



Students' perspectives of the impact of online streaming media on teaching and learning at the college of education at Kuwait University

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The objective of this study was to investigate the perspectives of pre-service and in-service teachers in the College of Education (COE) at Kuwait University (KU) on the use of online streaming media services as a facilitative and innovative tool for teaching, learning, professional development, and teacher preparation. Five research questions were used to compile a questionnaire and to guide analysis of the data. Various descriptive methods of analysis were applied to the collected data (e.g., frequencies and percentages to summarize the demographic data; means and standard deviations to address the research questions). The study revealed that the participants' awareness of the availability of such services is low ($M = 2.49$; $SD = 0.57$). However, their attitudes toward online streaming media as an innovative tool for teaching, learning, professional development, and teacher preparation were significantly positive among all subgroups, with a high mean score ($M = 4.5213$, and $SD = 0.27707$). Thus, online streaming media prepares teachers and students alike for a voyage of imagination and discovery. No school can afford to be without this tool—a gateway to a new world of educational possibilities.

Keywords: online streaming media services, educational/instructional videos, teaching and learning, pre-service and in-service teachers, ICT

INTRODUCTION

Online streaming media is growing rapidly due to the increasing use of mobile devices (Maia, Yehia, & de Errico, 2015). Streaming media consists of video and/or audio content sent in a compressed digital format over the Internet and seen by multiple viewers immediately in real-time. With streaming media, the user does not

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have to wait for a file to download and then save it on a storage device to be played later. Instead, the content is sent in a continuous stream of data and played as soon as it arrives. Users can pause, fast-forward, or rewind as they would with a downloaded file unless the content is being streamed live. The user needs a media player, which is a program that decompresses and sends the video data to the display and the audio data to the speakers. A media player can be an integral part of a browser, a plug-in, a separate program, an embedded player within the video file itself, or a dedicated device, such as an iPod. Some newer media players enable streamed media to be viewed, downloaded, and edited simultaneously (Rouse, Wigmore, & Thing, 2009). For the purposes of this study, streaming media refers to online digital videos; simply defined, they are videos that are delivered online through the Internet. They can be downloaded entirely and then accessed or streamed; however, they are not distributed in a physical format such as a videocassette, optical disc, compact disc (CD), digital versatile disc (DVD), Blu-ray disc (BD), hard disk drive (HDD), flash memory drive, or memory card (Shephard, 2003).

Historically, educational videos were viewed in classrooms via educational/instructional television services provided by public television stations, which were later accompanied by closed-circuit TV (CCTV) services through the use of cable and satellite technologies. Instructional videos then became widely available on physical media such as videocassettes, optical discs, CDs, DVDs, and BDs. Eventually, digital educational/instructional videos became extensively accessible online through the Internet, in either a downloadable or streaming format through the use of commercial Web-based digital video service providers (e.g., Discovery Education, which owns—in addition to its own collections—Unitedstreaming, AIMS Multimedia, and Rainbow Educational Media collections, three of the largest providers of educational videos for classrooms in the United States) and/or free Web-based digital video service suppliers (e.g., YouTube, TeacherTube, Bozeman Science, and Khan Academy, along with Web 2.0 or Web 3.0 tools for content creation and manipulation) (Mardis, 2009).

Thus, schools and higher education institutions have a history of using educational/instructional videos in the classroom as a tool to enrich teaching and learning. An increasing number of teachers and faculty members broadcast lectures by digitally recording and uploading them for students (Ritzhaupt, Pastore, & Davis, 2015).

Streaming video technology has been used as “supplementary materials to demonstrate the ideal practice of procedures; tools for self-assessment and reflection on one’s own practice; and resources to help student prepare for examinations” (Sowan & Abu Idhail, 2014, p. 593). Other studies, however, have found that several factors have hampered the use of streaming video technology in education, such as delays in physical or online access (e.g., inadequate bandwidth), restrictive policies, limited video selection, scarcity of projection devices, and a tendency for whole-class

State of the literature

- Online digital videos have been used to (1) diversify the types of resources and activities used in teaching and learning; (2) match content and needs; (3) help with instructional differentiation; and (4) link available digital videos and curriculum standards.
- Students made digital video recordings of their experiences/practices using a video camera, selected segments during video editing, and uploaded these short videos to a streaming media server.
- ICT facilitation using streaming media positively influenced the three processes of the students’ reflection; however, they also revealed some deficiencies in the process.

