific majors, while 34% of the participants were majoring in Humanities'.

As shown in Table 21 in Chapter 4, the linear combination of the three variables was not significantly predictive of the overall attitudes of Saudi students at King Abdul-Aziz University towards cloud collaborative learning, with $F(3,302) = 1.32$, $p > .05$ (age with a standardized beta coefficient of .02, $p = (.76)$, gender with a standardized beta coefficient of .104, ($p = .08$), or major with a standardized beta coefficient of .07, ($p = .26$)). However, the findings are the opposite to Sahin's (2006) study, which revealed a significant difference in students' perceptions of web-based learning and satisfaction with online learning in relation to gender, age, and academic major. The findings also did not support Frederickson's et

al. (2000) findings that concluded age has a significant effect on learners' perception toward web-based learning; the oldest students perceived the most learning and satisfaction, while the youngest students perceived the least learning and satisfaction. Additionally, the findings do not support Alanazy's (2011) study that revealed age has a significant effect on students' attitudes towards applying coeducational online collaborative learning; the oldest group reported the most positive attitudes, while the youngest groups reported the least positive attitudes. In addition, the findings are the opposite to Alnazy's study, which revealed that one's academic major was a factor that affected students' attitude towards applying coeducational online collaborative learning. The most positive attitudes were expressed by political science and science majors, while art and education students showed the least positive attitudes. Alanazy's (2011) study also showed that gender is a significant factor affecting students' attitudes. Male students' attitudes towards online cooperative learning was more positive than that of female students. The findings also do not support Anderson and Haddad's (2005) study which concluded that gender is a predictor of students' attitudes towards learning collaboratively online. It was found that females experienced greater perceived deep learning when involved with online courses, when compared to face-to-face courses as compared to males.

Regarding gender, I think the conservative nature of the Saudi society is what makes a difference between males and females in terms of using technology. Nowadays, Saudi society is becoming less conservative and females are using technology more than before. Right now, most people are becoming more open mind and liberal. In the current study, 98.7% of the sample (male and female) have smartphones, and are connected to cloud applications. Regarding age and academic major, cloud technology is becoming more dominant in people's lives and they are utilizing technology no matter what their age or major might be.

Also, in the current study, when comparing the percentages of the sample (N=306) and population (N=200,000) regarding the gender, the male students' percentage was 54.90% for the sample, while it was 52.96% for the population. However, the percentages for the females was 45.10% in the sample, while it was 47.04% in the population.

Limitations of the Study

The current study has several limitations that should be taken into consideration. The first limitation is that participants were not selected based on random selection; instead, they were selected according to their willingness to participate in the study. Also, the lack of face-to-face communication may not encourage participants to provide accurate and honest responses. In addition, some questions might be unclear or not understandable to the participants without the researcher's explanation, which means that their responses would be different if the researcher explained the questionnaire to them. Moreover, the study was conducted at only one of the Saudi universities, which is King Abdul-Aziz University, so the findings might not be generalized to other universities.

Implications

The current study investigated Saudi students' attitudes towards adopting cloud computing applications to support students' collaborative learning. It was also designed to explore factors affecting the students' attitudes towards adopting the cloud applications, and to discover challenges that exist to adopt these applications for learning purposes, by Saudi students at King Abdul-Aziz University.

The findings of the study have implications for instructors, administrators, leadership, and decision makers at King Abdul-Aziz University to improve education. Cloud computing has the potential to expand collaborative learning and teaching. The cloud can be a very useful

solution for education, given that it is economically a perfect solution for universities. The cloud may reduce costs incurred from the purchase of computers and other equipment, and from employing IT people. It is urgent that universities and administrators begin implementing this solution. Saudi students reported high and positive attitudes towards adopting cloud applications to enhance and support their collaborative learning, and revealed that their instructors use and encourage them to use such applications So administrators should implement the solution of the cloud and help the instructors incorporate these tools into their curriculum and teaching environments. They should also provide the instructors with training programs, seminars, and conferences that help instructors to better understand how to implement cloud applications effectively, to support the students' learning abilities, by enhancing their collaborative learning skills. One of the obstacles the participants mentioned in the study was the lack of a training programs provided by the university to teach them how to use the cloud effectively for learning collaboratively. Therefore, administrators should provide training programs for the students to help them understand the wide range of benefits and positive impact of adopting the cloud for learning purposes. As the Saudi government has made a lot of efforts to enhance their educational system over the last 10 years, it is necessary that Saudi universities should advise and encourage administrators and leaders on the tremendous applications and services available by using the cloud, to help Saudi students and instructors best utilize these technologies. Alshwaier et al. (2012) stated, "we consider cloud computing education system is promised in KSA because there are financial supports, government commitment and subtle pressure from women faculty for change" (p. 93).

