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Editorial

An Eye to the Future

Donald G. Perrin

Personal and cultural foundations:

Learning requires curiosity, intrinsic motivation, and direct purposeful experiences. It is enriched by language, communication and feedback. It is modeled by cultural artifacts and traditions. It is time-binding and space-binding through artifacts and communication media that reach back thousands of years – from cave paintings, stone tablets and papyrus; monuments, temples, pyramids and palaces; pottery, carvings, statues, paintings and other art objects; scrolls and illuminated manuscripts.

Communication was accelerated the invention of language – first spoken, then written. Spoken language was enhanced by gestures and pictures. Written language began with picture words, hieroglyphics and symbols that led to alphabets and word structures as we know them today.

Tribal cultures propagated knowledge through story-telling. Agrarian cultures observed the sun and stars to know when to plant and when to harvest. Villages and cities became places for trade in goods and ideas, and public events such as sports and theatre. Man built houses of mud, stone, bricks and straw. He learned to make glass and pottery and metal objects. He learned to manage the environment by building irrigation channels for crops; later he used water for baths, palaces, and houses of the rich. Transportation was expedited by invention of the wheel. And thus civilization has continued to develop . . . .

Some think that education is a product of the ancient Greeks, the industrial revolution, the invention of the printing press, or Horace Mann in the American colonies. Not so. It began in pre-history with animals (and peoples) communicating survival skills to their young. Only the successful survived.

Parents apply to their children's education the deeply enculturated values and procedure that worked for them. The explosion of knowledge, and dissonance caused by rapidly changing technologies and remarkable social, political and economic changes, is confusing parents and school systems in terms of what our children must learn to be successful in a dynamically changing future. However, as Marshall McLuhan pointed out, we spend too much time looking in the rear vision mirror.

Reinventing education:

We have to rethink public education with an eye to the future. There are a lot of "givens" that point the way.

Success demands we develop self-directed independent learners. The submissive learner, or the overly active learner slowed down by drugs, is not going to compete well with learners who are energetic, curious and good at evaluating, problem solving and making decisions. We have to recognize what motivates this new generation of learners and provide learning environments that respond to their individual differences. We must harness their unique and different strengths to scaffold mastery in higher levels of learning – analysis, synthesis, creativity, problem solving, evaluating, making decisions, and more.

We also need to enhance human values – sensitivity to cultural differences and disadvantaged populations, skill in conflict resolution, and dedication to help those less fortunate. Today's learners also need a greater knowledge of life skills such as family care, health and nutrition, medical treatments, economics, and civic responsibilities.

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Editor' Note: Accessibility and popularity of smartphones provides a powerful communication medium to support teaching and learning. The challenge now is to find ways for instructional designers and teachers to learn how to effectively use this tool.

First year students' acceptance of the formal integration of smartphones into their learning:

a study using an extended TAM which includes social influences and perceived enjoyment

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Jordan

Abstract

The study applied an extended version of the Technology Acceptance Model (TAM) to examine university students' intentions to use smartphones to support their learning. In addition to ease of use and perceived usefulness, which were included as predictors in the original TAM, the extended model includes social influence and perceived enjoyment. The extended model was empirically examined using responses to a questionnaire by 170 students in a university in Jordan. The results indicated that the four proposed predictors: students' perceptions of smartphones ease of use, students' perceptions of smartphones usefulness, students' perceptions of smartphones enjoyment, and students' perceptions of social influence related to use of smartphones, explained 55% of the of the intention to use variance. The results indicated that perceived enjoyment was the most important factor in predicting the students' intentions to use smartphones to support their learning, followed by social influence, and perceived usefulness. Ease of use was not a significant predictor of students' intentions to use smartphones to support their learning. Based on the findings, a set of recommendations is presented.

Keywords: technology acceptance model, TAM, smartphones, students' perceptions, social influences, perceived enjoyment, education.

Introduction

In the last decade, there has been massive growth in digital technologies; these technologies have contributed to changes in teaching and learning systems. For instance, higher education institutions have used these digital technologies to deliver instruction in different formats such as blended learning, flipped learning, online learning, and Massive Open Online Learning (MOOC). The roles of students and teachers, the interactions between students and teachers, teaching methods, and the ways in which information and educational materials are accessed, have changed (Kirkwood & Price, 2014; Avidov-Ungar & Nagar, 2015).

Developing countries are characterized by economic constraints that limit the integration of different digital technologies in their educational systems (Touray, Salminen, & Mursu, 2013; Rivers, Rivers, & Hazell, 2015), particularly digital technologies that need high investment in infrastructure. One type of information and communication technology (ICT) that can overcome such constraints is the smartphone. Most university students own smartphones (Smith & Caruso 2010; Balakrishnan & Loo 2012; Woodcock, Middleton, & Nortcliffe, 2012; Gasaymeh & Qablan, 2013; Dahlstrom & Bichsel, 2014; Jesse, 2015; Aljomaa, et al. 2016). University students can afford smartphones and they are familiar with their use. Smartphone users can accomplish a range of tasks starting from simple ones such as making phone calls and exchanging SMS to more sophisticated ones such as using a wide range of specialized applications (i.e., apps). In many cases, smartphones can replace computers. Smartphones have applications in almost every field of our lives, including communication, entertainment, business, medical, sports and religion (Chun, Lee, & Kim, 2012; Aldhaban, 2012; Franko & Tirrell, 2012; Kim & Han, 2014).

Smartphones are accessible at all times. They are easy to use, personal, reliable, mobile, cheap, multi-functional, ubiquitous, and stylish.

In education, smartphones can provide flexible learning opportunities that can be independent of time and place, and they can provide students with easy access to a wide range of educational resources (Cochrane & Bateman, 2010). In addition, using smartphones in education does not involve training, since university students are familiar with them. The use of smartphones in higher education can facilitate student-centered learning environments (Abatan & Maharaj, 2014). Smartphones can be used in several ways in higher education. They can enable access to administrative information, provide direct teaching, and facilitate collaborative learning. They can be used to collect data and to access different types of educational media (e.g., e-books, simulations, audio recordings, educational SMS, and videos), and they can be used to test students' knowledge using quizzes (Petrova, 2010; Herrington, 2009; Malecela, 2016). Wai et al. (2016) found that the most common uses of smartphones for educational purposes among university students included communication and interaction, accessing academic materials, organizing information and sharing, self-learning, information searching, and course-based learning. Abatan and Maharaj (2014) found that the most popular uses of mobile communication services among university students were SMS, voice calls, and data services. They found that the majority of university students used mobile communication services for academic purposes that included finding new information, getting exam results, sharing information, and research. They found that university students used mobile communication services for social purposes that included keeping in touch with family and friends, making new friends and using social networking websites.

Students' perceptions of the educational advantages of smartphones in higher education settings have been examined in some studies. Woodcock, Middleton, and Nortcliffe (2012) found that university students believed that the use of smartphones for educational purposes would improve their productivity and learning performance, since smartphones provided easy and fast access to the intent and their own information (e.g., emails and course materials). Robinson et al. (2013) reported that medical students believed smartphones could be useful educational aids Arab countries, including Jordan, have experienced spectacular increases in smartphones ownership and usage. In Jordan the number of mobile cellular subscriptions per 100 people was found to be 179 (World Bank, 2015). Studies have suggested that smartphones have several advantages in higher education. Students' perceptions and beliefs about the formal integration of smartphones in their learning, and the factors that shape such perceptions and beliefs, are essential success factors. The current study applied an extended version of the Technology Acceptance Model (TAM) to examine students' perceptions of smartphones and their acceptance of the formal integration of smartphones into their learning.

Theoretical framework

TAM has been widely used to examine and explain users' perceptions of attitudes toward, and acceptance of, the use of different types of technologies (Chuttur, 2009).The TAM proposes that perceived usefulness and perceived ease of use can predict a user's attitude toward using a technology (Davis, 1986). These factors are influenced by external variables such as the technology's characteristics, users' characteristics, and organisational variables (Davis, Bagozzi, & Warshaw, 1989). Users' attitudes toward the use of a technology affect their intentions to use it. Intention to use a technology is a key factor in shaping individuals' acceptance of that technology (Davis, 1986). Figure 3.1 shows the proposed relationships between factors in the TAM. Perceived usefulness was defined as "the degree to which a user believes that using the system will enhance his or her job performance" (Davis, 1989, p. 320), while perceived ease of use was defined as "the degree to which a person believes that using a particular system would be

free of effort" (Davis, 1989, p. 320). Attitude was defined as "a person's general favourableness or unfavourableness toward some stimulus object" (Fishbein & Ajzen, 1975, p. 216).

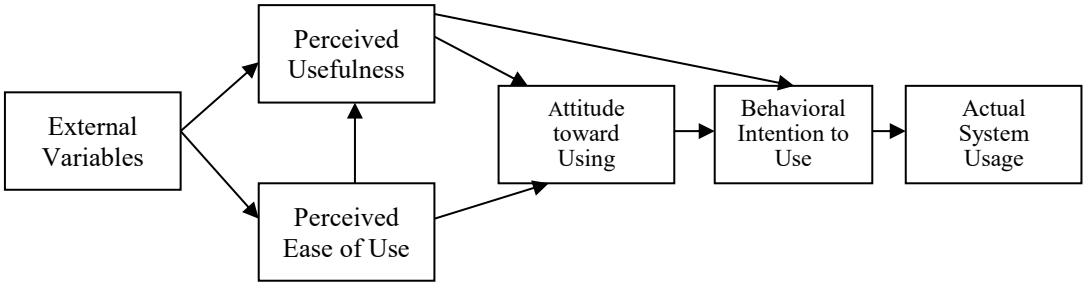

Figure 1. The original Technology Acceptance Model (TAM)
(Davis, Bagozzi, & Warshaw, 1989, p. 985)

In an updated version of TAM, Venkatesh and Davis (1996) argued that perceived usefulness and perceived ease of use directly and significantly influence potential users' intentions regarding the use of a technology. They omitted attitude toward using a technology from the model. Figure 3.1 shows the proposed relationships between factors in the modified TAM.

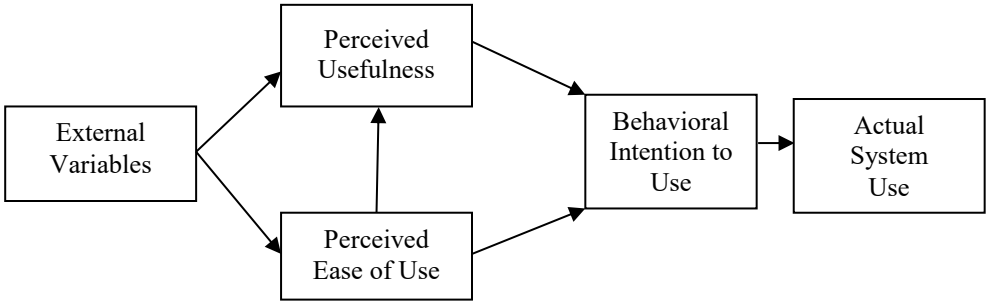

Figure 2. A modified version of TAM
(Venkatesh & Davis, 1996, p. 453)

The original TAM and its modified versions have been used in several studies in a number of domains, and it has been found to be valid in explaining individuals' acceptance of different types of technologies (Edmunds, Thorpe, & Conole, 2012). Extended versions of TAM have been commonly used to examine users' acceptance of different technologies. One factor that has been used in extended TAMs and other adoption models is social influence. For instance, in their Theory of Reasoned Action (TRA), Fishbein and Ajzen (1975) highlighted the importance of people's perceptions of the social pressure to perform a behavior. Ajzen (1991) highlighted the importance of the influence of referent individuals or groups on people's behavior. In the second version of TAM (i.e., TAM2), social influence was added as a factor that can affect individuals' intention to use a new technology. Social influence was seen as a factor that consisted of interconnected sub-factors including: subjective norms, voluntariness and image (Venkatesh & Davis, 2000). A more comprehensive acceptance model, the Unified Theory of Acceptance and Use of Technology (UTAUT) includes social influence as one of the main factors that explains some of the variance in potential users' acceptance of a new technology (Venkatesh, Morris, Davis & Davis, 2003). Empirical studies have shown that social factors contribute to shaping users' intentions to use, and actual use of, technology. For instance, Venkatesh and Morris (2000) demonstrated that social influence was a significant factor affecting the adoption of a new technology. Hsu and Lin (2008) found that social influence significantly affected users' intentions

to continue to use blogs. Hsu and Lu (2004) found that that social influence significantly affected users' intentions to use on-line games. Social influence refers to societal pressure on individuals to engage in a specific behavior, and this social pressure varies by culture (Bandyopadhyay & Fraccastoro, 2007). In the Arab world, social influence is one of the dominant factors shaping people's attitudes and behaviors, as Arab cultures are characterized as being high in power distance and uncertainty avoidance, and as being based on collectivism rather than individualism (Ameen & Willis, 2015).

Another factor that has been used to extend the TAM is perceived enjoyment. The founders of the TAM reported that perceived enjoyment influenced intention to use and actual use of technology. They suggested that perceived enjoyment is similar to intrinsic motivations (Davis, Bagozzi, & Warshaw, 1992). Empirical studies have shown that perceived enjoyment contributes to potential users' intentions to use and actual use of technologies. For instance, Davis, Bagozzi, and Warshaw (1992) found that that enjoyment and usefulness were significant factors that influenced the intention to use a technology. Teo and Noyes (2011) found that perceived enjoyment had a significant influence on intention to use a technology.

Given the importance of social influence and perceived enjoyment in shaping individuals' acceptance of technology, and the validity of the original TAM's two factors (i.e., ease of use and usefulness), the current study applied an extended version of the TAM to examine university students' intentions to use smartphones to support their learning. In addition to ease of use and perceived usefulness, the model in this study incorporates social influences and perceived enjoyment. Since the study opened up the use of the extended TAM in the Jordanian higher education, the current study used a straightforward model to examine university students' acceptance of the use of smartphones to support their learning. Figure 2 shows the extended TAM that guided the current study.

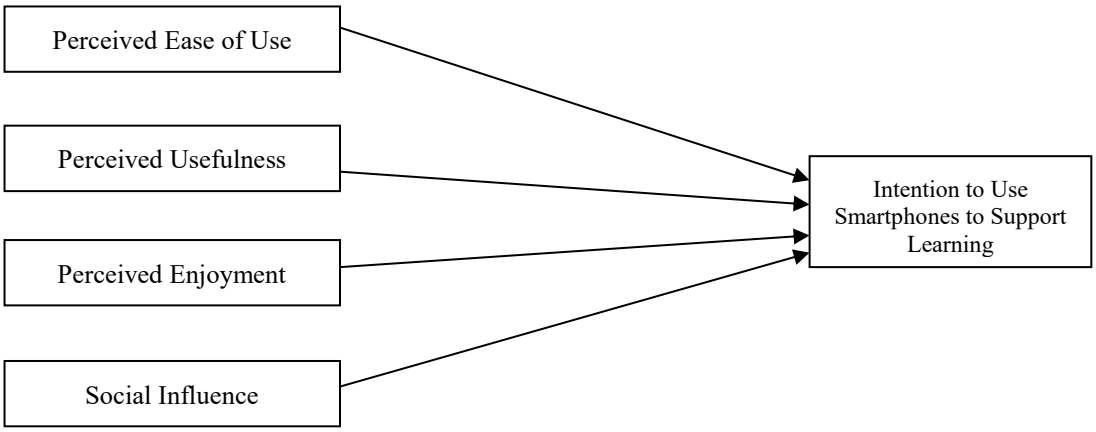

Figure 3. The used extended TAM

Several studies have used the TAM and modified versions of the TAM to examine potential users' attitudes, intentions to use, and actual use of different types of technologies. The next section discusses some of these studies that were conducted in different parts of the world to examine the acceptance and adoption of mobile technologies in general and smartphones in particular.

Previous studies

Some studies have focused on examining students' perceptions of the use of smartphones services and apps in higher education. For instance, Vázquez-Cano, (2014) investigated students'

perceptions concerning the potential of smartphones and specific-subject apps for enhancing learning processes in university subjects. They used a survey in which 388 students completed a questionnaire. The results showed that the students believed that the use of smartphones in their education had enhanced their learning, enhanced their engagement with their subjects, and facilitated collaborative learning. Other studies have focused on specific factors that influence students' use of smartphones for personal and educational purposes. For instance, Suki (2013) examined the effect of social needs, social influences and the convenience of smartphones on Malaysian university students' dependence on smartphones. A survey was used in which 200 students completed a questionnaire. The results showed that only social needs and social influences significantly influenced students' dependence on smartphones

Different versions of TAM have been used to examine university students' adoption of mobile technologies in different studies. For instance, Wai, et al. (2016) used the original TAM to assess students' attitudes towards using mobile apps for educational purposes. A survey was used in which 150 students from Hong Kong completed a questionnaire. The results showed that perceived usefulness had a more significant impact on students' adoption of mobile apps for educational purposes than perceived ease of use. In Korea, Chun, Lee, and Kim, (2012) used a modified version of TAM to investigate college students' attitudes towards, and intentions to use, smartphones. A cross-sectional design was used in which 239 students completed a questionnaire. The results showed hedonic enjoyment and utilitarian usefulness had a direct and significant influence on students' adoption of smartphones, suggesting that the students were motivated to use smartphones to accomplish specific tasks and for entertainment. Liu, Li, and Carlsson, (2010) conducted a study that used an extended version of the TAM to examine the factors that would affect the adoption of mobile technology to attain knowledge. The researchers used a cross-sectional design. Two hundred and nine undergraduate students from a university in China completed a questionnaire. The results showed that students' adoption of mobiles for learning was influenced by their perceptions of the near-term and long-term usefulness of mobile learning, as well as their personal innovativeness. However, their perceptions of the ease of use did not significantly affect their acceptance of mobile learning. In another study, Abatan and Maharaj (2014) used TAM to investigate students' perceptions and use of mobile communication services for personal and academic purposes. They used a cross-sectional study design. Three hundred and thirteen undergraduate students from a university in South Africa completed a questionnaire. The researchers reported that the findings aligned with TAM assumptions in terms of the valid relationships between its constructs and the use of mobile communication services.

Other studies have used different adoption models to examine higher education students' acceptance of the use of their smartphones for personal and educational purposes. Cheon, Lee, Crooks, and Song (2012) used the theory of planned behavior (TPB) to examine university students' perceptions of mobile learning. One hundred and seventy-seven US college students completed a questionnaire after watching videos that showed mobile learning activities. The students' favorite mobile learning activities were accessing administrative course information, communicating with instructors, discussing educational matters with other students, accessing course educational content, collaborating with other students and taking test exams. Students' intentions to use mobile learning were significantly related to their attitudes toward mobile learning, subjective norms, and perceived behavioral control.

In a more recent study, Pullen, Swabey, Abadooz, and Sing (2015) used the unified theory of acceptance and use of technology (UTAUT) to examine a group of Malaysian undergraduates' acceptance of mobile technology for their learning. The participants were students from a college of educational science. The researchers used a quantitative approach in a cross-sectional study. A total of 100 participants completed a questionnaire. The results showed that there were significant positive relationships between students' acceptance of mobile devices for learning and

performance expectancy, effort expectancy, social influence, attitude toward technology and self-efficacy. Arpaci, (2015) used modified version of UTAUT to examine the adoption of mobile learning in two countries, Canada and Turkey. The researcher used a cross-sectional design in which 190 Turkish and 163 Canadian undergraduates completed a questionnaire. The results showed that for Canada, performance expectancy, effort expectancy and experience, social influence, facilitating conditions, and personal innovativeness had significant relationships with their acceptance of mobile learning. For Turkey, the results were similar except that facilitating conditions were not a significant predictor of students' acceptance of mobile learning. Social influence had a stronger effect on mobile learning adoption in Turkey than in Canada, while personal innovativeness had a stronger effect on adoption in Canada than in Turkey.

University students commonly use their smartphones for personal and educational purposes (Herrington, 2009; Petrova, 2010; Abatan & Maharaj, 2014; Malecela, 2016; Wai, et al. 2016; Woodcock, Middleton, & Nortcliffe, 2012; Dahlstrom & Bichsel, 2014; Jesse, 2015; Aljomaa, et al. 2016). However, their use of smartphones for educational purposes is mostly self-defined (Abatan & Maharaj, 2014). Students' use of smartphones for their informal learning would suggest that smartphones could provide significant pedagogical advantages if integrated into their formal leaning (Woodcock, Middleton, & Nortcliffe, 2012; Robinson et al. 2013; Vázquez-Cano, 2014). Understanding students' attitudes towards the formal use of smartphones in their leaning is important for their successful integration. The above studies showed that students perceived the use of smartphones in their education to be useful for their learning in multiple ways. Original TAM, that incorporates perceived usefulness and ease of use, was useful in explaining students' adoption of smartphones for educational purposes (Abatan & Maharaj, 2014; Wai, et al. 2016). The studies showed that other factors might also influence students' acceptance and adoption of smartphones for their personal and educational purposes. The use of the original TAM and the modified TAM to examine mobile technology adoption among university students indicate the robustness and value of the model for examining individual acceptance of the mobile technologies. The findings of previous studies have shown that besides usefulness and ease of use, other factors have significant effects on users' acceptance of the use of smartphones for educational purposes. These factors include hedonic enjoyment (Chun, Lee, & Kim, 2012); personal innovativeness (Liu, Li, & Carlsson, 2010); attitudes toward smartphones, subjective norms, and perceived behavioral control (Cheon, Lee, Crooks, & Song, (2012); social influence, attitudes toward technology and self-efficacy (Pullen et al.); and experience, social influence, facilitating conditions, and personal innovativeness (Arpaci, 2015). Furthermore, the above studies suggested that perceived usefulness was significant in predicting individual uses of smartphones for educational purposes (Wai et al. 2016). The above studies showed that the factors that influence students' acceptance of mobile learning differ from one culture to another (Arpaci, 2015). While studies have used acceptance models to examine students' acceptance of smartphones technology for education in different parts of the world, there is a lack of the studies that have examined students' acceptance of the formal integration of smartphones to support their learning in the Arab world in general and in Jordan in particular.