Contribution of this paper to the literature

- The objective of this study was to investigate the perspectives, mindsets, and appraisals of pre-service and in-service teachers in the College of Education at Kuwait University regarding online streaming media services (i.e., online instructional digital videos) for teaching, learning, professional development, and teacher preparation.
- Five research questions regarding online educational media were used to compile the survey questionnaire and guide analysis of the data. Various methods of analysis were applied to the data, and the participants’ personal data were summarized in terms of frequencies and percentages.

rather than individual use. Moreover, methodological concerns, including "insufficient description of streaming videos, small sample size, and the absence of reporting reliability and validity estimates of the data collection tools" (Sowan & Abu Idhail, 2014, p. 593), have been reported in many studies of streaming media.

The rapidly increasing presence of high-speed broadband Internet connectivity in education, the widespread access to information and communication technology (ICT) tools and services, and the current growth of freely available Web-based digital video content providers have accelerated the use of instructional videos in education (Mardis, 2009). Moreover, the emergence of cutting-edge smartphones and other high-quality devices with high resolution, large screen size, and other display features has improved the quality of streaming videos, depending on the Internet service provider's ability to avoid failures and delays (Maia et al., 2015).

Streaming media has already proved to be indispensable as a teaching and learning tool in the diverse student community of schools and higher education institutions, and its benefits are not limited to distance learning (Cascaval et al., 2008). Willmot, Bramhall, and Radley (2012) demonstrated a strong connection between streaming video and learner engagement, enjoyment, and appreciation. Once incorporated properly, streaming media can increase learner motivation, enhance the learning experience, and help develop learner autonomy. The growing access to rich online streaming media has transformed the way we teach and learn and offers increased opportunities to advance ICT integration, use rich multimedia, remix content, and respond to teaching and learning challenges. Increasing access to rich online educational digital videos can also play a key role in professional development and teacher preparation; educators can witness and model exemplary teaching and learning methods, practices, and strategies and acquire experience using ICT resources (Mardis, 2009). A recent study verified that streaming media is a fruitful teaching strategy that yields a high level of students' satisfaction, self-efficacy, and achievement as it improves learning skills, particularly when carefully designed (Sowan & Abu Idhail, 2014). Other supportive studies indicated that online media has a positive influence on learning satisfaction, academic/classroom performance, and overall final grades (Chen & Wu, 2015; Orús et al., 2016).

Studies have already documented that educators can become skilled in using such tools with minimal or no effort and that many teachers are eager to learn to navigate this technology to deliver supplementary materials that are beneficial to most, if not all, of their learners. Streaming media has a universal appeal as an educational supplement (Cascaval et al., 2008).

Objectives of the study

The objective of this study was to investigate the perspectives, mindsets, and appraisals of pre-service teachers (i.e., undergraduate students) and in-service teachers (i.e., graduate students) in the College of Education at Kuwait University regarding the use of online streaming media services (i.e., online educational/instructional digital videos) as a facilitative and innovative tool for teaching, learning, professional development, and teacher preparation. To that end, a survey was developed that consisted of the following five research questions, which were used to guide the ensuing analysis:

Are KU's pre-service and in-service teachers aware of the online streaming media services available to them?

Do KU's pre-service and in-service teachers acknowledge and appreciate the usefulness of online streaming media services in education?

What are KU's pre-service and in-service teacher's motivations/reasons for using online streaming media services?

What are KU's pre-service and in-service teacher's difficulties/obstacles in using online streaming media services?

Are KU's pre-service and in-service teachers satisfied with the use of online streaming media services?

Assumptions and limitations of the study

This study assumes that the perspectives, mindsets, and appraisals of KU's pre-service and in-service teachers are highly positive with regard to the five research questions concerning the use of online streaming media services in teaching, learning, professional development, and teacher preparation. The study involved the use of online streaming media and its related services in student academic activities (i.e., 250 female undergraduate pre-service teachers and 25 female graduate in-service teachers from the COE at KU). These students were enrolled in ICT undergraduate courses and in an ICT graduate course. The courses were all taught by Ammar Safar, PhD, and Fahad Alkhezzi, PhD, the authors of this paper. Other uses of online streaming media were not studied. The data collection phase spanned two academic years: 2013–2014 and 2014–2015. Enrollment was limited to 20–25 students in each section of the undergraduate courses and 10 students in each section of the graduate course.

Significance of the study

The literature covering the use of educational/instructional videos is extensive because the use of this technology as a teaching and learning tool goes back to the 1950s. However, studies of the use of online digital videos (i.e., streaming media) services in education are only now emerging. The small body of scientific literature is problematic because of the current prevalence of ICT tools in educational environments and their immense educational potential. Current case studies should go beyond digital video production by educators and investigate the use of online digital videos in education.