Recommendations

Based on the findings of the current study, several recommendations are provided:

1. Institutions should provide faculty with training programs, seminars, workshops, and conferences that develop their personal learning and experiences regarding how to effectively implement cloud computing applications to support students' learning.
2. Institutions should provide students with training programs and workshops that teach them about potential advantages and benefits of cloud computing applications to learning, and that train them to use these tools to support their learning skills, such as collaborative skills.
3. Institutions should provide students with workshops and seminars focusing on privacy, security, and data issues related to the cloud, to increase their awareness regarding these issues, especially given the obstacles reported by the students in the current study.
4. Institutions should integrate digital ethics lessons to the curriculum plans to develop students' awareness regarding digital ethics as they become more attached to technology in this digital era.
5. Faculty should develop their personal learning regarding cloud computing applications and how they can incorporate them into their teaching environments to support students' learning skills, such as collaborative learning.

Suggestions for Future Research

Based on the current study, several suggestions are provided:

1. Conduct a comparative study to find out if there are differences between Saudi students' attitudes toward adopting cloud computing applications to support collaborative learning at King Abdul-Aziz University, and the attitudes of students at other universities in Saudi Arabia;

2. Conduct a study investigating attitude of faculty of other universities, to analyze their attitudes towards the adoption of cloud applications to support students' collaborative learning, and compare those findings to this current study;
3. Conduct a study to examine if there are gender differences among faculty at King Abdul-Aziz University towards adopting cloud applications to support students' collaborative learning;
4. Do an in-depth investigation on students' gender differences regarding the obstacles they encounter when utilizing the cloud to enhance their collaborative learning skills.
5. Investigate the effect of faculty adopting the cloud on students' learning achievements;
6. Conduct a study examining if other factors such as GPA, academic status, or/and other factors are affecting students' attitudes toward adopting the cloud to support their collaborative learning

Conclusions

The main purpose of this study was to investigate the attitudes of Saudi students at King Abdul-Aziz University towards adopting cloud computing applications to support their collaborative learning. Factors affecting the students' attitudes towards the adoption of cloud collaborative learning were also examined. Additionally, the study investigated the challenges to adopt cloud collaborative learning by the students.

The study was conducted at King Abdul-Aziz University, Saudi Arabia, in the fall of 2018. Participants of the study were Saudi female and male students at King Abdul-Aziz University. The sample-size was 306 participants. There were168 male students who represented 54.9% of the participants, and 138 female students who represented 45.1% of the total participants.

The conclusions can be stated as follows:

1. Of the participants in this study, 60.1% use cloud computing applications for their learning, while 39.9% don't use cloud applications for their learning.
2. Of the participants of this study, 69.9% preferred the learning style that mix between collaborative and individual learning style, 17.6% preferred learning collaboratively with their classmates, and 12.4% preferred individual learning.
3. Participants reported that they are working collaboratively with their classmates (M = 3.47, SD = .799), collaborate with their friends out of the classroom to accomplish some study assignments (M = 3.88, SD = .998), and have done some of their assignments and projects while working with their classmates (M = 3. 76, SD = .94).
4. Participants have positive attitudes towards collaborative learning with their classmates (M = 4.07, SD = .78); they reported that collaborative learning has many educational benefits (M = 4.34, SD = .774); collaborative learning helps them understand the subject material more (M = 4.16, SD = .93); and believe that students need to learn collaboratively (M = 4.05, SD = .89).
5. Participants have positive attitudes towards using cloud computing applications to support their collaborative learning (M = 3.96, SD = .77); they like to use cloud computing applications for collaborative learning (Mean = 4.14, SD = .85); found that using cloud applications for collaborative learning is a good idea (M = 4.17, SD = .84); found that cloud applications are important tools to support collaborative learning (M = 4.12, SD = .92); they like to engage themselves with their classmates in collaborative projects using cloud applications (M = 3.96, SD = 96); and they found learning collaboratively using cloud applications is enjoyable (M = 3.88, SD = 1.01).

