AJSP
المجلة العربية للنشر العلمي
العدد الثلاثون
تاريخ الإصدار: 2 – نيسان – 2021 م
www.ajsp.net
ISSN: 2663-5798

"Flipped Classroom Model Based Technology Acceptance and Adoption among Faculty Members in Saudi Arabia Universities"

Researcher:

Norah Fahad Albadran

A Dissertation/ Doctor of Philosophy Degree

Major: Curriculum and Instruction: Educational Technology

The University of Toledo

"Under the Supervision of Professor Berhane Teclehaimanot"

May 2020

العدد الثلاثون
تاريخ الإصدار: 2 – نيسان – 2021 م
www.ajsp.net
ISSN: 2663-5798

ABSTRACT:

This study aimed to explore faculty members' acceptance of the flipped classroom model (FCM) based technology with student-centered approach in their classrooms in Saudi universities. Specifically, the study investigated factors that influence faculty members acceptance or rejection of the adoption and use of the FCM based technology by incorporating the theoretical framework of UTAUT. Four factors or determinants were examined: Performance Expectancy, Effort Expectancy, Facilitating Conditions, and Perceived Understanding of the flipped classroom characteristics. These four constructs predict the intentional use of technology and behavioral use of technology. The survey was administered to 758 faculty members affiliated with Saudi Arabian universities. The study showed that 44.06% of participants did not report FCM adoption while 55.94% of participants reported adopting FCM in their classrooms and planning to adopt it in the upcoming academic years. Behavior Intention and Perceived Understanding of the FCM characteristics found to be the strongest predictors that influence faculty members' acceptance or rejection of FCM adoption. The findings imply that faculty members were most likely to adopt FCM based technology in their classrooms when they perceive that FCM was easy to implement and use which can be supported by professional development and training. Also, the findings imply that faculty members are most likely to adopt and implement FCM based technology in their classrooms when there was adequate infrastructure and necessary resources. Finally, faculty members who already adopted FCM based technology are using it student-centered approach, and providing support across the adoption of FCM based technology could lead to more effective and efficient teaching with the support of technology.

KEYWORDS: Flipped Classroom Model (FCM), Student-Centered Approach, Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), Behavioral Intention (BI) and Use Behavior (UB).

1. INTRODUCTION

The Kingdom of Saudi Arabia (KSA) has been increasingly promoting initiatives to modernize and advance society, including in the field of education. Saudi Arabia's education system includes K-12 schools, public and private universities, other colleges and institutions that teach many programs, and all administrations under the Ministry of Education (MOE). In 2010, the Saudi Ministry of Higher Education (MOHE) created a national plan called AFAQ ("Horizons") to achieve excellence in science and technology as well as to transform the KSA toward a knowledge-based society. As part of the Horizons plan, the MOHE (2010) initiated three technology-focused projects: developing eLearning and distance education, employing information systems in all higher-education institutions, and building a high-speed educational network among Saudi universities. More recently, in 2016 the KSA released its Vision 2030 strategic plan, a vision to reform all aspects of life, including education. The Ministry of Education (MOE) is moving toward digital education by integrating new technologies in the classroom and requiring a change in teaching and learning strategies from teacher-centered to student-centered strategies. According to the Ministry of Communications and Information Technology (2016), in 2007, the government of Saudi Arabia prioritized and supported the introduction of current technology, such as learning management systems like Blackboard, mobile learning, online discussions, and writing software into the educational sector. Also, the Ministry of Communications and Information Technology established the National E-learning and Distance Learning Centre for applying the national strategic plan for technology in education through a centralized unit (2017). As a result, most of the Saudi universities asked their faculty members to use the center and its services. Alebaikan and Troudi, have pointed out that some universities in Saudi Arabia required their faculty members and their students be able to benefit from the center's services like access to an electronic library for academic programs, access to the course content, and the ability to send assignments online (2010). However, some universities still do not provide full access to the internet to their students. For example, at Hail University, where the researcher works as a faculty member, the students can have access to the internet only in the computer lab but cannot access the internet on their own laptops or smartphones. According to Al-Sarrani (2010), the availability of technology in the education system does not always mean it is going to be used; there are many universities who adopted some technology tools, which were not then subsequently used by the administration, faculty members, or students.

Despite modernization efforts like AFAQ and Vision 2030, some people have resisted adopting new technologies in their institutions because they can be difficult to implement and learn how to use properly (Dziak, Mark, & Salem, 2017). Also, Alshahrani and Ward (2014) mention that adopting new technology is challenging among educators due to the impacted cultures that display resistance to most of new technology tools. To investigate specific technology acceptance among users, the literature on technology acceptance provides robust models. Whiles studies in technology acceptance at

the university level have included the use of mobile learning, iPads, e-learning, and social media, these studies did not apply any of the acceptance models and did not use any of their variables that affect users' acceptance; instead, they developed their own data collection method (Alfarani, 2014; Narayanasamy & Mohamed, 2013). One teaching method that incorporates technology to achieve a more student-centered approach, and that could help achieve the KSA's visions for the future, is the flipped classroom model (FCM) based technology. However, based on the literature, there are no studies on flipped classroom acceptance in general and specifically in the KSA that investigate faculty members acceptance of adopting and using FCM based technology. As a result, this shortage of research in the acceptance of an FCM yields the need to this study by investigating Saudi university faculty members' acceptance of FCM in their traditional classes. The following section provides a clarification of the research problem and its rationality in the Saudi context.

2. STATEMENT OF THE PROBLEM

The problem the KSA faces is the traditional teacher-centered approach to teaching is dominant, with very limited use of technology among faculty members in Saudi universities. Moreover, several researchers (e.g., Alqarni, 2015; Al-Hattami, Muammar, and Elmahdi, 2013; Al-Maini, 2011) have pointed to limitations in the existing infrastructure (e.g., the lack of classroom computers, language laboratories or other means of integrating computers into subject teaching in Saudi universities) as well as faculty members' lack of training and experience in using technology as the factors that contribute to the problem. However, research on the use of technology by faculty members in the KSA is very limited.

Most of the existing research technology use in the classroom has been done in the United States, with the focus on the K-12 settings. Examples include the convergence of mobile network learning and traditional classroom teaching modes through the use of Twitter in class (Wang, 2017); the promotion of student-centered learning using iPads (Woloshyn, Bajovic, & Worden, 2017); the use of student-centered technologies to give students ownership and control of the learning, and to build new information on past knowledge and experiences (Arman, 2019); and a quasi-experimental study comparing students' performances in the K-12 setting in traditional classroom and FC (Unal & Unal, 2017). However, research is needed that would examine Saudi faculty members' willingness and acceptance to move from teacher-centered to student-centered learning by integrating technology through the flipped classroom model.

The flipped classroom model based technology offers a promising solution for this problem because it is a technology-supported pedagogy which means when instructors adopt FCM would have to integrate technology. The reform of Saudi education leads to the need to focus on FCM as a way for adopting technology into any college classroom. Students of the current generation are digital natives who require that educators should focus on teaching and learning methodologies that include technologies, such as FCM (Cardoza & Tunks, 2014). The FCM approach consists of two components: (1) direct computer-based individual instruction outside the classroom through video lectures and (2) interactive group-learning activities inside the classroom (Unal & Unal, 2017). The flipped classroom is associated with both the student-centered approach and the use of technology and media to provide an effective and engaging learning environment. This means teachers must use technology to be able to adopt FCM, because they have to create videos and quizzes for the students to watch and practice outside the classroom.

As a result, if faculty members are willing to integrate technology into their classrooms, FCM would be a good approach because it leads to a student-centered approach, given that in the FCM, students are the focus of the learning process instead of the teacher. Further, FCM allows teachers to provide assessment to their students during class time (Davies, Dean, & Ball, 2013). Overall, it has been shown that the FCM approach can boost students' engagement and help them develop team-based skills, as well as allow faculty to focus on classroom discussions, provide personalized student guidance, and provide faculty freedom (Kennedy, 2015). Examining Saudi faculty members' willingness to adopt and acceptance of FCM with a student-centered approach will allow the researcher to determine what factors impact their acceptance or rejection of the FCM and student-centered approaches.

Research Questions:

The purpose of this non-experimental, quantitative correlation study is to examine the acceptance level of implementing a flipped classroom (FC) model with a student-centered approach among faculty members who are teaching undergraduate courses in Saudi universities. To achieve this purpose, the study addressed the following research questions:

1. Is performance expectancy a significant predictor of Saudi higher education instructors' behavioral intention to implement FCM based technology with a student-centered approach?

2. Is effort expectancy a significant predictor of Saudi higher education instructors' behavioral intention to implement FCM based technology with a student-centered approach?

3. Are facilitating conditions a significant predictor of instructors' use behavior of FCM based technology with a student-centered approach?

4. What is the relationship between instructors' perceived understanding of the characteristics of FCM and their behavioral intention to implement FCM based technology with a student-centered approach?

5. What is the relationship between instructors' demographic factors (age, gender, and experiences) and their use behavior to adopt FCM based technology with a student-centered approach in their classrooms?

Significance

Card, Moran, and Newell (1983) state that the interaction between humans and computer has increased remarkably for the purpose of completing any task. As a result, this study will investigate whether faculty members in higher education in Saudi universities are willing to adopt student-centered teaching by adopting flipped classroom models in their classrooms or not. The FCM approach has received a large amount of attention in educational research literature recently for its effectiveness in the higher education setting because there has been an increasing awareness of the shortcomings of the traditional style of lecture-based teaching. There is also growing evidence that active learning methods lead to enhanced retention, comprehension and cooperative learning. Moreover, the current 'millennial' generation of learners expects greater integration of technology as part of effective teaching practice (Tan, Brainard, & Larkin, 2015). As mentioned before, this study is aligned with the mission of education of Saudi Arabia "AFAQ and Vision 2030". This study can help in extending the literature of flipped classroom model-based technology and student-centered approach acceptance through combining constructs that have been theoretically and empirically validated in the context of educational technology in general. Based on reviewing the literature, there are no previous studies that explore Saudi university faculty members' acceptance of adopting an FC in a traditional learning environment.

Operational Definitions

Here are definitions of certain terms as they are used for the purposes of this study:

Flipped Classroom Model (FCM). "Flipped classroom model' is a model for teaching that reverses the traditional classroom model where lectures are given during class and then students work with the material after class. In the flipped classroom, a pre-recorded lecture (video or audio) might be viewed before class to be followed by in-class activities on the lecture material (Unal & Unal, 2017). When lectures are viewed beforehand, the freed in-class time can be devoted to interactive modules such as Q&A sessions, discussions, exercises or other learning activities.

Student-Centered Approach. Kember (1997) describes the "student-centered approach" as one in which students construct knowledge and the lecturer is a facilitator of learning rather than a presenter of information. This approach shifts the control from the teacher to the students by giving them more responsibilities.

Performance Expectancy (PE). Venkatesh et al. (2003) define "performance expectancy" as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (p. 447). In this study, PE refers to the instructors' beliefs that flipped classroom model based technology will benefit them in performing teaching tasks and benefit their students in performing learning tasks.

Effort Expectancy (EE). Venkatesh et al. (2003) define "effort expectancy" as "the degree of ease associated with the use of the system" (p. 450). In this study, EE refers to the level of ease of adopting and using flipped classroom model based technology in the classroom.

Facilitating Conditions (FC). Venkatesh et al. (2003) define "facilitating conditions" as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (p. 453). In this study, FC refers to the extent to which an individual believes that the available infrastructure in his/her organization supports his/her adoption and use of flipped classroom model based technology.

Behavioral Intention (BI). "Behavioral intention" refers to the extent that individuals construct a thought-based decision whether to perform or not to perform a specific behavior (Venkatesh et al., 2003). In this study, BI refers to the individual's conscious decision to adopt flipped classroom model based technology or to reject it.

Use Behavior (UB). This construct could also be named "actual use," and it refers to the level of performing the required behavior that results from an individual's intention to use a specific system/technology (Venkatesh et al., 2003). In this study, UB will be the level at which faculty members who intend to use flipped classroom model based technology translate it into actual use.

Delimitations and Limitations

Limitations

Because the study's target population will be faculty members in Saudi public universities, one of the limitations of the proposed study might be the lack of generalizability to other faculty members in other countries. The second limitation is that there are several Acceptance Models, but this proposed study will be limited to the UTAUT model. The researcher has applied the UTAUT model because the prediction percentage to user behavior in UTAUT model reached to more than 70% of the model variables and 50% in users' adoption of new technologies which are the highest prediction percentage reached among all the acceptance models (Venkatesh et al., 2003). The third limitation is related to the researcher's decision to conduct a quantitative research study and use close-ended questions, thus limiting the participants' answers to the selection's options (Rahman, 2017). As a result, the researcher will not be able to gain an in-depth understanding of participants' perceptions.

Delimitations

According to the Ministry of Education (MOE, 2014), there are many types of universities in Saudi Arabia: public, private, old, and new. Moreover, Saudi Arabia currently has 25 public universities and 38 private colleges and universities (MOE, 2018). However, this proposed study will be restricted to faculty members affiliated with one of the Saudi public universities and teaching one or more undergraduate courses at the time of this study. The reason for the latter delimitation is that the researcher wanted to get responses from instructors who are teaching and working at Saudi universities during the time of the study, so their reality will be reflected in a clear and current way. The researcher also excluded faculty members studying abroad as most have never taught in Saudi universities; they were sent abroad right away after their employment to complete their graduate studies. As a result, they did not have experiences in teaching.