The researchers performed this study because they recognized the need to understand and measure the use and efficacy of online streaming media services in education. This research can help provide a reference roadmap for educators, practitioners, administrators, policy/decision makers, and researchers interested in the use of online digital video services in education. It can provide a method to break down current barriers to the use of online streaming media, which will assist educators, scholars, practitioners, administrators, and policy/decision makers in making the best use of this technology in classrooms. The research presents empirical evidence that either supports or challenges the application and integration of online educational/instructional digital video services to education on a national level in Kuwait's academic institutions.

Literature review

Many studies over the past decade have described how online streaming media is used to support and augment teaching and learning in compulsory education and in higher education. These studies asserted that online digital videos can play a remarkable role in enhancing the teaching environment, improving learning effectiveness, and providing learning opportunities for larger cohorts of students with increasing variation in background, age, and ability to learn. These studies examined the role of streaming media and identified the processes that could extend its application to education.

Evidence of effectiveness and validity

In the spring of 2008, Mardis evaluated the perceptions of K-12 educators in Michigan regarding online digital video services provided to their schools. An online questionnaire consisting of 18 items and several demographic questions was distributed to all of Michigan's K-12 educators (99,838 individuals, according to the NCES data). A total of 426 educators participated in the study; of those, 340 participants had been educators for more than 6 years, and almost 91 percent worked in either the classroom (i.e., $n = 284$) or the school library (i.e., $n = 113$). The results reflected the respondents' enthusiasm for using online digital video services because access was available anytime, anywhere, and the videos were in short-segment formats, which often fits the curriculum better. The participants appreciated the services' content breadth and ability to cultivate educational innovation in teaching and learning. The findings also revealed that streaming media was used to some extent in all subject areas; however, they were used mainly by teachers in science, social studies, and language arts at the beginning and conclusion of teaching and learning experiences (i.e., to introduce and reinforce new concepts). Online digital videos were commonly used to (1) diversify the types of resources and activities used in teaching and learning; (2) match content and needs; (3) help with instructional differentiation; and (4) link available digital videos and curriculum standards (Mardis, 2009).

The survey responses also revealed that the barriers to using online digital video services causing the most frustration and dissatisfaction were: (1) lack of time to search for videos; (2) inadequate bandwidth (i.e., slow broadband Internet connectivity); (3) issues with video and sound quality (i.e., videos that were old and pixelated); (4) insufficient network privileges to save or download videos on demand, edit them, or view multiple files simultaneously (i.e., restrictive ICT policies); (5) inadequate availability of display equipment; (6) dissatisfaction with the quantity and quality of school computers for student activities; (7) inability to conduct a comprehensive search for videos and other sources/materials simultaneously; (8) inability to link the search results to curriculum standards; (9) failure to be notified when new content in their interest areas was added; (10) inability to upload student- and teacher-created videos; and (11) scarcity of support personnel. The findings also indicated that, together, teachers, ICT personnel, and school library media specialists (i.e., LMSs or teacher-librarians) control and manage access to digital video services in their schools (Mardis, 2009).

Other examples of online video lectures and their accessibility

In 2007, Cascaval, Fogler, Abrams, and Durham conducted a study of in-class undergraduate students enrolled in traditional mathematics courses at a mid-sized university, the University of Colorado at Colorado Springs (UCCS), in the western United States. UCCS had successfully offered archived online videos of several mathematics courses since 1998 through a program called MathOnline. This online video lecture archiving system streams in-class lectures live and archives them for asynchronous viewing. The system offers students Web access to complete video recordings of classroom lectures and, sometimes, lecture notes shortly after the completion of the in-class sessions. The students also have access to previous lectures from related courses (e.g., prerequisite courses). The system offers podcasting, RSS feeds, and other features, and can be used to supplement or substitute for in-class presentations. At UCCS, the main objective of the system was to deliver mathematics content to remote students unable to attend regular classes, such as high school students taking advanced math and military personnel. Other notable universities

embrace similar technologies, including MIT, Yale University, the University of California at Berkeley, Stanford University, and North Carolina State University (Cascaval et al., 2008).

In recent years, preliminary data collected to assess the impacts of the availability of such materials online on student learning has been promising. The system used at UCCS was also found to be useful for students who missed a lecture, allowing them to remain current with the course material. In 2005, it was theorized that the archival system would be a valuable teaching and learning aid for both hybrid mathematics courses (i.e., enrollments including remote or online students and on-site students) and traditional on-site mathematics courses. By the end of the 2007–2008 academic year, more than 30 courses had been archived—including courses other than mathematics—and they are now available at no charge on the MathOnline program's Web site (Cascaval et al., 2008).