6. There was a significant relationship between the overall attitudes of Saudi students at King Abdul-Aziz University (M = 3.96, SD = .77) and perceived usefulness of cloud applications in collaborative learning (M = 4.09, SD = .68), with r (306) = .774, p = .00; participants reported that with cloud computing applications, their assignments and projects would be easy to perform (M = 4.25, SD = .84); time and effort are saved (M = 4.17, SD = .94); cloud computing applications are a useful tool in collaborative learning (M = 4.12, SD = .87); it gives them greater control over their work (M = 4.10, SD = .85); their collaborative learning skills are enhanced (M = 4.07, SD = .87); the quality of the work is improved (M = 4.07, SD = .87); work team productivity increased (M = 4.05, SD = .91); and their performance was improved (M = 3.87, SD = .95).
7. Participants encountered some challenges when adopting cloud applications for learning (M = 2.82, SD = .55); of the challenges they reported, the most frequently reported barrier was data concerns (M = 3.86, SD = 1.01); the second most frequently reported barrier was privacy issues (M = 3.64, SD = 1.22); the third most frequently reported one was security issues (M = 3.47, SD = 1.19), and the fourth barrier was the lack of training programs offered by the university (M = 2.87, SD = 1.30).
8. Of three predictors in the model of this study: age, gender, and major, neither was a significant predictor to attitude of the students toward adopting cloud collaborative learning (F (3,302) = 1.32, p > .05); age with a standardized beta coefficient of .02, p = (.76); gender with a standardized beta coefficient of .104, (p = .08); or major with a standardized beta coefficient of .07, (p = .26).

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Appendixes

Appendix A

Saudi College Students' Attitudes towards Online Collaborative Learning

اتجاهات طلاب الكليات السعودية نحو التعلم التعاوني عبر الإنترنت

البحث لنيل درجة الدكتوراه في تقنيات التعليم
إعداد الطالب
اسامة الغامدي

Students' Survey

استبانة الطلاب

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عزيزي الطالب:

السلام عليكم ورحمة الله وبركاته وبعد:

هذه استبانة دراسة بعنوان " اتجاهات طلاب الكليات السعودية نحو التعلم التعاوني عبر الإنترنت "

التعلم التعاوني هو طريقة من طرق التعلم ، حيث يتعاون فيه شخصان أو أكثر مع بعضهم البعض بغرض التعلم معًا او لإنجاز المهام والمشاريع الدراسية ضمن مجموعة .
على عكس التعلم الفردي والذي يتعلم فيه الطالب بمفرده.

تقنية الحوسبة السحابية هي تقنية حديثة للتواصل او تخزين البيانات والوصول إليها عبر الإنترنت بدلاً من تخزينها على جهاز للكمبيوتر الخاص بك. ومن خلال هذه التقنية يستطيع الفرد نقل المعالجة و مساحة التخزين الخاصة بالحاسوب إلى ما يسمى بالسحابة التي يتم الوصول إليها عبر شبكة الإنترنت.

هناك العديد من تطبيقات الحوسبة السحابية ، على سبيل المثال منصة قوقل (Google) ويمثلها محرك أقراص قوقل Google Drive ويضم العديد من البرامج مثل مستندات قوقل Google Doc ، وشرائح قوقل Google Slide وغيرها

ملاحظة : يفضل استخدام جهاز كمبيوتر لاجابة الاستبانة . في حالة استخدام لوح كفي او جهاز هاتف ذكي يرجى وضعه بالعرض ليتسنى مشاهدة الاسئلة بوضوح وخيارات الاجابات.

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□

Dear Student:

This is a questionnaire of a study titled “Saudi College Students’ Attitudes towards Online Collaborative Learning”

Collaborative learning is a way of learning, where two or more people collaborate with each other to learn together, or to accomplish tasks and projects within a group.
Unlike individual learning in which a student learns alone.

Cloud computing technology is a modern technology for connecting or storing data and accessing it online rather than storing it on your computer. Through this technology, users can transfer processing and storage space from computer to the Cloud which connected via the Internet.