Literature Review

Theoretical Framework: Unified Theory of Acceptance and Use of Technology

The UTAUT is the framework to guide this study. It is a well validated and a solid model of technology acceptance (Venkatesh et al., 2003). The developers of UTAUT, Venkatesh et al. (2003), reviewed eight technology acceptance models: diffusion of innovation (DOI), the theory of reasoned action (TRA), the technology acceptance model (TAM), TAM2, theory of planned behavior (TPB), the model of pc utilization, the motivational model, and the social cognitive theory. Venkatesh et al. compared the similarities and differences among 14 constructs from the eight models and came to specific framework that contains four constructs—effort expectancy, performance expectancy, social influence and facilitating conditions—and four significant moderating variables—gender, experience, age and voluntariness of use.

The UTAUT is one of the latest models conceived to understand the nature of technology usage and has been applied in various domains such as education, banking, and health care. Venkatesh et al. (2003) created the UTAUT after reviewing eight dominant models in the technology acceptance. These eight models stem from different perspectives– sociological, psychological, technological, or functional. Researchers have proposed various models and theories that investigate factors influencing humans to use computers and its applications. The UTAUT is one of the most cited models and well known in the area of technology acceptance where it recorded 22749 citations in Google Scholar as of January 31, 2019 (Google Scholar). It aims to understand users' behavior and intention to use different types of technologies.

The UTAUT model has four primary constructs, which are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions FC. The first three constructs are direct determinants and predictors of an individual's behavioral intention (BI), while the facilitating condition construct is a direct determinant and predictor of an individual's usage behavior (UB). Besides the four main constructs, UTAUT has four moderating variables, which are gender, age, experience, and voluntariness of years, each of which plays a key role in increasing or decreasing the influence of each construct.

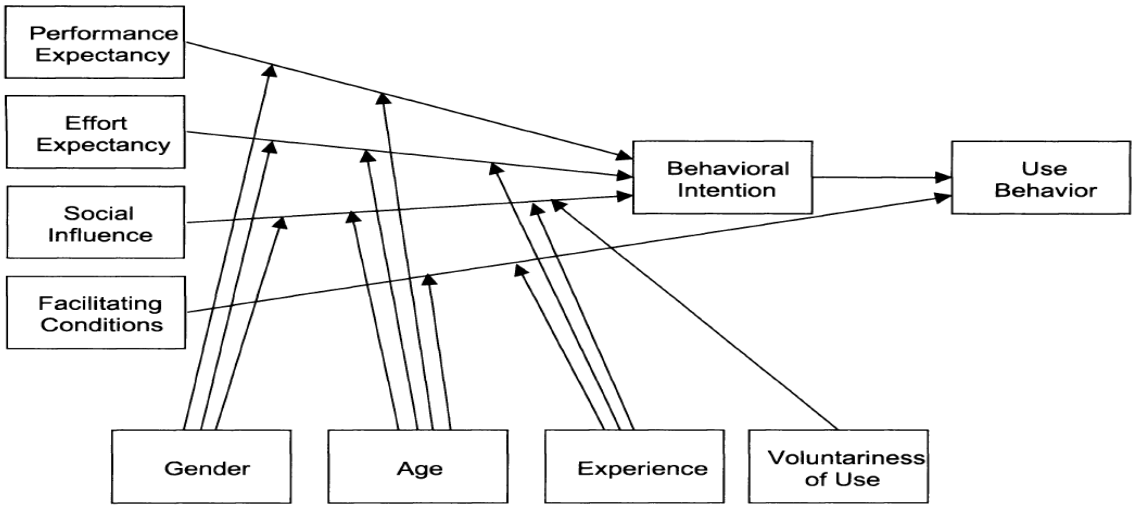

Figure 1: Unified Theory of Acceptance and Use of Technology Model (UTAUT) From: "User Acceptance of Information Technology: Toward a Unified View" By: Venkatesh, et. al., (2003). MIS quarterly, 27(3), 425-478. Copyright © 2003 by Regents of the University of Minnesota.

This research will use the UTAUT model as a theoretical driver for this study by following the original model, constructs and questionnaire of Venkatesh et al. (2003) as closely as possible. However, the original UTAUT contains four independent variables—PE, EE, SI, and FC—and two dependents variables—BI and UB. In this research, three of the independent variables will be used, which are PE, EE, and FC, to which the researcher will add one new independent variable—perceived understanding of the FC characteristics (PU). Thus, the total will be four independent variables, two dependent variables, and three moderators (see Figure 2).

ISSN: 2663-5798

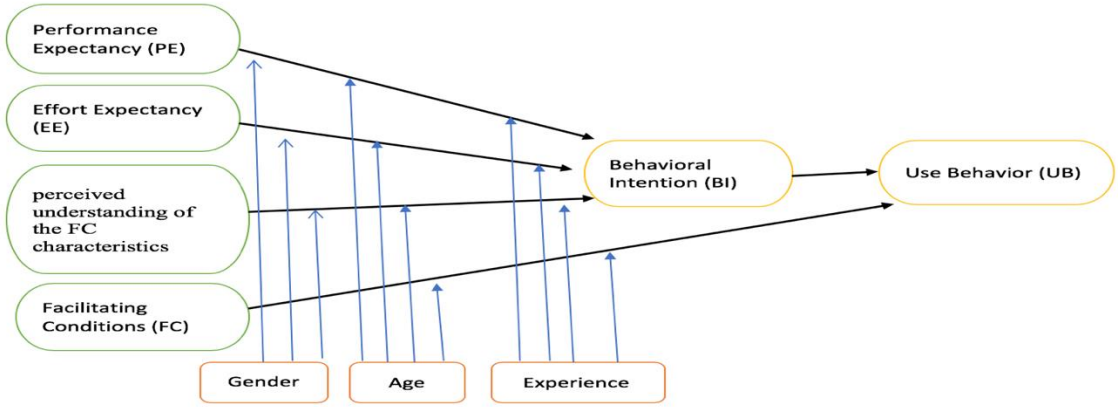

Figure 2. The proposed research model of flipped classroom model based on Unified Theory of Acceptance and Use of Technology (UTAUT).

Gender Differences in Using Technology

Much literature exists that has found that men and women have been characterized by a range of social, biological, psychological, and cultural differences (Hon Keung Yau, & Alison Lai Fong Cheng, 2012). It has been observed from the review of the existing literature that gender plays a significant role in determining the intention of accepting new technology (Goswami, & Dutta, 2016). For example, in the context of usage of information technology, gender acts as an influencing factor in technology adoption, as men are found to be more technologically adept compared to women (Goswami & Dutta, 2016). These differences can influence women and men's perceptions and behaviors on using technology. Research on social stereotypes has shown that feminine behavior is often stereotyped as being tactful, gentle, and aware of the feelings of others, while masculine behavior is stereotyped as aggressive, independent, unemotional, logical, and competitive (Gefen & Straub, 1997). In addition, the genders' differences among human beings are influenced by national, ethnic and cultural factors (Gefen & Straub, 1997).

Several studies have investigated gender differences in using technology. According to Morris and Venkatesh (2000), males and females differ in their acceptance of new technology. Gefen and Straub (1997) surveyed groups of 392 female and male knowledge workers using e-mail systems in the airline industry to determine gender differences in their beliefs about and use of computer-based media. They found women and men differ in their perceptions but not use of e-mail. These findings suggest that researchers should include gender effects in any future study related to technology acceptance because the use of technology may be perceived differently by the sexes. Feingold (1994), discovered no gender differences in technology usage, but males were found to be less anxious than female in accepting and using technology. Moreover, a study about computer-related behavior and skill conducted by Whitley Jr. (1997) found that gender differences in using technology exist but are minor. The bulk of these studies suggest that gender differences exist in the decision to adopt technology. However, there is no academic research focusing on the adoption of FCM model using UTAUT as theoretical framework.

Beside gender differences mentioned above, the KSA is the only country in the world that has a gender segregation policy in nearly the entire public sector, especially universities (except for the medical sector and King Abdullah University of Science and Technology). Male and female students are taught by the same gender in most cases, although in some cases, male faculty members may use video conferencing to teach female students. FCM model could be a useful approach that faculty members can adopt and use in their traditional classroom. However, gender differences are expected to have influence on behavioral intention and actual use in the KSA.

Flipped Classroom Model Based Technology

The FCM based technology is not an entirely new concept. For instance, English teachers may be among the first to use this model by asking their students to complete assigned readings at home in preparation for class discussions. Sams and Bergmann (2004), science teachers from Colorado, extended this model to other subjects. They distributed take-home

instructional materials, such as screencasts and previously recorded lectures, to students who were absent due to illness or extra-curricular activities. The two teachers realized how efficient this technique was for delivering instruction and decided to extend flipped lectures to the entire class. As a result, they were able to spend less class time lecturing and more time working on experiments while interacting with their students (Bergmann & Sams, 2011). Thus, they created the FC Model.

The FCM based technology describes an educational strategy that reverses the traditional lecture and homework elements of a course. According to Tolks, Schafer, Raupach, Kruse, Sarikas, Gerhardt-Szep, and Hege (2016), the self-directed learning stage where new materials and knowledge are introduced and the classroom stage where the students practice and implement previously gained knowledge are the main component of the inverted classroom. Cabi (2018) explained that "FCM is an educational technique which consists of two significant components: (1) the use of computer technologies such as video lectures and (2) the involvement of interactive learning activities" (p. 203). In the FCM, teachers first present learners with course material in advance of class—such as watching a video, reading a book chapter, or listening to a podcast—which frees class time from simple delivery of information that can be used for other purposes such as small group, active learning exercises, solving problems with their professors or peers, and applying what they learn to new contexts (Moffett, 2015; Berrett, 2012). Moreover, this advance of method gives teachers the chance to provide assessment for their students during the class time (Davies et al., 2013).

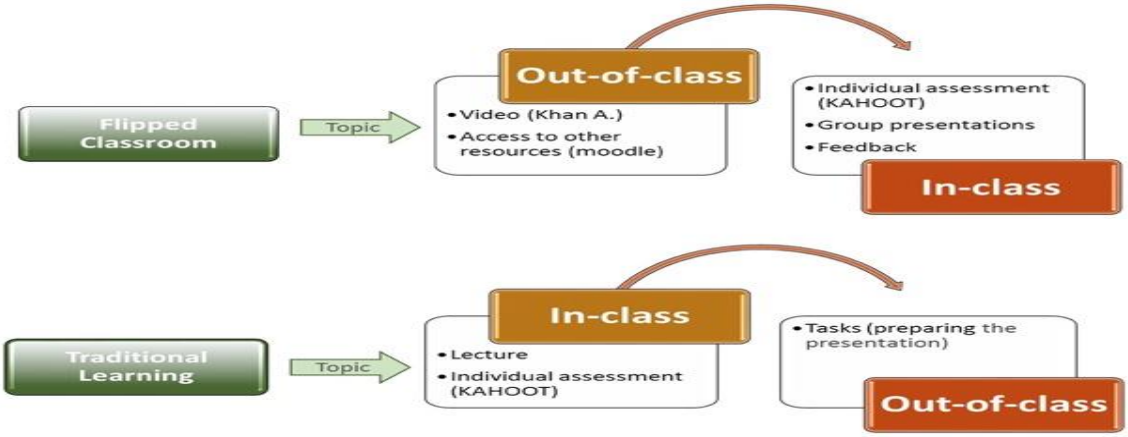

Figure 3. Flipped Classroom Model.

The main goal of any higher education institution is to provide quality learning to its students by facilitating deep learning; however, this goal is not fully achieved globally in most higher education institutions; this is sometimes due to over-reliance on the lecture method of delivering instruction. (Ivala, Thiart,& Gachago, 2013). As a result, adopting the FCM based technology will help educators in higher education to achieve their goal because technology is very important for today's students. Moreover, when educators integrate technology in their FC, that means students will have control on their own learning which will has a positive effect on their performances. Gerstein provided a full picture of the flipped classroom model based on an experiential model of learning that focus on continual learning cycle where it improved to include some technologies such as video lectures, Internet resources, and Web 2.0 tools. As shown in Figure 2.8 below. This model has four phases begins with experiential engagement activities "Experience" such as games, experiment, community project, and art activities. Then, this leads to concept exploration "What" that could be done through video lectures, audio lectures, online chats, and content-rich websites; these kind of resources will support and strengthen the students' learning because the learners control how and when these materials are accessed and viewed. Then, the third phase is making meaning "So What" it comes from the experiences and the concepts, this can be occur through blogging, voice reflections, video reflections, and tests. Finally, this model ends with how the learners demonstrate and apply what they learned "Now What" it can be done through creative personalized projects and presentations (2012). There are some benefits of using video in the FCM based technology: establishing discussion and idea exchange among students, educators, and subject matter experts, allowing students to access and learn from the best sources, enabling students to progress at their own pace, using class time for students collaborative, and preparing students for global citizens by allowing them to meet other students and teachers from around the world (Gerstein, 2012).