This study was performed in the spring term of the 2007–2008 academic year to evaluate the impacts of this online video lecturing archive system on students' learning and academic performance (i.e., to assess changes in students' attitudes and behaviors, changes in the dynamics of professor–student relationships, and changes in student achievement or performance) from the perspective of UCCS students. A total of 147 students from various majors (e.g., mathematics, engineering, biology, computer science, physics, and chemistry) who had enrolled in seven mathematics courses were invited via e-mail to participate in the study. Three of the courses were hybrid undergraduate lower-division mathematics courses (Calculus II, Calculus III, and Number Theory); the other four courses were traditional upper-division mathematics courses offered at the senior undergraduate and/or beginning graduate level (Mathematical Modeling, Modern Analysis II, and Scientific Computation and Mathematical Statistics II). These courses were taught by six instructors with varied teaching styles. The data were collected using a customized Web survey based on information gathered in focus groups (Cascaval et al., 2008).

The study findings demonstrated that the archived video lectures and lecture notes provided through the online video lecture archiving system added significant value to overall learning. Marked improvements were observed in academic performance in addition to the positivity of the overall student experiences in the classes. No significant differences were found in students' attitudes and behaviors as a function of gender, age, or number of courses taken. The results, however, indicated that the level of difficulty of the class and the scores achieved influenced the students' reaction toward the system. The more difficult the course was, the more positive the students' feelings about it and the higher their grades. The findings also revealed, intriguingly, that the students in large classes were more interested in the video system than those in smaller classes. Moreover, the students who achieved lower scores tended to show more interest in the system than those with higher scores. Surprisingly, the availability of online lectures did not significantly affect the attendance rate in the traditional classes. No significant negative changes were observed in the students' attitudes and behaviors regarding attendance. The results of this study might encourage other mathematics departments to adopt similar technologies and share their courses online with other universities (Cascaval et al., 2008).

Reflection is a cognitive process performed with the intention of learning from experiences through individual inquiry and collaboration with others. It helps us to deepen our learning experiences and outcomes, attain more compound and integrated knowledge structures and access more usable knowledge (Billing, 2007; Moon, 2005). Reflection is commonly included in diverse educational fields and contexts (e.g., practical educational courses such as dance education, nursing education, medical studies, language learning, and teacher education) and is considered significant for improving performance qualities and building a

professional identity (i.e., it positively affects the learning of professional competences) (Admiraal, Janssen, Pijls, & Gielis, 2008). Students' reflection is a challenging activity for learners and requires support—including ICT facilitation through streaming media with the use of video-based teaching and learning environment—in the form of guidance from assignments, questions, criteria, and forms or directly from a teacher (Abou Baker El-Dib, 2007; Lee, 2005; Lee & Wu, 2006; Leijen, Admiraal, Wildschut, & Simons, 2008).

An evaluation case study was conducted in a dance academy in the Netherlands, focusing on ways in which ICT can help dance students reflect on their competencies. The participants were 15 second-year students enrolled in two practical dance education courses (a composition course, $n = 8$ students; a ballet course, $n = 7$ students; average age of 21; average dance experience of 9 years) and two teachers (average teaching experience of 6.5 years). The two practical courses exploited a streaming video-based teaching and learning environment, namely DiViDU, which was developed for re-using and creating learning tasks based on authentic practical situations. DiViDU was used as a tool to facilitate the students' daily reflection activities. The students made digital video recordings of their experiences/practices using a video camera, selected video segments during editing, and uploaded these short videos to a streaming media server (Leijen et al., 2009).

In addition to the usual learning activities, streaming media were used in three ways in the reflection assignments, which were carefully designed in collaboration with the teachers and a researcher to support the dance students' reflection processes. These methods were: (1) video editing and viewing to support learners in describing their experiences; (2) online self-evaluations—following the questions and criteria provided by the teachers and researchers—regarding the experiences conveyed in the video content for helping students assess their experiences; and (3) online peer-feedback related to the recorded practices to help the students learn from multiple perspectives. The focus of the reflection differed between the two classes; the students in the composition class reflected on the choreography performed by their peers, whereas the students in the ballet course reflected on their own performances of the ballet techniques (Leijen et al., 2009).

Following the reflection assignments, the data were collected in six semi-structured interviews (four with the students and two with the instructors) that focused on the use of the streaming media in the courses. The findings of this exploratory case study are consistent with those from similar large studies of the same discipline and of different educational professional contexts (Admiraal et al., 2008; Lee & Wu, 2006; Moreno & Valdez, 2007). Overall, students and teachers alike were highly satisfied with the ICT facilitation through the use of streaming media, which was accompanied by several reflection assignments as a means of positively influencing the three processes of students' reflection. The streaming media helped the students develop a more realistic view and prolific description of their dance experiences and enabled them to capture the richness and complexity of their practices for later analyses. It also facilitated the students' thinking processes, which helped in formulating in-depth (i.e., detailed and elaborated) understanding of the content and taking a more active role in their learning (Leijen et al., 2009).