Purpose of the study

The current study applied an extended version of the Technology Acceptance Model (TAM) to examine university students' attitudes toward the formal use of smartphones to support their learning. In addition to ease of use and perceived usefulness in the original TAM, the model used in this study incorporates social influence and perceived enjoyment.

Research methods

The current study used a quantitative approach and a cross-sectional study design in which data were collected using a questionnaire to measure university students' perceptions and intentions to use smartphones in their formal learning.

Data collection method, instrument and procedure

The data was collected using a paper-based questionnaire. The questionnaire had six sections: 1) student background information that include gender, age, major, and ownership of smartphone; 2) students' perceptions of smartphone ease of use; 3) students' perceptions of smartphone usefulness; 4) students' perceptions of smartphone enjoyment; 5) students' perceptions of social influences related to use of smartphones; and 6) students' intentions to use smartphones to support learning. The possible responses for participants were: strongly disagree, disagree, undecided, agree, and strongly agree. Table 1 shows a sample of questionnaire items.

The instrument items were based on previous studies (Davis, Bagozzi, & Warshaw, 1989; Ajzen, 1991; Davis, Bagozzi, & Warshaw, 1992; Venkatesh & Davis, 2000; Venkatesh, & Morris, 2000; Hsu & Lu, 2004; ; Hsu & Lin, 2008; Teo & Noyes, 2011).

Table 1
Examples of the items in the questionnaire instrument

First scale: demographic data and use of ICTs Age, gender, major, smartphone ownership
Second scale: students' perceptions of smartphone ease of use Smartphones are easy to use
Third scale: students' perceptions of smartphone usefulness Smartphones would be useful in my education
Fourth scale: students' perceptions of smartphone enjoyment The use of a smartphone in my learning would be fun
Fifth scale: students' perceptions of social influence related to use of smartphone My family would support my use of a smartphone for educational purposes
Sixth scale: students' intentions to use smartphones to support learning I would like to use my smartphone in my formal education

In order to ensure reliability and validity of the used instrument, a group of reviewers examined the instrument and Cronbach's Alpha coefficients were computed for data from the study. Table 2 shows the results of the reliability analysis. The values of Cronbach's Alpha reflected good internal consistency of the items in the scales (Aron, Aron, & Coups, 2005).

Table 2
Summary of reliability analysis

	Constructs	Cronbach's Alpha (N =170)
1	Smartphone perceived ease of use	.82
2	Smartphone perceived usefulness	.88
3	Smartphone perceived enjoyment	.75
4	Social factors related to use of smartphone	.70
5	Intentions to use smartphones to support learning	.89

The participants were recruited by contacting faculty members who were teaching first year students to request their permission to have their students to participate in the study. One instructor who was teaching a class with a large number of first year students agreed to distribute the questionnaire in that class. The author of the study visited that class and provided a presentation about the purpose of the study and the possible ways of integrating smartphones in students' formal learning, and then questionnaires were distributed. The students completed and returned the questionnaires in the same class meeting.

Data analysis

Descriptive statistics including means and standard deviations were used to describe students' perceptions of and intention to use smartphones. Correlation analysis was used to determine the intensity of the relationships between the study's variables. Regression analysis was used to examine the intensity of the relationship between the students' intentions to use smartphones to support their learning and their perceptions of smartphone ease of use, usefulness, perceived enjoyment, and social influence. However, before conducting the regression analysis, the assumptions of multicollinearity, normality, linearity and homoscedasticity of residuals were verified using variance inflation factors (VIF) and the shape of the residuals scatter plot. The assumptions of multicollinearity, normality, linearity and homoscedasticity of residuals should be verified before regression analysis is conducted (Tabachnick & Fidell, 2006).

Participants

The participants were university students from an elective university course for first year students. Table 3 shows the students' gender, age, major, and smartphone ownership.

One hundred and seventy students completed the questionnaire. Female students slightly outnumbered male students. The great majority if participants (97.6%; n=157) were between the ages of 18 and 20. The typical age of first-year students is 18. The participants were from different majors.

Table 3
Descriptive summary of participants' characteristics

	Category	Frequency	Percent
Gender	Male	82	48.2
	Female	88	51.8
Age	18-20	157	97.6
	21-25	4	2.4
Major	Education	4	2.4
	Arts and Literatures	39	22.9
	Science	52	30.6
	Engineering and Computer Science	38	22.3
	Nursing and Health Science	23	13.5
	Business Management	6	3.5
Owning smartphone	Yes	168	98.8
	No	2	1.2

Results

The results suggest that the participants had highly significant and positive perceptions of smartphone ease of use, usefulness, and enjoyment. In addition, the participants had highly significant and positive intentions towards the use of smartphones in their learning. They had moderately significant and positive perceptions of the effect of social influences on the use of smartphones (Table 4).

Table 4
Descriptive statistics of participants' responses to questionnaire scales (N = 170)

	Constructs	*M*	*SD*
1	Smartphone perceived ease of use	4.31	.63
2	Smartphone perceived usefulness	3.53	.88
3	Smartphone perceived enjoyment	3.71	.74
4	Social influence related to use of smartphone	3.10	.88
5	Intentions to use smartphones to support learning	3.56	1.04

The results regarding the strength of the relationships between the study variables showed that students' perceptions of smartphone usefulness, perceived enjoyment, and social influence were moderately correlated with their intention to use smartphones to support their learning. Students' perceptions of smartphone ease of use had a low correlation with their intention to use smartphones to support their learning (Table 5).

Table 5
Bivariate correlations between smartphone ease of use, usefulness, perceived enjoyment, social influence, and intention to use

	Ease of use	Usefulness	Perceived enjoyment	Social Iinfluence
Usefulness	.342*			
Perceived Enjoyment	.390*	.684*		
Social Influence	.192*	.468*	.324*	
Intention to Use	.254*	.610*	.650*	.530*

The results of the regression analysis indicated that the four predictors (students' perceptions of smartphone ease of use, students' perceptions of smartphone usefulness, students' perceptions of smartphone enjoyment, and social influence related to use of smartphones) explained 55% of the of the intentions variance (R=.739, F (4,165)=49.65, p<.05).

The beta weights reflect the strength of relationships between the independent variables and the dependent variable. Beta weights showed that students' perceived enjoyment of the use of smartphone in their learning had the highest contribution to students' intention to use smartphones in their learning (β = .45, p<.05) followed by: social influence on the use smartphones in their learning (β = .31, p<.05), students' perceptions of smartphone's usefulness in their learning (β = .17, p<.05). However, students' perceptions of smartphone ease of use did not significantly predict students' intentions to use smartphones in their learning (Figure 2).

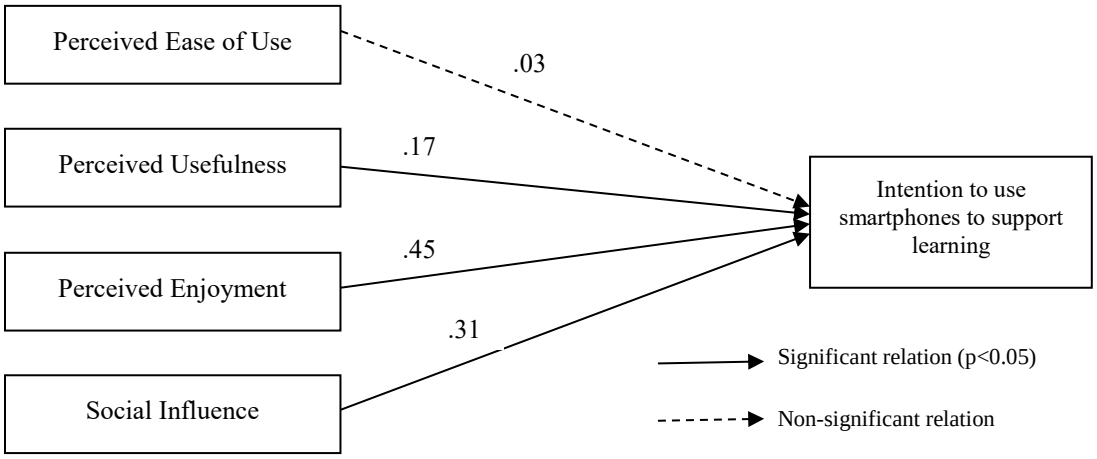

Figure 4. Results of regression

Discussion

Students' perceptions of the use of smartphones

The great majority of the participants owned a smartphone; the use of smartphones is common and popular among university students. Therefore, the students reported strong positive perceptions of smartphone ease of use. This finding is aligned with the findings of other similar studies on the popularity of smartphones among university students (Woodcock, Middleton, & Nortcliffe, 2012; Dahlstrom & Bichsel, 2014; Jesse, 2015; Aljomaa, et al. 2016). University

students' familiarity with the use of smartphones suggest that the integration of smartphones in their' education would not require training on how to use them. That makes smartphones easy to introduce into higher education. Students believed that smartphones would be useful for their education for improving their learning productivity, enhancing their learning performance and providing effective instruction. The students did not have actual experience of using smartphones in their formal learning; their beliefs were based on their experiences of the use of smartphones for personal purposes and in their informal learning tasks. Students' positive perceptions of the usefulness of smartphones for educational purposes originated from their perceptions of the usefulness of smartphones for personal purposes. In similar studies, it has been found that university students believed that smartphones would be useful for their education (Cochrane & Bateman, 2010; Abatan & Maharaj, 2014; Vázquez-Cano, 2014).

The students believed that they would enjoy using smartphones in their learning. Students' positive perceptions of the enjoyment they would obtain from using smartphones for educational purposes originated from their enjoyment when using smartphones for personal purposes. In addition, students' perceptions of smartphone enjoyment were associated their perceptions of smartphone usefulness and ease of use. The literature has shown that smartphones are the main tools that university students use to communicate with others using phone calls and SMS, to access internet, to access SNS, to listen to music, and to play games (Gasaymeh & Aldalalah, 2013; Jesse, 2015). Such uses of smartphones reflect their capabilities for personal enjoyment. The students had moderate perceptions of the effect of social influences on their use of smartphones. The students believed that their parents, society, and traditions would moderately support their use of smartphones. In the Arab world, smartphones and other new ICTs might be seen as threats to the culture and social norms since it may be assumed that they will negatively influence values and norms of behavior in gender-segregated societies.

TAM and students' perceptions of and intention to use smartphones in learning

Students' intentions to the use smartphones to support their learning are an important factor in the successful integration of this technology in their education. The extended TAM was valid for explaining the relationships between students' perceptions of smartphones and their intentions to use them. The model explained 55% of the intentions to use variance.

Students' perceptions of smartphone usefulness for educational purposes, students' perceptions of smartphone enjoyment, and students' perceptions of the impact of social factors, significantly influenced their intention to use smartphones to support their learning. Contradicting the proposition of TAM that ease of use is a determinant of intention to use (Venkatesh & Davis, 1996), the findings indicate that students' perceptions of smartphone' ease of use do not directly and significantly affect their intentions to use smartphones to support learning and teaching. This contradicts the findings of some previous TAM studies (e.g., Abatan & Maharaj, 2014) while it aligned with others (e.g., Liu, Li, & Carlsson, 2010). A possible explanation is that the use of smartphones is very common among students, they are regular users of smartphones and they perceived them to be easy to use for personal purposes and in any future educational purposes. Hence, there are other factors that may motivate students to use smartphones to support their learning.

Consistent with the propositions of TAM that perceived usefulness is a determinant of intention to use, this study found that students' perceptions of smartphone usefulness for educational purposes significantly and directly influenced their intentions to use smartphones to support their learning. The finding is aligned the findings of previous studies (Chun, Lee, & Kim, 2012; Wai et al. 2016; Liu, Li, & Carlsson, 2010; Abatan & Maharaj, 2014). Reasonably, students would like to use smartphones to support their learning and teaching only if they believe that it would be useful in improving their learning and increasing their productivity.

Students' perceptions of smartphone enjoyment played an important role in shaping their intentions to use smartphones to support their learning. This finding aligned with the findings of other research (e.g., Chun, Lee, & Kim, 2012). Among the factors examined as possible predictors, perceived enjoyment had the greatest effect on students' intention to use smartphones to support their learning. A possible explanation is that university students' ways of using smartphones, which emphasised enjoyment of their use in their daily lives, made perceived enjoyment an important factor that influenced their intentions to use smartphones to support their learning. Social influence is the second-most significant factor that affected students' intention to use smartphones to support their learning. Pressure from family, friends, and society influenced their intentions to use smartphones. This finding aligned with the findings of other studies (Cheon, Lee, Crooks, & Song, 2012; Suki, 2013; Pullen, Swabey, Abadooz, & Sing, 2015; Arpaci, 2015). A possible explanation is that Arab culture is characterized by being tribal and collectivist rather than individualistic, and therefore society influences personal choices (Arpaci, 2015; Ameen & Willis, 2015).

Conclusions, recommendations, and limitations

The availability of a wide variety of digital technologies and students' familiarity with the use of these tools and applications in their daily lives made the factors that affected their acceptance of the use of such technologies in their education go beyond the basic determinants of ease of use and usefulness. Students' acceptance of the use of smartphones to support their learning was influenced by their perceptions of their usefulness for educational purposes, their perceived enjoyment of them, and the social influences related to the use of smartphones. The students believed that smartphones were easy to use and useful for educational purposes. In addition, the students believed that the use of smartphones was enjoyable. The students only agreed to a moderate extent that the use of smartphones is socially acceptable. The students had positive intentions toward the use of smartphones to support their leaning. In order to understand university students' acceptance of the use of technology to support their learning, the extended TAM that incorporated other factors in addition to perceived ease of use and perceived usefulness provided a better understanding of their acceptance. The extended TAM model that included perceived enjoyment and social influence was more effective than the original TAM in explaining smartphone acceptance for educational purposes.

Several implications can be inferred regarding the integration smartphones to support students' learning in higher education settings. The integration of smartphones in higher education should consider how to make such integration more useful, more enjoyable, and more socially accepted in order to increase its acceptability among students. Students' perceptions of smartphones' usefulness for educational purposes had a positive effect on students' intentions to use smartphones to support their learning. Therefore, the formal integration of smartphones in higher education should benefit the students by improving their access to educational content, improving their learning, and increasing their productivity and efficiency. In addition, the formal integration of smartphones in higher education settings should be accompanied with making the university students aware of the anticipated benefits to their learning. Such awareness can be developed through organizing meetings with the students that involve discussing the benefits of using smartphones in their learning. In addition, these meetings could involve demonstrations of how smartphones could be useful for students' learning.

Since perceived enjoyment had the greatest influence on students' intentions to use smartphones to support their learning, higher education practitioners should focus on the use of smartphones to support students' learning in ways that promote their enjoyment. The ways in which smartphones are used in students' learning and teaching should consider the factors that influence their enjoyment of the use of smartphones for personal and social purposes. Higher education

practitioners should be aware of the importance of social influences on students' use of smartphones. Smartphones should be used in higher education in ways that align with the social norms and traditions of the society, and that protect the privacy of the students.

The current study has some limiting factors. The limited number and the homogeneity of the participants might limit the generalizability of the findings. The issue that this study examined could be better understood through employing mixed research methods that would explore in-depth students' perceptions and use of smart phones. Future research might incorporate other factors that might influence students' intentions to use smartphones in their learning. The analysis used in the current study is another potentially limiting factor. For instance, smartphone characteristics and participants' demographic characteristic could be used to examine their effects on students' perceptions and use of smartphones.

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Editor's Note: The flipped classroom makes sense for deaf students since the traditional lecture-demonstration is essentially one way communication and mostly verbal. It is not clear what language assistance is provided – captions, American Sign Language, printed lecture notes or summaries. For persons with lip-reading skills, some additional language and contextual support would be required. Classroom activities would facilitate interaction and feedback, enhance communication and reinforce learning. This study looked at social and psychological aspects as well as cognitive learning.

Deaf students' learning experiences and perceptions of the flipped classroom

Millicent M. Musyoka
USA

Abstract

Online learning has become a major trend in higher education. As colleges seek for a way to supplement their face-to-face learning with online teaching, the flipped classroom approach has gained prominence in higher education system. This instructional method frees up classroom time that had previously been used for lecturing. Research has not examined Deaf college students' perceptions and experiences in flipped classroom. Therefore, this study explores deaf students' perceptions and experiences when a flipped classroom model is used to teach a graduate course at a university in the United States. Students presented mixed perceptions and experiences about the flipped class. Five major themes that emerged in the study included; (a) understanding the content, (b) classroom structure, (c) flexibility, (d) technology, and (e) time.

This research has implications for using technology in the instruction of deaf students. The findings of this study illustrate that technology can provide a self-paced instructional setting that can effectively support mastery learning for students.

Introduction

The flipped classroom instructional model has gained popularity as an effective instructional method not only in K-12 programs but also in higher education. The term flipped classroom was coined by Bergmann and Sams (2012) and referred to a "teaching model in which that which is traditionally done in class is now done at home, and that which is traditionally done as homework is now done in class" (p. 13). Flipped classroom is a component of blended learning which combines classroom learning with online learning. Flipped classrooms are conducted in various ways including; using reading assignments, online interactive text, and video lecture capture for pre-class content or foundational theories instruction.

The goal for flipped instructional method is to allow the students to interact with new material outside of class and before the class session by watching asynchronous video lessons and online collaboration (Halili & Zainuddin, 2015; Lage, Platt, & Tregalia, 2000; Davies, Dean, & Ball, 2013). Halili and Zainuddin (2015) observed that the class time session is used to apply the new material through various activities including in class discussion, hand-on activities or supporting individual and group assignments. To make this possible, flip teaching can be conducted with different kinds of instructional technologies such as video, Blackboard, in the internet and social media. Pre-class assignments, such as reflection responses, reading quizzes or worksheets, help students better prepare for in-class participation.

Previous studies have explored the effectiveness of using flipped classroom (Al-Zahrani, 2015; Deslauriers, Schelew & Wieman, 2011; McLaughlin, White, Khanova, & Yuriev (2016; Missildine., Fountain, Summers, & Gosselin, 2013). The flipped model is student-centered, treating each student as an independent and self-directed learner (Missildine., Fountain,

Summers, & Gosselin, 2013). A positive effect on flipped classroom model is reported to influence on students' attendance, engagement, student-faculty engagement and more student-student interaction and comprehension of content (Deslauriers, Schelew & Wieman, 2011)

Several studies have compared a flipped classroom model to traditional teaching particularly the lecture method (Day & Foley, 2006; Deslauriers, Schelew, & Wieman, 2011; Gross, Marinari, Hoffman, DeSimone, & Burke, 2015; Lage, Platt, & Tregalia, 2000). The study by Gross et.al. (2015), found that high levels of students' engagement and course satisfaction were noted among students in the flipped courses. Also, studies reported that flipped classroom led to students' better academic gains demonstrated in improvement in examination scores and final grades (Day and Foley, 2006; Deslauriers, et.al., 2011; Koo, Demps, Farris, Bowman, Panahi, & Boyle, 2016; Mason, Shuman & Cook, 2013). Other benefits associated with flipped classroom is its influence on students' cooperation, innovation and task orientation (Strayer, 2012) and creative thinking skills (Al-Zahrani, 2015).

Students perceptions of flipped classroom model

The literature review found that students reported their experiences with flipped classroom model as positive and satisfying (Anyanwu, 2003; Armstrong, 2011; Hung, 2015; Khanova, McLaughlin, Rhoney, Roth, & Harris, 2015; Koo, Demps, Farris, Bowman, Panahi, & Boyle, 2016; Lage, Platt, and Tregalia, 2000; McLaughlin et al. (2013; Strayer, 2012; Strohmyer, 2016; Wong, Ip, Lopes, & Rajagopalan, 2014; Ziegelmeier & Topaz, 2015). Students' perception mostly focused on the nature of students' engagement. According to Gross, et al., (2015) students reported they liked their experience of being in a flipped course because the course was more engaging and that the format aided them in learning the material. Lage, Platt, and Tregalia (2003) reported that students felt that they learned more and enjoyed the hands-on activities in the flipped environment more than in a lecture course. In Hung (2015) study, students' perceived flipped method provided more engaged in the out-of-class study and expressed significantly higher levels of satisfaction than those from the traditional classroom. Students were held positive perception on using class time to apply content introduced in the recordings (Koo, et al., 2016). Besides the course engagement, students reported that in flipped classroom, they had positive interactions with peer and instructors that supported their learning (Strohmyer, 2016). In particular, students expressed there was no delay in learning because in class activities students were able to apply knowledge and clarify thoughts and ideas sooner rather than the next day when the student sought out the teacher (Strohmyer, 2016).

Further, student perceived the flipped instructional provided flexibility in learning. According to McLaughlin et al. (2013), students felt empowered in their learning because they were able to learn at their pace, find and use additional content, and assess their learning progress. Also, students reported that flipped model helped them to independently develop critical thinking, problem-solving, professionalism, and studying skills. Also, students also expressed positive perceptions of the tutoring system of video which allowed them to access the tutorial several time at their own time (Strayer, 2012). Additionally, flipped instructional model flexibility enabled students to realize available resources at their reach and develop self-discipline in completing their task, expectations for personal readiness to learn and a trust they could meet the course expectations (Strohmyer, 2016).

Some students' perceptions were negative in regards to their experience of the flipped instructional model. Khanova et.al. (2015) reported students' perception of flipped instructional design in a pharmacotherapy course as negative. In particular, students were critical of excessive module length as well as the structure that did not differentiate between most important and supplemental information. In Koo, et al., (2016) study some complained of the length of time needed to watch videos as opposed to reading slides. Additionally, students perceived that the

time requirement of the course was excessive and felt overwhelmed by managing this course with other because of the flipped method (Koo, et al., 2016). Similar findings were reported by Wong, et al., (2014) who noted a video lecture of 90 minutes or less was more positively received by students, while a 2-hour lecture was found to be less favored. To attend to the demanding time student required in a flipped classroom, Wong et al., (2014) proposed curriculum changes including an increase in the number of course credit, a decrease of in class time, or a reduction in the number of projects outside of class.

The issue of video length time had a mixed perception because Ziegelmeier & Topaz (2015) noted that some students in the flipped section indicated that there was too little lecture compared to traditional class. On the other hand, in Murray, Koziniec, & McGill (2015) study the students acknowledge that though the pre-recorded video lectures were shorter (10 minutes) compared to the typical traditional lecture (2hours), the videos had more focused content than in regular class. Specifically, students reported that though it was less regarding the quantity of time it was more efficient than the long hours of lecture.