ISSN: 2663-5798

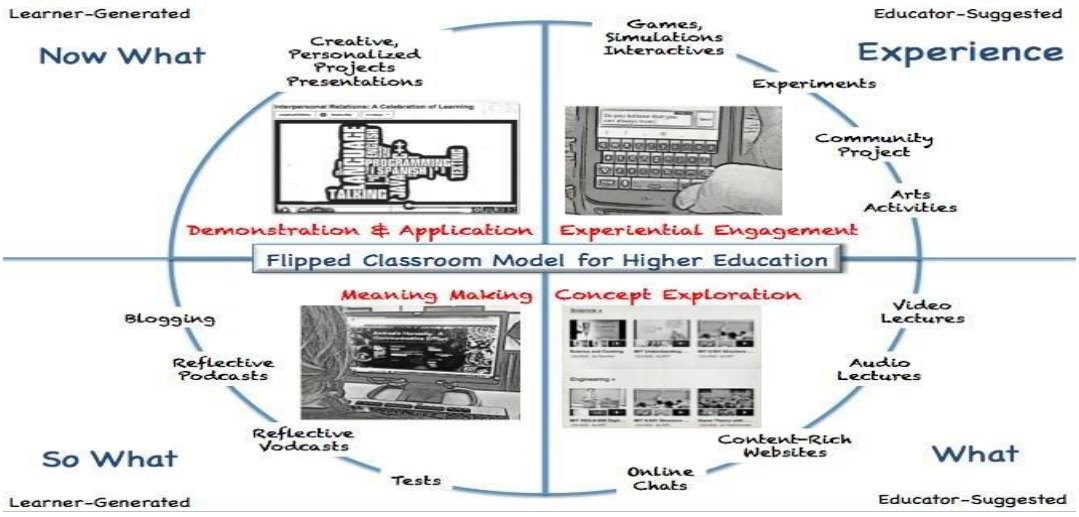

Figure 4 The Flipped Classroom Model: A Full Picture (Gerstein, 2012) From: "The Flipped Classroom: The Full Picture" by: Gerstein. J, (2012), p. 87. Copyright © 2012 by Jackie Gerstein.

Classes that Frequently Use Flipped Classrooms

FCM has gained much attention and acclaim among educators, and has become almost ubiquitous in K-12 and higher education settings (Turan & Goktas, 2016). However, certain elements of FC are not a wholly new ideas or methods, as math, science, and English classes have frequently used FC-like strategies for decades (Berrett, 2012). For instance, in literature classes, the professor may ask the students to read a novel at home and then discuss themes and symbolism in class or how law schools traditionally apply a flipped method in which students study and prepare materials ahead of time and participate in class through Socratic seminars. Moreover, according to Moffett (2015) medical schools rely on FCM to provide better education for the students. Professors in different universities have applied the FC for decades. According to Berrett (2012), Law professors used to ask their students to study the materials before class time, and the same way with Humanities professors who expect their students to read the assigned novel; so, class time would be for drawing out themes. The University of Michigan at Ann Arbor provides an example for adopting FCM for their math department. Since the mid 1990s its math department has offered up to 60 small sections for 80 minutes long for three days a week with 32 students or less in each class, so the students did their reading and preparing at home before class so the class time could be for discussing and practicing (Berrett, 2012).

Educators interested in improving teaching and learning strategies believe that flipped learning will be the future of education technology learning since FCs allow for a direct interaction between teacher and students in the class. An AP Literature teacher provided one successful example when he flipped his English class by using a blog for introducing the lessons to his students (Sztabnik, 2014). The traditional method for English class is that students assigned a book to read at home then do some discussion and worksheet in the school. Sztabnik adopted a new method with his students by giving them the chance to choose any book they want to read, letting them read in the class 3-4 times a week, and finally, writing in their blog about their experience at home. The teacher role in this method is to help the students during the reading time by answering their questions, giving them some affective strategies for their reading, and giving feedback to their blogs.

The Advantages of Using Flipped Classroom

FCM promotes the integration of independent learning and use of technology outside the classroom, as well as learner-centered activities and more efficient student–teacher interactions inside the classroom (Chen, Lui, & Martinelli, 2017; Jensen, Kummer, & Godoy, 2015; Young, Bailey, Guptill, Thorp, & Thomas, 2014). Integrating technology in teaching and learning has positively transformed higher education's delivery system from traditional face-to-face to the concept of a digital delivery platform (Ivala, Thiart, & Gachago, 2013; Maarop, & Embi, 2016). FCM also boosts students' engagement, develop team-based skills, focus on classroom discussions, provide personalized student guidance, and provide faculty freedom (Kennedy, 2015). When educators flip their classes, it frees them from introducing the new materials and concepts. As a result, they will have more time to spend with their students and focus more attention on their

needs as individuals. Another key element of flipped classroom is the consistency which means every class adopt FCM should have group work and plenty of time to practice and apply the key concepts which means learning is happening all the time.

Flipping allows colleges to make the traditional lecture model more productive. If instructors do this well, they can use faculty members' time and expertise more appropriately, they can also use their facilities more efficiently and they can get better student-learning outcomes (Berrett, 2012). Moreover, they will be able to know which concepts or subjects that need more focusing. FCM helps educators to organize their courses' materials as what will be covered prior to class and what will be during the class by using educational models to help them such as Bloom's taxonomy (Moffett, 2015).

FCM ensures a good use of the study time; allows learners to repeat the lesson more than once based on their individual differences and comprehension ability; gives teachers the class time to guide, motivate and help students; builds stronger relationships between teacher and learners; promotes the best use of modern technology in education; makes the learner an active learner; and promotes critical thinking, self-learning, experience building, communication skills and collaboration among learners (Bergmann & Sams, 2011; Kennedy, 2015). Videos and the Internet are the main two components of flipped learning. Abdulrahman and Al-Zahrani (2015) claimed FC mainly relies on the use of visualization such as videos and presentations. As a result, videos and presentations will help to improve the creative thinking among students especially in higher education because visualization usually used to promote creativity (Abdulrahman and Al-Zahrani, 2015). In fact, FCM boosts students' engagement, develops team-based skills, focuses on classroom discussions, provides personalized student guidance, and provides faculty freedom (Ivala, Thiart, & Gachago, 2013; Kennedy, 2015).

The FC Model positively impacts teacher-students interaction and learning satisfaction (Cabi, 2018). Another advantage of adopting flipped classroom for educators that some Medical educators suggest that they can benefits from integrating new methods or people onto their courses like involving experts to their courses and give the students the chance to ask them and learn from them (Moffett, 2015). Moreover, flipped classroom might be beneficial for quiet students who do not contribute in the classroom by giving them more courage and motivation to participate in small group discussion and practice collaborative skills. It allowed teachers to walk around, meet all groups of students, and talk with them (Berrett, 2012; Findlay-Thompson & Mombourquette, 2014). The FCM is flexible, and it is very scalable that teachers do not have to flip their whole semester; they can flip one lesson or one unit. According to Moffett (2015), a decision to flip need not be an "all-or-nothing" commitment. The FCM techniques can be incorporated around single topics or modules; indeed there is evidence to suggest that students prefer courses that are divided into both traditional and FC portions.

The FC model has gained widespread attention during the latest decade. As a result, some meta-analyses and systematic reviews have been conducted to determine the advantages of FCM. A systematic review of the effectiveness of flipped classrooms in undergraduate medical education was conducted using the major electronic databases in 2016. Results from this review suggest that the FCM is a promising teaching approach, particularly when the intent is to increase learners' motivation and increase task value and engagement. Also, examining these studies shows that students generally liked the FC method of education. Although the results were mixed with regard to knowledge and skill set gains, the FC was shown to be at least as effective as traditional education with regard to these outcomes (Chen, Lui, & Martinelli, 2017). Another systematic review of research on the FCM was in the field of engineering education. The purpose of this review is to describe the current state of knowledge and practice in the FC model by critically appraising and summarizing existing quantitative and qualitative research; this systematic review reviewed articles published between 2000 and 2015. The results indicated that FCM gained popularity amongst engineering educators after 2012. The review revealed that research in engineering education focused on documenting the design and development process and sharing preliminary findings and student feedback (Karabulut-Ilgu, Cherrez, & Jahren, 2018).

A meta-analysis of 28 eligible comparative studies about FCM and how it improves student learning in health professions education was conducted. Findings showed an overall significant effect in favor of flipped classrooms over traditional classrooms for health professions education. In addition, the FC approach was more effective when instructors used quizzes at the start of each in-class session. The majority of participants reported they preferred FCM to traditional classrooms (HEW, & LO, 2018).

The Disadvantages of Using Flipped Classroom

Whilst FCM can have many advantages for addressing the ways educators teach and the ways in which students learn, several challenges are associated with the implementation of FCM. Despite the simple idea of FCM, many teachers make mistakes when applied on the ground because effective FCM depends on the precise preparation of the scientific content. The transfer of lessons requires a lot of time and effort by the teacher and the preparation of activities and projects and training must be prepared in a deliberate manner to get the desired educational impact and stimulate learners to prepare a good lesson (Berrett, 2012).

The application of FCM based technology takes a lot of time and effort by the teacher and may need to develop other skills such as learning to produce and edit video clips or animated presentations and other technical skills (Berrett, 2012). Learners may complain about the reduced time of lessons given face-to-face, especially if they believes they can understand the scientific content by watching sections without attending lessons based on activities and exercises. The opposite may occur when learners do not believe in the importance of this educational strategy, especially that its success depends on the enthusiasm and motivation of the learners, so they attend classes without prior preparation, which affects their educational attainment (Keengwe, Onchwari & Oigara, 2014). In addition, there are potential challenges associated with the flipped classroom approach, which need to be noted. The FCM may cause students to become quite resistant or concerned, as FCM requires them to take on more responsibility for their self-learning (Findlay-Thompson & Mombourquette, 2014).

There is a systematic review of FCM research in the field of education technology examined academic publications on FC based on all Scopus database (n = 530) references available until mid-June 2016. The aim of this review is to examine the knowledge contributions with the field so far in relation to the wider research topic of educational technology. Most of these studies were conducted in the United States (US), and they focused on higher education sector in the area of (science, technology, engineering and math). This systematic review found that the current state of FCM as a field of interest is growing fast. However, the knowledge contributions related to the flipped classroom approach are relatively siloed and fragmented and have yet to stabilize. Academically and socially, the research is quite scattered, and only local evidence and experiences are available. In addition, the knowledge contributions within this field of interest seem to be anecdotal rather than systematically researched. Most of these studies in this review lacked anchoring, which means they did not apply a strong theory like learning theory or instructional design to guide their research or examine aspects of the FC model more fully (Lundin, Rensfeldt, Hillman, Lantz-Andersson, & Peterson, 2018).

Implementation of Flipped Classroom

It is important for educators who want to implement FC in their course to know that the changing and implementation require time, effort, and technical support to adopt the approach (Moffett, 2015). Another essential point when educators make their decisions about the implementation should think first about the educational theory and evidence based-practice related to the use of FC (Moffett, 2015). Universities are providing a plethora of programs to support academics in flipping their courses because FCM became so popular (Miles & Foggett, 2016). Many online resources exist for faculty to create and upload materials for the out-of-classroom lessons, such as the following:

- Office Mix: for creating materials.
- TouchCast: a new medium that looks like video, but feels more like the web. It makes communication richer, interactive and more human.
- Camtasia: used for making videos and screen recordings. It is a video-based screen capturing software program. The software should be installed on a computer, then, the screen captures will be directly recorded to a digital video format with higher quality audio.
- Screencast: a free screen recorder for instant screen capture and sharing.
- You Tube: for uploading videos.
- Vimeo: a video sharing platform that was launched in 2004 by a group of filmmakers.
- Screencast: a digital video recording that captures actions taking place on a computer desktop, and it contains voice-over narration.

- Storify: a social media tool that lets users create stories or timelines from a variety of social media resources like Facebook and Twitter, as well as other web resources.
- TeacherTube: a free community for sharing instructional videos and content for teachers and students.

These are only a few of the resources that can help faculty who are planning on flipping their classroom, or have already. These sites and apps can help instructors to create and deliver their content to the students in an interactive way.

Overview of Higher Education in Saudi Arabia and Its Teaching Approach

The KSA has 28 public universities located in different geographic regions in the KSA. The Saudi MOE governs all the universities in the kingdom. Since the beginning of the year 2016, the KSA's crown prince Mohammed bin Salman has adopted a new vision and strategies for the development of the KSA to become one of the most advanced countries in the world in terms of the economy and education in 2030 (Alharbi, 2016). Therefore, university leaders in the kingdom have responded to the development by becoming with world-class universities and internationalizing higher education. Because of the new vision for the KSA, it has become more challenging to meet the country's higher education expectations. For example, Saudi universities are still facing challenges concerning research productivity, accreditation, improving quality, and technology integrating (Alharbi, 2016).

Higher education relies heavily on traditional pedagogical models that emphasize the memorization and recollection of information with minimal focus on critical examination, context, and application (Duch, Groh, & Allen, 2001). Accordingly, students do not fully engage with the content and often "fail to develop the full battery of skills and abilities desired in a contemporary college graduate" (Duch, Groh, & Allen, 2001, p. 4). The teaching process in higher education classroom used to emanate from the instructor, who was the one who dominated the whole teaching and learning process. This strategy is called the teacher-centered approach, in which teachers play the primary role in the learning process as the information providers or evaluators, and in which students are viewed as learners who passively receive information (Ive, 2017). As a result, the instructor acts as the only source of knowledge, and students feel that they are excluded. Paulo Freire named this type of teacher-centered teaching approach as the banking model education. Freire, Ramos, and Macedo (2017) stated,

In the banking conception, it is the educator who knows and the pupils who are thought, it is the educator who speaks and the pupils who quietly listen, it is the educator who makes and prescribes his choice and the pupils who follow his prescription, it is the educator who chooses the content of the program; the pupils' ideas on the program are never heard. (p. 14)

In this approach, instructors usually have less motivation for innovation in teaching because instructors usually use particular textbooks that contain the same information presented by the instructor, these books also include some exercises that make the students more individualistic because they have less opportunity to think aloud or interact with other students. Alhareth, Aldighrir, and Alhareth, (2015), stated that traditional methods of teaching were used at Saudi universities where students play no active role and much memorizing without creative thinking or discussion; students are expected to accept what they hear from their professors or read from their textbooks and their role is to learn the information, which is reflected in the way their personality develops.