There are many cloud computing applications, such as the Google platform, represented by Google Drive, and includes many programs such as Google Docs, Google Slide, and others.

Note: A computer is preferred to answer the survey. If you are using a smartphone or tablet, please make sure to put it in the wild display position so that you can see the questions and answer the options clearly.

Part 1: Usage of Cloud Computing by Students.

A. What is the learning style that you prefer?

- Learning or studying in a group (collaborative learning)
- Learning while I was studying individually (individual learning)

الجزء الأول استخدام الحوسبة السحابية من قبل الطلاب

ا – ما نمط أسلوب التعلم الذي تفضل؟

- **ادرس او اتعلَّم في مجموعة (تعلم تعاوني)**
- **أدرس وأتعلم بمفردي (تعلم فردا)**

B. For each statement, please choose one item that indicates your answer.
Do you use cloud computing applications in learning?

- Yes
- No

ب – هل تستخدم تطبيقات الحوسبة السحابية في التعلم بشكل عام؟

- **نعم**
- **لا**

C. Below are some purposes people use cloud computing applications.
For each possible purpose, indicate how often YOU use each of the following cloud computing applications.

ج – فيما يلي بعض الأغراض التي يستخدم الناس من أجلها تطبيقات الحوسبة السحابية . لكل غرض المحتمل، حدد عدد مرات استخدامك لكل من تطبيقات الحوسبة السحابية التالية :

Purpose الغرض	5 Always دائما	4 Often غالبا	3 Some times احيانا	2 Rarely نادرا	1 Never أبدا
1.Learning لأغراض التعلم					
2.Business لأغراض التجارة					
3.Projects لإنجاز المشاريع					
4.Personal لأغراض شخصية					
5.Socialize للتواصل الاجتماعي					
6. Files sharing لمشاركة الملفات					
7. Other اخرى					

D. How often do you use each type of the following applications?
د. كل متى تستخدم كل نوع من التطبيقات التالية ؟

Applications التطبيقات	5 Always دائما	4 Often غالبا	3 Some times احيانا	2 Rarely نادرا	1 Never أبدا
1. Gmail البريد الالكتروني					
2. Google Drive قوقل محرك أقراص					
3. Google Docs مستندات قوقل					
4. Google Slide شرائح قوقل					
5. Google Sheet ورقات قوقل					
6. YouTube يوتيوب					
7. Google Forms نماذج قوقل					
8. Google Hangout					
9. Others أخرى					

E. In case you use some other applications, please mention them?
هـ . في حالة استخدام تطبيقات أخرى ارجو ذكرها :

F. How many times do you use the following devices for internet connection

و – كم مرة تستخدم كل نوع من انواع الاجهزة التالية :

Devices **الأجهزة**	**5** **Always** **دائما**	**4** **Often** **غالبا**	**3** **Some times** **احيانا**	**2** **Rarely** **نادرا**	**1** **Never** **أبدا**
1.Personal computer كمبيوتر شخصى					
2. Tablets كمبيوتر لوحي					
3. Smart phone هاتف ذكي					

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Part II: Learning Through Using Collaborative Learning Strategy.

الجزء الثاني : التعلم من خلال ممارسة استراتيجيات التعلم التعاوني

A. Attitude of students towards collaborative learning

ا- اتجاهات الطلاب نحو التعلم التعاوني :

To what extent do you agree or disagree with the following statements?
(Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5).

إلى أي مدى توافق أو لا توافق على العبارات التالية؟
(أوافق بشدة = 5 / أوافق = 4 / ، محايد = 3 / غير موافق = 2 / لا أوافق بشدة = 1).

Items البنود	5 Strongly agree موافق بشدة	4 Agree موافق	3 Neutral محايد	2 Disagree غير موافق	1 Strongly disagree غير موافق بشدة
1. Collaborative learning has many educational benefits 1. التعلم التعاوني له فوائد تعليمية					
2. I would like to study with my colleagues 2. أرغب ان اذاكر وادرس مع زملائي					
3. Collaborative learning helps me understand the subject material more 3. التعلم التعاوني يساعدني في فهم المادة أكثر					
4. Students need to learn collaboratively 4. يحتاج الطلاب أن يتعلموا بشكل تعاوني					
5. Collaborative learning increases my academic achievement 5. التعلم التعاوني يزيد من تحصيلي الدراسي					