Also, students' perceptions to flipped classroom were noted to be negative regarding the lack of interaction in the video lectures. Some students may express feelings of alienation from their instructor when learning and practicing through technology mediation (Anyanwu, 2003). Armstrong (2011) found that, although students valued the increase in independence and self-directed learning that technology-mediated instruction allows, students felt they were also losing direction from and communication with instructors.

Finally, despite most students expressing flexibility as positive, some students did not like the flexibility of the instructional model because they felt the lack of an allocated or scheduled lecture time, hindered their motivation and engagement in learning (Murray, Koziniec, & McGill, 2015). The feeling of alienation can be attributed to differences in learning. Hence, as Wong et al., (2014) flipped teaching need not be adopted across the entire curriculum, but possibly for individual courses or topics.

Online/distance education and deaf students

Previous studies have explored online/distance learning and deaf students. Long, Marchetti and Fasse (2011) conducted a study on interaction in online courses between hearing, deaf and hard of hearing students and found that online learning facilitated better direct communication between hearing and D/HH students and the associated learning that occurs. Further, the deaf students reported positive interaction with their hearing peers and improved ability to communicate their ideas. In Richardson, Long and Foster (2004) study deaf students said the positive aspect of online learning was flexibility while the most disadvantage was a feeling of isolation.

Communication is an important part of learning among deaf students. Previous studies examined communication and online learning with deaf students (Long & Beil, 2005; Luetke, 2009; Richard, Long and Foster, 2004; Roberson, 2001; Yoon, & Kim, 2011). Roberson (2001) found the most used technology used when instructing deaf students included computers, printers, video recorders, and internet connections. A study by Richard et.al, found that deaf students who participated in online learning reported they were able to avoid the problems of communication and participation associated with learning in a traditional setting. In Long & Beil (2005) deaf students expressed they felt left behind in traditional classroom dialogue and often do not wish to ask questions or interject thoughts. Similar findings were reported by Luetke (2009) whose findings showed that most deaf students reported that taking a web-based course helped them to avoid problems with traditional courses involving note taking, interpreters, and communication with faculty. About online content access, deaf students stated that providing captions in online content along with sign language video clips had a positive effect on learning that exceeded that

of sign language video clips (Yoon and Kim, 2011). Also, deaf students reported positive levels of satisfaction concerning the printed and video materials containing the contents (Lagarto, Mineiro, & Pereira (2013).

Despite the importance and use of technology with deaf students, deaf students' learning experiences and perceptions with flipped classroom model have not been researched in higher education classrooms. This research explored the learning experiences and perception of deaf college students who took a course offered using flipped classroom model.

Methodology

This study involved the use of qualitative action research design. A qualitative design was used in to gain an in-depth understanding of the flipped instructional model from the participant's perspective by examining the perception and experiences of the students (Creswell, 2009). According to Mertler (2006), action research is "systematic inquiry conducted by teachers, administrators, counselors, or others with a vested interest in the teaching and learning process or environment for gathering information about how their particular schools, operate, how they teach, and how their students learn" (p.2). For this study, the researcher used action research design to examine students' learning experiences and perceptions of the flipped classroom model. The flipped classroom model component was included in one course offered as part of a master's degree in deaf education.

Participants

This study utilized purposeful and convenient sampling procedures. Purposeful sampling was used for the identification and selection of information-rich cases related to the phenomenon of interest (Creswell & Clark, 2011; Patton, 2002). Also, the sampling method appropriate for this sample was convenience sampling because the participants were readily available to the researcher at the given time and willing to participate in the study Creswell (2008). Participants included 6 deaf graduate students enrolled in a teacher preparation program in deaf education that took a course implemented with a component of the flipped classroom model. The age of the students 24-50 years. There were one male and five females. All the participants responded to the questionnaires. All the participants were in their second year of study. Participation in this study was voluntary. Participants were given information about the study and those who were willing to participate completed informed consent form. Ethical clearance was obtained from the university's Institutional Review Board.

Research context

The course used in this study was a three credit-hour graduate degree master's degree in Deaf Education. The course met six times a semester meaning every two weeks for a face-to-face class section. Each face-to-face section was four hours. The other course work was conducted online. The flipped portion of this course included six online videos on foundational concepts and methods. A face-to-face class section followed each online video. Class time gained by using the online lectures was used for a variety of activities including (a) writing lessons (b) in-class mock teaching, (c) writing an IEP, and (d) developing an assessment plan. Additionally, students selected topics for their presentations. Each student randomly selected a topic. The topics focused on the various types of additional disability a deaf child may have including, dead blind, deaf intellectually different, deaf with learning disabilities, deaf with ADHD among others.

Data collection

A survey questionnaire and researcher's reflective field notes were used to collect data. The survey questionnaire was given to the student at the end of the course. Before and at the end of each face-to-face class instruction the researcher will write reflective notes on the process of

developing the flipped classroom model and the observed students' learning experiences and the process.

Instrument

The experiences and perception of the students about flipped classroom instruction model of teaching and learning was assessed by a survey questionnaire. The survey questionnaire was developed by the researcher based on various items on online learning with and without deaf students in previous research. The questionnaire included 4 open-ended questions. This study focused on the four open-ended questions.

The open ended questions included:

Describe your experience taking a course using the flipped classroom model

What was most helpful for your learning using the flipped classroom model?

What challenges did you face using flipped classroom model in terms of your learning?

What suggestion(s) would you make related to the use of the flipped classroom model that would enhance your learning experience in future?

Procedure

The duration of this study was 14 weeks. The instructor selected one of the core courses in the Master's degree. Pre-recorded video lessons were uploaded to the course learning management system Blackboard a week before the class. For this class the instructor used Kaltura to develop and upload the videos. Students were asked to watch the video lesson before coming to the class. Students viewed videos about the foundational concepts and answered self-assessment questions prior to face-to-face sessions involving patient case discussions. During classroom time, students were engaged in the activities based on video lessons. Students also were divided into groups to discuss and work on the lesson's and course assignments. Additionally, the instructor provided remedial assistance on sections not clear and answered students' questions during the face-to-face meeting. At the end of the intervention, the students completed a self-reporting survey on their experiences and perception of the flipped classroom model.

To accomplish this, the following research questions guided the study:

1. What are deaf students' perceptions of flipped classroom instruction model?
2. What is the experience deaf students on the use of flipped classroom?

Data analysis procedure

Data analysis in this study followed Hickey and Kipping (1996) multi-stage approach to the coding of data from open-ended questions. The approach involves eight stages and three coders. The current study involved two coders, hence two stages that involved a third coder were removed. The data analysis followed six stages including, 1) immersion and identification of preliminary categories, 2) reaching consensus on categories, 3) allocating category and detail codes 4) dealing with 'rogue' responses, and 5) Merging and re-allocating details.

Immersion and identification of preliminary categories involved developing a script of all the responses to the open-ended questions. Initial coding followed with two coders independently coding the data to identify preliminary categories emerging. Next the coders discussed about the codes and reached a consensus on what would comprise the final codes. The two coders developed a coding manual that described each code in detail. The two coders also discussed on 'rogue" responses that did not seem to fit into the codes in the coding manual. Finally, the coders checked for the patterns and emerging themes by merging and re-allocating details. Any disagreements were discussed until all coders were satisfied.

Findings

Data analysis revealed five major themes regarding deaf students' perceptions and experience of flipped classroom instruction model.

Understanding the content

Most students consistently agreed that flipped method contributed to their learning. First, students noted that watching video recorded lectures before class and the in class learning discussions and activities supported their understanding of the content. One student said

> "*The flipped instructional model enabled the understanding of the content or knowing the topic we will discuss or do before class".*

Secondly, cooperative learning activities such as writing IEPs and designing a behavioral plan helped the students to develop understanding and implementation of the content learned. Students described their learning as active and engaging. One student *said "the in class group activities helped me to understand the course better".* Another student expressed *"I liked the in-class activities, group work and that the instructor was in the room to answer our questions".* Generally, most value of interactive face-to-face case discussions which a strong part of the flipped instructional model in the hybrid program.

Structure of the flipped classroom

Students' responses about the structure of the flipped classroom were mixed. This study was conducted in a master's program that was a hybrid program. Students had opportunity to view six videos online before attending each of the six face-to-face class. Only one student reported having previous experience with flipped classroom before taking this course. All the students in this study reported that the structures of the class provided by the flipped classroom provide them with opportunity to be more engaged in their learning. Additionally, the structure of the class provided them opportunity for active engagement with the instructor and other students. Students reported the class structure enabled the students to work in team and develop team work skills, effective dialog skills and leadership qualities. Further, students expressed they were more satisfied with small group teaching with spilt timings for discussions and question answer sessions. One student *said*

> *"Allowing me to complete more work in class rather than doing it at home as I was able to discuss questions / challenges with my classmates and my instructor"*

Despite the positive comments on the class structure, most students preferred a traditional classroom structure. As one student said *"It was so different experience as I am used to face-to-face lecture. I learn better face-to-face".* Also, students expressed they lack the essence of a face-to-face lecture that involves questions and answers interactions between students and instructor. One student *said "There wasn't an opportunity to interact, discuss or ask question to the instructor in the video lectures."* Another student stated *"If I didn't understand something or a sign that I am not familiar with, how can I ask the instructor".* Similar comments were made by another student who said *"With flipped instruction I felt if I was lost in some areas, I couldn't ask the professor because of this I prefer face-to-face instruction".*

Flexibility

Students' responses perceived the flipped instruction model positively because of the flexibility and convenience of viewing the recordings. Students could view and review the recordings as many times as they needed prior to the face-to-face class sessions. Also, some students commented that having the opportunity to access the video lecture outside class hours enabled students to fit the watching of the videos in their schedules and lifestyle. The flexibility can be noted by students' comments that varied from "I watched the video lectures before attending in-

class sessions", to "I watched the video lectures on way to attending in- class sessions" or "I watched the video lectures after attending in- class sessions".

Video

Several issues were raised in regard to the technology used in the flipped instructional model in particular the use of video lecture. The issues centered on quality of video lecture, length of video recorded lectures, and the ease of using the video material. Depending on the device the student used some students experienced challenges. One students shared that "Sometime the video was not clear in the beginning due to pausing and stopping, but the more we use the video without pausing the video picture became clearer". Another student commented "I couldn't watch all at one time. If I shut down can't come back to where left off. I learnt to write where I stopped". Two students expressed concerns with technology and internet issues that could arise affecting the viewing the video".

Additionally, all the students expressed challenges with the length of the recorded video lecture. One student said "This has, so far, need beneficial as it has allowed me to complete a lot of work in class, however the length of the videos was sometimes very long". A second student said "Maybe make the video shorter- sitting inform of computer screen or other device for a longer period of time is exhausting and affects trying to grasp and comprehend all information being presented". Most students suggested that a 30-45 minute videos were the best amount of time for a video lecture.

Time

The issue of time came up in most of the students' comments. There were a mixed perceptions and experience about time in this study. Some students focused on time in relations to the in class activities. One student said "This has, so far, need beneficial as it has allowed me to complete a lot of work in class". Another student conveyed the same feeling "Completing some assignments in class, I had more time to complete other assignments". On the other hand, some student felt the flipped instructional model was time consuming. One student stated "This flipped video added about 2 extra hours of work on top of the assignment and still meeting 4 hours in class". Another student had similar comments "I spend most of my time watching the video recorded lectures, pausing to make notes… taking more time for one class was overwhelming".

Discussion

An increasing number of educational institutions are implementing flipped classroom instruction model. Understanding students' perceptions and experiences is vital for improving outcomes and preparing aspiring teachers to attend to the needs of deaf students in K-12 classrooms. The findings from this study support other studies that examined student perceptions that revealed flipped instructional model provided more opportunity for active engagement in learning (Gross, et al., 2015; Hung, 2015; Lage, Platt, & Tregalia, 2003; Strohmyer, 2016). As in previous studies, active engagement was mainly observed during the in class activities which comprised of individual and group activities.

Additionally, students' perceptions and experience indicated the flipped classroom provided a student-centered approach to learning that allowed flexibility and independent learning. Similar experiences were noted in previous studies (McLaughlin et al., 2013). The benefit for this approach noted in previous studies included the transfer of the responsibility for learning onto the students, the opportunity for students to learn at a time and place preferred and the opportunity to revise the material (Howland and Moore 2002). Because of the challenge of flexibility expressed by some students, there is need for students to learn time management and study skills in online learning.

The issue of amount of time needed by the student to complete a flipped course still remained a concern as in other previous studies (Khanova et.al. 2015; Koo et.al, 2016). Students expressed of the challenging amount of time required to complete the course compared to course work. Previous study suggested a need to revisit the organization of the course including number of course credit, amount of class time, and the number of projects outside of class (Wong et al., 2014). Hence, findings from this study demonstrate the need for thoughtful design of flipped classroom structure in particular, in and out of class activities and length of video.

Also, the current study concurred with previous findings in which students preferred face-to-face instructions compared to video recorded lectures because they felt incapable to interact with the instructor (Armstrong, 2011; Anyanwu, 2003; Murray, Koziniec, & McGill, 2015). This suggest it's important for teachers to understand their students before flipping the class. Assessing students learning readiness is critical because it provides instructors to understand the type of support students need to succeed (Doe, Castillo, & Musyoka, 2017). Also, instructors can gradually flip some topics or content of the course instead of the whole course to accommodate students' learning differences.

Implication of the study

Lessons learned from this study will be used to revise the course by incorporating suggestions from the students. For instance, the researcher will make adjustments on length of the video, the time required for assessment out of class, and the in class structure. Also, the study offers guidelines for instructors or course developers considering implementation of flipped instructional model with deaf students. For an effective flipped classroom with deaf students, instructors will include careful consideration of the type of interaction the instructor employs in the classroom as well as their presence in video, or how to include flipped activities that promote visual learning. Additionally, instructors will examine students' online learning readiness. In particular, flipped classroom require student taking more responsibility for the learning process. Hence, students need to develop self-regulated learning skills to support their performance in a flipped classroom.

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Editor's Note: A new curriculum is an excellent time to implement new instructional methods and technologies. It makes sense to do test the effectiveness of the new materials and methods of instruction.

The impact of teaching using the STEM approach in acquisition of scientific concepts and developing scientific thinking among Classroom-Teacher students at the University of Jordan

Adnan Salem Al-Doulat
Jordan

Abstract

This study aims to investigate the effect of teaching using the STEM approach in Acquisition scientific concepts and developing the scientific thinking among Class Teacher Students in the first semester of the academic year 2015/2016. To achieve the aim of this study two study tools were developed and applied on the study sample of (68) students, divided into two groups, control group and study group. The study group was studied according to the STEM approach and the control group used the ordinary teaching method. Results of the current study show that there is a statistical differences at (α=0.05) level between the average marks of the two groups of Classroom-Teacher students in the scientific concepts test and the scientific thinking test, for those who learned using the teaching using the STEM approach, and those who learned using the ordinary way and that the experimental group outperformed the control group. Based on these results, the researcher recommended using the STEM approach in teaching scientific concepts in the undergraduate stages.

Keywords: teaching, STEM approach, acquisition of scientific concepts, development of scientific thinking, Class Teacher Students.

Introduction:

There are strong trends in scientific education globally and locally towards the acquisition of concepts. Building and acquiring the skills of scientific thinking is one of the most important goals of scientific education, where the teacher of science must be keen to achieve during the educational process. Through learning they can find effective ways and contribute in finding solutions to the problem of low skills of scientific thinking and a weak conceptual structure.

Scientific concepts have an important role in the field of scientific knowledge and structure. It helps to acquire scientific knowledge and interpret scientific phenomena correctly. It also helps scientists to predict and control phenomena, gives scientists motivation to discover new fields of scientific knowledge,learn scientific concepts and how to acquire them.

The importance of scientific concepts is emphasized in reducing the complexity of the environment. It is the language of science and the key to scientific knowledge. It organizes and describes a large number of events, objects and phenomena that constitute the main scientific concepts, principles and conceptual structures that represent the product of science, and helps scientists to solve and understand the problems that impact daily life (AwadAllah, 2012).

Scientific thinking is particularly important in the teaching of science. Science learning requires a wide range of operations required for scientific activity such as planning, hypothesis development, prediction, design, surveying, interpretation, scheduling and reporting of results, and communication. It also includes a number of key activities such as: observation, procedural definition, measurement, question and description, data collection and recording, analysis, training and placement of students, which can be employed in many areas (Abu Hamdan, 2006)

Salamat (2012) states that scientific thinking is an acquired skill that can be developed. Thinking is an active interaction between the individual and the knowledge. It requires the teacher to use modern strategies that focus on scientific activities and on the positive active role in the learning process.

In order for the student to learn the skills of scientific thinking, appropriate learning situations based on scientific thinking should be made available. Students should be trained to use scientific thinking skills and use their steps to solve problems. Therefore, those working in the teaching profession in general and teaching science in particular should provide their students with experiences and positions learning to learn through which to develop the skills of scientific thinking. Students are immersed in the learning environment and interact with them, allowing them to practice a number of scientific thinking skills by giving them a self-learning experience and following the behavior of scientists in solving problems.

Garrett (1987) observed that training of students to identify the problem is the most important step in the process of scientific thinking. The ability to identify the problem, as suggested, is more important than finding solutions to this problem, depending on several factors such as student interests and tendencies. He also assumed that both puzzles and problem-solving activities were important in providing the school's science curriculum with a method of identifying the problem, yet the skills required for that lack training.

Many scientific books and curricula lead traditional activities that lack to the concept and entrench it in the minds of students to acquire permanent knowledge and scientific thinking skills. This has led us to seek out the usual pattern of education to give students the opportunity to learn in a way that suits them and meets their needs.

The successful launch of the Sputnik in 1957 in the Soviet Union increased the emphasis on science and engineering education in the United States. The renaissance of educating individuals to develop a generation of scientific and technological innovation, investment in science technology, engineering and mathematics (STEM) Which has led to the creation of new jobs and created areas of technology work that have elevated the United States to a global center for scientific innovation (NSB, 2007).

All STEM specializations offer opportunities to emphasize 21st century skills such as adaptability, social skills, non-routine problem solving, management / self-development, and systems thinking. It also contributes to the major challenges of our time, such as energy efficiency, Resource Use, Environmental Quality, and Risk Mitigation (Bybee, 2010).

The purpose of STEM education is getting science, technology, engineering and mathematical knowledge, use that knowledge to identify issues, acquire new knowledge, apply knowledge to related issues, and understand the distinctive features of STEM as humanitarian forms of inquiry, design, analysis, And realize how the STEM disciplines shape our physical, intellectual, and cultural life in the world.

This trend has received increasing attention over the last decade, with a call for greater focus on the areas it contains, for improvements in the quality of curricula and teaching. STEM advocates have emphasized its complementarity and application in pre-school to twelfth grades; which increases student motivation and achievement in education (Honey, Pearson, Schweingruber, 2014).

STEM is keen to teach students of science and math to make the world better, not just to ensure their success in exams. Edith Ackerman said: "The practice on design is not intended to arrive at a model as it exists and is conventional, but it is to imagine everything that does not exist in our reality and then bring it to reality." (Ackermann, 2007)

The STEM is based on problem solving, giving the learner a problem and asking him to design a suitable solution based on his scientific knowledge and mathematical skills, engineering construction, and his use of technology in the research, design and testing process and presenting his ideas in an environment that combines active and cooperative learning, And verbal communication (Reyes, 2012)

STEM-based education requires a conscious planning of the curriculum to be carried out in precise and conscious projects and tasks within and outside the school environment in classroom and classroom activities, and provides the learner with the opportunity to deal with real and realistic problems and tasks.

The STEM approach encourages the preparation of tomorrow's scientists by engaging students in countless experiments, adapting them to different levels of difficulty, helping them to think scientifically, discovering, solving problems, and acquiring the scientific education they need. And the skills of solving the problem and the societal values that education seeks to achieve and develop society, and the education of individuals on them, from collective work and cooperation between individuals

Learning contributes to STEM-based learning in acquiring suitable practical skills for students from manual skills in how to use, control, manipulate, maintain and maintain tools and devices, and academic learning skills, including data recording, collection, reference and use, graphic work, and laboratory reporting. etc (Zaitoon, 2003). We do not lose sight of the benefit achieved in providing social skills from cooperative and collective work, and the interaction of students to achieve optimal learning.

Talabah (2013) in his study aimed to determine the effectiveness of the use of the modified model of the course of constructive learning in the acquisition of scientific concepts and solve different types of physical issues and the development of thinking conflicts among students in the first grade secondary. There is a statistically significant difference in the achievement of physical concepts and different types of thinking in favor of the experimental group.

The Olivarez study (2012), which aimed to examine the impact of science, technology, engineering and mathematics (STEM) in academic achievement, The result was more than the STEM-based academic group on the STEM-based group in all outcome measures because STEM teachers used project-based learning, collaborative learning and experiential learning, which had a positive impact on students' achievement in mathematics and science and reading.

The Wang study (2012), which aims to reveal teachers' perceptions of STEM integration and how to integrate them into STEM attitudes in their educational practices. The study concluded that the integration of the STEM approach is not achieved through the quantity of integrated curricula in the classroom, but is achieved through the ability of students to use the engineering design with what they have from knowledge of science or mathematics to find the greatest number of solutions to problems.

The Banks study (2013), which aimed to explore how teachers effectively implement STEM education strategies in North Carolina's technology classrooms, which was revealed to promote student learning. The study sample consisted of five STEM teachers in North Carolina. The study found that an effective STEM teaching strategy is project learning.

The Carter study (2013) was designed to obtain consensus on the characteristics of the integrated STEM approach. An expert group was selected based on their knowledge of the integrated STEM approach. The study showed inconsistencies between the objectives and the results in the STEM-oriented literature, both in the current literature and in the business curricula of private companies and institutions. This study identified the characteristics of STEM's integrated curriculum approach.