A teacher-centered approach does not help in integrating the new information into students' minds. Moreover, the existence of a gap between the needs and requirements of the community and the nature of the educational process and methods of teaching that rely on conservation and indoctrination and not on the development of the skills of the learner. As a result, it has become necessary to find another teaching method that can meet the needs of the community and the learners; a student-centered approach is a good choice. Some researchers advocate the adoption of more modern methods, such as student-centered, active learning using brainstorming, teamwork and inventive thinking. As a result, the government launched the King Abdullah Bin Abdul Aziz Project for Developing Public Education with a budget of SAR 11.8 billion, to modernize the educational system and introduce modern technologies such as the internet and computer applications to develop teachers' skills and enhance and improve school activities (Alhareth, Aldighrir, & Alhareth, 2015). Innovation in teaching has begun and active learning strategies are now being used at some universities; however, still the majority of universities and faculty members use the passive methods which is teacher-centered (Alhareth, Aldighrir, & Alhareth, 2015).

Student-Centered Approaches

Currently, strategies of teaching any subject or curriculum seek to get every student in board; which means students should be engaged fully in the learning process and no one is left behind. According to Haber-Curran and Tillapaugh, there is a need for pedagogical approaches that challenge traditional strategies of teaching and learning by incorporating students to help construct their learning and engaging students in the learning process (2013). For example, student-centered approach helps students to be active learners, and active learning includes several approaches that are very helpful for applying student-centered approach which are problem-based learning, action inquiry, collaborative learning, and cooperative learning Such pedagogical approaches help empower students, encourage them to become invested in their learning, and facilitate the development of interdependent relationships with peers and instructors (Baxter Magolda & King, 2004; Duch, Groh, & Allen, 2001; Haber-Curran & Tillapaugh, 2013). "In the student-centered class learners do not rely on their instructor all the time; waiting for instructions to be given, correction and praise. Instead learners listen to each other's voice and respond actively" (Leo, 2007, p. 2). The student-centered teaching encourages learners to be responsible for their own learning and become independent learners at the end of the school day because the student-centered approach means specifically bringing the learners into the Centre of the whole learning process (Arman, 2018).

A student-centered approach is a powerful approach that educators can integrate with other frameworks. For example, a study used the student-centered approach with Moses' five-step approach as a scaffolding framework to teach diverse learners. Moses' approach serves as a liberating framework, allowing diverse learners a common entry point to experience and comprehend complex concepts and vocabulary. This pedagogical framework fosters a rich student-centered environment where students become active agents of their own learning (Ahn, Ji Yeong , White, Monroy, & Tronske, 2018). In a student-centered class, at different times, learners can do a variety of tasks: they can work individually and jointly, they can work in groups sharing their ideas and experiences; make comments to improve their partner's work, and compare and discuss their answers (Arman, 2019). Learners value each other's contributions and assist each other and work on a variety of things. For instance, students work in groups, pairs, and as a whole class. A teacher's role is viewed as somebody who helps students to learn; she/he is considered to be one of the participants and not someone who dominates the whole scene (Arman, 2018). Student-centered approaches work well with FCM because both focus on the learners. By adopting FCM, the instructor is applying a student-centered approach at the same time. The FCM is one of the best pedagogical approaches in higher education that has greatly transformed teaching and learning practices of instructors and students by permitting increased interaction during class by transferring the responsibility of learning from instructors to students through student-centered approach and active learning (Smith, 2015; Tu & Liu, 2016).

There are some theories that led to the emergence of student-centered approach. For example, constructivism, in education, is deemed to be the primary pillar that led to the emergence of student-centered as a learning approach (Arman, 2018). It is considered to be a paradigm shift in the field of teaching and learning (Arman, 2018). Constructivism in the field of education tries to give an explanation to the following questions: how human learning takes place? How knowledge is constructed? What role does social environment play in the process of constructing knowledge? (Arman, 2018).

Active learning. University faculty members often desire to increase engagement of students in the classroom. Student engagement is a rich research area. Educators must continue to seek to understand and apply specific, well-considered, if not agreed upon, strategies that support student engagement in learning both in and beyond the classroom (Taylor, 2000). One approach that has been successful for student engagement is active learning. Bonwell and Eison defined active learning as any instructional method that engages students in learning processes that "requires students to do meaningful learning activities and think about what they are doing" (as cited in Prince, 2004, p. 223). Active learning is a broad term for instructional methods that engage students through meaningful learning activities that require students to solve a problems or tasks. Moreover, the tasks should be sufficiently complex that higher-order thinking is involved like analysis, synthesis and evaluation (Sibona & Pourreza, 2018). One essential goal that any faculty member should achieve during the class time is to be able to actively engage students with the material because students learn better when they participate in the process of learning. When faculty use active learning, students engage with the material, participate in the class, participate in discussion, and collaborate with other students.

Active learning is a teaching strategy that can be part of the constructivist learning models that aim to encourage students not just to remember information but to engage with it, work with it, take ownership of it, and understand it by adding to known knowledge and building on new knowledge by exploring possibilities (Clark, 2008). The core elements of active learning are class activities and encouraging the students to participate in the class activities. Student-centered approaches often lead to active learning; notable pedagogies used within student-centered active learning that facilitate

student engagement and empowerment in the classroom include cooperative learning, collaborative learning, action inquiry, and problem-based learning.

Cooperative learning and Collaborative learning. Cooperative learning and collaborative learning are two teaching strategies that many people and educators used them interchangeably because both of them have some similar characteristics such as student work in small groups instead of lecture-based teaching, student are encouraged to work together, active learning is highlighted, teacher acts as facilitator, and teaching and learning knowledge and experiences are shared by both teacher and student (Millis, 2010). However, these two strategies are different from each other. Some educators view collaborative learning as cooperative learning because both of them encompass all group-based instructional methods (Prince, 2004).

Cooperative learning is part of collaborative learning. It is related to student-centered approach because it focuses on learners. People thrive on cooperation (Hamdan, 2005; Millis, 2010). Cooperation, therefore, is a significant factor in the development of all aspects of human societies including education. Cooperation is working together to accomplish shared goals. Within cooperative situations, individuals seek outcomes that are beneficial to themselves and beneficial to all other group members (Hamdan, 2005). Cooperative learning relies on the students participation in a small groups to work in structured projects that has a clear goal or outcome. According to Prince, Cooperative learning can be defined as a structured form of group work where students pursue common goals while being assessed individually; the core element held in common is a focus on cooperative incentives rather than competition to promote learning (2004).

Collaborative learning is part of cooperative learning. Also, it is more teacher-centered approach. Prince (2004) defines collaborative learning as "any instructional method in which students work together in small groups toward a common goal; the core element of collaborative learning is the emphasis on student interactions rather than on learning as a solitary activity" (Prince, 2004, p. 223). In fact, collaborative learning is taking place whenever students are working together, whether this was in helping one another with homework or participating in a class debate.

Action inquiry. Action inquiry means engages learners in reciprocal and mutual inquiry through reflecting in action on oneself, the situation, one's relationships, and the system as a whole (Haber-Curran, & Tillapaugh, 2013). In addition, simultaneously engaging in action and reflection can help the instructor and learners to increase their awareness which can lead to greater leadership capacity and organizational effectiveness. As a pedagogical approach, action inquiry invites students to make meaning of their experiences and shape their own learning and the learning of their classmates. Exposure to this type of learning equips students with valuable skills of inquiry and reflection while actively engaging in leadership (Haber-Curran, & Tillapaugh, 2013).

Problem-based learning. One of the biggest problem facing universities today is that most of what teach to their students are far from reality because a huge part of what we learned in the past from the textbooks, we did not use even once in our daily lives. As a result, the biggest challenge today is to create a learning environment similar to what happens in life and reality which could be accomplished through problem-based learning strategy. Prince defines problem-based learning (PBL) as "an instructional method where relevant problems are introduced at the beginning of the instruction cycle and used to provide the context and motivation for the learning that follows" (Prince, 2004, p. 223). PBL is a strategy that falls under active learning, where the learners is the focus and basis of the educational learning process. Learning occurs according to this method by converting the goal of the lesson into a specific problem that requires exploration in the first place, understanding it, analyzing it, and finding the appropriate solution for it (prince, 2004). Learning occurs better when students deal with real life problems, as they are more motivated to learn through their attempts to find a solution to these problems whether these problems in school position or real life situations. PBL typically involves significant amounts of self-directed learning on the part of the students by applying their knowledge to solve a problem (Prince, 2004).

It should be noted that PBL is not a new strategy, as John Dewey who is an American philosopher, psychologist, and educational reformer touched upon in his book "Democracy and Education"; he developed a concept of education that includes a focus on problem-solving, and added that schools must reflect what the society needs by making classrooms as laboratories to solve real-life problem (2009). PBL is also considered to be related to constructive school because the student analyzes new data according to his/her previous knowledge and builds upon new knowledge. Also, it considered to be related to social learning because work on analyzing and solving the problem occurs within groups. Finally, the instructor's role in this kind of teaching strategy is limited to facilitating learning by supporting and guiding learners and monitoring the learning process.

Methodology

Design:

This study followed a non-experimental, quantitative correlational design in which the research purpose was to examine the acceptance level of implementing a flipped classroom model with a student-centered approach among faculty members who are teaching undergraduate courses in Saudi universities through examining the relationship between the variables (Creswell, 2012). Specifically, performance expectancy (PE), effort expectancy (EE), facilitating conditions, and perceived understanding of FC characteristic were examined in relation to behavioral intention and use behavior.

Sample and Population:

The target population for this study was university male and female faculty members from Saudi government-sponsored universities from all fields and all educational or academic ranks (i.e., professors, associate professors, assistant professors, lecturers, instructors, or teachers). There are 38 universities in the KSA, 28 of which are public located throughout all 13 Saudi administrative provinces (Riyadh Province, Makkah Province, Madinah Province, Qassim Province, Eastern Province, Asir Province, Hail Province, Tabuk Province, Al-Baha Province, Northern Boarder Province, Jazan Province, Aljouf Province, and Najran Province) (MOE, 2016). According to Alkhalaf, Nguyen, and Drew (2013), institutional growth in Saudi Arabia exploded from 2005 to 2009; a new university was opened every three months, and five colleges were opened every five months. According to the Saudi MOE (2018), approximately 83,884 teaching staff work in Saudi universities, 69,588 of which are faculty members teaching in public universities, regardless of their positions, degree, and gender (MOE, 2018). This study focused on public universities as these universities are under the umbrella of the MOE; thus, the population of the study was the 69,588 public university faculty members, (39,380 male and 30,208 female). Because of this large population size, a sample size of N= 382 was determined to be sufficient based on Krejcie and Morgan (1970). This sample size assures a 95% confidence interval with 5.0% margin of error. However, taking into consideration that surveys typically have low response rate (Fan & Yan, 2010), the researcher continued sending out surveys until the desired sample size was reached and then surpassed. The final sample sized was 776 participants.

The researcher used a combination of stratified random sampling with equal allocation and quota sampling methods for this proposed study. The researcher used one stratifying variable - the gender with a target sample size of 776, 388 male and 388 female participants were randomly selected from the respondents to obtain an equal number of male and female faculty members.

Stratified random sampling is a probabilistic sampling that involves simple random sampling from each stratum (Vogt, Gardner, & Haeffele, 2012, p. 125) formed based on members' shared attributes or characteristics. According to Vogt, Gardner, & Haeffele (2012), researchers use stratified random sampling when they want to compare groups that are not equally represented in a population, which is the case in this study, as Saudi universities have different numbers of male and female faculty members (MOE, 2016). Furthermore, stratification can improve the efficiency of the sampling design and ensure adequate representation in the sample of specific groups from the target population at the same time (Joncas & Foy, 2011).

Quota sampling was employed in that the researcher continued sampling until the desired sample size from each stratum was reached (i.e., 191 males and 191 females). This sampling method is non-probabilistic sampling and is used when the population is divided into strata to select members of the population according to their relevancy to the topic of interest (Yang & Banamah, 2013).

Variables and Instrumentation:

Based on the research questions, there are five independent variables in this study—performance expectancy (PE), effort expectancy (EE), facilitating conditions (FC), perceived understanding of the flipped classroom characteristics (PU), and three moderating variables which are gender, age, and experience —and two dependent variables—behavioral intention (BI) to use flipped classroom-based technology and use behavior (UB) of adopting flipped classroom-based technology. For each variable, a Rasch score was computed from instructors' responses to a series of questions on a 4-point scale from strongly agree to strongly disagree. Higher Rasch scores were interpreted as a higher level of acceptance to adopt FCM based technology with student-centered approach.