The findings regarding the teachers' perspectives clearly indicated that ICT facilitation through the use of streaming media positively influenced the three processes of student reflection; nevertheless, the teachers also described certain deficiencies. From the students' perspectives, the streaming media were clearly useful in both courses and supported the three processes of student reflection. Certain differences in the perceived usefulness and effectiveness of the two classes were noted in the students' responses, however. For example, the online self-assessment technique—in which video footage of the dance practice was evaluated following the

presentation of the questions and criteria by the teacher—for supporting the second reflection process (i.e., evaluating the experience) was considered useful by the students in both classes. The study also reported that streaming media facilitation with video editing and viewing was regarded as effective and useful for supporting the first reflection process (i.e., describing an experience) more frequently by the students in the ballet course (wherein students viewed themselves on video recordings) than by those in the composition class, in which students viewed their peers in the videos. Students in both courses reported that the streaming media system provided a safe environment for sharing ideas with peers and that the written feedback in the virtual environment was more rational than feedback provided in a face-to-face situation and was highly related to the materials and less emotionally loaded. The results also demonstrated that the online peer-feedback activities through the use of streaming media were regarded as effective and useful for supporting the third reflection process (i.e., learning from multiple perspectives) more frequently by the students in the composition class than by those in the ballet class (Leijen et al., 2009).

Wang, Mattick, and Dunne (2010) performed a study in a medical institution encompassing five main locations for curriculum delivery across southwestern England. This research was part of a larger study funded by the UK's Joint Information Systems Committee and Higher Education Academy as part of the national Pathfinder project. The study investigated medical students' insights into video-linked lectures and video streaming; it explored how instructors and learners used these ICT interventions and assessed their effects on teaching and learning. Twenty undergraduate medical students (representing four sites and five academic levels) selected at random participated voluntarily in the study. The students in this study had two options. The first option was to attend the lectures in a traditional, instructor-led, face-to-face manner or remotely with the use of video-conferencing technology, referred to as video-linked lectures. The live lectures were recorded and made available for access in a streaming-video format by the institution's Web-based learning management system as an additional learning resource. The availability of these materials online allowed the students to view them at a later date anytime, anywhere. The video-linked lectures permitted medical students in various locations and between the institution and hospital bases to collaborate in shared teaching and learning. The second option for the students was to not attend lectures in person but to achieve the learning objectives and tasks by other means. Those students were able to rely heavily on the streamed videos.

The data were collected qualitatively using semi-structured interviews that were audio-recorded and transcribed verbatim. The data analysis revealed several key patterns. Most of the participants showed reacted positively to the use of video-conferencing as a teaching and learning tool. The medical students were thrilled with the opportunity to be educated by professionals (i.e., with both theoretical and practical experience) drawn from a broad geographic area. They reported that video-linked lectures supplemented their other learning opportunities. The results also indicated that most of the students favored attending live lectures at the home site—where they could interact and engage with the instructor/lecturer more easily—rather than attending live lectures virtually (i.e., via video-conferencing remotely) or watching the streamed videos later. The participants reported that the interaction between the locations was a critical challenge and that the most common technical barrier to site interactivity was locating and accessing a microphone—specifically, an audience member forgetting to use a microphone to ask questions. Remote students also reported that misconduct of their peers led to disruption and frustration (Wang et al., 2010).

The findings also affirmed that several factors influenced the students' choice to attend real-time lectures rather than watch the video-streamed lectures online. These

reported factors were: (1) whether the lecture topic appeared interesting; and (2) whether the speaker was able to interact with and engage audiences in all locations. Regardless whether the students spoke favorably of the videos' availability as a teaching and learning resource, the results revealed that video-streamed lectures were often used by a minority of students, relatively infrequently, in the evenings and on weekends and holidays. Three reasons were given for viewing the videos: (1) to view a highly recommended lecture that the student missed; (2) to review interesting and informative lectures; and (3) to strengthen their understanding of the content/materials. Participants also indicated that the ability to control the streamed videos (i.e., pause, rewind, and fast-forward) was the greatest advantage of video streaming (Wang et al., 2010).

"Hot" and "cool" media

In 1995, in the book *Understanding Media: The Extensions of Man*, Marshall McLuhan differentiated between what he referred to as "hot" and "cool" media. Hot media are characterized by low levels of participation, whereas cool media have a high level of participation and popularity. McLuhan's theory was acknowledged in *The Economist*. An article titled "A survey of new media: Among the audience" asserted that we are in the beginning phase of a slow, steady, continual transition to a new epoch that may be referred to as the era of participatory/personal media. In this era, the boundaries between media audiences and creators are often imperceptible (McLuhan & Gordon, 2003; Trier, 2007a; Trier, 2007b).