B. To what extent do you do the following educational practices

ب- إلى أي مدى تصنف تكرار الممارسات التعليمية التالية

Items البنود	5 Strongly agree موافق بشدة	4 Agree موافق	3 Neutral محايد	2 Disagree غير موافق	1 Strongly disagree

					غير موافق بشدة
1. I have done some of my assignment and projects while working with my classmates 1. أقوم ببعض المهام الدراسية مع زملائي داخل القاعة الدراسية					
2. I collaborate with my friends outside the classroom to accomplish some study duties 2. أتعاون مع زملائي خارج الصف لإنجاز بعض المهام الدراسية					
3. I encourage my friends to study collaboratively 3 . أشجع زملائي على الدرسة بشكل تعاوني					
4. My instructors apply collaborative learning strategies in my classes 4. يمارس أساتذتي التعلم التعاوني في تدريس المواد الدراسية					
5. My professors encourage me and my friends to study in groups collaboratively. 5. يشجعني الأساتذة انا وزملائي على الدراسة في مجموعات بشكل تعاوني					

C. In your opinion, what are the three most important skills supported by the collaborative learning method:

- Self-confidence
- Dialogue literature
- Speaking and listening
- Critical thinking
- Problem Solving
- Teamwork
- Social Media
- Leadership
- Responsibility

ج – ما هي في نظرك أهم ثلاث مهارات يدعمها التعلم التعاوني :

- الثقة بالنفس
- أدب الحوار
- آداب التحدث والاستماع
- التفكير الناقد

- حل المشكلات
- العمل الجماعي
- التواصل الاجتماعي
- القيادة
- المسؤولية

Part III: Attitudes Towards Using Cloud Computing Applications to Support Collaborative Learning

الجزء الثالث : اتجاهات الطلاب نحو تطبيقات الحوسبة السحابية لدعم التعلم التعاوني

To what extent do you agree or disagree with the following statements?
(Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5).

إلى أي مدى توافق أو لا توافق على العبارات التالية ؟
(أوافق بشدة = 5 / أوافق = 4 / ، محايد = 3 / غير موافق = 2 / لا أوافق بشدة = 1).

Items البنود	5 Strongly agree موافق بشدة	4 Agree موافق	3 Neutral محايد	2 Disagree غير موافق	1 Strongly disagree غير موافق بشدة
1. I like to use cloud computing applications for collaborative learning purposes. 1. أرغب في استخدام تطبيقات الحوسبة السحابية لأغراض التعلم.					
2. Cloud computing applications are important tools to support collaborative learning. 2. تطبيقات الحوسبة السحابية هي أدوات مهمة للتعلم.					
3. I found that learning collaboratively by using cloud computing applications is enjoyable 3. لقد وجدت التعلم باستخدام تطبيقات الحوسبة السحابية امر ممتع					
4. In my opinion, using cloud computing applications to support collaborative learning is a good idea. 4. في رأيي ، استخدام تطبيقات الحوسبة السحابية لدعم التعلم فكرة جيدة					

5. I like to engage myself with my classmates in collaborative projects using cloud computing applications. 5. أحب أن أشترك مع زملائي في المشاريع التعاونية باستخدام تطبيقات الحوسبة السحابية					
6. Once I started using cloud computing applications to support my collaborative learning, I found it difficult to stop. 6. بمجرد أن بدأت استخدام تطبيقات الحوسبة السحابية ، وجدت صعوبة في التوقف أو التخلي عنها					

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Part VI. Perceived Usefulness of Cloud Computing Applications

القسم الرابع : الفائدة المتلقاة من استخدام الحوسبة السحابية لدعم التعلم التعاوني

To what extent do you agree or disagree with the following statements?
(Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5).

إلى أي مدى توافق أو لا توافق على العبارات التالية؟
(أوافق بشدة = 5 / أوافق = 4 / ، محايد = 3 / غير موافق = 2 / لا أوافق بشدة = 1).