Problem of the study

The results of many studies and educational researches have shown that the focus of the educational system on the knowledge and teaching methods marginalized the role of the learner and led to the emergence of many negative results reflected on the outputs of the educational process, most notably the inability of the learner to face daily problems, (Albaker, 2002). Through the experience of the researcher in the teaching of science, he noted that the activities provided to students do not exceed the procedural steps prepared by the teacher generalized to all students and pay attention to the individual differences between them, and the diversity of their patterns of learning, on the one hand, the scientific concepts and the skills of scientific thinking need practical application, employing new teaching methods that keep up with the age and development on the one hand, and keeping pace with the needs of different students on the other hand, which is difficult to teach, and it is difficult for students to acquire the ability to acquire Maintaining the concept and weak use of scientific thinking skills.

Therefore, the researcher saw the use of the STEM teaching approach, which met the needs of the new era based on technology and engineering construction, which integrated with science and mathematics. The STEM approach met the needs of the learners with their unique characteristics which like experimentation, In order to achieve this, the researcher tried to use this approach because it integrating between four disciplines: science, technology, engineering, and mathematics; to give the students scientific concepts and thinking processes in a new way and linking them to experimental empirical reality, thus the problem was posed in the form of a direct question is:

What is the impact of teaching using the STEM approach in acquiring scientific concepts and developing scientific thinking among class teacher students at the University of Jordan**?**

Study questions:

In the light of the problem of the study, this study came to answer the following questions:

What is the impact of teaching using the STEM approach in acquiring the scientific concepts among the Class Teacher Students?

What is the impact of teaching using the STEM approach in the development of scientific thinking among the Class Teacher Students?

Importance of the study

The importance of this study is to achieve the following:

Simulating the recent trend and needs to be up-to-date and concentrate on the differences in the needs of students and their learning methods.

Its new trend is based on an innovative approach to integration and curriculum integration.

Based on using the STEM approach in teaching to know its impact because it encourages creativity and innovation by integrating it into four important subjects: science, technology, engineering, and mathematics.

Study limits and specifications:

This study was limited to teaching the unit of newton-laws to the Class Teacher Students enrolled in the course of scientific concepts and methods of teaching in the second semester of the year 2014-2015 in the Faculty of Educational Sciences at the University of Jordan. The generalization of the results of this study is determined on the size of the sample and the nature of its selection, psychometric of sincerity and steadfastness.

Terminology

STEM approach: is a multidisciplinary approach for learning, where accurate scientific concepts are combined with the real world through students' practical application of science, technology, engineering and mathematics in contexts that link school, community, work, and global projects, enabling learners to learn and develop STEM education, Competition in the New Economy (NAE, 2010) and is defined procedurally as a method of teaching in which the content of the school curriculum is presented as an integrated curriculum between science, technology, engineering and mathematics.

Scientific concept: It is what the person has of meaning or understanding related to a particular word, phrase or process (Nashwan, 2001). And is measured by the mark obtained by the student in the test of scientific concepts

Acquisition of scientific concepts: is "an inductive exploration of the characteristics of the spoken or the characteristics of a set of stimuli and these characteristics are combined to form the mental image of the concept" (Abu Hatab and Amal, 1996) and is defined procedurally as the mark obtained in the test of tribal and post-scientific concepts.

Scientific thinking: Conceptually defined as: A way of looking at things depends mainly on reason and convincing proof of experience or evidence. Or objective behavior directed objectively towards the study of a particular problem in all its facts and dimensions (Olive, 2008**).**and is defined procedurally as a mental process to organize ideas in a logical manner in an attempt to solve a problem by following specific steps and skills including: problem identification, choice of hypotheses, hypothesis validity test, interpretation and generalization, and is measured by the student's score, for study purposes.

Research methodology:

The study was based on the experimental method based on semi-experimental design. The study included independent variables (teaching method and two levels). the STEM approach and the usual method of teaching, and dependent variables (acquisition of scientific concepts and scientific thinking).

Study members

The sample of the study consisted of (68) male and female students of the regular teacher grade enrolled in the course of scientific concepts and teaching methods in the Faculty of Educational Sciences at the University of Jordan, divided into two divisions (experimental and control) equally. The sample of the study was deliberately chosen for the researcher’s work in this college.

Study tools

First: a conceptual test to detect the effectiveness of applying the STEM approach in acquiring the scientific concepts of the students of the grade teacher.

Description of the conceptual test

The conceptual test was prepared after analyzing the mechanics unit (Newton's laws in motion) to limit the scientific concepts contained in this unit. Accordingly, the conceptual test of the 25-paragraph multi-choice type was prepared. The question is presented to the students in practice, and then they choose the correct answer. This test measures the acquisition of the scientific concepts related to the unit of mechanics. The test was applied to the two groups: Experimental and control.

Validation of the test

The validity of the conceptual test was verified through the following steps:

The test was presented to a committee of university professors specialized in methods of teaching science, measurement and evaluation from the University of Jordan, and from the Balqa Applied University in its primary form and the number of paragraphs were (30) paragraph. After making their observations, the test paragraphs were amended according to the opinion of the committee to be in its final form with (25) paragraphs.

The stability of the concept test was verified by applying it to a sample from the outside of the study sample twice for two weeks, and its stability was verified using the Chuddar Richardson equation. It was found to be (0.79). As calculated according to Pearson correlation coefficient stability, they found it equal to (0.599) which is statistically significant at ($\alpha = 0.05$).

Second: the test of scientific thinking.

This study is based on the test developed by Sheikh and Abu Hamdan (Abu Hamdan, 2006), which consists of (23) paragraph of multiple choice type, followed by each question of a set of alternatives. Students' answers were corrected so that the correct answer was given one sign the full mark is (23) and the minimum zero, and to verify the validity of the test it was presented to a group of arbitrators with experience and competence, review the paragraphs of the test and judged in terms of scientific and linguistic relevance and effectiveness of alternatives and the extent of measuring each paragraph for the special purpose for which it was developed, Amend some paragraphs according to the findings of the test committee .

Stability of the scientific thinking test

The test was confirmed by testing (Test-Retest) by applying it to a survey sample from the same study society and from outside the sample. The number of students was 25 years. The test was re-applied after two weeks on the same survey sample Test, and the average time it needed when applied to the study sample, and the value of Cronbach Alpha for the test (.82).

Results and discussion

Results related to the first question, which stated: ‘What is the impact of teaching using the STEM approach in acquiring the scientific concepts among the Class Teacher Students?”

To answer this question, the arithmetical averages and standard deviations were extracted on the test of before and remote concepts according to the variable of the experimental group and the control group as shown in Table 1:

Table 1

The arithmetical averages and the standard deviations of the marks of the students of the grade teacher on the test of concepts according to the group variable in the before and post test.

group	pre			post		
	number	averages	standard deviation	number	averages	standard deviation
experimental	34	13.71	1.292	34	20.06	1.650
control	34	13.06	1.391	34	16.21	2.280

Table 1 shows that there are apparent differences between the arithmetic mean of the students of the grade teacher on the test of the post-concepts according to the experimental group and the control. The experimental average of the experimental group is (20.06) a standard deviation is (1.650) while the arithmetic average of the control group is (16.21) with a standard deviation is (2.280). To find out the

significance of these differences, the analysis of the variance accompanying the group effect was used as shown in Table 2.

Table 2
ANCOVA analysis of the impact of the group on test concepts in the post-test.

Source of Contrast	Total of squares	Degrees of freedom	Squares Average	Calculated p	Level of	2η
Test pre concepts	35.715	1	35.715	10.284	.002	.137
group	196.309	1	196.309	56.529	.000	.465
error	225.726	65	3.473			
total	513.809	67				

Table 2 shows that the differences between the performance of the experimental and control groups on the pre and post tests are statistically significant at ($\alpha = 0.05$), due to the effect of the group on the test of concepts in the post-test. The value of (56.529) is a statistically significant value. The differences were in favor of the experimental group studied according to the STEM approach. The value of 2η was interpreted as 46.5% of the predicted variance in the dependent variable, namely, the acquisition of scientific concepts among the class-teacher students at the University of Jordan.

In order to detect the return of differences in the results of teacher students on the test of the post-scientific concepts according to the variable of the group, the modified arithmetical averages and standard errors for the performance of the grade teacher students were extracted on the post-concept test, as in Table 3:

Table 3
Modified arithmetical averages and standard errors of student grade marks on the test of scientific concepts

Group	Adjusted averages	Standard error
Experimental	19.882	.324
Control	16.383	.324

Based on the adjusted averages of the experimental and control groups in Table 3, the modified experimental average of the experimental group is higher than the adjusted average of the control group by a difference of (2.699). The modified experimental average of the experimental group on the test of the post-scientific concepts (19,882) with Standard error of (.324), while the modified arithmetic mean of the control group on the test of scientific concepts (16,383) reached a standard error of (0.324). Indicating that there is a statistically significant effect at the level of significance of ($\alpha = 0.05$) to teach using the STEM approach to gain the scientific concepts for the students of the experimental grade teacher more than the students of the control group who studied in the normal way.

This can be explained by the fact that STEM teaching as a multidisciplinary approach allows students to understand the scientific concept in an integrated way from all angles according to the

components of science, technology, mathematics and engineering. In this way, we ensure the integrated learning of the concept and its relevance to practical life. Based on the survey and problem solving, helps to perpetuate the concept in their minds and build other concepts in the light of their understanding, which helps to deduce the concept within an enjoyable learning environment suited to the different learning patterns of students through collaborative work loved them, ensure the concept is confirmed in their minds, which near them to the real applications of life of the concept.

Results related to the second question, which stated: "What is the impact of teaching using the STEM approach in the development of scientific thinking among the Class Teacher Students?"

To answer this question, the arithmetical averages and standard deviations were extracted on the test of concepts according to the variable of the experimental group and the control group as shown in Table 4.

Table 4

The arithmetical averages and standard deviations of the marks of the students of the grade teacher on the test of scientific thinking according to the group variable in the tribal and post-test.

group	pre			post		
	number	averages	standard deviation	number	averages	standard deviation
experimental	34	13.76	1.327	34	19.26	1.563
control	34	13.41	1.417	34	14.47	1.542

T
able 4 shows that there are apparent differences between the arithmetic mean of the students of the grade teacher on the test of the post-scientific thinking according to the experimental group and the control. The experimental average of the experimental group is (19.26) with a standard deviation of (1.563), while the arithmetic average of the control group (14.47) with a standard deviation of (1.542). To find out the significance of these differences, the analysis of the variance associated with the effect of the group was used as shown in Table 5.

Table 5

ANCOVA analysis of the impact of the group on the test of scientific thinking in the post-test.

Source of Contrast	Total squares	Degrees of freedom	Average squares	P calculated	Level of significance	2η
Test of pre scientific thinking	84.536	1	84.536	73.704	.000	.531
group	338.955	1	338.955	295.525	.000	.820
error	74.552	65	1.147			
total	549.809	67				

Table 5 shows that the differences between the performance of the experimental and control groups on the pre and post tests are statistically significant at alpha ($\alpha = 0.05$), due to the effect of the group on the test of scientific thinking in the post-test, with a value of (295.525), which is a statistically significant value of (.000). The differences were in favor of the experimental group studied according to the STEM approach. The value of 2η with percentage of (82%) was

explained by the explanatory variance in the dependent variable, which is the development of scientific thinking among the students of the grade teacher at the University of Jordan.

In order to detect the return of the differences in the results of the teachers on the test of the post-scientific thinking according to the variable of the group, the modified arithmetic averages and the standard errors of the teacher's performance were obtained on the test of the post-scientific thinking, as in Table 6.

Table 6
Modified arithmetical averages and standard errors of student grade marks on the scientific thinking test

group	adjusted averages	Standard error
experimental	19.119	.184
control	14.616	.184

Based on the adjusted averages of the experimental and control groups in Table 6, the modified experimental mean of the experimental group is higher than the adjusted mean of the control group by a difference of (1.034). The modified experimental mean of the experimental group on the post-scientific thinking experiment (19.119) with standard errors of (1,844), while the modified arithmetic mean of the control group on the test of scientific concepts (14.616) was a standard error of (0.184). Indicating that there was a statistically significant effect at the level of significance of ($\alpha = 0.05$) for teaching using the STEM approach in the development of scientific thinking for the students of the experimental grade teacher than the students of the control group who studied in the usual way.

This can be explained by the fact that teaching as a multidisciplinary approach allows students to think about solving problems in an integrated way from all sides according to the components of science, technology, mathematics, and engineering. The researcher may attribute this result to a structured experimental approach To investigate and solve problems, which helps to use the processes of higher thinking by identifying the problem and develop hypotheses for the appropriate solution and thus experimentation and create relationships between science and mathematics and engineering design using modern technology in an enjoyable learning environment suited to learning styles the students are encouraged to work through the process of thinking, and to bring them closer to the application of the results in daily life to overcome the problems facing the learner. The linking processes that the learner needs in this direction make the learner the practitioner of scientific thinking processes**.**

Recommendations

Based on the study results, the following recommendations were made:

- Using the method of application in accordance with the STEM course during the teaching because of its effective effect in the acquisition of scientific concepts among students.
- Conduct further studies on the impact of STEM implementation on variables such as achievement, motivation, scientific trends in public science, as well as impact study in problem solving, and further studies on different age stages, especially secondary and basic.

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Editor's Note: A literature search is a first step in planning and implementing an effective distance learning program.

Initializing an online program: ten themes from the literature

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Abstract

Financial pressures on higher education institutions may lead them to consider online delivery for new and existing academic programs. However, initializing an online program is not automatically successful. A review of the literature on initializing online programs in higher education was undertaken to identify factors that led to successful implementation. This review resulted in ten themes emerging as factors that were consistently identified as contributing to the success of implementing an online program: building interaction and community, mission alignment, policy, administration, technical support, faculty development, program development time and effort, student preparation, instructional design, program flexibility, and assessment and evaluation. Literature that exhibits these themes are presented from diverse fields of study, and include successes as well as failures. While all must be considered for a successful program, some may be more salient, may present unique obstacles, or may be applied uniquely in a given context.

Keywords: distance learning, distance program, higher education, online program, program initialization, program initializing, program implementation, online implementation, program success, implementation success, initialization success

Introduction

Purchasing additional capacity for the Course Management System (CMS) is faster and cheaper by several orders of magnitude than building a new student dormitory. This financial calculation makes online distance programs more attractive as an option in an environment where universities are charged to increase access and enrollment with little or no new permanent funding. While comparing CMS capacity to dormitory space is oversimplified, it illustrates that distance education can be seen as financially attractive to a university in our current climate.

Other financial situations may factor in to this decision. In North Carolina, the NC Promise program lowers tuition at three University of North Carolina System campuses to $500 per term (Anderson, 2016). While this makes these campuses more attractive to prospective students, an increase in enrollment cannot be accommodated if campus resources such as dormitories, dining services, classrooms, the library, and parking are already heavily utilized.

One option in response to these pressures is to consider online education. Moving existing programs to online delivery and creating new programs online can be framed as more efficient use of resources already available at the university. Distance and online education (which will be used interchangeably in this paper) have moved from dabbling by faculty enthusiasts to being an integrated component of academic departments. See Palmer & Tulloch (2001) for an example of this progression.

But, what are effective ways to initialize an online program, and what are pitfalls to avoid? Institutions should utilize best practices when initializing an online program to make success more probable. This paper will review findings in the literature about either moving a program online or creating a new online program.

Method

The purpose of this review is to find theoretical discussions, case studies, or research oriented articles related to initializing an online academic program in higher education. Given the rapid pace of development in internet/digital technology, this search will focus on articles since 2005. This year was chosen as it is the year YouTube went live and marks when streaming video became a viable, mainstream technology. This is also the year after the term "Web 2.0" became widespread for interactive digital services that were initialized at that time (Battelle & O'Reilly, 2004).

The literature search began with the database Education Source. The search included all journal articles from 2005 to the present and a search of article titles only for keywords such as "distance education," "online," and "program." Other terms such as "convert" or "conversion" were used to capture articles about moving programs to online delivery, as it was assumed that most case studies would be about this topic. Searching for titles only was chosen due to the broad nature of terms such as "program" as it was assumed that an article about putting a program online would have that term in the title. Out of over 2000 articles returned from the attempted searches, several promising articles were found. A few journals were identified that may have other papers on this topic due to their mission and scope. These were searched either manually or by query search, whichever was available. Relevant citations were also followed to identify any other applicable papers. Several articles found through these methods are older than 2005 but are included in this literature review.

Results

After this search, 33 articles were found that address initializing an online academic program in higher education. Of these, four are considered theoretical papers that are not tied to a specific implementation case (Arroyo, 2014; Chung-Herrera & Krentler, 2008; McAlister, Rivera, & Hallam, 2001; Milman, 2016). The remaining twenty-nine were case studies or program evaluations. These represent several academic disciplines including seven from education (Amrein-Beardsley, Foulger, & Toth, 2007; Ferdig & Dawson, 2006; Groulx & Hernly, 2010; Harrell & Harris, 2006; Koehler et al., 2013; Korach & Agans, 2011; Willis, Tucker, & Gunn, 2003), five from business (Combe, 2005; Cordeiro & Muraoka, 2015; Hergert, 2003; Masalela, 2011; Schrum & Benson, 2000), six from health and medical (Carroll-Barefield, Smith, Prince, & Campbell, 2005; Gwozdek, Springfield, Peetz, & Kerschbaum, 2011; Jacobson, 2005; Leech & Holcomb, 2004; Pettersson & Olofsson, 2015; Savard, 2015), one from family studies (Bold, 2005), one from forensic science (Grundmann, Wielbo, & Tebbett, 2010), one from gender studies (Murray, Byrne, & Koenig-Visagie, 2013), one from law (Centner, 2014), one from psychology (McClure & Woolum, 2006), one from research administration (Smith & Torres, 2011), one from theology (Hines, McGee, Waller, & Waller, 2009), and four that cover multiple programs (Davis, 2001; King, McCausland, & Nunan, 2001; Moloney et al., 2010; Vogt, 2014). The articles were spread out by year of publication as seen in Figure 1.

In addition to coming from various fields, the articles represent program evaluations, case studies, and reviews of multiple programs. Five of the case studies and program evaluations were of new academic programs; the rest were conversions of existing programs that were offered in a traditional face-to-face format or via distance in a different delivery mode, mainly via mailing print material.

Figure 1: Number of Articles Published by Year

Emergent themes

Each article has its own perspective on what factors contribute to successful initialization of an online program. Some are highly focused on a few barriers that were overcome, others note factors that were executed well and led to success, and some even describe failures in initializing programs. In spite of this diversity, ten themes emerged from the collection of articles. Each is described below along with some examples of each. The number of articles that describe a theme as having a significant impact on initializing a program is found in Figure 2.

Interaction and community

This theme was noted by sixteen of the articles in some way as either a factor of success or a key goal of the implementation. Some articles referred to interactions between students and faculty, some to interaction among students. These are closely related to the concept of building a community, which requires interaction and is desired as the result of that interaction. Thus, these related concepts are combined in one theme.

Several articles discussed this factor explicitly. Grundmann et al. (2010) describe creating a new program in partnership with two international universities. They stated student interaction was a key component of the design of the program. The program evaluation showed that the student interaction component received lower ratings than other aspects of the program design, but received multiple positive open-ended comments.

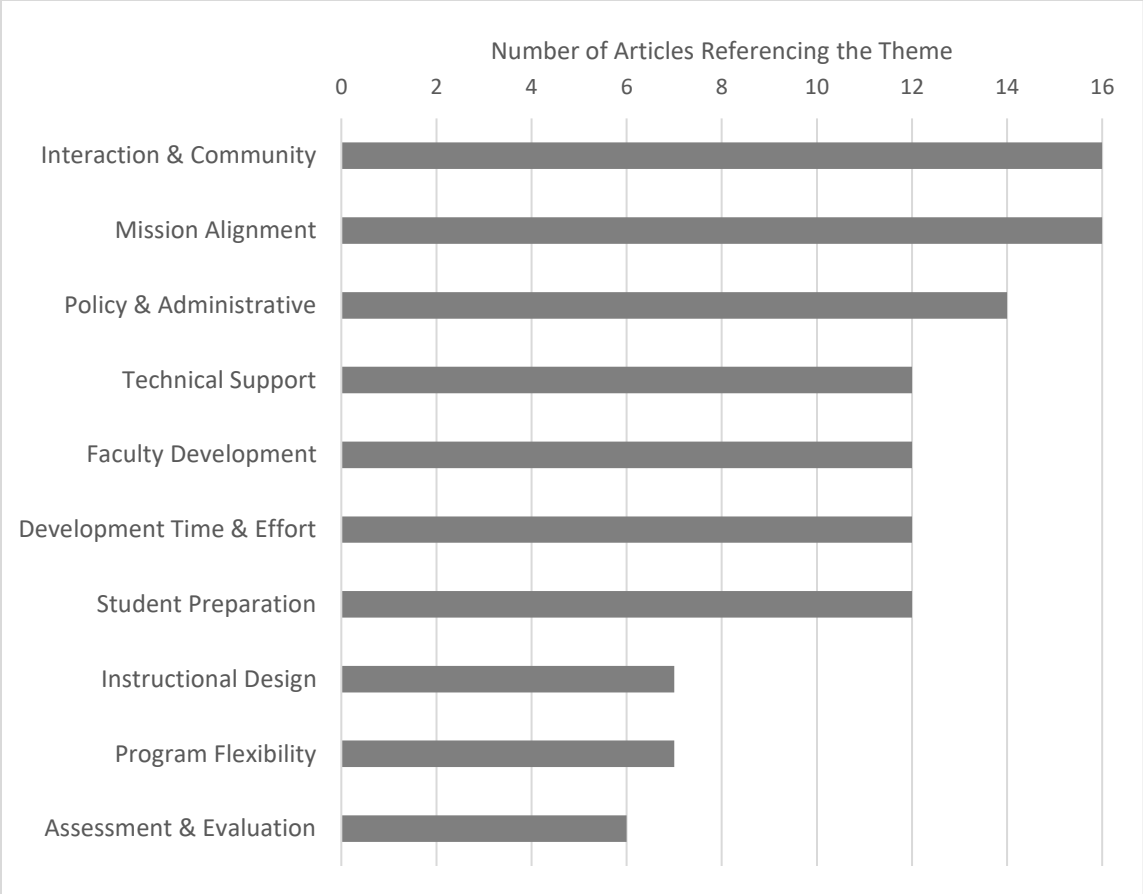

Figure 2: Frequency of emergent themes in articles

Korach and Agans (2011) described conversion of an educational leadership program to a hybrid design. They designed their program around cohorts focused on a shared inquiry project to build community. This community carried over to classes where threaded discussions were used to synthesize the content.