This study employed a modified UTAUT questionnaire, employing only five UTAUT constructs (performance expectancy, effort expectancy, facilitating conditions, behavioral intention, and use behavioral) to ask about FC characteristics. Furthermore, the researcher developed the questionnaire for the perceived understanding of FC characteristics.

One new construct was proposed in this study: the perceived understanding of the flipped classroom characteristics. This construct was developed by the researcher and its questionnaires were validated by four experts in the college of Education. Moreover, the researcher ran a pilot study with 29 Saudi university instructors to ensure that they were able to answer the questions. The researcher did not find any studies that had the same proposed construct. However, there are many studies that apply "technology characteristics" with another type of technology like mobile learning, and they found that this construct was a significant influencer of technology acceptance (Al-Mahadeen, Thamer, & Bassam, 2013; Chaveesuk, Vongjaturapat, & Chotikakamthorn, 2013).

The survey was divided into two sections. The first section contained demographic questions. The second section was about the UTAUT. It was divided into six subsections as follows: performance expectancy, effort expectance, facilitating conditions, perceived understanding of FC characteristics, behavioral intention, and use behavior. Each subsection contained six to eight questions. All the questions were asked on a 4-point Likert scale, from strongly disagree (1) to strongly agree (4). This section contains thirty three items (8 items for the first construct, and 5 items for each other constructs) twenty-eight of the items validated by Venkatesh et al. (2003), and the five remaining items validated by other experts.

Research Ethics and Permissions:

This study investigates factors that influence the acceptance to adopt FCM based technology among faculty members in Saudi universities. As a result, the researcher needed to get the approval from the University of Toledo Institutional Review Board (IRB) because the study involved human subjects and the results would be published as a dissertation. The IRB approval facilitated the researcher's communication with the Saudi MOE, the universities, and the departments within those universities. The researcher was required to obtain informed consent from the participants. The informed consent was linked to the survey. It included the study title and purpose, a brief description of the procedures, an explanation of benefits and risks, and assurance of confidentiality. Participants were also informed that there would be no costs to them for participating in this research study. The participants were informed that the risks would be minimal because the survey was anonymous. The participants were also informed that the use of cloud computing instead of storing data on hard devices with strong passwords and accessing data from secured networks will ensure confidentiality.

Rasch Analysis

Rasch analysis is a statistical approach to the measure of human performance, attitudes and perceptions. It is named after its inventor, the Danish mathematician Georg Rasch. He published his theory in 1960. Rasch analysis is a psychometric tool for use in the social sciences to improve the precision with which researchers construct instruments, monitor instrument quality, compute respondents' performances, and evaluate the strength of the inferences drawn from instruments. In fact, Rasch analysis also helps researchers think in more sophisticated ways with respect to the constructs (variables) they wish to measure.

Data Collection Procedures:

The data in this study was quantitative data obtained from the questionnaire. The Qualtrics survey website was used for publishing the questionnaire. Qualtrics is a private research platform, and two links for the questionnaire were produced to be sent to participants; faculty members affiliated with Saudi universities were contacted and invited to participate in the study. They received the link of the questionnaire through WhatsApp and by email. The researcher could collect data using social networking sites through three strategies: direct contact, referrals, and social networks (Mirabeau, Mignerat, & Grange, 2013). The collection of data occurred in Fall 2019, that is, at the beginning of the academic year. The link to the survey was available to the participants for one month.

The researcher followed three data collection approaches to attempt to get a high participation rate. First, the researcher used personal communication with faculty members affiliated with Saudi universities, who were then asked to

participate and to share the questionnaire link with their fellow faculty members. Second, Saudi universities, as well as colleges and departments within those universities, were contacted via email and asked to post the questionnaire among their faculty members and then encourage all faculty members to distribute the questionnaire to other faculty members from their contact lists. Lastly, the researcher shared the link of the questionnaire on social medial platforms such as WhatsApp. The questionnaire was available online for four weeks, with a reminder email to be sent to potential participants to encourage and remind participation in the survey.

Data Analysis

Two types of programs were used to analyze the data for different purposes. The researcher used Winsteps, which was developed by Benjamin Wright and John Michael Linacre in the 1980s at the University of Chicago (Linacre, 2004). The main purpose of analyzing the data with Winsteps was to see if the research instrument measured what the researcher planned to measure or not by looking at items and instructors' reliabilities and separations, items and instructors' distributions, response' probability, and items and instructors' fitting. The other program used for data analysis was the latest version of Statistical Package for the Social Sciences (SPSS), which was used to perform a descriptive analysis regarding the demographic questionnaires and to analyze the research questions.

This study further analyzed the effect of the four antecedent constructs with the three moderators (age, gender, and experience) on behavioral intention (BI) and use behavior (UB). Multiple regression analyses were conducted to describe the relationship between the variables in all the research questions. This allowed for examining and analyzing the specific relationships among the predictors: performance expectancy (PE), effort expectancy (EE), facilitating conditions (FC), and perceived understanding of the characteristic of the FCM (PU) and their influence on BI and UB. Multiple regression was used to determine the degree to which independent variable were related to or predicted dependent variables (Creswell, 2012). Bryman and Cramer (2001) stated that linear regression is a widely used analysis that is useful for studying how single independent variables affect a dependent variable, and to study the influence of multiple independent variables and interaction effects involving combinations of those variables. Also, path analysis was used to discover the relationship among the multiple variables. According to Frances, Hasani, & Amaury (2004), Path analysis is a statistical technique developed to help social scientists deal with studies that involve the analysis of hypothesized relationships among multiple variables. Path analysis is a variation on multiple-regression analysis and is useful for analyzing a number of issues involved in causal analysis. With path analysis, researchers conduct a series of regressions to analyze influences on dependent variables within the model. Frequently, dependent variables serve as independent variables for later regressions within the model. In some models, but not all, there is one ultimate dependent variable of interest to the researcher. A regression is conducted for each dependent variable and effects are calculated across regressions for cumulative effects.

The researcher created a path diagram that included background variables (age, gender, and experience), predictors variables (PE, EE, FC, PU, and BI), and the outcome variable UB. The aim of creating a path diagram was to see if there was a direct or indirect relationship among the three types of variables.

Results

The aim of this section is to address the research questions through the analysis.

Pilot Study Details

In the pilot study, Rasch analysis has been applied to check the internal consistency, separation and reliability of instructors and items in the survey instrument. As shown in Table 1 below, the instructors' reliability = .94 which is perfect. Also, the instructors are separated into 3 or 4 groups, as shown in Figure 5. Based on the Rasch Measurement, the more separation we have, the better reliability we get. In addition, the items' reliability = .83 which is good, and the items are separated into 2 or 3 groups, as shown in Table 2.

العدد الثلاثون
تاريخ الإصدار: 2 – نيسان – 2021 م
www.ajsp.net
ISSN: 2663-5798

Table 1

Internal Consistency for Items and Instructors

	Items	Instructors
INPUT	29.00	29.00
Mean	54.00	61.50
Separation	2.19	4.09
Reliability	0.83	0.94

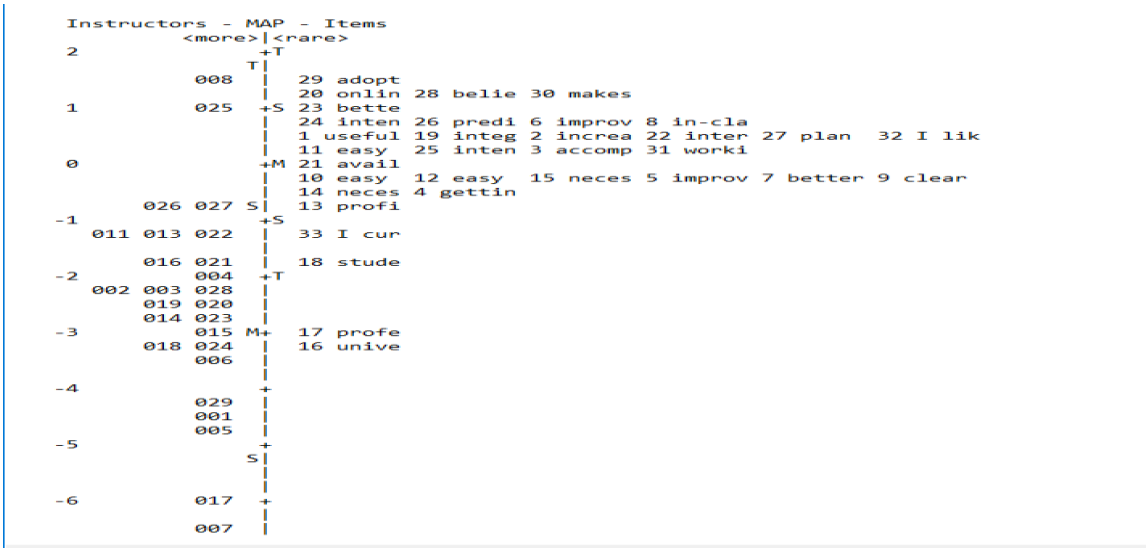

Figure 5. Items & Instructors Separation

Participant Characteristics

The total sample consisted of 758 participants who completed the whole survey. the participants were equal male 50% (n=379) and 50% of the participants were female 50% (n=379). The age of participants ranged from 22 to 40. Age breakdowns show that the group most represented in the sample were those aged 40 or older (37.60%). Those aged 22-27 represented the smallest group in the sample at 5.94% (n=32),11, 24.93% of participants were 28-33 years old, and 31.53% were between 34 and 39 years old. Participants were asked to disclose their current academic rank/title levels. The largest group of participants indicated that their rank was assistant professor (34.04%, n=258), followed closely by Lectures (33.25%, n=252). The remaining participants had the titles of Professor (11.35%), Associate Professor (12.01%), and Teaching Assistant (9.37%, n=71). Also, more than half of the participants (57.38%) (n=435) were doctorate holders classified as Professors, Associate Professors, and Assistant Professors. It is also possible that some lecturers are also doctorate holders. Participants were also asked to disclose their teaching experience in higher education. 13, 15.83% of participants had an experience of 1 to 2 years (n=120); 20.98% of participants had an experience of 2 to 5 years (n=159); 26.78% (n=203) of participants had an experience of 5 to 10 years, and 36.41% (n=276) had an experience of 10 years and above. Participants were asked to report their affiliated universities. The largest group of participants (8.58%) were faculty members affiliated with Taif University. All universities were represented at least once in this study except for two

universities: Yanbu University College and Yanbu Technical Institute. There were 3.17% of participants (n=24) selected "Other" and indicated universities not listed. participants also were asked to select their affiliated college/department or to select the (Other) option and report their affiliated college/department. The largest group of participants were faculty members at a different colleges in medical fields, with 19.79% (n=150) of participants; the medical fields included medical schools, nursing schools, dentistry, and other similar colleges. Second, faculty members at a Colleges of Education composed of the second largest group at 13.72% (n=104) of participants. Examples of other colleges were Interior Design, College of General Studies, Earth Science and Engineering, and Chemical Engineering; those were mentioned by participants who chose the option "other". Finally, participants were asked to report on their computer skills and use of technology. The vast majority of participants indicated that their computer skills and use of technology ranged from intermediate to advanced. A majority of participants (50.00%) indicated that their computer skills were advanced. The second-largest group was those who reported that their computer and technology use were intermediate (44.33%). Only 5.67% of participants (n=43) reported that their level of computer and technology use was low.

The Result of the Research Questions and Analysis

This section focuses on the research questions of this study. The analysis of the research questions will be divided into two parts based on the research design. The first part involved analysis of all the research questions together by using multiple regression analysis and a path analysis model to examine the relationships among the constructs. Then, the second part, focused on further analysis on gender differences by applying independent samples t-tests.

UTAUT Constructs. Several constructs were measured in this study in order to test the model of flipped classroom based on Unified Theory of Acceptance and Use of Technology (UTAUT) discussed in Chapter 2. Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Conditions (FC), Perceived Understanding of the flipped classroom model characteristics (PU), and Behavior Intention (BI) were all important antecedent constructs that influence an individual's adoption of the FCM based technology. Also, three demographic factors (gender, age, and years of experience in teaching) were considered to potential impact directly or indirectly on Usage Behavior (UB) of adopting the FCM based technology.

The Result of all Research Questions

We proposed that there is a relationship among the UTAUT construct (IVs & DVs) and the demographic factors (mediator variables), directly or indirectly. As a result, we build a hypothesized path model based on our assumptions, shown in the diagram in Figure 6.

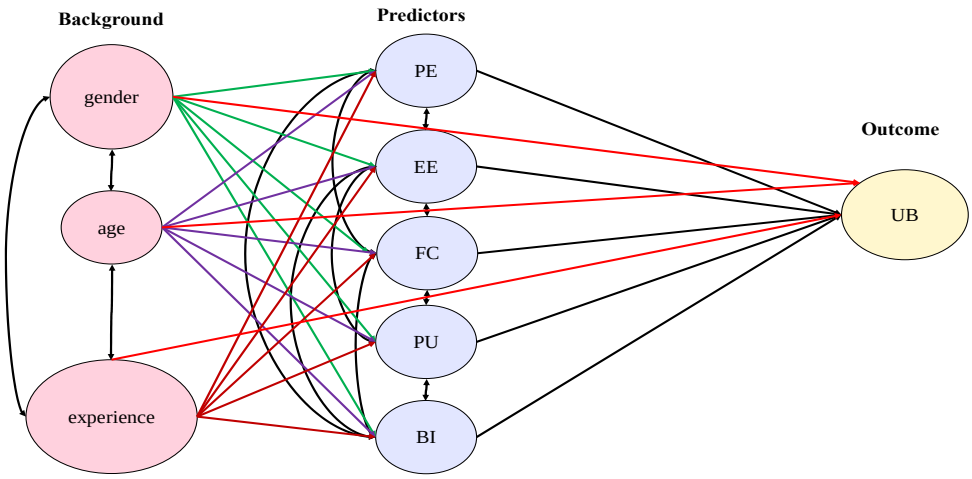

Figure 6. Proposed Path Model

A correlation first and multiple regression second were used to determine the relationships among all constructs, and to determine which paths are not significant in the model.