Taking into account McLuhan's 1995 theory, in 2007 Trier conducted a study at the University of North Carolina at Chapel Hill to investigate the pedagogical role that YouTube might play in a graduate course titled Cultural Studies and Education. Also under investigation were the possibilities that YouTube might offer for involving both teachers and students in other engagements with media. The researcher/instructor used a pedagogical method called the mosh-pit pedagogy during the course. The researcher introduced this strategy and the videocasting YouTube Web site to his graduate students at the beginning of the course in a participatory seminar (Trier, 2007a; Trier, 2007b).

Trier's pedagogical practice was based on four key strategies: (1) *cool hunting*, in which the students hunted (i.e., searched for and retrieved) for cool media materials (e.g., a video, audio segment, DVD, videocassette, music CD, image, Web site, or text) that articulated an aspect or idea found in the required readings every week during the course; (2) *gathering*, meaning the weekly cool participatory mosh-pit seminars and the class discussion board on the Blackboard e-learning system, which the students and instructor used to collect pertinent YouTube videos and thereby produce a treasure trove of communally constructed knowledge; (3) *time shifting*, in which the YouTube videos available on the course's Blackboard discussion board were viewable wherever there was an Internet connection; and (4) *space shifting*, in which the students and instructor could access the video collection in various physical settings (e.g., at home, in an office, or in a library) using a variety of ICT tools (e.g., desktop PCs, laptops, or devices such as tablets and smart phones) (Trier, 2007a; Trier, 2007b).

The study's findings revealed that the videos that the learners found through their cool hunting on YouTube were presented and explicated during the weekly cool participatory seminars and were posted on the class's Blackboard discussion board Web page. These videos were rich in content and had pedagogical benefits for the students and teachers alike. The study's results also indicated that the YouTube-powered mosh-pit allowed the students to participate in the discovery of knowledge rather than being involved in passive "hot" engagements, to use McLuhan's term. The findings indicated that the spirit and content produced by the YouTube-fueled mosh-

pit pedagogy during the course positively facilitated interactions with “cool engagements” inside and outside the classroom (Trier, 2007a; Trier, 2007b).

METHODOLOGY

Research design

A detailed quantitative evaluation case study design was used in this research. An exploratory case study method was used. This method is a type of descriptive research design that is used to evaluate, explain, and validate the findings of specific interventions that are implemented in a real-life context (Yin, 2014). The results offer better clarification and understanding of KU’s pre-service and in-service teachers’ insights, attitudes, and appraisals regarding the effectiveness of online streaming media in education.

Instruments

The data were collected using a customized online questionnaire that was constructed carefully from focus groups and former studies. The Web survey consisted of five areas/domains and seventy items that were stated positively. These domains were awareness of services, acknowledgment of usefulness, motivations/factors for usage, difficulty of use, and satisfaction with services. The statements were designed to assess pre-service and in-service teacher perceptions of and attitudes toward the impacts of online streaming media on teaching and learning. The instrument also contained a section for recording the participants’ demographic information: name, major, grade point average (GPA), university grade level, type of ICT user, type of learner, level of comfort with ICT tools, and willingness to integrate ICT tools into education.

Validity and reliability

The research instrument was examined for face and construct validity by nine experts in educational technology and research methods at the College of Education at Kuwait University and the Public Authority for Applied Education and Training. These experts checked the items independently for adequacy, quality, relevancy, completeness, and comprehensibility. Changes were made in accordance with the suggestions of the experts. The internal consistency was examined based on Cronbach’s alpha of data collected from 40 subjects who were excluded from the actual sample. The internal consistencies of the domains of awareness of services, acknowledgment of usefulness, motivations/factors for usage, difficulty of usage, and satisfaction with services were 0.867, 0.889, 0.862, 0.877, and 0.775, respectively. The overall internal consistency was 0.890. Table 1 shows the reliability of the questionnaire and the number of items in each domain.

Sample

The participants consisted of 250 female undergraduate pre-service teachers and 25 female graduate in-service teachers from the COE at KU who were enrolled in four undergraduate ICT courses: a 100-level course titled e-Learning, a 100-level and a 200-level course titled Computers in Education, a 300-level course titled Instructional Media Communication, a 300-level course titled Instructional Media and Technology, and an ICT graduate course titled e-Learning. These students were all asked by the researchers to take part in the study. The sample represented various ethnic and academic backgrounds.

Table 1. Number of items for each domain.

