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Educational Technology Skills and Use in Afghanistan: A Study of Faculty in a 2-Year Institute

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Abstract— Technology development in Afghanistan is explored, setting a context for a more in-depth analysis of how such development translates into higher education generally and into a 2-year institute in Kabul, specifically. Ways in which faculty use educational technology for instruction are examined along with their perceived level of comfort and access to technology and other factors. Results show the need for improved computer infrastructure and technology training programs along with focused attention to using technology for creating more student-centered instruction. Implications of these results for developing countries and post conflict zones are emphasized.

Keywords— Afghanistan, technology, educational technology, higher education, instructional technology, information technology

I. INTRODUCTION

The government of Afghanistan is promoting the establishment and expansion of technical, vocational, and 2-year tertiary education. Technical and vocational education uses the abbreviation TVET. The World Bank, UNESCO, and other world aid agencies are promoting TVET schools in the country. In 2001, around 1500 male students were attending 38 semi-functioning TVET schools. Today, 20,524 students (15 percent female) are attending 61 TVET schools and institutes (Roof, 2015). In 2009, the government reported that 61 vocational schools were active in 30 provinces. These schools and specialized institutes are part of the overall vision of higher education in Afghanistan.

The National Institute of Management and Administration (NIMA) is one such specialized institute in Kabul, Afghanistan. Established 25 March 2006, NIMA is a 2-year institute providing diplomas in three areas: Accounting, Information and Communications Technologies (ICT), and Management. NIMA diplomas are comparable to level 5 of the European Qualification Framework (EQF), the Higher National Diploma (HND) in the United Kingdom, or the associate's degree granted by junior colleges and technical institutes in the United States. NIMA was established as a model for 2-year education tertiary education, as no such form of education existed in Afghanistan prior to 2006. The primary purpose of these schools is to provide graduates with important, immediately employable skills for the workforce.

In August 2013 the authors of this study began working on a consulting project with the Afghanistan Ministry of Education. The initial aims of the project included strengthening the three academic programs, providing quality assurance, certifying students as completing an academic program that meets international standards, and assisting NIMA in obtaining accreditation from the Accreditation Council for Business Schools and Programs (ACBSP). The primary goals were carried out through a through a partnership with the Deputy Minister of Technical and Vocational Education and Training (DMTVET) of the Ministry of Education and the World Bank. An expectation of the partners, in order to strengthen the academic programs, emphasized moving from teacher-centered to student-centered instruction and teaching technology. This expectation was driven by the notion that dramatic change is needed in the education system in order for Afghanistan to catch up with international norms and to become a more fully-developed nation, and that technology can contribute significantly to such dramatic change (Baha and Diakoumi, 2010).

II. PERSPECTIVES ON TECHNOLOGY IN AFGHANISTAN

In Education in a Digital World: Global Perspectives on Technology and Education, Selwyn (2013) links the use of technologies to information societies and knowledge economies. Technology, he stresses, "is not a single entity, but a diverse array of technological devices and technologically-based activities and practices" (p. 5). For example, such devices range from smartphones, tablets, and computers used by individuals to Smart Boards and online courses used by educational institutions. How technologies are used and how they impact information and economies are contextual, shaped by the decisions, policies, and practices of nations. Technology is a means for individuals to change their context and to reposition themselves outside their cultural traditions. The significance of this capacity, in the framework of international research, has been noted by other researchers (Oord, 2013, pp. 30-31).

The following section provides a brief discussion of how technology development has played out in Afghanistan.