Correlations

Prior to conducting any multivariate models, Pearson's correlations between all UTAUT constructs and demographic variables were examined. Results are shown in Table 2. All UTAUT constructs were significantly and highly correlated with each other. BI and UB demonstrated the strongest significant correlation with r = .798 (p<.001); the correlation between PE and FC was weakest, but still moderate and significant with r = .371 (p<.001). The constructs were not significantly correlated with gender, age, and experience (p>.05).

Gender was significantly negatively correlated with age (r=-.173, p<.001) and experience (r=-.081, p<.05). As expected, age and experience were also highly significantly correlated, with r=.692 (p<.001).

Table 2

Correlations

	PE	EE	FC	PU	BI	UB	gender	age	exper
PE	1								
EE	.644**	1							
FC	.371**	.497**	1						
PU	.641**	.613**	.458**	1					
BI	.537**	.510**	.378**	.674**	1				
UB	.604**	.562**	.446**	.745**	.798**	1			
gender	-0.031	-0.053	-0.04	0.062	0.061	0.044	1		
age	-0.027	-0.005	0.039	-0.051	-0.039	-0.029	-0.173	1	
experience	-0.031	-0.049	0.029	-0.065	-0.066	-0.065	-0.081	0.692**	1

*p<.05, **p<.01, ***p<.001

Multiple Regression

To understand predictors of Use Behavior and factors contributing to increased use of the flipped classroom model, multiple regression was utilized as the primary analysis. The regression model was informed by the bivariate correlations. UB was the primary outcome with PE, EE, FC, PU, and BI as predictors. Gender, age, and experience were also included in the model as covariates. Multicollinearity statistics (VIF and tolerance) were within acceptable ranges, indicating no issues with multicollinearity.

The overall model was significant (F = 242.48, p<.001) and explained 72.9% of the variance in the model (R^2 = .729). As shown in Table 3, all of the UTAUT factors were significant predictors of UB, except for EE (effort expectancy). Although EE had a significant correlation with UB, it dropped out of the model when taking all UTAUT factors into consideration. PU and BI emerged as particularly strong predictors, with B=.329 and .467 respectively. As expected based on the correlation results, gender, age, and experience were not significant in the model (p>.05).

ISSN: 2663-5798

Table 3

Multiple Regression Model Predicting Use Behavior

	B	SE	Stand. B	p-value
Constant	-0.048	0.096		0.617
Predictors				
PE	0.124	0.032	0.106	0.000
EE	0.023	0.03	0.021	0.443
FC	0.068	0.021	0.073	0.001
PU	0.329	0.035	0.288	0.000
BI	0.467	0.024	0.508	0.000
Covariates				
gender	0.005	0.023	0.004	0.831
age	0.016	0.017	0.025	0.341
experience	-0.015	0.014	-0.028	0.289
Model Statistics				
R-square	0.729			
F	252.478***			

Dependent Variable: Use Behavior

Based on the correlation and multiple regression analysis' results, a new reduced path model, which has some of the relationships deleted because they are not contribute to the model due to lack of significance, are shown below in figure 7

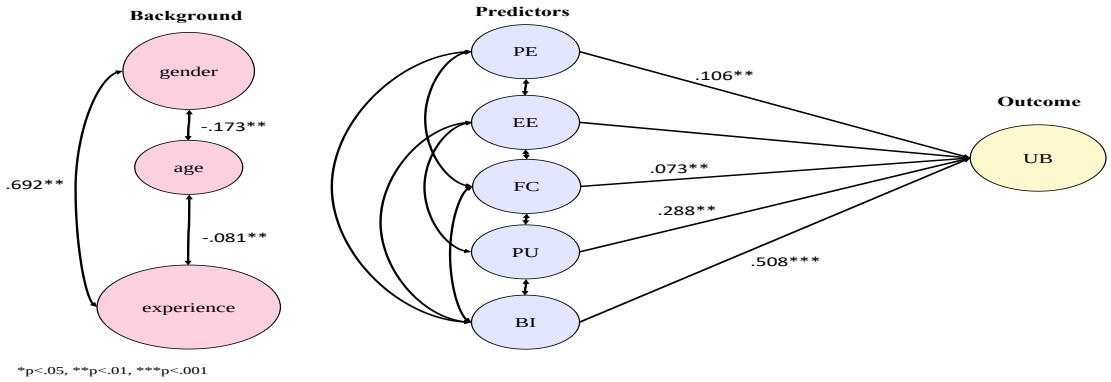

Figure 7. Overall Path Model

Further Analysis for Research Questions 5

Gender differences. Differences in Use Behavior (UB) were examined by gender, using independent samples t-tests. There was no evidence of significant differences in UB by gender, with male participants (M=2.97, SD= .61) and female participants (M=3.02, SD=.57) having similar mean scores, t=-1.203 , p=.229. Other UTAUT factors indicated similar results, with no significant differences by gender.

The extent of flipped classroom model adoption. For the final research question, we sought too to investigate the current adoption of the FCM based technology by faculty members in Saudi Arabian universities. Specifically, we examined differences by demographic information, including gender, age, teaching experience, academic rank, and affiliated university. Participants were asked to disclose whether they currently adopt the FCM based technology in their classroom or not. As presented in Table 4, 55.94% of participants (n=424) reported adopting the FCM based technology in their classroom and 44.06% of participants (n=334) did not report FCM adoption.

Table 4
Adoption of The flipped classroom model in Teaching

	No. of Participants	Percent
I currently adopt flipped classroom model in my classroom?		
Yes	424	55.94%
No	334	44.06%
Total	758	100%

The flipped classroom model adoption based on their gender. The overall study sample consisted of 50% female participants (n=379) and 50% male participants (n=379). Among those who adopted the FCM based technology, only 46.69% male participants (n=198) reported that they have adopted the FCM based technology in their classrooms. On the other hand, 53.30% of female participants (n=226) reported that they have adopted the FCM based technology in their classrooms.

An independent samples t-test was conducted to identify any significant differences by gender, with a significance cutoff of p<.05. As shown in Table 13, there was no significant difference between male and female faculty members in adopting FCM, t(611.37) = 1.091, p = .586. The result are presented in Table 5.

Table 5
Adoption of FCM in Teaching Based on Gender

	Male		Female		Mean Comparisons by Gender		
Do you adopt FCM in Teaching?	Number	Percent	Number	Percent	t	df	p
Yes	198	46.69%	226	53.30%	1.091	611.37	.586
No	181	54.19%	153	45.80%			

*p<.05

Flipped classroom model adoption based on their age. The age of participants ranged from 22 to 40. Age breakdowns show that most adopters of the FCM based technology were those aged 40 or older (36.32%). Those who 22-27 represented the smallest group of adopters of the FCM based technology at 7.31% (n=31). Regarding other participants' age groups, 26.41% of the FCM based technology adopters were 28-33 years old, and 29.95% were between 34 and 39 years old.

Flipped classroom model adoption based on their teaching experience. As shown in Table 6, among the FCM based technology adopters, most faculty with over 10 years of experience have adopted the FCM based technology and planning to adopt it for the upcoming school year (34.19%), followed by 5-10 years of experience. Specifically, 27.35%

(n=116) and 20.51% were 2-5 years of experience (n=87). 1-2 years of experience were the smallest group, with only 17.92% reporting the FCM based technology adoption (n=76).

Table 6

Flipped Classroom Model Adopters by Years of Experience

Years of Experience	No. of Participants	%
1-2 Years	76	17.92%
2-5 Years	87	20.51%
5-10 Years	116	27.35%
10 or More Years	145	34.19%
Total	424	100%

Flipped classroom model adoption based on their academic rank. As shown in Table 7, participants with the title of assistant professors were the majority of the FCM based technology adopters, followed closely by lecturers. Specifically, 33.25% of the FCM based technology adopters were assistant professors (n=141) and 33.01% were lecturers (n=140). Professors were the smallest group, with only 10.37% reporting the FCM based technology adoption (n=44).

Table 7

Flipped Classroom Model Adopters Based on Academic Rank

Academic Rank	N	Percentage
Professor	44	10.37%
Associate Professor	53	12.5%
Assistant Professor	141	33.25%
Lecturer	140	33.01%
Teaching Assistant	46	10.84%
Total	424	100%

Flipped classroom model adoption based on their affiliated universities. King Saud University had the most faculty members' adopting the FCM based technology among the universities in Saudi Arabia. As shown in Table 7, 10.84% of the participants (n=46) who adopted the FCM based technology in their classrooms were faculty members at King Saud University. This was close to King Abdulaziz University, which was second highest at 9.43% of the FCM based technology adopters.

Discussion

Demographics. The survey involved an equal number of female and male participants when compared to the population of the study which is 69,588 faculty members and 39,380 of them are male. The equal sampling of female and male faculty members may have influenced the results, since the population under study (Saudi Arabian Faculty) are not equally divided by gender. The total number of participants was 776, and a total of 758 responses were valid and completed. The participants' age ranged from 22 years old to 40 years old or older. The most common age group was 40 years old or older representing 37.60% of participants, while the smallest age group among participants was 22-27 years old, representing 5.94% of participants. In terms of experience in higher education instruction, the majority of participants (36.41%) reported that they had 10 years' experience and over and 26.78% reported that they had 5-10 years' experience. The smallest group based on years of experience those who had 1-2 years of experience, with only 15.83% of the sample. With regard to participants' academic rank, assistant professor were the most represented group with 34.04%. The smallest group of participants based on their academic rank were teaching assistant. Participants were all faculty members affiliated with Saudi universities. All universities were represented by at least one participant in this study except for two universities: Yanbu University College and Yanbu Technical Institute. The most represented participants were faculty members affiliated with Taif University with 8.58%. With regard to affiliated colleges, the most represented participants (19.79%) were faculty members affiliated with College of Medical Fields that combined (medical schools, nursing schools,

dentistry, etc.). Participants affiliated with two colleges: College of Sports Sciences and Physical Activity was the lowest with 1.19%. Finally, the survey involved more advanced faculty members in regard to their computer skills and technology use with 50.00%. Then, 44.33% of faculty members their levels were from intermediate to advance in their computer skills and technology use.

Research question one. Is performance expectancy a significant predictor of Saudi higher education instructors' behavioral intention to implement the FCM based technology with a student-centered approach?

Performance expectancy is defined as the degree to which instructors believe that flipped classroom model will benefit them in performing teaching tasks and benefit their students in performing learning tasks. The findings of the study utilizing the multiple regression analysis revealed that the FCM based technology was well accepted where the performance expectancy acted as significant predictor of the faculty members behavior intention to adopt the FCM based technology. However, the moderating effect of gender, age, and experience on the relation between performance expectancy and behavioral intention showed that there were no significant differences between participants' ages, genders, and experiences. In other words, the performance expectancy construct contributed significantly and positively in instructors' behavioral intention to use and adopt flipped classroom model regardless of their genders, ages, and teaching experiences. However, this finding was different from previous studies; performance expectancy has been found to influence behavioral intention to use technology, an effect that has been moderated by age, gender, and experience, specifically with more significant effect for younger men (Venkatesh et al., 2003). On the other hand, this finding is consistent with other findings from previous studies where performance expectancy significantly influenced behavioral intentions to use other types of technology such as mobile learning and cloud classrooms in flipped instruction, disregarding the moderators' effects: gender and age (Donaldson, 2010; Nassuora, 2012; Mtebe and Raisamo, 2014; Arpaci, 2015; and Yang, Yang, & MacLeod, 2019).

Research question one is covered items that explore instructor's performance and their perception about their students' performance. Based on the faculty members' perceptions, the results indicated that the FCM based technology may play an important role in improving both instructors' and students' performances. This result is in line with a study conducted by Abdulrahman and Alzahrani (2015), which investigated the impact of the flipped classroom on the promotion of students' creative thinking in higher education. The result of that study indicated that flipped classroom may have a positive impact on students' creative thinking especially in terms of fluency, flexibility and novelty through the integration of technology that supports the FCM. According to Martin & Schwartz (2014), creativity cannot be promoted in the FCM without applying the appropriate design and use of technology. As a result, these findings confirm that the FCM based technology can improve students' performance in their assignments, grades, in-class learning activities, inquiry inside and outside the classroom. Another qualitative case study conducted by Albishi (2018), investigated faculty members' perspectives toward the use of the FCM in teaching mathematics in Saudi Arabia universities. The participants in this study reported that they were in favor of the FCM because they perceived some benefits such as differentiated instruction, improved student comprehension, engagement during class, and saved more time for in-class activities. Regarding the influence of the FCM on the students' performances, the author observed seven classrooms to examine students' interaction and engagement. Results indicate that the FCM helped students to asked questions, to contributed to group activities, and to supported the learning of other students (2018).

Research question two. Is effort expectancy a significant predictor of Saudi higher education instructors' behavioral intention to implement the FCM based technology with student-centered approach?