Items□ البنود	5□ Strongly agree موافق بشدة	4 Agree موافق	3 Neutral محايد	2 Disagree غير موافق	1 Strongly disagree غير موافق بشدة
1. My assignments and projects would be easy to perform with cloud computing applications. 1. من السهل تنفيذ المهام الخاصة بي باستخدام تطبيقات الحوسبة السحابية					
2. Using cloud computing applications gives me greater control over my work. 2. استخدام تطبيقات الحوسبة السحابية يعطيني تحكم أكبر على عملي					
3. Using cloud computing applications improves my performance. 3. استخدام تطبيقات الحوسبة السحابية يحسن أدائي الدراسي					

4. Using cloud computing applications saves me time and effort. 4. استخدام تطبيقات الحوسبة السحابية يوفر وقتي وجهدي في التعلم					
5. Using cloud computing applications enhances my collaborative learning skills 5. استخدام تطبيقات الحوسبة السحابية يعزز مهارات التعلم التعاوني					
6. Using cloud computing applications improves the quality of the work l do. 6. استخدام تطبيقات الحوسبة السحابية يحسّن جودة العمل التعاوني					
7. Using cloud computing applications increases my teamwork productivity 7. استخدام تطبيقات الحوسبة السحابية يزيد من إنتاج فريق العمل التعاوني					
8. Overall, I found cloud computing applications a useful tool in collaborative learning. 8. بشكل عام ، وجدت تطبيقات الحوسبة السحابية. أداة مفيدة في التعلم التعاوني					

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Part V: Challenges To Use Cloud Computing Applications in Learning

الجزء الخامس التحديات والعقبات لاستخدام تقنية الحوسبة السحابية في التعلم

To what extent do you agree or disagree with the following statements?
(Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5).

إلى أي مدى توافق أو لا توافق على العبارات التالية ؟
(أوافق بشدة = 5 / أوافق = 4 / ، محايد = 3 / غير موافق = 2 / لا أوافق بشدة = 1).

Items□ البنود	5□ Strongly agree موافق بشدة	4 Agree موافق	3 Neutral محايد	2 Disagree غير موافق	1 Strongly disagree غير موافق بشدة
1. My instructors encourage students to study collaboratively using cloud applications.					

1. يشجع الاساتذة الطلاب على الدراسة بشكل تعاوني.					
2. My instructors use cloud computing applications in their teaching 2. أساتذتي يستخدمون تطبيقات الحوسبة السحابية في التدريس					
3. I get enough training in the university about how to use cloud computing applications in learning. 3. أحصل على تدريب كافي حول كيفية استخدام تطبيقات الحوسبة السحابية في دعم التعلم التعاوني					
4. I use cloud computing applications because the internet is affordable 4. أستخدم تطبيقات الحوسبة السحابية لأن الإنترنت متوفر					
5. I am concerned about security problems related to using cloud computing applications. 5. أنا قلق بشأن المشاكل الأمنية المتعلقة باستخدام تطبيقات الحوسبة السحابية					
6. I am concerned about privacy problems related to using cloud computing applications. 6. أنا قلق بشأن مشاكل الخصوصية المتعلقة باستخدام تطبيقات الحوسبة السحابية					
7. I am concerned about losing my data when I use cloud computing applications. 7. أنا قلق بشأن فقدان بياناتي عند استخدام تطبيقات الحوسبة السحابية					
8. I can understand cloud computing applications that use the English language. 8. يمكنني فهم تطبيقات الحوسبة السحابية التي تستخدم اللغة الإنجليزية.					

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Part VI: Demographic Information

الجزء السادس : المعلومات الشخصية

- Major
  - Science Studies
  - Humanities'

التخصص :

- ادبي (دراسات إنسانية)
- علمية (دراسات علمية)

- What is the academic degree you are currently working towards?
  - Diploma
  - Bachelor
  - Master's
  - PhD

درجة العلمية التي تسعى للحصول عليها

- دبلوم
- بكالوريس
- ماجستير
- دكتورة

- What is your age?

ما هو عمرك؟

□
□

- Gender
  - Male
  - Female

الجنس :

- ذكر
- أنثى

□
□

- What is your GPA?

- ما معدلك التراكمي ؟

- At what university do you now study?

- ما الجامعة التي تدرس بها الان ؟

□
□
□

Part VII: Open Ended Question

A. Do you have other comments or thoughts regarding using cloud computing applications as an educational tool to support collaborative learning?

الجزء السابع : سؤال مفتوح

هل عندك أي تعليق او اضافة تتعلق باستخدام تقنية الحوسبة السحابية و تطبيقاتها كأدوات تعليمية لدعم التعلم التعاوني

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