III. TELECOMMUNICATIONS

In 1990, an estimated 30,000 functioning telephone lines in a country the size of Texas were in operation (Ulda&Marjan, 2006). However, by 2001 there were only 20,000 telephone lines - primarily connected to phone booths in large cities. Afghan-American entrepreneur Ehsan Bayat established the Afghan Wireless Communication Company (AWCC) a month following the Bonn agreement (Ulda&Marjan, 2006, p. 20). Today, cell towers are being built and installed around the country. However, the influence of warlords has stymied growth in telecommunications. The AWCC has suffered from both overselling phones with the infrastructure to support them and poor connections. The Ministry of Education reports that, "All education departments in the capital and provinces, 20 percent of district education offices, and 15 percent of educational institutes have been equipped with telephones. Around 40 percent of the central departments in the capital and provinces, but none of the district departments and educational institutes, are equipped with a computer and printer (Wardak, 2011, p. 26).

Afghanistan's major diaspora caused a significant demand for communication (Ulda&Marjan, 2006). However, the country is still struggling to develop an infrastructure for information and communication. Although the government and a number of NGOs are investing resources and making a concerted effort a number of challenges still exist. This is especially true in more rural areas of Afghanistan, but also in the most urban areas such as Kabul. As one researcher notes,

Although Kabul has as many as four telekiosks, housed in post offices and equipped with new computer terminals and internet access, as well as internet cafes, Afghanistan is overall on the negative side of the digital divide - a situation in which people are unable to access information and communication technologies (ICT) with sufficient regularity or ease, or are unable to access it at all. By and large the Internet, banned by the Taliban, is still unavailable, except to UN agencies, NGOs and a few ministries. Afghanistan faces basic problems: low levels of education, poor technology infrastructures, and a lack of sufficient disposable income among even a few. Use of the Internet requires a rather complex set of skills and technology. At the very least, one must have electricity, a communications line, a terminal capable of interacting across the communications lines, and (in most cases) a reasonable fluency in English. Eighty percent of the material on the World Wide Web is written in English. All these factors contribute to the digital divide. (Riphenburg, 2006, p. 511)

One area where NGOs and government are seeking to overcome the digital divide is within the country's universities. The government and NGOs have information technology literacy as a key competency for University graduates. The World Bank, for example, declared that learning about modern technology such as information technology is essential for graduates of higher education (Aturupane, 2013, p. E2). In addition, there is a hope that universities in Afghanistan will connect globally to various information systems (Aturupane, 2013, p. 31).

IV. INFORMATION AND COMMUNICATIONS TECHNOLOGY AND INTERNET ACCESS

Information and Communications Technology (ICT) and Internet access is currently relatively low in Afghanistan. However, there is optimism among policymakers that this will change in time. Higher education policymakers are being urged by the World Bank to quickly increase expenditures in universities to improve computer access and infrastructure, including wireless networks and Internet access with the intention of building human capital, or aligning college graduates with the emerging employment market in Afghanistan (Aturupane, 2013, p. 31).

While the government tends to support information technology publicly, there is significant resistance to open Internet access. As with many predominantly Muslim countries, much of the Internet deemed to be inappropriate is blocked. Furthermore, the governments tends to limit Internet access out of a fear that the Internet will facilitate communication among subversive social organizations and individuals (Riphenburg, 2006, p. 512).

In the education realm, Internet access has predominantly been supplied by NGOs. For example, LAN (local area network) and VSAT (very small aperture terminal, or Internet provided through satellite terminals) provide the Internet for the journalism Lab at Khost University (Wentz, Kramer, & Starr, 2008, p. 25). At Kabul University, NATO's "Virtual Silk Highway" project provides affordable high-speed Internet access to staff and students. The campus is wired with a fiber optic network, and NATO-provided satellite access to the Internet (Wentz et al., 2008, p. 25). However, the majority of universities have inconsistent power and Internet access for their computer labs. As of 2010, roughly 50% of provincial education offices reportedly had access to the Internet (Education, 2010).

V. TECHNOLOGY, DEMOCRACY, AND SOCIAL REFORM

As research has shown, it is essential to understand the social, cultural, political and ideological context of higher education (Tate, 2012). In the South Asian area technological disparities began growing in the 1990s (Akhtar & Gregson, 2001). This had a dramatic impact on universities and faculty research. For example, there were no science literature research papers presented by Afghan professors between 1990 and 1994.