Effort expectancy was defined as the level of ease of adopting and using the FCM based technology in the classroom. This study utilized multiple regression analysis to reveal that the flipped classroom model was well accepted where the effort expectancy acted as significant predictor of the faculty members behavior intention in a higher level to adopt the FCM based technology. This finding provides further support that the construct of effort expectancy has a significant positive effect on the behavioral intention of individuals to utilizes a specific technology. However, there was no significant moderating effect of gender, age and experience on the relationship between effort expectancy and behavioral intention. Compared to the literature, this findings did not consistent with previous studies conducted by Venkatesh et al. (2003); Donaldson (2010); Liew, Kang, Yoo, and You (2013); and Thomas, Singh, and Gaffar (2013), where they found out that effort expectancy moderated by gender, age and experience influenced the individuals' behavioral intentions to use technology and such influence will be stronger from women (Venkatesh et al., 2003).

Research question two is covered some items that explore instructor's effort expectancy and their perception about how easy it is to adopt the FCM based technology; for example, their interaction with the FCM based technology would be clear and understandable, learning to operate the FCM based technology would be easy, and becoming skillful in adopting and using the FCM based technology would be easy. Based on the faculty members' responses, the results indicated that the FCM might be easy to learn, use, and adopt. Instructors' behavioral intentions implied that faculty members are willing to adopt the FCM based technology when there is a great degree of ease of use, which facilitated their investment of greater amounts of time into other tasks, activities, and spending more time with their students.

Research question three. Are facilitating conditions a significant predictor of Saudi higher education instructors' use behavior of the FCM based technology with a student-centered approach?

Facilitating conditions referred to the extent to which an individual believes that the available infrastructure in his/her organization supports his/her adoption and use of the FCM based technology. As mentioned in Chapter Four, internal consistency for this construct was improved with the elimination of one item, leading to a four-item scale. Based on the literature, the facilitation conditions construct is the only construct that proposed to directly influences individuals' use behaviors rather than behavioral intentions. The findings of the study utilizing the multiple regression analysis revealed that the flipped classroom model was well accepted and facilitating conditions acted as a significant predictor of the faculty members' use behavior to adopt the FCM based technology. Based on the multiple regression analysis, there was no moderating effect of age and experience on the relation between facilitating conditions and use behavioral. However, there was a marginally significant of the moderating effect of age and teaching experience on the facilitating conditions-use behavior relationship, which is supported by the literature. Faculty members with more teaching experiences and older ages would show a stronger positive correlation between facilitating conditions and use behavior.

Research question three covered four items regard facilitating infrastructure that faculty members received from their institutions. For example, if they have the necessary resources and knowledge to adopt the FCM based technology, if there is a specific person or group for assistance with adopting the FCM based technology, and if there is a specific professional development about the FCM based technology. The investigation of the faculty members' views about facilitating conditions revealed that they were generally not satisfied with what they received from their institutions. According to Albishi (2018), faculty members faced some challenges when implementing the FCM such as creating high-quality videos and addressing different students levels of internet access at home. Notably, item that deleted from the FC construct asked about whether internet was available for all students outside the classroom.

Research question four. What is the relationship between instructors' perceived understanding of the characteristics of FCM and their behavioral intention to implement FCM based technology with student-centered approach?

Perceived understanding of the characteristics of FCM was defined as the level of understanding of the FCM by the faculty members. Through multiple regression model, the findings indicated that the FCM based technology was well accepted. Perceived understanding of the characteristics of FCM acted as a significant predictor of the faculty members' behavioral intention to adopt the FCM based technology. As discussed previously, there was no moderating effect for participants' characteristics, including teaching experiences. In other words, participants of all levels of teaching experience showed a similar relationship between PU and BI. As a result, the finding of this question recommends that PU significantly influences Saudi faculty members' intentions to adopt FCM disregarding their teaching experiences. In this study, the distribution across the four categories was a good number within each category, so the similar number within each categories might be a result of the absence of the teaching experience moderating effect in this study. As a result, further researches are needed to examine the potential moderating effects of teaching experience on the relationship between PU construct and faculty members' behavioral intentions.

Research question four covered five items on the understanding the FCM characteristics by faculty members and its benefits. For example, participants were asked whether the FCM based technology helped them to integrate different learning materials, if the videos helped in the students' engagement, whether they had sufficient availability of many types of technologies software and apps to support the FCM based technology, if the FCM based technology helped in connecting students with experts, and their beliefs about the FCM based technology as a better learning modality. The investigation of the faculty members' views about the FCM characteristics and its benefits revealed that they were

generally satisfied about it. According to Albishi (2018), faculty members believed that the FCM's characteristics helped them in assessing student understanding of the lesson content, facilitating active, group-based problem-solving activities, encouraging students to share their views on the content and take an active role in the class, and including assignments at the end of the class.

Research question five. What is the relationship between instructors' demographic factors (age, gender, and experiences) and their use behavior to adopt the FCM based technology with a student-centered approach in their classrooms?

Based on the results, there were no significant differences in UB by gender, age, and experiences. Both gender groups of them had similar mean scores in Use Behavior and t-tests confirmed this. The lack of evidence supporting gender differences indicates that UTAUT factors affect FCM adoption or rejection, regardless of gender in Saudi Arabian university.

Notably, women faculty are underrepresented in the leadership of academia which impacts addressing their needs and concerns; also, women faculty usually attend different trainings and receive different facilitating conditions than men, even when both groups are both affiliated with the same institution. Although gender differences exist in academic throughout the world, in Saudi Arabia, men and women are largely segregated in much of Saudi Arabian society, and higher education is no exception (MOE, 2018). However, even though there was no significant differences between male and female faculty in adopting the FCM based technology, the number of women faculty who reported adopting the FCM based technology in their classes was higher than the number of male faculty. The implementation of the flipped classroom creates a new atmosphere that better supports active learning and creativity which is that the fundamental aim of higher education in the 21st century (Bergmann & Sams, 2011; Hargrove & Nietfeld, 2014).

Path analysis. Path analysis was used to test the research hypotheses and the structural model. Note that the proposed model which included (age, gender, and experience) as background variables that should have relationships with the predictors variables (PE, EE, FC, PU, and BI). Then, the five predictors were hypothesized to have a direct or indirect relationship with the outcome variable (UB). However, the findings of the study utilizing the multiple regression analysis revealed that there were no significant relationships between the background variables (age, gender, and experience) and the rest of the variables in this proposed path model. A previous study conducted by Lakhal, Khechine, & Pascot (2013), used path analysis to examine the undergraduate business student acceptance to use desktop video conferencing in a distance course; they found a significant relationships between gender and age and the UTAUT variables. Despite similarities in construct, the study by Lakhal and colleagues focused on student acceptance in School of Business in Quebec City, Canada, and this study focuses on faculty acceptance in Saudi Arabian universities. The differences between the two studies may have influenced the different findings.

Conclusions

In this study, the acceptance of faculty members in Saudi Arabia universities about the adoption of the Flipped Classroom Model (FCM) based technology were explored. The FCM based technology leads to student-centered approach which focuses on active learning, problem-solving skills, higher-order thinking and participation of the students in group discussions.

the benefits and advantages of the FCM based technology were highlighted based on the literature and the participants responses to the questionnaires. Based on the results, the advantages and benefits of the FCM based technology far outweigh the challenges involved, a finding confirmed in the literature.

The findings of this study emphasized the mostly positive perceptions of the participants regarding acceptance to the adoption of the FCM based technology, which means moving from a teacher-centered approach to a student-centered approach might be easier than now in the future. As a result, it important to offer professional development for faculty members and helping them to be knowledgeable about it to help them in implementing the FCM based technology.

Importantly, these findings might be not generalized to other institutions in other countries because this study focused exclusively on faculty members in Saudi Arabia universities, but we believe they are a promising indication for all universities of the importance of UTAUT factors in adopting the FCM based technology.

Finally, there is a need to focus on the FCM based technology adoption due to ongoing reforms of Saudi higher education towards providing high-quality learning, the current generation of the students who are digital natives, and the rapid development of technology tools and software. A focus on the FCM based technology adoption will help both instructors and learners and it will improve university capacities in meeting workplace expectations.

Recommendations for Future Research

Despite the growth of the literature on the flipped classroom model, there are few studies about the acceptance of the FCM, Further research is still needed to draw more attention on appropriate additions or modifications to the current models, UTAUT, and relevant constructs. There are still many findings that need to be confirmed through future research.

A large sample is needed for further investigations; it should include all faculty members in Saudi Arabian universities in general, Saudi, non-Saudi, and faculty who are studying abroad. Also, it should include both private and public universities faculty to explore the difference between acceptance behavior of the FCM based technology in these two different settings.

Because this study is a quantitative, future research could include the collection of qualitative date to provide further in-depth information on the constructions. For example, the facilitating conditions construct represents objective influences on acceptance; so, qualitative date could provide insight into barriers that lead faculty to accept or reject the adoption of the FCM based technology.

Future research could examine the social influence construct, which refers to the way in which individuals change their behavior to meet the demands of a social environment. Quantitative and qualitative data could be collected about this construct to explore how faculty members' attitudes and behaviors might be changed in response to what they perceive others might do or think.

Future research could include voluntariness of use as a moderator to investigate its influence on faculty members' acceptance of the FCM based technology. Also, other variables could be proposed in future research, including further exploration of potential mediating or moderating variables. For example, academic rank, and affiliated institutions were included in this study as a demographic variables. Future research could examine these variables as moderators to the UTAUT model and investigate their influence on other constructs as a moderating variable.

This study is the first study that examined UTAUT with the FCM based technology. Also, this study pioneered the construct of perceived understanding of the flipped classroom characteristics in the proposed form. More research is needed to confirm the validity and reliability of this construct addition into UTAUT.

This study could be replicated in a different context or different countries to determine what factors that influence faculty members to accept or reject the adopt of the FCM based technology.

Based on the findings, more than half of the participants (55.93%) in this research are currently adopting the FCM based technology (N=424). Future replications could focus just on the faculty members who are adopting the FCM based technology, and establish specific criteria for evaluating FCM best practices in the Saudi higher education system. This kind of scientific research can help in determining the best practices and common barriers that face any faculty members.

Future research could also investigate undergraduate students' acceptance of the FCM based technology using the framework of UTAUT to predict what factors influence them to accept or reject the adoption of the FCM.

Based on the findings, the age and teaching experience had no significant relationship with the UTAUT constructs, and this might be because grouping the age and teaching experience options into categories from 1-4. As a result, future studies should put the exact age and years of experience instead of grouping for more analysis.

Reference:

Abdulrahman, M., & Al-Zahrani1, a. (2015). From passive to active: The Impact of the flipped classroom through social learning platforms on higher education students' creative thinking. British Journal of Educational Technology, 46(6), 1133–1148.

Ahn, R., Ji Yeong I, White, J., Monroy, L., & Tronske, N. (2018). Student-centered pedagogy: Using Moses' Five-Step Approach as a Scaffolding Framework to Teach Diverse Learners. Transformative Dialogues: Teaching & Learning Journal, 11(2), 1–18.

Albishi, S. (2018). The Use of Flipped Classroom Instructional Model in Teaching Mathematics in Higher Education: Instructors' Perspectives in Saudi Arabia [ProQuest LLC]. In ProQuest LLC.

Alebaikan, R., & Troudi, S. (2010). Blended learning in Saudi universities: challenges and perspectives. ALT-J Research in Learning Technology, 18(1), 49-59.

Alfarani, L. A. (2014). Influences on the adoption of mobile learning in Saudi women

teachers in higher education. Paper presented at the 2014 International Conference on Interactive Mobile Communication Technologies and Learning (IMCL), Thessaloniki, Greece.

Alharbi, E. A. (2016). Higher Education in Saudi Arabia: Challenges to Achieving World-Class Recognition. International Journal of Culture and History, 2(4), 169–-172.

Alhareth, Y., Aldighrir, I., & Alhareth, Y. (2015). Review of women's higher education in Saudi Arabia. American Journal of Education Research, 3(1), 10–15.

Al-Hattami, A. A., Muammar, O. M., & Elmahdi, I. A. (2013). The need for professional training programs to improve faculty members teaching skills. European Journal of Research on Education, 1(2), 39–45.

Alkhalaf, S., Nguyen, J., Nguyen, A., & Drew, S. (2013). Online learner satisfaction and

collaborative learning: Evidence from Saudi Arabia. International Journal of Information and Communication Technology Education, 9(2), 66–86.

Al-Mahadeen, B. M., Thamer, A. A., & Bassam, M. A. M. (2013). Extended UTAUT to examine the acceptance of web based training system by public sector. International Journal of Interactive Mobile Technologies, 7(1), 4-9.

Al-Maini, Y. H. (2011). Using technology in EFL in Saudi Arabia. Literacy Information and Computer Education Journal, 2(3), 477–480.

Alqarni, A. A. (2015). Educational technology in Saudi Arabia: A historical overview. International Journal of Education, Learning and Development, 3(8), 62-69.

Al-Sarrani, N. (2010). Concerns and professional development needs of science faculty at Taibah University in adopting blended learning. Retrieved from http://krex.k state.edu/dspace/handle/2097/3887

Alshahrani, S., & Ward, R. (2014). Shifting from traditional approaches of teaching to a blended learning approach; challenges and possible solutions. Paper presented at the 7th Saudi Students Conference-UK, Edinburgh, United Kingdom.