Two negative examples also indicate the importance of student interaction. Bold (2005) noted that while student interaction is important, they sacrificed interactive capability to have program flexibility. The students indicated in the program evaluation that they did desire the flexibility of an asynchronous distance program, but did not like the lack of interaction. Centner (2014) describes a law certificate program created from a collaboration of five universities. While Centner noted the importance of student interaction in online programs, the oversight body for the program did not take a stance on promoting interaction among students. The article presents this as a significant failing and urges the oversight body to provide guidance to all the universities on this issue.

Mission alignment

This theme is about aligning the design of the academic program with the mission, vision, and/or general philosophy of the department and institution. Several articles articulate their respective mission and philosophy and draw out the implications for an online program in their context. In one, a theological seminary's mission and beliefs guided the design of a mentoring component and building online community (Hines et al., 2009). In another, Murray (2013) describes a

degree in gender studies at an open university and how their program emphasizes access and flexibility in keeping with the philosophy of Open Education and the feminist stance of the program. Third, a theoretical paper examines the mission of many historically black colleges and universities (HBCUs). The author finds that the HBCU mission does not mesh with many applications of distance education and discusses how the two could be harmonized such that an HBCU could have a distance education program consistent with their mission (Arroyo, 2014).

Davis (2001) describes the open educational philosophy of another university and how the desire for access and flexibility drove the decision to give students the option to use mailed print material or online delivery when possible. Moloney et. al. (2010) describe how one university system chose a hybrid approach for multiple programs to align with their mission to serve the local regions in their state. The article claimed that the local face-to-face meetings were an indicator that the distance/hybrid program served the local region of each university, which is part of the system's mission.

Policy and administrative themes

The policy and administrative theme includes navigating the administrative and curricular processes and interpreting and changing policies to facilitate initialization of an online program. Milman (2016) in one theoretical paper indicates the policy and administrative tasks such as following state requirements, marketing, and hiring staff must be considered. Several articles noted that the support of administration through the process was a key factor in the success of their online program. Smith and Torres (2011) describe creating an interdisciplinary degree program in research administration. They collaborated with multiple departments, and the department head that ultimately initiated the program supported its creation and progress toward approval. Ferdig and Dawson (2006) concentrated on issues related to this theme, such as negotiation with university administrative units about shorter terms (8 weeks instead of 16), compensation (standard FTE generation or running for profit courses), and tenure/load issues for faculty. Gwozdek et al. (2011) had a team that planned the implementation of the program and included issues such as an admissions policy to maximize the students' chance of success and a marketing policy. Davis (2001) describes how that open university already has policies in place that follow the open education philosophy, thus making policy changes for online education was not difficult.

Finally, an instance of a failed program illustrates the effect of this factor. Masalela (2011) describes an attempt to convert a master's degree to online format. The decision to do this was top-down without support or buy-in from faculty. The faculty were not given adequate training to convert their materials to an online format. Further, the unit charged with supporting distance education was reported elsewhere to be ineffective (Tau, 2008). The lack of administrative will to devote resources and follow through was indicated as a key issue in the program not going online.

Technical support

The technical support theme includes all support and troubleshooting needed to use the technology that enables online learning. This largely includes the CMS, but could include other technology also. This theme was not a central focus of any single article, but is mentioned by several of them as a necessary component of a successful online program. Chung-Herrera and Krentler (2008) include the necessary investment in technology and supporting resources in their guidelines for the feasibility of initializing an online program. King et al. (2001) discuss the technology support setup at their university for all programs. This included developing a CMS in-house and merging the office of distance education with the faculty development center to support distance teaching methods. This was done as they were moving more programs to online delivery. Schrum and Benson (2000) indicate that in the program evaluation of that work, the faculty indicated technology support was one of the key factors in the success of the program.

McClure and Woolum (2006) discuss an abandoned online program project in psychology. Their department piloted online delivery at the university and were close to having a fully online degree program. They realized they did not have the resources to maintain their homegrown CMS and increase enrollment based on only their department resources. The university chose a different path for going online with degree programs, including purchasing a commercial CMS. The lack of technical support is one reason the department discontinued the program.

Faculty development

The faculty development theme encompasses faculty training on the use of any new technology and on instructional methods for online delivery. King et al. (2001) found that the skill level and existing faculty development were not enough to support the development of online programs across their university. This was addressed with the goal of training faculty to have enough skills to convert their own materials to an online format and putting them in the campus home-grown CMS.

Two programs in business addressed this with outside experts. Schrum and Benson (2000) described how their faculty received a month-long seminar and ongoing support from a course design consultant to prepare them for online delivery. Cordeiro and Muraoka (2015) also held training sessions and hired a consultant to provide development support to faculty.

Savard (2015) provided significant detail on the planning phases of converting a program to online delivery. This plan included training for faculty in both pedagogy and technology. Once their CMS was functional, the faculty used it during the planning and development stages so they would increase their skill in using it.

Finally, the lack of provision of faculty development is noted as one factor in the failure of an online program initiative at the University of Botswana (Masalela, 2011).

Development time and effort

This theme refers to the usually large amount of development time and effort required to initialize an online program. This was referred to explicitly in some cases as issue; in others it can be inferred from the development times noted in the articles. Carroll-Barefield et al. (2005) mention this as one of the major lessons learned, that it takes significant time and effort from faculty to convert a program. This is in part due to converting all the courses and all the non-course materials and processes such as student handbooks and orientation. Harrell and Harris (2006) also discussed the extensive time required to initiate the program, and how they obtained grants to support this initial work form their state.

Student preparation

The theme of student preparation includes the need to prepare students to participate in an online program, particularly with respect to the technology. Carroll-Barefield et al. (2005) planned how to provide students with training before they began the program. Their solution was to mail a CD to each new student with all the materials covered during orientation on campus, and added training on using the CMS. They also provided an orientation and training module within their CMS.

For a new program in family studies that was designed to be delivered asynchronously online, the program offered an optional face-to-face seminar at the beginning of each term on technology use, scholarly writing, statistics, and other topics (Bold, 2005). This approach seems to go against the goal of making a distance program and no data are presented about how many students attended these optional seminars. Still, this is a unique attempt to serve students who presumably are within driving distance of the campus but intend to pursue a program with online delivery. This strategy was also employed by Gwozdek et al. (2011); they required students to

attend an on-campus two day orientation before starting their program which included technology training.

Instructional design

This theme covers the role of instructional design when initializing an online program. Combe (2005) extensively discusses the instructional design approach they took during program planning. Other programs either hired an instructional designer to support their work (Savard, 2015) or had someone with that expertise in a key program development position (Smith & Torres, 2011).

Program flexibility

The theme of program flexibility refers to how the program is designed to give students educational delivery options that work for them even if they are not aligned with the residential university course system. King et al. (2001) indicated their university allowed students to choose whether they wanted to receive the printed distance materials in the mail or online delivery when available. This is in line with their university's open education philosophy. Willis et al. (2003) initially planned a blended/hybrid design for their program but decided to deliver it fully online after they found their students preferred the flexibility of that format. Koehler et al. (2013) developed a blended delivery doctorate in educational technology involving face-to-face courses in the summer and online courses during the academic year. This accommodates the typical calendar year of professional educators.

Assessment and evaluation

Assessment and evaluation are key components of an academic program that seek to improve the program. Cordeiro and Muraoka (2015) note that assessment was built-in to their new program and used to evaluate its effectiveness. Gwozdek et al. (2011) also included assessment in the design of their program and reported they already made a change to how their program portfolio works based on that assessment.

Conclusions

The ten themes that emerged from the literature review are found are:

1. Interaction & Community
2. Mission Alignment
3. Policy & Administrative
4. Technical Support
5. Faculty Development
6. Development Time & Effort
7. Student Preparation
8. Instructional Design
9. Program Flexibility
10. Assessment & Evaluation

During the course of this review of literature, it became clear that these themes are not new. One of the oldest articles found is by McAlister et al. (2001) which lists twelve questions to ask when developing web-based education that are quoted here:

1. Will the Web curriculum offered be congruent with the institution's mission and strategy?
2. Do you have administrative support?
3. Are there institutional obstacles to adopting a Web curriculum?
4. How will you handle intellectual property issues?
5. How will you compensate instructors for offering or administering Web courses?
6. Do you have clear, well-defined criteria for selecting classes to be offered through the Web?
7. What facilities or capabilities are available to assist in the preparation and delivery of course materials?
8. What methods will be used to deliver class content?
9. How will student progress be assessed?
10. Do your students have the skills necessary to use the Web and participate in class?
11. What course delivery platform will you use?
12. Where will the class materials be maintained?

Except for the emergent theme of interaction and community not having a question to match in McAlister's list, the questions map to the themes identified above. Given the year of publication, this list of questions has stayed relevant and captured most of the major issues related to initializing an online degree program in higher education.

These ten themes have support from both theoretical and case study/program evaluation articles. They come from many points in time since 2000 (Figure 1) and from a diversity of academic programs. They are supported by both positive examples of success and negative examples in failed program launches.

While each article reviewed includes only a subset of the themes, no single article included all ten themes. Given the nature of these themes, it is reasonable to assume that all programs being initialized for online delivery must consider all ten themes to be successful. For example, any curricular change will have to be reviewed by the institution's curricular review process whether that is explicitly stated in a case study or not. In light of this, the frequencies in Figure 2 that show how often a theme was found in this literature review may reflect the salience of that factor in initializing a program. That may be due to that theme presenting a significant obstacle or to finding a unique, effective solution.

Yet, the relative importance and outcome of each theme may depend greatly on the local context of the problem. Looking at the Policy & Administration theme, Smith and Torres (2011) noted they had significant administrative support for their program and was a factor in their success while in Masalela (2011) and McClure and Woolum (2006) the support was lacking and led to failure. Also, themes like program flexibility may mean different things in different contexts. Willis et al. (2003) found program flexibility meant delivery should be fully online while Koehler et al. (2013) found a hybrid program worked best with their student population.

In conclusion, based on a review of the literature that found a diversity of articles, these ten themes appear to be significant factors of success in the initialization of online programs in higher education. Each may be applied in different and specific ways within a given context, but all should be considered. These ten emergent themes are commended to practitioners to guide the initialization of new online distance programs.

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Editor's Note: Evaluation is essential to success in adopting new technologies and to ensure continuous quality improvement.

The key factors influencing internet network attitudes: an empirical study in the University of Jordan

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Jordan

Abstract

The aim of this study is to investigate and measure undergraduate students' attitudes toward the Internet Network at The University of Jordan during the fall semester 2016/2017. A total of 230 students participated in this study. Results reveal that: (1) Internet services are related with type of faculty, level of academic year, and student's GPA, (2) no significant differences were found on students' Internet network barriers (Perceived Control) related with level of academic year, and GPA, and (3) undergraduate student's awareness toward Internet usage is type of faculty related.

The findings of the study provide significant implications for the academicians, and government policy makers where showed that the students in medical and scientific faculties have higher positive attitudes toward internet than humanities faculties.

Keywords: awareness, internet, Jordan, students.

Introduction

With information age, many advantages in using ICTs (Information and Communication Technologies) i.e. providing comfort in people's life, eliminating the communication barriers, and providing fast and effective communication among peers [1]. Several factors have dictated the internet attitudes such as having an experience with computers in early ages, possessing a computer, and having access to ICT [2].

Internet has been one of the most necessary technologies that people use as a place to get knowledge and resources. Compared to a decade ago, people frequently use the internet as an interactive tool to collect information from certain resources on the World Wide Web, which enables communication among all computers [3]. The Internet is used in education for different purposes including teaching, research, social media, sharing information, and as an educational tool [4].

This paper is structured as follows: Section 2 provides the literature review, the research methodology (Sample, Measures, Discussion and Results) are presented in Section 3. The conclusion is in Section 4.

Literature review

Many studies on Internet network use have found that the internet network is most widely used among young highly educated people [5-7]. According to Tadasad et.al [8], students used internet for general or recreational purposes and did not realize the potential support provided by the internet for their academic activities.

According to Jones [9], the internet plays an important role in students' education and significantly affects their college lives. Rhoades et.al [10] supported this finding by reporting that most students used the internet at home for information searches and regarded the internet as a credible, easy to understand, and beneficial source of information [11].

Hong et.al [12] found that a significant majority of students had positive attitude toward the internet and regarded the internet as a universal fast gateway to get knowledge in life. Anunobi [13] and Sharma et.al [14] found that most students used the internet for academic purposes and perceived it as a source of latest knowledge. Suhail and Bargees [15] studied internet use among Pakistani teens and adults and found that majority used the internet for academic purposes, and found that a majority of students' had positive outcomes from internet use and used the internet to enhance their academic skills

According to Usta et.al [16], there was a difference attitudes toward the internet between students who had a computer in their homes and those who did not have a computer. Researchers claimed that students who started using computers at early ages had more positive attitudes towards the internet than students who started using computers during college years. Lastly, they found that students mainly used internet for educational purposes and social media.

The Internet has had many impacts on society compared to the traditional mass media. There was a longitudinal study carried out in Iceland by Klobas and Clyde [17] to find out the attitudes of adults in Iceland to use of the Internet. The study used a short questionnaire sent via email and distributed to Internet training courses for three years, according to the Theory of Planned Behavior.

In Malaysia, Hong et.al [18] conducted a study with 88 university students who studied at five colleges at Sarawak University of Malaysia. They used a scale with three sub-dimensions (skills, students' knowledge of the Internet, and conducive educational environment) for using the Internet at the university and students' attitudes to the Internet in education. The study showed positive attitudes for using the Internet in education, but there were no differences in the attitudes to the Internet between both genders and between those with high or low GPA's. However, it showed that the students of College of Engineering and College of Technological Sciences had positive attitudes compared to the students of College of Human Development. Besides, the study showed that the educational environment in the university has encouraged students to use the Internet. The study ascribed this to the role of the university and staff members in enhancing education through the Internet.

Research methodology

An attitude refers to one's judgment (positive or negative) about a concrete subject. Attitudes are learned; they are moldable and may change with experience of the stimulus objects and with social rules or institutions [19]. Attitudes toward ICT usage have been defined as a person's general evaluation or feeling towards ICT and specific computer and Internet related activities [20]. The learner's attitude toward the computer measures a person's capabilities in effective learning. Garland and Noyes [21] indicated that in the educational context, confidence should lead to more positive attitudes toward computers and the Internet, and this will enhance learning and associated activities. The Theory of Planned Behaviour (TPB) as initially designed by Ajzen and Fishbein [22] attempts to understand peoples' intentions to engage in a number of activities. It appears that the application of the theory of planned behavior deals with the antecedents of attitudes, subjective norms, and perceived behavioral control.

The Theory of Reason Action (TRA) proposed by Fishbein and Ajzen [23] postulates that an individual's behavior is determined by his/her intention to perform that both behavior and intention are influenced jointly by the individual's attitude and subjective norm. Davis [24] developed the Technology Acceptance Model (TAM) to explain perceived technology usefulness and usage intentions by taking into account social influence and cognitive processes.

Based on the previous models (i.e. TPB, TRA and TAM), in the present study, attitudes toward internet networks assessed in term of the perceived usefulness, perceived control, and emotional

response. Perceived Usefulness refers to individual's beliefs about the usefulness of Internet (internet network services). Perceived Control refers to difficulty (internet network barriers) of using Internet. On the other hand, Emotional response refers to the level of awareness when using the Internet. In the present study, students' attitudes toward Internet attitudes were investigated through type of faculty, level of academic year, student's GPA, and student's Internet skills. Fig.1 shows the research model employed in this study with the hypotheses.

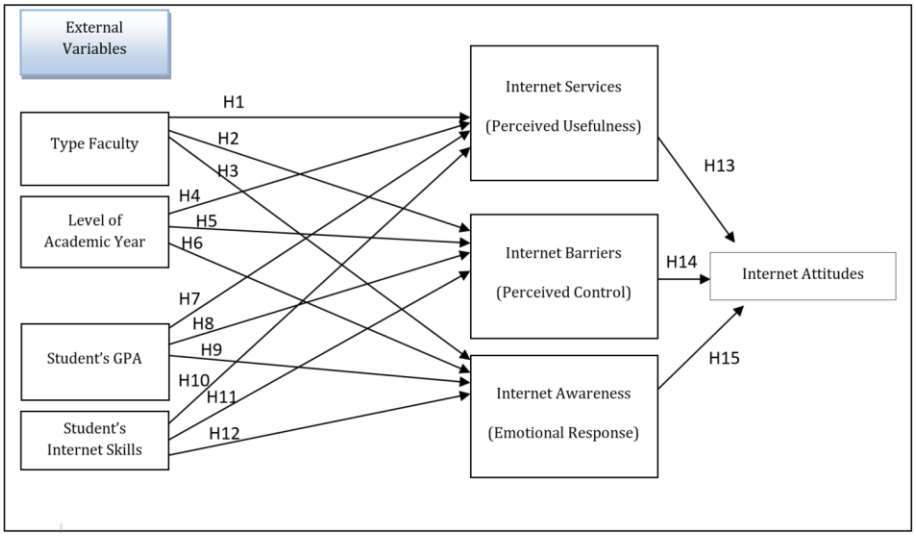

Fig.1. Visual Research Model with hypotheses

The present study was conducted using a quantitative approach; a questionnaire and a descriptive methodology were used to collect data on the students' internet network attitudes at The University of Jordan during the Fall Semester of the academic year 2016-2017. The answers of the students were collected and analyzed using SPSS software for statistical analysis.

Hypotheses

H1: The type of faculty has an influence on Internet services.

H2: The type of faculty has an influence on Internet barriers.

H3: The type of faculty has an influence on Internet awareness.

H4: The level of academic year has an influence on Internet services.

H5: The level of academic year has an influence on Internet barriers.

H6: The level of academic year has an influence on Internet awareness.

H7: The student's GPA has an influence on Internet services.

H8: The student's GPA has an influence on Internet barriers.

H9: The student's GPA has an influence on Internet awareness.

H10: The student's internet skills have an influence on Internet services.

H11: The student's internet skills have an influence on Internet barriers.

H12: The student's internet skills have an influence on Internet awareness.

H13: The Internet Services have an influence on Internet attitudes.

H14: The Internet Barriers have an influence on Internet attitudes.

H15: The Internet Awareness has an influence on Internet attitudes.

Sample

The research instrument used for this study was a questionnaire which was distributed among 230 students in different faculties (medical, scientific, and humanitarian) in different academic years (first, second, third, forth, and fifth) with different GPA's (excellent, very good, good, fair, and under fair) and different student's Internet skills (excellent, moderate, and weak skills). All questionnaires were collected upon completion by the researchers themselves. Before filling the questionnaire in, the participants were briefed about the nature and the purpose of the survey.

The questionnaire consisted of two sections with a total of 25 questions. The first section included 4 questions on the respondents' demographic data such as the student's faculty, level of academic year, GPA, and skills on Internet network which are shown in Table 1.

Table 1
Student demographics

Category	Characteristics	Number	Percentage
Type of Faculty	Medical	49	21.3
	Scientific	98	42.6
	Humanities	83	36.1
Level of Academic Year	First	72	31.3
	Second	68	29.6
	Third	49	21.3
	Forth	33	14.3
	Fifth	8	3.5
Student's GPA	Under Fair	2	.9
	Fair	24	10.4
	Good	94	40.9
	Very good	82	35.7
	Excellent	28	12.2
Student's Internet Skills	Excellent Skills	102	44.3
	Moderate Skills	115	50.0
	Weak Skills	13	5.7

The second section included 21 questions divided to 7 questions for Internet services (i.e. communication, entertainment, academic studies and research, software downloading playing games, reading news, and buying online), 5 questions for Internet barriers (i.e. slow speed of internet network, inadequate computers in the labs, payment restrictions, difficulty in finding relevant information, and technical problems), 4 questions for Internet awareness (i.e. using internet network improve communication, important for studying and obtaining learning material, save time and efforts, and availability of internet network 24/7), and 5 questions for internet network attitudes (improving my studying, having a desire to use internet all the time, thinking internet is an intelligent tool, preferring the search using internet network, and feeling freedom when working on the Internet network). The students' responses within this section were based on a five-point Likert-type scale ranging from strongly agree to strongly disagree. The questions in this section are adopted from previous information system researches [25-28].

Measures

Measurement validity in terms of reliability and construct validity was evaluated. The reliability analysis measured the internal validity and consistency of questions used for each construct by calculating Cronbach's alpha coefficient [29]. Flynn et al. [30] argued that a Cronbach's alpha of 0.6 and above was considered an effective reliability for judging a scale. In this study, the Cronbach's alpha was higher than 0.6 as shown in Table 2 which implies that the instrument is reliable.

Table 2
Cronbach's Alpha

Item	Number of Items	Cronbach's Alpha
Internet Services	7	0.75
Internet Barriers	5	0.81
Internet Awareness	4	0.82
Internet Attitudes	5	0.85

Discussion and results

In testing the hypotheses, for the external variables the researchers used one way ANOVA with pre-set level of significance is 0.05 followed by Post Hoc tests to examine the differences between the students in their Internet usage, barriers and their awareness of Internet based on their demographics.

Table 3

One-way ANOVA: type of faculty

		Sum of Squares	df	Mean Square	F	Sig.
Internet Services	Between Groups	301.731	2	150.865	11.812	.000
	Within Groups	2899.330	227	12.772		
	Total	3201.061	229			
Internet Barriers	Between Groups	83.498	2	41.749	4.191	.016
	Within Groups	2261.497	227	9.963		
	Total	2344.996	229			
Internet Awareness	Between Groups	104.774	2	52.387	8.340	.000
	Within Groups	1425.921	227	6.282		
	Total	1530.696	229			

The type of faculty has significant influence on services, barriers, and awareness as shown in Table 3 (H1, H2, and H3 are supported). Post Hoc Tests are shown in Table 4, to specify that the medical and scientific students are highly used Internet services and highly Internet awareness than humanities students. This returns to the nature of medical and scientific courses and research, which need more working on the computer and Internet with search engines than humanities faculties, which affect positively on Internet services, and as a result the students from these faculties will feel with the barriers (especially the slow speed of internet network and payments restrictions) more than students from humanities faculties.