Domain	No. of Items	Cronbach's Alpha
Awareness of services	8	0.867
Acknowledgment of usefulness	10	0.889
Motivations/factors for usage	21	0.862
Difficulty of usage	12	0.877
Satisfaction with services	19	0.775
Overall reliability	70	0.890

Three of the four undergraduate courses are requirements for the professional preparation of pre-service teachers in the COE; the fourth, e-Learning, is an elective class. The graduate course is also an elective. Each course presents unique content and is a three-credit class. All courses were taught by the same instructor using the same instruction method, as described earlier.

Data collection

The researchers collected the data during the two academic years of 2013–2014 and 2014–2015. The participants were always encouraged to share their thoughts openly. They were also assured anonymity and that all the data gathered in the study would be confidential and used only for the purposes of this study's statistical analysis.

Methods of analysis

Various methods of analysis were used to review the collected data. Frequency and percentage were used to describe and summarize the demographic data. Descriptive analytical measures (i.e., means and standard deviations) were calculated to address the research questions.

The collected data were interpreted based on the study objectives. Each research question is presented, analyzed, and discussed separately and consecutively. The findings are displayed in Table 2.

Table 2. Descriptive statistics for the five domains being tested.

Domain	Qs	Mean	Std. Deviation
Awareness of services	1-8	2.49	0.57
Acknowledgment of usefulness	9-18	4.25	0.44
Motivations/factors for usage	19-39	4.32	0.32
Difficulty of usage	40-51	2.48	0.38
Satisfaction with services	52-70	4.52	0.27

DATA ANALYSIS

Research question no. 1: awareness of services

The question regarding awareness of services addresses the awareness of KU's pre-service and in-service teachers of online streaming media services available to them. To answer this question, descriptive statistics were applied to items 1 to 8 in the questionnaire. A high mean score indicates a high level of awareness of available online streaming media

services, whereas a low mean score indicates a low level of awareness. The results, shown in Table 2, indicate that this level is generally low (mean score of 2.49 on a 5-point scale).

Research question no. 2: acknowledgment of usefulness

The question regarding acknowledgement of usefulness addresses whether KU's pre-service and in-service teachers acknowledge and appreciate the usefulness of online streaming media services in education. To answer this question, descriptive statistics were applied to items 9 to 18 of the questionnaire. A high mean score indicates a high level of acknowledgment and appreciation of the usefulness of online streaming media services in education, whereas a low mean score indicates a low level. The findings, shown in Table 2, indicate that this level is generally high (mean score of 4.25 on a 5-point scale).

Research question no. 3: motivations/factors for usage

The question regarding motivations/factors for usage addresses KU's pre-service and in-service teachers' motivations and reasons for using online streaming media services. To answer this question, descriptive statistics were applied to items 19 to 39 of the questionnaire. A high mean score indicates a high level of motivation and reasons for using online streaming media services, whereas a low mean score indicates a low level. As shown in Table 2, this level is generally high (mean score of 4.32 on a 5-point scale).

Research question no. 4: difficulty of usage

The question regarding difficulty of usage addresses KU's pre-service and in-service teachers' difficulties/obstacles in using online streaming media services. To answer this question, descriptive statistics were applied to items 40 to 51 of the questionnaire. A high mean score indicates a high level of difficulties/obstacles in using online streaming media services by the participants, whereas a low mean score indicates a low level. The findings, shown in Table 2, indicate that this level is generally low (mean score of 2.48 on a 5-point scale).

Research question no. 5: satisfaction with services

The question regarding satisfaction with services addresses whether KU's pre-service and in-service teachers are satisfied with the use of online streaming media services. To answer this question, descriptive statistics were applied to items 52 to 70 of the questionnaire. A high mean score indicates a high level of participant satisfaction with the use of online streaming media services, whereas a low mean score indicates a low level. As shown in Table 2, this level is generally high (mean score of 4.52 on a 5-point scale).

DISCUSSION

In this study, we collected experimental evidence of the satisfaction level of the COE's pre-service and in-service teachers at KU with regard to using online streaming media in education. The study revealed that the participants' awareness of the availability of such services is generally low ($M = 2.49$, and $SD = 0.57$). This result may be attributable to the scarcity of recent literature describing the use of online streaming media services in education. It could also be attributed to the level of knowledge of this topic in the AGCC nations and in the Middle East in general.