Arman, M. S. (2019). Student-centered approach to teaching: It takes two to tango. Ahfad Journal, 35(2), 64–71.

Arpaci, I. (2015). A comparative study of the effects of cultural differences on the adoption of mobile learning. British Journal of Educational Technology, 46(4), 699-712.

Baxter Magolda, M. B., & King, P. M. (2004). Learning partnerships: Theory and models of practice to educate for self-authorship. Sterling, VA: Stylus Publishing, LLC.

Bergmann, J., & Sams, A. (2011). Flip your classroom: Reach every student in every class every day. Washington, DC: International Society for Technology in Education.

Berrett, D. (2012, February 19). How flipping the classroom can improve the traditional lecture. The Chronicle of Higher Education. Retrieved from https://people.ok.ubc.ca/cstother/How_Flipping_the_Classroom_Can_Improve_the_Traditional_Lecture.pdf

Bonwell, C. C., & Eison, J. A. (1991). Active learning: Creating excitement in the classroom. Washington, DC: School of Education and Human Development, George Washington University.

Bryman, A., & Cramer, D. (2001). Quantitative data analysis with SPSS Release 10 for Windows: A guide for social scientists. London, United Kingdom: Routledge.

Cabi, E. (2018). The impact of the flipped classroom model on students' academic achievement. International Review of Research In Open & Distance Learning, 19(3), 202-221.

Card, S. K., Moran, T. P. & Newell, A. (1983) The Psychology of human-computer interaction. Hillsdale, NJ: Erlbaum.

Cardoza, Y., & Tunks, J. (2014). The bring your own technology initiative: An examination of

teachers' adoption. Computers in the Schools, 31(4), 293–315.

Chaveesuk, S., Vongjaturapat, S., & Chotikakamthorn, N. (2013). Analysis of

factors influencing the mobile technology acceptance for library information services: Conceptual model. Paper presented at the Information Technology and Electrical Engineering (ICITEE), 2013 International Conference on.

Chen, F., Lui, A. M., & Martinelli, S. M. (2017). A systematic review of the effectiveness of flipped classrooms in medical education. Medical Education, 51(6), 585–597.

Clark, J. (2008). PowerPoint and pedagogy: Maintaining student interest in university lectures. College Teaching 56(1), 39–44.

Creswell, J. W. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Boston, MA: Pearson.

Davies, R., Dean, D., & Ball, N. (2013). Flipping the classroom and instructional technology integration in a college-level information systems spreadsheet course. Educational Technology Research and Development, 61(4), 563–580.

Dewey, J. (2009). Democracy and Education : An Introduction to the Philosophy of Education. The Floating Press.

Donaldson, R. L. (2010). Student acceptance of mobile learning. (Doctor of Phiosophy Ph.D.), The Florida State University, Ann Arbor.

Duch, B. J., Groh, S. E., & Allen, D. E. (2001). The power of problem- based learning. Sterling, VA: Stylus Publishing.

Fan, W., & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. Computers in Human Behavior, 26(2), 132-139.

Feingold, A. (1994). Gender differences in personality: A meta-analysis. Psychological bulletin, 116(3), 429.

Findlay-Thompson, S., & Mombourquette, P. (2014). Evaluation of a flipped classroom in an undergraduate business course. Business Education & Accreditation, 6(1), 63–71.

Frances K. Stage, Hasani C. Carter, & Amaury Nora. (2004). Path Analysis: An Introduction and Analysis of a Decade of Research. The Journal of Educational Research, 98(1), 5.

Gefen, D. & Straub, D. W. (1997). Gender Differences in the perception and use of e-mail: An Extension to the Technology Acceptance Model. MIS Quarterly, 21(4), 389–400.

Gerstein, J. (2012). The flipped classroom model: A Full Picture. [E-reader Kindle]. Retrieved from https://www.goodreads.com/review/list/111438205?shelf=to-read

Goswami, A., & Dutta, S. (2016). Gender differences in technology usage-a literature review. Open Journal of Business and Management, 4, 51-59.

Haber-Curran, P., & Tillapaugh, D. (2013). Leadership Learning through student-centered and inquiry-focused approaches to teaching adaptive leadership. Journal of Leadership Education, 12(1), 92–116.

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

Hargrove, R. A. & Nietfeld, J. L. (2014). The Impact of metacognitive instruction on creative problem solving. The Journal of Experimental Education, 1–28.

HEW, K. F., & LO, C. K. (2018). Flipped classroom improves student learning in health professions education: a meta-analysis. BMC Medical Education, 18, 1–12.

Hon Keung Yau, & Alison Lai Fong Cheng. (2012). Gender Difference of Confidence in Using Technology for Learning. The Journal of Technology Studies, 38(1/2), 74.

Ivala, E., Thiart, A., & Gachago, D. (2013). A Lecturer's Perception of the Adoption of the Inverted Classroom or Flipped Method of Curriculum Delivery in a Hydrology Course, in a Resource Poor University of Technology. Proceedings of the International Conference on E-Learning, 207–214.

Ive, E. (2017). Teacher-centered or Student-centered Learning Approach to Promote Learning? Social Humaniora, 10(2), 59–70.

Jensen, J. L., Kummer, T. A., & Godoy, P. D. D. M. (2015). Improvements from a Flipped Classroom May Simply Be the Fruits of Active Learning. CBE-LIFE SCIENCES EDUCATION, 14(5), 1–12

Joncas, M., & Foy, P. (2011). Sample design in timss and pirls. Retrieved from http://timssandpirls.bc.edu/methods/pdf/TP_Sampling_Design.pdf

Karabulut-Ilgu, A., Cherrez, N. J., & Jahren, C. T. (2018). A systematic review of research on the flipped learning method in engineering education. British Journal of Educational Technology, 49(3), 398–411.

Keengwe, J., Onchwari, G., & Oigara, J. N. (2014). Promoting active learning through the flipped classroom model. Hershey, PA: Information Science Reference.

Kember, D. (1997). A reconceptualization of the research into university academics conceptions of teaching. Learning and Instruction 7(3), 255–275.

Kennedy, J. (2015). 5 reasons why the flipped classroom works in higher education. Tech Decisions. Retrieved from https://techdecisions.co/higher-ed/5-reasons-why-the-flipped-classroom-works-in-higher-education/

Krejcie, R., & Morgan, D. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30, 607–610.

Lakhal, S., Khechine, H., & Pascot, D. (2013). Student behavioral intentions to use desktop video conferencing in a distance course: Integration of autonomy to the UTAUT model. Journal of Computing in Higher Education, 25(2), 93-121.

Leo, J. (2007). The student-centered classroom. Cambridge, United Kingdom: Cambridge University Press.

Liew, B. T., Kang, M., Yoo, E., & You, J. (2013). Investigating the determinants of mobile learning acceptance in Korea. Paper presented at the EdMedia: World Conference on Educational Media and Technology 2013, Victoria, Canada.

Linacre, J. M. (2004). From Microscale to Winsteps: 20 years of Rasch Software development. Rasch Measurement Transactions, 17(4), 958.

Lundin, M., Rensfeldt, A. B., Hillman, T., Lantz-Andersson, A., & Peterson, L. (2018). Higher education dominance and siloed knowledge: a systematic review of flipped classroom research. International Journal of Educational Technology in Higher Education, 15, 1–30.

Maarop, A. H., & Embi, M. A. (2016). Implementation of blended learning in higher learning institutions: A review of literature. International Education Studies, 9(3), 41–52.

Martin, L. & Schwartz, D. L. (2014). A pragmatic perspective on visual representation and creative thinking. Visual Studies, 29, 1, 80–93.

Mtebe, J. S., & Raisamo, R. (2014). Investigating students' behavioural intention to adopt and use mobile learning in higher education in East Africa. International Journal of Education and Development using Information and Communication Technology, 10(3), 4.

Miles, C. A., & Foggett, K. (2016). Supporting Our Students to Achieve Academic Success in the Unfamiliar World of Flipped and Blended Classrooms. Journal of University Teaching & Learning Practice, 13(4), 114.

Millis, B. J. (2010). Cooperative learning in higher education : across the disciplines, across the academy. Sterling, VA: Stylus.

Ministry of Higher Education (2016). Ministry of Communication and Information Technology. Riyadh, Saudi Arabia: Ministry of Higher Education.

Ministry of Higher Education (2017). Ministry of Communication and Information Technology. Riyadh, Saudi Arabia: Ministry of Higher Education.

Ministry of Higher Education. (2010). Ministry of Higher Education's plan to achieve

excellence in science and technology. Riyadh, Saudi Arabia: Author.

Ministry of Education (2014). Higher Education. Kingdom of Saudi Arabia.

Ministry of Education (2016). Higher Education. Kingdom of Saudi Arabia.

Ministry of Education, (2018). Higher education statistics. Retrieved from https://departments.moe.gov.sa/PLANNINGINFORMATION/RELATEDDEPARTMENTS/EDUCATIONSTATISTICSCENTER/EDUCATIONDETAILEDREPORTS/Pages/default.aspx

Mirabeau, L., Mignerat, M., & Grange, C. (2013). The utility of using social media networks for data collection in survey research. Paper presented at the Thirty Fourth International Conference on Information Systems, Milano, Italy. Retrieved from http://aisel.aisnet.org/cgi/viewcontent.cgi article=1313&context=icis2013

Moffett, J. (2015). Twelve tips for ‘flipping’ the classroom. Medical Teacher, 37(4), 331-336.

Morris, M. G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing work force. Personnel Psychology, 53(2), 375-403.

Narayanasamy, F. S., & Mohamed, J. B. K. (2013). Adaptation of mobile learning in higher educational institutions of Saudi Arabia. International Journal of Computer Applications, 69(6), 34–38.

Nassuora, A. B. (2012). Students acceptance of mobile learning for higher education in Saudi Arabia. American Academic & Scholarly Research Journal, 4(2), 24-30.

Prince, M. (2004). Does active learning work? A review of the research. Journal of Engineering Education, 93(3), 223–231.

Rahman, M. S. (2017). The advantages and disadvantages of using qualitative and quantitative approaches and methods in language 'testing and assessment' research: A literature review. Journal of Education and Learning, 6(1), 102–112.

Sibona, C., & Pourreza, S. (2018). The impact of teaching approaches and ordering on it project management: Active learning vs. lecturing. Information Systems Education Journal, 16(5), 66–77.

Smith, J. P. (2015). The efficacy of a flipped learning classroom (Doctoral dissertation).

McKendree University: Lebanon, IL.

Sztabnik, B. (2014, October 17). Start a reading revolution flip your class with blogs. EduTopia. Retrieved from https://www.edutopia.org/blog/flip-ela-class-with-blogs-brian-sztabnik

Tan, E., Brainard, A., & Larkin, G. L. (2015). Acceptability of the flipped classroom approach for in-house teaching in emergency medicine. Emergency Medicine Australasia, 27(5), 453–459.

Taylor, P. G. (2000) Changing expectations: Preparing students for flexible learning, The International Journal of Academic Development, 5(2), 107–115.

Thomas, T. D., Singh, L., & Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. International Journal of Education and Development using Information and Communication Technology, 9(3), 71.

Tolks, D., Schafer, C., Raupach, T., Kruse, L., Sarikas, A., Gerhardt-Szep, S., & Hege, I. (2016). An introduction to the inverted/flipped classroom model in education and advanced training in medicine and in the healthcare professions. GMS Journal for Medical Education, 33(3), 1–11.

Tu, H., & Liu, Y. (2016). Understand the flipped classroom: A reflection. International

Journal of Arts & Sciences, (9)2, 249–256.

Turan, Z., & Goktas, Y. (2016). The flipped classroom: Instructional efficiency and impact on achievement and cognitive load levels. Journal of E-Learning & Knowledge Society, 12(4), 51–62.

Unal, Z., & Unal, A. (2017). Comparison of student performance, student perception, and teacher satisfaction with traditional versus flipped classroom models. International Journal of Instruction, 10(4), 145–164.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS quarterly, 27(3), 425-478.

Vogt, W. P., Gardner, D. C., & Haeffele, L. M. (2012). When to use what research design. New York, NY: Guilford Press.

Wang, L. (2017). Exploring the convergence of the mobile learning mode in network environment and the traditional classroom teaching mode. International Journal of Emerging Technologies in Learning, 12(7), 170–181.

Whitley Jr, B. E. (1997). Gender differences in computer-related attitudes and behavior: A meta-analysis. Computers in Human Behavior, 13(1), 1–22.

Woloshyn, V. E., Bajovic, M., & Worden, M. M. (2017). Promoting student-centered learning using iPads in a grade 1 classroom: Using the digital didactic framework to deconstruct instruction. Computers in The Schools, 34(3), 152–167.

Yang, H. H., Yang, L., & MacLeod, J. (2019). Understanding College Students' Acceptance of Cloud Classrooms in Flipped Instruction: Integrating UTAUT and Connected Classroom Climate. Journal of Educational Computing Research, 56(8), 1258–1276.

Yang, K., & Banamah, A. (2013). Quota sampling as an alternative to probability sampling? An experimental study. Sociological Research Online, 19(1), 1–11. doi:10.5153/sro.3199

Young, T. P., Bailey, C. J., Guptill, M., Thorp, A. W., & Thomas, T. L. (2014). The flipped classroom: A modality for mixed asynchronous and synchronous learning in a residency program. Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health, 15(7), 93