Table 4
Post-hoc test: type of faculty

Dependent Variable	College (I)	College (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Internet Services	Medical	Scientific	2.28571*	.62529	.000	1.0536	3.5178
		Humanities	3.09565*	.64385	.000	1.8270	4.3643
	Scientific	Medical	-2.28571*	.62529	.000	-3.5178	-1.0536
		Humanities	.80993	.53312	.130	-.2406	1.8604
	Humanities	Medical	-3.09565*	.64385	.000	-4.3643	-1.8270
		Scientific	-.80993	.53312	.130	-1.8604	.2406
Internet Barriers	Medical	Scientific	-.17347	.55225	.754	-1.2617	.9147
		Humanities	1.13155*	.56864	.048	.0111	2.2520
	Scientific	Medical	.17347	.55225	.754	-.9147	1.2617
		Humanities	1.30502*	.47084	.006	.3772	2.2328
	Humanities	Medical	-1.13155*	.56864	.048	-2.2520	-.0111
		Scientific	-1.30502*	.47084	.006	-2.2328	-.3772
Internet Awareness	Medical	Scientific	1.07143*	.43851	.015	.2074	1.9355
		Humanities	1.84042*	.45153	.000	.9507	2.7301
	Scientific	Medical	-1.07143*	.43851	.015	-1.9355	-.2074
		Humanities	.76899*	.37387	.041	.0323	1.5057
	Humanities	Medical	-1.84042*	.45153	.000	-2.7301	-.9507
		Scientific	-.76899*	.37387	.041	-1.5057	-.0323

*. The mean difference is significant at the 0.05 level

Regarding the academic year, the level of academic year is influenced only on Internet Services (H4 is supported) while no statistically influence on Internet barriers and awareness (H5 and H6 are rejected) as shown in Table 5.

Table 5
One-way ANOVA: level of academic year

		Sum of Squares	df	Mean Square	F	Sig.
Internet Services	Between Groups	200.755	4	50.189	3.764	.006
	Within Groups	3000.306	225	13.335		
	Total	3201.061	229			
Internet Barriers	Between Groups	60.875	4	15.219	1.499	.203
	Within Groups	2284.121	225	10.152		
	Total	2344.996	229			
Internet Awareness	Between Groups	22.299	4	5.575	.832	.506
	Within Groups	1508.397	225	6.704		
	Total	1530.696	229			

The Post Hoc test in Table 6 shows that the students of academic year: second, third, fourth and fifth levels are better than the students in the first level and this is normal situation because the students in the first year don't have enough knowledge of Internet services like searching, online shopping, etc. they are fresh graduate from high schools, often depend on using of computer applications through their study.

Table 6
Post-hoc test: level of academic year

Dependent Variable	Year (I)	Year (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Internet Services	First	Second	-1.65196*	.61750	.008	-2.8688	-.4351
		Third	-1.84014*	.67627	.007	-3.1728	-.5075
		Forth	-1.89394*	.76765	.014	-3.4066	-.3812
		Fifth	-3.66667*	1.36090	.008	-6.3484	-.9849
	Second	first	1.65196*	.61750	.008	.4351	2.8688
		Third	-.18818	.68428	.784	-1.5366	1.1602
		Forth	-.24198	.77471	.755	-1.7686	1.2846
		Fifth	-2.01471	1.36489	.141	-4.7043	.6749
	Third	first	1.84014*	.67627	.007	.5075	3.1728
		Second	.18818	.68428	.784	-1.1602	1.5366
		Forth	-.05380	.82232	.948	-1.6742	1.5666
		Fifth	-1.82653	1.39247	.191	-4.5705	.9174
	Forth	first	1.89394*	.76765	.014	.3812	3.4066
		Second	.24198	.77471	.755	-1.2846	1.7686
		Third	.05380	.82232	.948	-1.5666	1.6742
		Fifth	-1.77273	1.43907	.219	-4.6085	1.0630
	Fifth	first	3.66667*	1.36090	.008	.9849	6.3484
		Second	2.01471	1.36489	.141	-.6749	4.7043
		Third	1.82653	1.39247	.191	-.9174	4.5705
		Forth	1.77273	1.43907	.219	-1.0630	4.6085

Table 7
One-way ANOVA: student's GPA

		Sum of Squares	df	Mean Square	F	Sig.
Internet Services	Between Groups	422.210	4	105.552	8.546	.000
	Within Groups	2778.851	225	12.350		
	Total	3201.061	229			
Internet Barriers	Between Groups	40.002	4	10.000	.976	.421
	Within Groups	2304.994	225	10.244		
	Total	2344.996	229			
Internet Awareness	Between Groups	21.739	4	5.435	.810	.520
	Within Groups	1508.957	225	6.706		
	Total	1530.696	229			

As shown in Table 7, the hypothesis H7 is supported (sig < 0.05) which means the degree of GPA has a significant influence on Internet services but the GPA has no statistically influence on Internet barriers and Internet awareness (H8 and H9 are rejected).

Table 8
Post-hoc test: student's GPA

Dependent Variable	(I) GPA	(J) GPA	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Internet Services	Under Fair	Fair	-1.08333	2.58647	.676	-6.1801	4.0135
		Good	-3.81915	2.51130	.130	-8.7678	1.1295
		Very good	-4.69512	2.51512	.063	-9.6513	.2611
		Excellent	-6.28571*	2.57222	.015	-11.3544	-1.2170
	Fair	Under Fair	1.08333	2.58647	.676	-4.0135	6.1801
		Good	-2.73582*	.80373	.001	-4.3196	-1.1520
		Very good	-3.61179*	.81561	.000	-5.2190	-2.0046
		Excellent	-5.20238*	.97759	.000	-7.1288	-3.2760
	Good	Under Fair	3.81915	2.51130	.130	-1.1295	8.7678
		Fair	2.73582*	.80373	.001	1.1520	4.3196
		Very good	-.87597	.53104	.100	-1.9224	.1705
		Excellent	-2.46657*	.75662	.001	-3.9575	-.9756
	Very good	Under Fair	4.69512	2.51512	.063	-.2611	9.6513
		Fair	3.61179*	.81561	.000	2.0046	5.2190
		Good	.87597	.53104	.100	-.1705	1.9224
		Excellent	-1.59059*	.76922	.040	-3.1064	-.0748
	Excellent	Under Fair	6.28571*	2.57222	.015	1.2170	11.3544
		Fair	5.20238*	.97759	.000	3.2760	7.1288
		Good	2.46657*	.75662	.001	.9756	3.9575
		Very good	1.59059*	.76922	.040	.0748	3.1064

By conducting Post Hoc test in Table 8 to find out which of the five categories of GPA has the most influence on Internet services, the results indicated that students with excellent GPA have most usage of internet network services (including academic studies and research).

The student's internet skills have no significant influence on Internet services as shown in Table 9 (H10 is rejected) but have influence on Internet barriers and Internet awareness (H11 and H12 are supported). Post Hoc Tests are shown in Table 10 to specify those students with weak and moderate skills on internet faced problems when using internet network more than students with weak skills, and excellent student's internet skills have a positive influence toward Internet awareness.

Table 9
One-way ANOVA: student's computer skills

		Sum of Squares	df	Mean Square	F	Sig.
Internet Services	Between Groups	.499	2	.250	.018	.982
	Within Groups	3200.562	227	14.099		
	Total	3201.061	229			
Internet Barriers	Between Groups	259.410	2	129.705	14.117	.000
	Within Groups	2085.585	227	9.188		
	Total	2344.996	229			
Internet Awareness	Between Groups	85.947	2	42.973	6.752	.001
	Within Groups	1444.749	227	6.365		
	Total	1530.696	229			

Table 10
Post hoc test: student's computer skills

Dependent Variable	Skills (I)	Skills (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Internet Barriers	Weak Skills	Moderate Skills	.51006	.41227	.217	-.3023	1.3224
		Excellent Skills	4.74284*	.89264	.000	2.9839	6.5018
	Moderate Skills	Weak Skills	-.51006	.41227	.217	-1.3224	.3023
		Excellent Skills	4.23278*	.88692	.000	2.4851	5.9804
	Excellent Skills	Weak Skills	-4.74284*	.89264	.000	-6.5018	-2.9839
		Moderate Skills	-4.23278*	.88692	.000	-5.9804	-2.4851
Internet Awareness	Weak Skills	Excellent Skills	-2.15988*	.74295	.004	-3.6238	-.6959
		Moderate Skills	-1.16789	.73819	.115	-2.6225	.2867
	Moderate Skills	Weak Skills	1.16789	.73819	.115	-.2867	2.6225
		Excellent Skills	-.99199*	.34313	.004	-1.6681	-.3159
	Excellent Skills	Moderate Skills	.99199*	.34313	.004	.3159	1.6681
		Weak Skills	2.15988*	.74295	.004	.6959	3.6238

*. The mean difference is significant at the 0.05 level

The researchers used a regression analysis and found H13, H14, and H15 are supported as shown in Table 11.

Table 11
Regression results for the research model (TAM model) hypotheses

Independent Variable	β	SE	T	P	R2	Dependent Variable
Internet Services (Perceived Usefulness)	0.352	0.062	5.685	0.000	0.124	Internet Attitudes
Internet Barriers (Perceived Control)	0.391	0.072	6.421	0.000	0.153	Internet Attitudes
Internet Awareness (Emotional Response)	0.362	0.090	5.895	0.000	0.131	Internet Attitudes

The results showed that the Internet services, internet barriers, and internet awareness have equal influences on the attitudes towards Internet network. This returns to The University of Jordan students' high awareness to Internet and focusing on its advantages.

Conclusion

The present study aims to determine the factors that influence students' attitude toward Internet network in The University of Jordan through a useful theoretical base (i.e. TAM model). The four factors (student's faculty, level of academic year, GPA, and skills on Internet network) were revealed to significantly impact students' attitudes. Future studies can investigate the attitudes to a large sample where this is limited to one public university, which is The University of Jordan and is included only the undergraduate students at The University of Jordan.

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Editor's Note: Some educational technologies focus on the administrative aspects of teaching and learning such as delivery of content or assignments and keeping grades and records. The interactive nature of Web 2.0 technologies have gained widespread acceptance for social networking. This also opens up more personal, social and interactive opportunities for learning. It also gives learners autonomy to choose what and how they want to learn.

The effect of personal learning environments on participants' higher order thinking skills and satisfaction

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Abstract

The present study aimed to examine the effect of personal learning environments on participants' higher-order thinking skills and satisfaction. Two main instruments, namely a test for higher order thinking skills and a scale for participants' satisfaction were developed to achieve this aim. I-Google Portal and Blackboard System provided by Najran University for students were also used. Experimental approach was adopted to detect the relationship between the dependent variable, i.e. personal learning environments versus learning management system (Blackboard) and the dependent variables mainly participants' higher order thinking skills and satisfaction. Fifty students of the sixth level at the department of mathematics at the college of science and arts took part in the present study. Participants were distributed randomly to two experimental groups of (25) students in each. Findings showed that there was a statistically significant difference between the modified gain ratio of participants' degrees in the first experimental group that was taught through the personal learning environments and second experimental group that received learning via learning management system (Blackboard) in accordance to participants' higher-order thinking and satisfaction in favor of the first experimental group.

Keywords: Personal learning environments, learning management system, blackboard, higher order thinking skills, and students' satisfaction.

Introduction

Most Higher Education (HE) institutions offer many opportunities for online learning using various educational technologies. Over the past few years, Najran University, as well as other universities all over the world, has started with the use of Blackboard as a Learning Management System. However, the stability and maturity of the LMS may become yet another resistance factor working against the introduction of innovations. New tools and trends cannot be ignored, and this is the reason why learning platforms should become open and flexible environments (García Peñalvo, Conde García, Alier Forment, & Casany Guerrero, 2011). LMSs have been slow in adapting to new developments on the Web in terms of social networking and widgets. They also tend to remain fixed in the instructor-designated, top-down approach, which differs markedly from the ever more collaborative environment, which is the hallmark of Web 2.0 (Godwin-Jones, 2009). However, the emergence of interactive social media has influenced the development of learning environments and so Personal Learning Environments (PLEs) have been commonly used nowadays by teachers and students at Najran University. One aim of these PLEs is the personalization and individualization of learning. (Conde, García-Peñalvo, Casany, & Forment, 2011) argue that PLE is a recent concept and one possible definition could be a differentiation between those who stress the importance of the technological concept as central to the PLE and those that consider the pedagogical benefits of it.

(Schaffert & Hilzensauer, 2008, p. 1) mention that the rapid progress in technology usually influences learning and teaching methods and possibilities. The idea of Personal Learning

Environment (PLE) stresses the fact that learning is continuing and seeks to provide tools for the support of such learning (Attwell, 2007, p. 2). PLE, therefore is a learner-controlled environment for developing higher order thinking skills. More specifically, it is a combination of tools, usually digital with resources chosen by the learner, to support different aspects of the learning process, beginning from goal setting to materials selection ending with assessment (Reinders, 2014, p. 14). Unlike Learning Management Systems (LMSs), Personal Learning Environments (PLEs) are based on the idea of user-centered learning approach that uses Social Software tools. (Schaffert & Hilzensauer, 2008, p. 1). Furthermore, PLE is a potentially promising pedagogical approach to integrate both formal and informal learning via the use of social media and support of student self-regulated learning in higher education contexts. (Dabbagh & Kitsantas, 2012, p. 3).

For the user, PLE is not a separate space on the internet but an essential part of his workspace. It should be highly integrated with his framework of tools for his/her personal use of the internet (Kerres, 2007, p. 11). Pedagogy behind PLE assumes that it offers a portal to the world, through which learners can explore and create, according to their own interests and directions. They also can interact with their friends and community at all times (Downes, 2007, p. 23).

PLEs are a relatively new phenomenon in the e-learning domain (Van Harmelen, 2006). This new phenomenon is motivated by:

> Learners' life-long needs for a system that provides a standard interface for different institutions' e-learning systems and allows portfolio information to be maintained across institutions.
>
> A response to pedagogic approaches, which demands that learners themselves should have control on their own e-learning systems.
>
> The needs of learners who sometimes perform learning activities offline, e.g. via mobile system in a wireless-free hospital, or on a remote mountainside.

A Personal Learning Environment (PLE) is a new concept in which learners can manage their own learning process, collaborate and communicate with others and receive personalized learning. Learners could benefit from not only a single source, but also from many of web 2.0's tools, add-ons and extensions (Kesim & Altınpulluk, 2013). Developing PLEs represents a significant shift in the pedagogic approaches to how learning processes are supported. It is very critical not to view PLEs as just a new application of educational technology, but rather as a concept, (Attwell, 2009, p. 59). Therefore, understanding the thinking that underlies the concept of PLE is much more important than just understanding the particular type of technology it adopts, (Downes, 2007, p. 20).

PLE combines information from a heterogeneous set of services within the purview of the user such as an information portal. However, the user can obtain more value when the information of these services is combined to enable sorting, filtering and searching (Wilson et al., 2007, p. 35). The system and technology itself, or the activity the learner is being involved in, should be interesting enough and engaging for the learner to work his or her way through the problems that will undoubtedly come up during the learning journey. (Fournier & Kop, 2010, p. 2). Therefore, characteristics of such as laptops, mobile phones, and portable media devices; applications like newsreaders, instant messaging clients, browsers, and calendars; and a set of services like for instance social bookmark services, weblogs and wikis within what is thought as practicing personal learning by using technology (Wilson et al., 2007, p. 36). Learners themselves usually select and maintain these tools and resources and access them from a computer or a smartphone, as appears in Figure 3, (Reinders, 2014, p. 15).

Figure 1: Common tools used to create a PLE

Among the studies that have examined or detected the effect of PLEs on students' learning was, for example, (Saz, Engel, & Coll, 2016) focused on the relationships established by the participants (students and teachers) in two higher education instructional sequences using institutionally powered PLE. Results showed that in both cases the relationships that the participants established with their peers and teachers were indeed related to the characteristics and requirements of the particular techno pedagogical designs. Although the technological environment allowed all the participants to establish relationships with others, the main interactions were found in small working groups created to carry out learning and assessment activities.

(Shaikh & Khoja, 2012) also aimed to discuss the changing roles and competencies of a teacher in context of prevailing developments accomplished by the vast availability of social software, which have made easy the development of Personal Learning Environments (PLEs). Results outlined the roles that portray the importance of teacher competencies as role in Planning and Design, Instruction and Learning, Communication and Interaction, Management and Administration, and Use of Technology. Del (Barrio-García, Arquero Montaño, & Romero-Frías, 2015) aimed to analyze the factors like e-learning satisfaction and students' perceptions, among others that determine the intention of use of a PLE 2.0 initiative.

In addition, the study analyzed the moderating role of the Need for Cognition (NFC) in the model. The results indicated that the model proposed has a high explanatory power of the intention to use a PLE 2.0 and gives support to the moderating role of NFC. The study discusses how this analysis can help to improve course designs by teachers.

Aims of study

The study aims to:

Detect the effect of using Personal Learning Environment on developing higher order thinking skills of mathematics students enrolled in "Educational Technology" course.

Detect the effect of using Personal Learning Environment on the satisfaction of mathematics students enrolled in "Educational Technology" course.

Methodology

The present study aims to reach an effective employment of Personal Learning Environments (PLEs) in the development of students' higher order thinking skills. Study sample consisted of (50) students who were all of the sixth level at the department of mathematics at the college of science and arts at Najran University. Participants were divided into two equal experimental groups of (25) participant in each group. The first experimental group was taught by the use of Personal Learning Environment. They all learned via the free use of a set of social services, tools, technologies, and software that empowered them to manage their learning and construct their knowledge in a social context. Means of social communication with other personal spaces for effective knowledge exchange were also provided for learners in the first group. I-Google Portal, Google Books, photos, videos, blogs, wikis, email, Facebook, RSS, and tags were used to establish Personal Learning Environments. Each learner could plan, build and customize the existing content according to his cognitive needs, which vary from one learner to another. Figure 2 presents the main screen of I-Google Portal website.

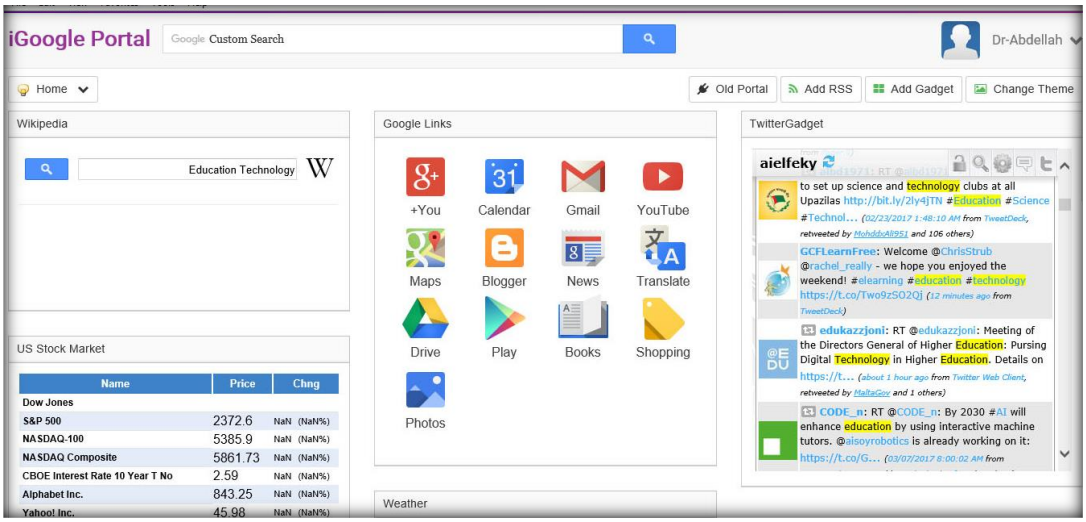

Figure 2: Main Screen of I-Google Portal

The second experimental group learned the teaching content and materials of " Educational Technology" course via Learning Management System (Blackboard) provided by Najran University. The teaching content was divided into separate lectures through PowerPoint presentation and uploaded to Blackboard. The result was (10) lectures that can be accessed by clicking of "Content" link at the top left main screen. In addition to "Content" link, there were other links for discussion, groups, and posters. Another set of tools were used to encourage interaction either among students themselves or with their teacher. Figure 3 exhibits the content of the website provided via Blackboard system.

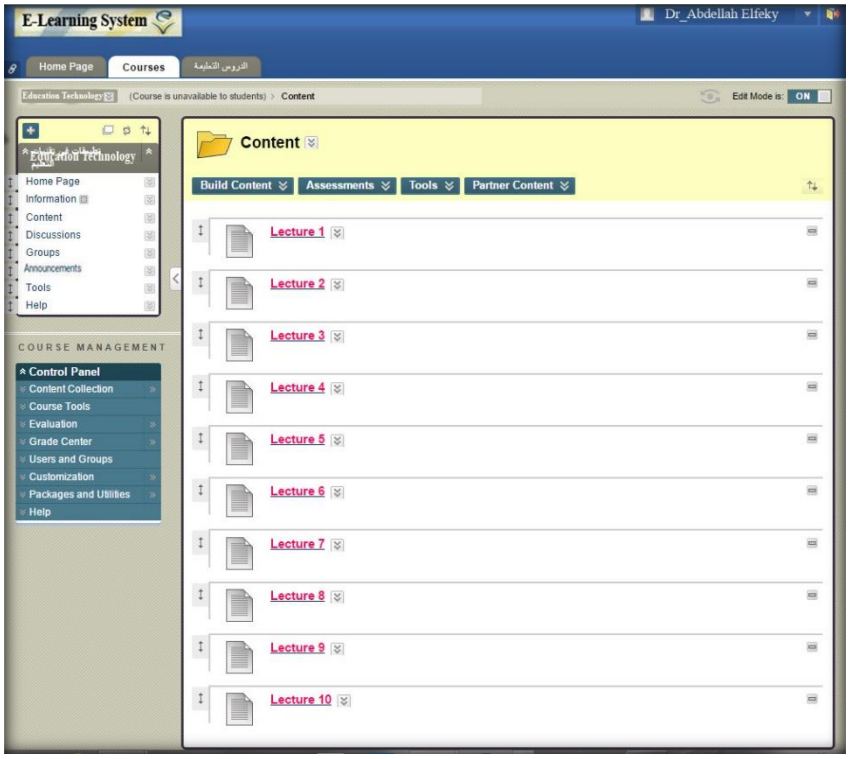

Figure 3: content of the website provided via Blackboard system

Because the experimental approach was adopted by the present study, Pre-Posttest group design was used for two equivalent experimental groups. Table 1 presents the research design of the study.