Despite the participants' low awareness of the availability of online streaming media services, their perspectives, mindsets, and appraisals regarding the use of online streaming media as an innovative tool for teaching and learning and for professional development and teacher preparation were significantly positive among all subgroups, with a high mean score ($M = 4.5213$; $SD = 0.27707$). Indeed, pre-service and in-service teachers

acknowledged the usefulness of online streaming media services in education, and all subgroups scored high in this domain ($M = 4.2540$, and $SD = 0.44462$). Their motivation and reasons for using online streaming media services in education was also significantly positive among all subgroups, with a high mean score ($M = 4.32$, and $SD = 0.32$). These findings are consistent with the results of earlier studies conducted within the previous 10 years in several geographic regions and a variety of disciplines (Boster, Meyer, Roberto, Inge, & Strom, 2006; Cascaval et al., 2008; Chang, 2004; Cooper & Higgins, 2014; Fredriksen, 2015; Green et al., 2003; Hartsell & Yuen, 2006; Leijen et al., 2009; Mardis, 2009; Sowan & Abu Idhail, 2014; Trier, 2007a; Trier, 2007b; Wang et al., 2010; Yunus et al., 2006). The results also confirm the hypotheses presented earlier in this paper.

If we review the five domains that were tested in this study, namely, awareness, acknowledgment, motivation, difficulty, and satisfaction with online streaming media, the only area that needs improvement is the first, awareness of these media services. In the other four areas, the students rated high in the factors involved in the use of streaming media (or, in the case of difficulties or obstacles, low). Students readily acknowledged the services and were highly motivated to use them, and they reported little to no difficulty accessing online media services. Their overall satisfaction with the media services was high, meaning that their expectations about it were met. Clearly, then, the only area that is lacking is the students' awareness of online media as an option in instruction. Future studies of online media should address how students discover course options and how universities can publicize these new or alternative instruction options.

CONCLUSIONS AND RECOMMENDATIONS

ICT has made significant contributions in removing barriers that divide cultures, nations, and individuals. ICT should not drive the curricula; instead, such tools and technologies should provide learners with opportunities to open the world of the "Knowledge Age," which great thinkers such as McLuhan only imagined. The teacher's role has also been greatly expanded by ICT tools and practices. As educators in this knowledge-driven century, we must act as facilitators for students. We need to embrace and use the best ICT tools in education and understand that ICT has altered students' outlooks and enabled them to take charge of their own learning outcomes and experiences. The enormous advances in ICT make us look closely at ourselves and ask, "What do we want the students we are teaching to accomplish in the time we have with them? How do we want the rest of the world to see our classrooms?" Responsible educators can no longer ignore the effects of ICT in general and streaming media in particular on the thinking, teaching, learning, and leading processes in education. The literature has demonstrated the various ways that online streaming media can be used in education to achieve its potential effectively and efficiently.

Streaming media technology demonstrates the power of using online digital educational/instructional videos in education. Streaming media facilitates deeper learning by providing the necessary knowledge (i.e., information, competencies, skills, values, trends, and experiences) in a way that teachers and students both can understand and enjoy. It inspires imagination as well. Albert Einstein said many years ago, "Imagination is more important than knowledge... for knowledge is limited to all we know and understand...while imagination embraces the entire world and all there ever will be to know and understand" (Calaprice & Dyson, 2011).

Thus, online streaming media prepare teachers and students for marvelous voyages of imagination and discovery in teaching and learning. No school can afford to be without this tool, which is a gateway to a new world of educational possibilities. Educators eager to leverage its potential should note the following recommendations:

Upper-level managers and decision makers in the Ministry of Education (MOE) and Ministry of Higher Education (MOHE) should invest in online digital educational videos and streaming media technology in Kuwait's educational institutions. Based on the literature reviewed in this study, a blended strategy (i.e., a combination of various

strategies described in the scientific literature) of ICT intervention is strongly recommended to support on-site, off-site, and cross-site teaching and learning opportunities.

Video-linked lectures (i.e., ICT facilitation strategy using video-conferencing and video lecture archiving systems) should be adopted nationally. Professional instructors who can bring diverse expertise and experience to teaching and learning are encouraged to be part of the initiative.

To fully achieve the beneficial aspects of implementing streaming media in education, as noted in the studies, it is highly recommended that both commercial Web-based digital video services providers and free Web-based digital video content providers be used. Both short educational videos (i.e., learning segments or objects that can easily be synthesized to create meaningful learning experiences) and long videos (to support and facilitate deeper understanding of the content) should be used.

Ensure that learners' streaming media usage experiences are protected with acceptable-use policies (AUPs) and in-school monitoring techniques.

Additional qualitative studies should be performed to investigate more effective ICT facilitation of streaming media. The investigator triangulation method is recommended for quality assurance of the procedure and to verify and validate qualitative studies by exploring a research question from multiple perspectives. Validity in qualitative research signifies whether the results are accurate and reliable: accurate in the sense that research findings truly reflect the situation, and reliable in the sense that the results are supported by the evidence (Creswell, 2012; Guion, Diehl, & McDonald, 2011; Lapan, Quartaroli, & Reimer, 2012; Marshall & Rossman, 2011; Patton, 2002; Rossman & Rallis, 2012).

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