Table 1

Research design

	Pre-test	Treatment	Post-test
Experimental Group 1	O1	X1	O2
Experimental Group 2	O1	X2	O2

Note. O_1 = Participants' satisfaction/ higher order thinking skills of pretest
O_2 = Participants' satisfaction/ higher order thinking skills of posttest
X1= Personal Learning Environments
X2= Blackboard system

To check the research hypotheses, a test for higher order thinking skills in "Educational Technology" and a scale for participants' satisfaction were prepared. Wording of test items was based on course-desired outcomes. Test items took into account participants' academic level, too. The final version of the test included (20) multiple-choice items. The test was initially applied to (10) students of the department of mathematics at the college of science and arts at Najran University. The aim of such pilot study was to determine the time needed for completion, test validity, and test reliability. After completion, the estimated time was about (19) minutes. Cronbach Alpha was used to extract the test reliability and was (0.86), which indicated that results, when applied to study sample, were trustworthy.

Participants' satisfaction scale was also prepared. It consisted of (28) items, (14) items were positive while the other (14) items were negative. Likert model was used and there were five responses attached to each item namely, strongly agree, agree, neutral, disagree, and strongly disagree. As soon as it was completed, it was presented to a set of arbitrators who were all experts in the field of educational technology and methods of instruction to check its validity. Cronbach Alpha was used to calculate its coefficient and was (0.84), which meant that results, when applied to study sample, would be trustful.

Group's homogeneity in accordance to participants' higher order thinking skills satisfaction

To verify homogeneity of both groups, results of participants' pre-test measurement were analyzed using ANOVA. Differences between the mean scores of both groups are shown in Table 2 and Table 3.

Table 2

Significance of differences between both groups regarding participants' higher order thinking skills on the pre-test

	Sum of Squares	DF	Mean of Square	F. ratio	Sig.
Between Groups	0.720	1	0.720	0.242	0.625
Within Groups	142.800	48	2.975		
Total	143.520	49			

Results in Table 2 indicate that F. ratio (0.242) was insignificant at (0.05). That is, there were no statistically significant differences between participants in both experimental groups on the higher order thinking skills test.

Table 3

Significance of differences between both groups regarding participants' satisfaction on the pre-measurement scale

	Sum of Squares	DF	Mean of Squares	F. ratio	Sig.
Between Groups	121.680	1	121.680	1.722	0.196
Within Groups	3391.200	48	70.650		
Total	3512.880	49			

Results in Table 3 reveal that F. ratio (1.722) was not significant at (0.05). In other words, there were no statistically significant differences between participants in both experimental groups on the satisfaction the pre- measurement scale.

Findings

Findings related to participants' higher order thinking skills

After the presentation of research methodology, completion of basic experiment, and registering grades of participants in both experimental groups on the higher-thinking skills test, T- test for independent samples was used. Significance of the modified gain ratio of participants' grades in both groups are shown in Table 4.

Table 4

Significance of the Modified Gain Ratio of participants' grades in both groups on the higher order thinking skills.

Group	N	M	SD	Mean Difference	T. Ratio	Sig.
Experimental Group 1	25	15.52	1.8735	2.36	3.307	.022
Experimental Group 2	25	13.16	3.0369			

Table 4 reveals that F. ratio (T=3.307) for the difference between the modified gain ratio of students' grades in both experimental groups on higher order thinking skills test was significant. The mean score of students' grades in the first experimental group was (15.52) while it was (13.16) for their peers in the second experimental group. That is, there was a significant difference (α=0.05) between mean scores of both groups in favor of the first experimental group. In other words, modified gain ration of first group students who were taught via PLE was higher than the modified gain ratio of their peers in the second experimental group that was taught by Blackboard system. Therefore, it can be concluded that PLE had more effect on the higher order thinking skills of students in the first group than students in the second one. This, of course, indicates the importance of using PLE in the development of the higher order thinking skills of sixth level students at the department of mathematics at the college of education at Najran University. Figure 4 presents a comparison between mean scores of students' grades on the higher order thinking skills in both groups.

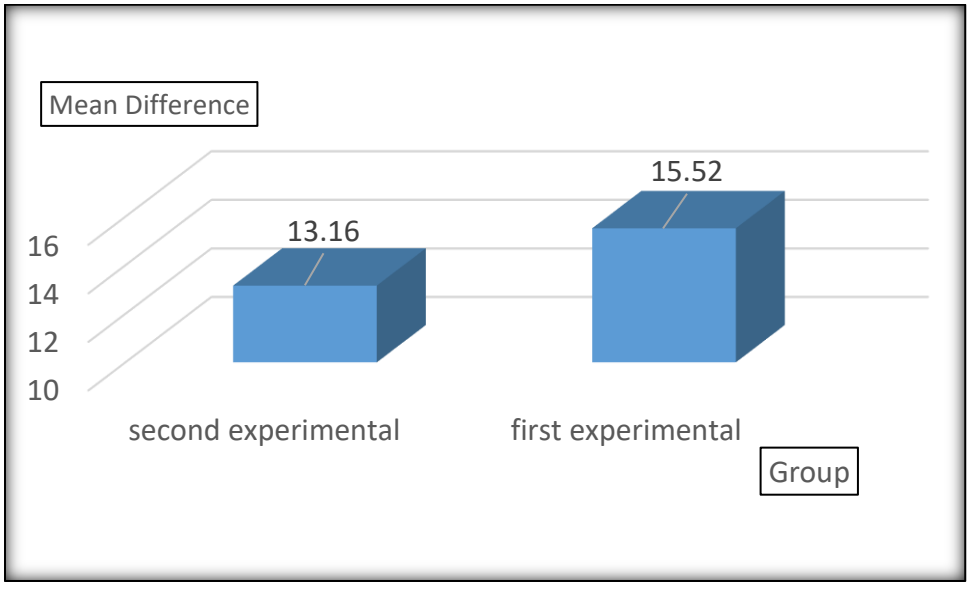

Figure 4: Modified Gain Ratio of the first experimental group in comparison with the second experimental group on the higher order thinking skills test.

Findings related to participants' satisfaction

After registering grades of participants in both experimental groups on satisfaction scale before and after experimentation, T- test for independent samples was used. Significance of the modified gain ratio of participants' grades in both groups are shown in Table 5.

Table 5

Significance of Modified Gain Ratio of the two experimental groups on participants' satisfaction scale

Group	N	M	SD	Mean Difference	T. Ratio	Sig.
Experimental Group 1	25	90.88	8.5309	16.60	5.425	0.026
Experimental Group 2	25	74.28	12.7001			

Table (4) indicates that F. ratio (5.425) for the difference between the modified gain ratio of students' grades in both experimental groups on higher order thinking skills test was significant. The mean score of students' grades in the first experimental group was (90.88) while it was (74.28) for their peers in the second experimental group. In other words, modified gain ratio of first group students who were taught via PLE was better than the modified gain ratio of their colleagues in the second experimental group that was taught by Blackboard system. Therefore, it can be concluded that PLE had more effect on the satisfaction level of students in the first group than students in the second one. This, of course, indicates the importance of using PLE in the development of the satisfaction of sixth level students at the department of mathematics at the college of education at Najran University. Figure (5) shows a comparison between the modified gain ratio of students' grades on the satisfaction scale in both groups.

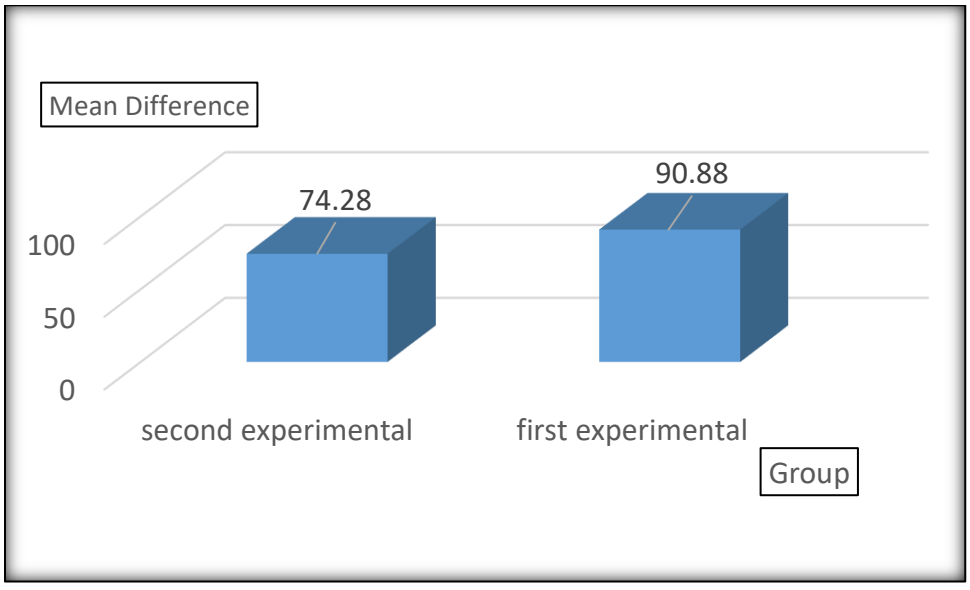

Figure 5: Modified Gain Ratio of the first experimental group in comparison with the second experimental group regarding their satisfaction level

Discussion of the findings

The study aimed to identify the impact of Personal Learning Environments (PLE) on the development of both of the higher order thinking skills and the satisfaction of students enrolled in "Educational Technology" course at Najran University. Results revealed that the use of PLE in teaching the course content was more effective than using Blackboard system. Mean scores of participants in the first experimental group who learned course content via PLE were higher than mean scores of their peers in the second experimental group taught through the Blackboard System. Findings like these can be attributed to many facts or reasons. The fact that the content and services of e-learning management system are usually available for registered users. The teaching content is usually prepared by specialists and experts such as graphic designer, instructional designer, programmer, etc. Besides, learning management systems are limited in services and tools. They are incapable of going along with changes in technology regarding the web as quickly as Personal Learning environment do. Therefore, it is important to have alternatives that provide similar services and the demanded speed. Furthermore, PLEs are characterized by their centeredness on the learner unlike Learning Management System that are curriculum centered. In addition, the concept of continuing learning or what is sometimes known as lifelong learning can be achieved in PLE and so learning can be personalized to fulfil the learner's personal needs. However, Learning Management systems are capable of registering and follow up students' records while no indication to such characteristic is found in the definition of PLE. That is, PLEs pay attention to the cognitive aspect but neglect the administrative one in teaching.

This finding corroborates the conclusion made by (Conde et al., 2011), which states that LMS have not achieved the expected improvements despite the acceptance they have because of these reasons:

> Learning should be focused on the user and not the institution or the course.
>
> It is necessary for learning environments to give support to lifelong learning.
>
> It is essential to consider the informal learning and the support of 2.0 tools that promote this model of learning.
>
> Learning systems must be able to evolve with new technologies

Findings of the present study also match what (Kesim & Altınpulluk, 2013) mention about the inadequacies of LMSs. Learning Management Systems have begun to become unpopular among educators because of the closed and teacher centered nature of LMSs where learners are unable to change the content. Learners have no authority over the course. Besides, LMSs do not seem to support lifelong learning because if the course process ends, the process of learning ends too. A Personal Learning Environment (PLE) is a new concept in which learners can manage their own learning process, collaborate and communicate with others and receive personalized learning. Learners could benefit from not only a single source, but also from many of web 2.0's tools, add-ons and extensions.

One more reason for the effectiveness of PLEs that was revealed by the present study is due to their design and development for corporate users. This is in agreement with (Ndongfack, 2016) as goals can be easily achieved if they are accounted for in the PLE design. Furthermore, the equipment of learners or users, the use of PLEs as an online learning platform for users to come together and undertake professional development activities while providing support to each other were the most important reasons that could make PLEs more effective.

One more fact that could make the use of PLEs, in the present study, more effective than the use of LMSs is the fact that the success of PLE depends on both students and teachers. It depends

highly on learners' adoption and willingness to actively participate socially using various Web 2.0 applications. The educator, on the opposite, plays an important role as facilitator and motivator, who promotes the use of Web 2.0 applications and provides essential scaffolding to learners in the learning process.

Recommendations

In light of the findings discussed above, the following set of recommendations was put forward:

Encourage the use of Personal Learning Environments to support the teaching process by integrating them with different academic courses.

Develop training programs for faculty members and students to improve their skills in using Personal Learning Environments that achieve online learning.

Create a general framework to develop the use of Online Personal Learning Environments that employ artificial intelligence strategies.

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Editor's Note: Affective elements are part of humanizing and relationship development within an online environment. It may be more important for students in the social sciences than in science and engineering, but this has been little explored. Here is a good place to start.

Creating a positive atmosphere in online courses: student ratings of affective variables in teacher education courses

Sarah Hamsher, Cynthia A. Dieterich
USA

Abstract

Instructors in higher education have to work to create a positive atmosphere. Yet, the behaviors instructors must exhibit to create such an atmosphere are different for online courses than face-to-face (F2F) courses. The current study surveyed graduate and undergraduate students in a teacher education program to identify which affective variables identified in academic literature for creating a positive online atmosphere are most and least important. The results of this study suggest undergraduate and graduate students rank logistical behaviors (e.g., clearly described directions and expectations, constructive feedback) as most important and emotional-relational behaviors (e.g., interpersonal relationships, humor related to content) as least important. The implications of this study advocate for online courses for adult learners that are clear in expectations and provide assignments that require both practical and higher order thinking. This study provides specific guidance for instructors about which behaviors have the most capital when teaching online courses in a way that creates a positive atmosphere.

Keywords: online courses, online teaching, course atmosphere, affective factors, emotional-rational behaviors, student satisfaction, student input, instructor capital, adult learner, teacher education

Introduction

In face-to-face (F2F) courses, instructors create an atmosphere using nonverbal as well as verbal communication techniques that are present outside academic, cognitive experiences (i.e., discussions, practice exercises, assessments, etc.). For example, when students experience F2F courses the instructors' facial expressions, gestures, posture, tone, clothing, and emotional state before or during the class can positively or negatively influence the students' impression of the instructor and overall course (Sidelinger, 2010; Myers, Goodboy, & Members of COMM, 2014; Witt, Schrodt, & Turman, 2010; Witt, Wheeless, & Allen, 2004). The instructor can also provide verbal communication unrelated to the cognitive experiences such as a humorous exchange after class, a shared conversation with another professor who unexpectedly enters the room before class begins (Booth-Butterfield & Wanzer, 2010), and an informal conversation with students about weekend activities (Myers, Goodboy, Members of COMM 600, 2014). All of these affective factors create a positive or negative atmosphere in F2F courses, which influence levels of engagement and motivation (Sidelinger, 2010; Myers, Goodboy, & Members of COMM, 2014; Witt, Schrodt, & Turman, 2010; Witt, Wheeless, & Allen, 2004).

In fully online courses, in-person affective factors that contribute to course atmosphere are absent. Graham (2006) explained, ''Many learners want the convenience offered by a distributed [online] environment yet do not want to sacrifice the social interactions and human touch they are used to in a face-to-face classroom" (p. 9). Thus, instructors must work to intentionally create a positive atmosphere in online courses in order to encourage high levels of engagement and motivation in students, which are evidence of a positive atmosphere (Zhu, 2012). Nonetheless, instructors are left to hypothesize which variables in the online platform can compensate for the

lack of F2F interaction and positively influence the student experience. When instructors are left to randomly determine these variables, they may spend valuable time and resources implementing practices that have no positive influence on the students' experience. Are there certain critical behaviors that students identify as contributing to more or less to a positive online environment? In the age of technology efficiency, it is equally important to be efficient with human resources and design a course that maximizes technology and instructor capital. Therefore, the purpose of this study is to investigate which affective factors are most important and least important to create a positive atmosphere in a fully online course.

Literature review

Affective factors can be defined as "behavior having to do with emotional or feeling responses to an object of experience and all the complex perceptions, attitudes, characteristics, and behaviors associated with seeking, accepting, and incorporating or avoiding and rejecting the object" (Wight 1972, p. 2). Emotions shape the learner's perceptions of particular aspects of a situation and focus on cognitive processes (LeDoux, 1996).

In addition, "effective teaching requires instructors to meet both their rhetorical goals and their relational goals" (Myers, Goodboy, & Members of COMM, 2014, p.15). Thus, if educators are concerned about learning in the online environment, they need to be concerned about a person's experience in the learning situation and design educational experiences that are both meaningful and positive to the student. Although, not all learning experiences will be interpreted positively for every student regardless of the instructor's efforts to create a positive atmosphere, and positive emotions are not always necessary for success with different types of thinking tasks (Picard, R. W., Papert, S., Bender, W., Blumberg, B., et al. 2004).

Furthermore, in the context of Emotional Response Theory perspective, "relationships among instructor communication and student behavior are mediated by the emotional responses of students to instructor messages" (Horan, Martin, & Weber, 2012). Specifically, if a student experiences positive interactions with the instructor, the student is "likely to feel…motivated, attend class, and study [resulting]… in increased cognitive and affective learning" (Horan, Martin, & Weber, 2012). Even mildly positive affective factors can improve thinking (e.g., memory retrieval, creativity/flexibility in problem solving) (Isen, 2000) and are "significantly related [to] learning outcomes" (Bryant, S., Kahle, J.B., & Schafer, B.A. 2005; Eom, Wen, & Ahill 2006).

Affective factors in online courses are largely communicated through texts (e.g., announcements, feedback, email conversations, discussion boards, etc.) students read or interpret within a learning management system. Research indicates methods of communication through text in the online environment contributing to a positive atmosphere include clearly described directions and requirements (ASHE 2014; Jaasma & Koper 1999), individualized, detailed, and constructive feedback (e.g., includes correcting wrong assumptions), instructor-held high expectations, higher order cognitive activities (ASHE, 2014), humor related to instructional content (Wanzer, Frymier, & Irwin 2010), instructor credibility (Teven & Hanson 2004), instructor's presence in the course (Arbaugh & Hwang 2006), opportunities to ask more questions to the instructor, interpersonal relationship with the instructor, caring and encouraging communication from the instructor, and consistent and timely feedback in emails and assessments (Vonderwell, 2002). All of these actions are affective factors contributing to the online learners' emotional response toward a course. While these affective factors are suggested in academic literature, they are not described as most or least important to creating a positive online atmosphere; therefore, it is at the discretion of the instructor to choose factors to interact with students. However, an instructor's preference may not match the students' needs and desires. In the end, an instructor may choose

affective factors but they are unknowingly unimportant to creating a positive online course atmosphere.

Recognizing that the underlying theory of student success is closely tied to positive interactions between instructor and student, it behooves educators to investigate the student satisfaction of the most important affective components of online courses. Two research questions addressed in this study include:

1. Which affective factors are most important to the creation of a positive atmosphere in an online course?
2. Which affective factors contribute most to the creation of a negative atmosphere in an online course?

Methodology

Participants in this study were students in a College of Education online course at a Mid-western urban institution. A total of 186 undergraduate and graduate teacher candidates enrolled in teacher education courses required for all education majors were surveyed using Survey Monkey during the spring of 2016. Students were asked to rank order 11 actions instructors take to contribute to a positive online course atmosphere. Items were ranked based on how each item was important to the student with 11 being the *most important* and 1 being the *least important.* These 11 actions were compiled from the literature indicating each as an affective factor influencing online course atmosphere (Arbaugh & Hwang, 2006; ASHE, 2014; Jaasma & Koper, 1999; Teven & Hanson, 2004; Vonderwell, 2002; Wanzer, Frymier, & Irwin, 2010). Following the rank order task, students were asked, in an open-ended format, to identify up to five instructor behaviors that contribute most to a negative online course atmosphere. Providing both a quantitative and qualitative response allows for the use of multiple sources to compare data collected to increase internal validity (Merriam & Tisdell, 2016, p.245).

Table 1
Demographics for entire sample

Variable		f	% of Total Sample
Age Range	18-22	10	175
	23-28	17	29%
	29-34	12	20%
	35-40	7	12%
	41 and older	13	22%
Degree Status			
	Graduate 3+ years	12	20%
	Graduate 1st-2nd year	26	44%
	Undergraduate 3+ years	19	32%
	Undergraduate 1st-2nd year	2	4%
Licensure Area			
	Early Childhood	19	32%
	Special Education	24	41%
	AYA	3	5%
	Reading Endorsement	5	8%
	Secondary	1	2%
	Middle Childhood	6	10%
	No License	1	2%

All respondents (*n*=59) completed the open-ended questions. A visual inspection of the demographics indicates that the sample successfully completing the rank ordering task (*n*=36) and respondents completing the open-ended questions (*n*=59) is similar in age range, degree status, and licensure area suggesting that the 23 students not completing the rank order were equally spread across demographic data.

Demographics of the 59 respondents indicate an age range 18 to above 41 years with the 23-28 years representing the most frequent age range (*n*=17). First and second year graduate students were the most represented degree status (*n*=26) with the first and second year undergraduate students the least represented (*n*=2). Respondents identified with a range of licensure areas with special education (*n*=24) and early childhood (*n*=19) the most frequent. A total of 59 students completed the survey (see Table 1); however, incomplete rank ordering data was received from 23 respondents who partially ranked the 11 items and are not included in the rank order summary leaving 36 respondents ranking all 11 items (see Table 2).

Table 2.

Demographics for individuals ranking all eleven items

Variable Items	Range	f	% of Total Sample
Age Range	18-22	5	14%
	23-28	10	28%
	29-34	8	22%
	35-40	5	14%
	41 and older	8	22%
Degree Status			
	Graduate 3+ years	6	16%
	Graduate 1st-2nd year	19	53%
	Undergraduate 3+ years	10	28%
	Undergraduate 1st-2nd year	1	3%
Licensure Area			
	Early Childhood	11	315
	Special Education	13	36%
	AYA	3	8%
	Reading Endorsement	4	11%
	Secondary	1	3%
	Middle Childhood	3	8%
	No License	1	3%

Note: N= 36. A total of 59 students completed the survey; however, incomplete rank ordering data was received from 26 respondents who partially ranked the 11 items and not included in this summary.

Table 3
Online Instructor behaviors and positive course atmosphere

Online behavior descriptor	M	Median	Mode	SD
Clearly described direction and requirements	8.61[1]	10	11	3.32
Individualized, detailed, & constructive feedback	7.63[2]	8.5	10	2.57
Instructor held high-expectations	5.33[7]	5	5	2.69
Higher order cognitive activities	4.58[9]	4	2	3.05
Humor related to instructional content	3.97[11]	3	1	3.47
Instructor knows the content	7.33[3]	8	8	2.72
Instructor updates home page, involved in discussions, provides announcements	5.86[5]	6.5	7	2.40
Opportunity to ask more questions to the instructor	5.22[8]	4.5	3	2.79
Interpersonal relationship with the instructor	4.52[10]	4	2	2.67
Encouraging and caring communication from the instructor	5.61[6]	6	3	2.71
Consistent and timely feedback in emails and assessments	7.30[4]	8	9	2.83

Note: *N*= 36. A total of 59 students completed the survey; however, incomplete data was received from 23 respondents who partially ranked the 11 items and not included in this summary. Online behavior descriptors appear in order presented on the Survey Monkey. Means are ranked in order of highest to lowest rating.

Results

As noted in Table 3, rank ordering of the 11 online instructor behaviors indicates that higher rated items are related to instructor *logistics*, including clearly describing directions and requirements ($\overline{x}$ = 8.61); providing constructive feedback ($\overline{x}$ = 7.63); timely feedback ($\overline{x}$ = 7.30); and provides web updates and announcements ($\overline{x}$ = 5.86). Conversely, the two lowest ranked items are associated with *emotional-rational behaviors* including the importance of an interpersonal relationship with the instructor ($\overline{x}$ = 4.52) and use of humor related to content ($\overline{x}$ = 3.97). However, the *emotional-rational* behavior, encouraging and caring communication, is a mid-ranked item ($\overline{x}$ = 5.61). One *academic/cognitive behavior,* instructor knows the content ($\overline{x}$ = 7.33) is ranked as the third highest behavior that responders indicate contributes to a positive online course atmosphere. A number of remaining rankings related to *academic/cognitive behaviors* including instructor held high-expectations ($\overline{x}$ = 5.33), opportunity to ask more questions to the instructor ($\overline{x}$ = 5.22), and higher order cognitive activities ($\overline{x}$ = 4.58) are also mid-ranked items.

An analysis of qualitative responses to the open-ended question asking respondents to identify behaviors that contribute to a negative online course atmosphere revealed six themes. Table 4 provides an overview of the themes which are listed in order of frequency based on the open-ended survey responses (i.e., lacks organization (*n*=34), feedback concerns (*n*=42), problematic assignments (*n*= 20), availability (*n*=12), overall disposition (*n*=9), and grading procedures (*n*=7). In a similar fashion, the themes that emerged in the open-ended responses that represented the important affective factors, which used negative language, were the same as ranking task, which used positive language. For instance, respondents ranked *clearly described directions/requirements* as the most important instructor behavior for a positive atmosphere then self-identified in an open-ended response that *lacks organization* is associated with a negative atmosphere. This agreement between rank ordering and open-ended questions is also noted in the

high rating of feedback contributing to a positive atmosphere and feedback concerns (e.g., no feedback, negative feedback, late responses) associated with a negative course atmosphere. In a like manner, items associated with *emotional-rational* behaviors were not viewed as particularly important to providing a positive atmosphere in the rank order task while few respondents self-reported that overall negative dispositions contributed to a negative atmosphere.

Table 4.

Instructor behaviors contributing to negative course atmosphere and associated examples

Instructor Action Theme	Respondent Examples
Lacks organization	Unclear directions and assignments
	Difficulty finding items within the course
	Unclear expectations
	Poor or unclear course schedule
	Confusing online structure
Feedback concerns	No or minimal feedback on assignments
	Negative feedback
	Feedback not constructive
	Indirect feedback with no details
	Late responses (grading, email, feedback)
Problematic assignments	Assignments do not represent the real-world or are meaningful
	Unrealistic due dates
	Same activities each week
	Page restrictions
Availability	No or minimal communication
	Not able to get in touch
Overall disposition	Inflexible
	Instructor is not encouraging
	Assumes students are lazy/disinterested
	Not understanding of learning management system issues
Grading procedures	Grading according instructor's beliefs
	Unfair grading
	Rigid grading/petty point deductions
	Unclear rubrics
	No rubrics for assignments

Note: N= 59.

Discussion

At the onset of this study the purpose was to identify affective behaviors that influence a positive online environment particularly since affective behaviors are not easily conveyed in an online setting compared to a F2F course. Additionally, since current research suggests affective behaviors play a role in student satisfaction and success, it was the intent of the researchers to secure student ratings of critical instructor behaviors to avoid instructors "guessing" which affective behaviors are viewed as having the most capital to secure positive student feedback.

Nonetheless, findings of this current study suggest students in online courses have a strong desire to complete the course and "check it off the list" (i.e., low rank for relationship with the instructor, high rank for desire for clear leadership and timeliness). Although this outcome does not support the literature on the importance of affective behaviors, it does support the characteristics of the adult learner as noted by Knowles (1984) a leader in adult learning theory who purports that the adult learner is self-directed, has a readiness to learn, and needs relevancy in their course work (Knowles, Holton, & Swanson, 2015).

An additional conclusion from this study suggests adult learners at the university level want assignments that are pragmatic and translate to the real world (i.e., low rank for higher order cognitive tasks, high rank for unmet expectations on assignments). This means students do not like "busy work" or fulfilling course requirements that do not translate to the occupation for which they are training. The focus of adult learners is such that each task completed, each minute devoted, and each financial investment matters; thus, they expect course requirements to be purposeful toward their intended vocation upon program completion or graduation.

Implications

There are three main implications from this study for online instructors to implement within their course load. First, instructors need to ensure that assignments are both practical (i.e., pragmatic and translate easily to the classroom) and involve higher order thinking (i.e., Bloom's Taxonomy levels of synthesis and evaluation). While higher order thinking was ranked low by adult learners in this study, online instructors cannot assume this is not an important skill for P-12 educators. It may be safe to assume that higher order tasks were ranked low because the adult learner perceives such tasks as time consuming and thus interferes with their desire for efficiency when completing course work. However, both the practical and higher order constructs of assignments can be achieved when assignment are directly related to coursework. For example, a teacher-candidate in a Literacy Assessment course might be required to assess a P-12 learner identified as at-risk and teach a lesson the same learner, which would be a practical assignment. This same teacher-candidate could be required to evaluate his lesson by reflecting on not only the pedagogy and data collected but his personal interactions with the P-12 learner. In this reflection, the teacher-candidate could be required to connect and affirm his observations to any research, theory, or an expert's work. The assignment is, therefore, both practical and requires higher order cognitive tasks.

The second implication is online instructors should read what they post or present in expectations, rubrics and directions from a student's perspective and anticipate what may be unclear or vague. This implication may seem elementary, yet it is of critical importance in the online environment in order to eliminate misinterpretations. Due to the lack of visual affective factors in an online course, instructors need to anticipate ways in which directions and descriptions (i.e., specific wording) could be misinterpreted. For example, instructors should avoid too many pronouns, provide examples and non-examples, avoid colloquialisms and metaphors, and repeatedly post due dates and where to submit assignments.

The final implication involves the need for research in this topic of study. Due to the sample size which reflects the many students out of 200 who did not complete the survey in its entirety, it would benefit the body of research to look at the strength of relationships among variables that affect online course atmosphere as well as the relationships among those that are ranked strongly (or weakly) with teacher-candidate demographics.

Conclusion

This study was conducted with students enrolled as teacher education candidates in a College of Education particularly because both authors are faculty in teacher preparation programs and seek to contribute to the literature related to online courses in teacher education. Students identified that a highly organized and responsive instructor were variables they regarded as contributing to a positive online environment. This is an unexpected result given the current literature on the importance of an instructor's affective behavior and student satisfaction. However, this finding does support research related to the adult learner who is looking for learning experiences that are directive and meet their needs.

To further understand the online adult learner, future research is needed to investigate to what extent online students in different areas of study (e.g., business, nursing, engineering, history, etc.) evaluate the meaningfulness of an instructor's affective behaviors. Academic areas often attract individuals with different personalities (Wille, Beyers, DeFruyt, 2012). Would this variable influence the affective factors they view as important contributors to a positive online environment? As online courses continually evolve and simulate the F2F classroom experience using multi-media and technology tools (Ganesh, Paswan, & Sun, 2015), such as synchronous discussions and live video feeds between instructors and a class of students, would the affective variables identified in this study as most (or least) important change in rating? Finally, online courses appeal particularly to graduate students (Grinder, 2014) who are older and who are more likely to manage course work alongside other life circumstances (e.g., marriage, full-time jobs, children) compared to typical undergraduate students. Are there affective variables associated with specific age ranges of students when creating a positive online course atmosphere?

While the academic literature has described affective variables that create a positive online course atmosphere, no previous studies have ranked them from most important to least important. The results of this study suggest a rank order for behaviors instructors can exhibit that promote student motivation and engagement reflective of a positive online course atmosphere. Instructors of online courses now have specific guidance about which behaviors have the most capital and influence when teaching online courses.

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Editor's Note: Although the sample size is not adequate, this study presents some interesting areas for more detailed studies in the future.

Gender differences in second language reading comprehension

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Abstract

Gender Differences can be attributed to both biological factors and socially constructed beliefs (Kissau, 2006, Saville-Troike, 2005). Research has suggested that males tend to be less motivated in reading and second language learning, and that females tend to perform better in these areas (Logan, 2009, Lietz, 2006, Massoud, 2013). However, some studies have presented evidence that there is no gender difference in reading comprehension or language learning ability (Van der Slik et al, 2015, Wang, 2014). This study investigated gender differences in reading comprehension among university students of Spanish as a second language at both the intermediate and advanced levels. The findings of this study indicate no gender differences among advanced Spanish students, but at the intermediate level, male learners outperformed their female classmates.

Keywords: second language learning, reading comprehension, gender differences, Spanish pedagogy, Spanish as a second language, acquisition

Introduction

A consistent trend in research indicates that females view reading more positively than males and tend to perform better at reading comprehension (Logan, 2009, Lietz, 2006, Massoud, 2013). Favoring one gender over the other in second language acquisition has been shown to be due to a social construct, reflecting the outcome of cultural and socio-psychological constraints and influences (Saville-Troike, 2005). Our study investigated reading comprehension in university students studying intermediate and advanced Spanish as a second language (L2).

Background

Skill Acquisition Theory states that all people learn in three distinct steps. (Dekyser, 2007). These steps have been labeled as a. declarative, the beginning stage of learning, when the learner is observing and memorizing information, b. procedural, when the learner begins to act on the information through repetitive practice, and c. automatic, when the learner can act on the information automatically without having to think about the steps (Dekyser, 2007). Considering this, it is possible that language learning follows the same pattern. Differences between males and females in their language acquisition and reading could be caused by different strategies that are used in the three stages of learning. It has been found that female students tended to use more social/affective strategies such transacting with others as well as more cooperation and questions for clarification in their second language classroom. (Zeynali, 2012) Higher levels of participation and social involvement may increase the mastery and acquisition of a second language. In turn, these social interactions may speed their declarative and procedural learning, causing females to learn quicker and perform better.

Furthermore, L2 ability involves working memory, the mental system responsible for storing and processing information. It is known that people vary in their working memory capacity (Vanpatten, 2007) Studies on working memory using forward digit spans have generally not found any significant gender differences (Wang, 2014) However, a study using a word recall task

to measure verbal short-term memory found that females performed significantly better over males (Herlitz, Nilsson, & Backman, 1997).

Previous studies on gender differences and reading comprehension

A meta-analysis of large scale reading achievement studies from 1970-2002 present a corpus of data that secondary school females performed better at reading comprehension assessments than males' most the time, regardless of age or their L1. (Lietz, 2006).

Masouu (2013) investigated 100 learners of English as an L2 and found that females performed better on an exam with vocabulary, grammar, sentence function, and reading comprehension.

A lack of motivation may influence males' ability to read or learn a second language. Logan (2009) found that the association of a man's attitude on reading was the most influential factor on his reading ability.

Furthermore, reading may be viewed in a negative manner by boys because of the idea that reading or learning a second language goes against traditional views of masculinity. Kissau 2006 found that males learning L2 French are less likely to pursue a second language because French is too "girly". According to Kissau, there are generally less male faculty and students in second language departments, and males can be deterred from pursuing this field of study (Kissau, 2006).

However, when male students decide to take a course or major in a second language, there is evidence that they are much more motivated learn the L2. In a study investigating Chinese college students, who chose to major in English were much more motivated and had a better outlook on learning a second language than the average student (You, 2016)

Other studies have found no difference in reading comprehension abilities between genders (Van der Silk et al, 2015). Since there is conflicting data on whether females perform better than males, our study investigated this area.

We predict that there will be no difference in gender ability in reading comprehension due to two factors. The first is due to the occurrence of mixed results for gender differences in the previously mentioned studies. The second is that students who are participating in this course are participating by their own will and motivation. Since language courses tend to be chosen for personal reasons rather than for mandatory causes, we predict that males participating in these courses will have a higher motivation and better attitude towards learning a language and towards reading comprehension.

Research Questions

1. Is there a gender difference in reading comprehension ability in intermediate learners of L2 Spanish?
2. Is there a gender difference in reading comprehension ability in advanced learners of L2 Spanish?

Hypotheses

1. There will be no gender difference in reading comprehension ability in intermediate learners of L2 Spanish.
2. There will be no gender difference in reading comprehension ability in advanced learners of L2 Spanish.

Method

Participants: All participants (n= #38) were students enrolled in an intermediate (n=19) or advanced Spanish course (n=19) at a small Liberal Arts university in the southeast. Of the intermediate level participants (n=2) were male students and (n=17) were female students. To be in intermediate Spanish II, all students were required to be non-native speakers that completed the pre-requisite course, Intermediate Spanish I, or had taken four or more years of high school Spanish or demonstrate equivalent skills.

Of the advanced level students, (n=5) were male and (n=14) were female. To be in the advanced Spanish course, students were required to be non-native speakers that completed the pre- requisite class Intermediate Spanish II, or had 4+ years of high school Spanish or equivalent skills.

Materials

The participants were administered two 10-minute timed readings from their designated course textbook to ensure that the material was appropriate for their L2 ability. The reading came from the chapter that the class was studying in their course. The intermediate level readings included a 540-word reading on Cultural changes, similarities, and differences between countries in Latin America. The second reading was from a 680-word reading on a testimony of an indigenous woman from Guatemala. The Advanced level readings included a 560-word reading about Puerto Rico. The second reading included a 1094-word reading on Cuban dance and music.

After the timed reading, a five-question timed True/False assessment was distributed to the participants (Tests are available in Appendix A, B, C, D). Each of these questions were based on information that came directly from the reading. The questions were formed from statements that were either true based on the reading or statements that were false and opposite of the information in the reading. The questions were designed to test if the student could understand or remember the reading.

Procedure

At the beginning of class, the professor explained that each student was going to have ten minutes to complete a reading from a designated section of their textbook. Students were also informed that the reading would be part of the material they are responsible for in the class. (For the second advanced reading and exam, the student researcher administered the readings and the test to gain experience with the research process). Once all students found the reading in the textbook, the timer began. The professor also mentioned that once students felt confident having comprehended the reading, they could close the book to show that they were finished and ready for the exam. The exam was not handed out until all students finished the reading. Most students finished the reading before the 10-minute period, but there were a few students who needed the complete 10-minute time for the reading. Once the 10 minutes were done, the professor handed out the exams face down until each student received one. They were instructed to write their name on the back of the exam and then start the exam. Once the professor said that they could start the exam, the students were given five minutes to complete the true/false exam. Most of the students finished the true/false statements in two and a half minutes or less, with some tests only taking about 1 and a half minutes until completion. They were instructed to turn over their exam when they were finished. The exams were collected by the professor or student researcher and the professor/student researcher reviewed the correct answers with the students. The names were removed from the exams, and they were marked with the score of the exam and the gender of the participant.

Results

Intermediate students

In the first test, a total of 19 tests were collected. (n=2 male students) (n=17 female students). On a scale of 0-100, the mean score of the male students equaled 80, while the females mean score was 70.59. Test 2 included a total of 18 tests that were collected (n=2 male students) (n=16 female students). The mean score for male students equaled 100, while the female mean score equaled 81.25. Two-sample t-test not assuming equal variances was conducted on both tests, and a one-tailed analysis found that males performed significantly better on the reading comprehension exams than their female classmates.

Table 1
Intermediate Test One Results

Gender	Mean	Standard. Deviation	df	Variance	Observations	P(T<=t) one tail
Male	80	0	16	0	2	0.044*
Female	70.59	21.35		456	17	

Table 2
Intermediate Test Two Results

Gender	Mean	Standard. Deviation	df	Variance	Observations	P(T<=t) one tail
Male	100	25.82	15	0	2	0.00095*
Female	81.25	19.95		398	16	

Advanced Students

In the first test, a total of 17 tests were collected. (n=4 male students) (n=13 female students). On a scale of 0-100, the mean score of the male students equaled 70, while the females' mean score was 81.54. Test 2 included a total of 19 tests that were collected (n=5 male students) (n=14 female students). The mean score for male students equaled 72, while the female mean score equaled 62.29. Two-sample t-test assuming equal variances was conducted on both tests, and a one-tailed analysis found that there were no significant differences between the means of the male and female students on both test 1 and 2.

Table 3
Advanced Test One Results

Gender	Mean	Standard. Deviation	df	Variance	Observations	P(T<=t) one tail
Male	70	28.52	15	666.67	4	0.209
Female	81.54	23.75		564	13	

Table 4
Advanced Test Two Results

Gender	Mean	Standard. Deviation	df	Variance	Observations	P(T<=t) one tail

Male	72	25.82	17	720	5	0.25
Female	64	26.83		380	14	

Discussion

The results of advanced test one and two present no significant difference based on gender for the reading assessments. Intermediate test one and two show significant differences; males outperformed females.

One of concerns that emerged after the exams was that certain questions were answered incorrectly by only 50% of the participants. This could indicate that some of the questions or the reading could have been past their level of comprehension, or that the questions were not worded in a clear manner. In Intermediate test 1, 14 out of 19 students marked question 1 (Los problemas en América Latina se manifiestan en formas muy similares) [The problems in Latin America manifest themselves in very similar forms] as true when the correct answer was false. In the Advanced Test 2, 12 out of 19 students marked question 3 (El bongó no originó en África, sino en Cuba) [The bongo did not originate in Africa, but rather in Cuba] as true when the correct answer was false. It is possible that the difficulty of this question could have emerged from it being the only question on the test that was asked in the negative. No other questions appeared to have a majority of students answering incorrectly.

As cited above, there tends to be fewer males that take language courses, and our study collected data from 2 intermediate level males and 5 advanced level males. Due to the nature of language classrooms having a small number of male students, we were unable to collect data from a larger number of male participants. In the intermediate class, the 2 male participants both received a perfect score on the exam. As this was higher than the overall class average, it is possible that these males may represent outliers.

A possible future direction of this study could include speaking or writing assessments to investigate if any differences exist in language output. Further research could also include classrooms with a larger student population to account for any outliers in a small population. In regards to future research on gender motivation, it is possible that males who attend college language classes are more motivated than traditional male students to excel in second language acquisition. Future research could investigate levels of motivation for male students that are in college and examine their attitudes and reasons for learning a second language.

Conclusion

Our study offers evidence that male and female advanced students have no difference in their reading comprehension abilities in the L2, and that intermediate males had an advantage over females in their reading comprehension ability. These are mixed results but offer some refute to previous research that suggested that males tend to be less motivated in reading and second language learning (Logan, 2009, Lietz, 2006, Massoud, 2013) and tends to align with studies that demonstrate no gender difference in reading comprehension or language learning ability (Van der Slik et al, 2015, Wang, 2014).

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Appendix A
Intermediate Spanish Test I

Chapter 9 p. 313

Encuentros y desencuentros

Los problemas en América Latina se manifiestan en formas muy similares. C F

Hay divisiones sociales y culturales por causa de los cambios en la manera de hablar. C F

La Inmigración en España se constituye principalmente de países hispanohablantes, no de países africanas o asiáticas. C F

La película “Flores del otro mundo” es sobre una comunidad sin discriminación ni violencia. C F

El consumo en América Latina ha cambiado mucho; por ejemplo, la creación del centro comercial en lugar de tiendas pequeñas. C F

Appendix B
Intermediate Spanish Test II

Me llamo Rigoberta Menchú

La autora, Rigoberta Menchu es una mujer muy vieja C F

La autora aprendió el español en la clase con una profesora C F

Hay veintitrés etnias en Guatemala C F

Rigoberta es del sur de Guatemala C F

No hay carreteras ni vehículos donde vive la autora C F

Appendix C
Advanced Spanish Test I

Chapter 5 p. 116

El clima en Puerto Rico no es demasiado cálido. C F

Uno de los motivos para la creación del Castillo San Felipe fue para proteger Puerto Rico de los piratas. C F

El inglés nunca ha sida la lengua obligatoria en Puerto Rico. C F

Los puertorriqueños no pagan los impuestos federales y no reciben la asistencia pública. C F

El Partido Independentista es el más popular en Puerto Rico. C F

Appendix D
Advanced Spanish Test II

Chapter 6 p. 145

Los siboneyes eran los fundadores de la música y del baile cubanos. C F

La guaracha es conocida por sus versos serios. C F

El bongó no originó en África, sino en Cuba. C F

El danzón es considerado el baile nacional de Cuba. C F

Un instrumento característico de la música guajira es una guitarra con tres cuerdas dobles. C F

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