Some researchers believe that information technology can help overcome economic and social problems. They advocate for governments to eliminate the barriers and increase the access and use of information technology (Aydin, McIsaac, & Johari, 2004). Sharif Fayez, Afghanistan's former Minister of Higher Education stated in 2004, "The U.S. government must demonstrate that it is really committed to promoting democracy, knowledge, and technology" (Chuang, 2004, p. 33).

Researchers have found through social media tracking in Afghanistan and Nigeria that information and communication technology can be utilized to respond to conflict stressed environments and the peculiarities of peace building (Best, 2013, p. 32). However, there is also debate regarding the extent to which ICT can play a role in the socioeconomic development in low-income countries (Best et al., 2007).

VI. TECHNOLOGY AND PEDAGOGY

The World Bank is supporting new pedagogical approaches that are learner-centered and interactive within the country. The overuse of teacher-centered curricula is well documented in Afghanistan (Aturupane, 2013; Roof, 2015). This includes small group instruction, with small classrooms. In addition, the World Bank is attempting to encourage the widespread use of technology, including multimedia projectors and equipment to enhance lectures and classroom spaces. The Bank has also emphasized technological learning spaces and the infrastructure necessary to support modern technologies. In Afghanistan, these include such basic items as adequate electricity and a consistent power supply (Aturupane, 2013, p. 33).

The World Bank has established a goal of continuing staff development, noting its importance in strengthening the quality of academic work and the importance of training in the use of technology in instruction. It is also suggesting the need for staff development centers in universities for training in the use of instructional technology (Aturupane, 2013, p. 27)

Afghanistan has been inspired to change its pedagogical approach by the successes of other dominantly Muslim countries, such as Turkey. This includes the incorporation of non-Islamic subjects, such as information communication technology (Wardak, 2011, p. 77). According to government policy documents, ICT departments are expected to,

(a) conduct research on the successful experiences of other countries in the use of ICT in the education system; (b) identify the ICT needs of program and administrative departments including computer systems (software), ICT equipment, and training needs of staff; (c) provide technical assistance to and supervision of the procurement of ICT equipment and its optimal use; (d) provide ICT infrastructure and equipment for all departments and offices in the center and provinces; (e) train ministry staff at the central, provincial, and district levels to use ICT effectively; (f) develop and implement a maintenance and support system for ICT equipment; (g) pilot test educational laptops for use in improving classroom teaching and learning achievements of grade 4 through 6 students; and (h) maintain the Ministry of Education's website to provide public information (Wardak, 2011, p. 106).

Internal Ministry of Education policy documents indicate they are working to develop a National Centre for science and technology education with mini satellites in every province (Samady, 2013, p. 5). The center will be located in Kabul and will potentially be funded by China (Wardak, 2011, p. 92). As of 2014, however, the National Centre has not been built. In addition, The Ministry of Education is in the process of developing new curricula for computer technology (Wardak, 2011, p. 96) and is seeking ways to assess and evaluate technology teaching (Wardak, 2011, p. 92). Some curricula revision has occurred, however very little updated curricula has been implemented in Afghan universities (Roof, 2015, pp. 85-86).

To develop a strategic vision for education revival and development in Afghanistan, President Karsai and the Transitional Government developed The Independent High Commission of Education for Afghanistan. The Commission's Report advocated consistency between general and vocational curriculum development, and advocated for the teaching of science and technology:

The general education curriculum should reflect national history and culture, values, and traditions. It should also be based on international scientific principles, norms and standards. The teaching of science and technology is essential for modern education, and for a better quality of life and economic development. The content and methods of formal education should be adapted to the needs of children and their environment. They should be developed in co-operation with communities, enterprises, businesses and industry (Georgescu, 2007, p. 439).

Various researchers have stressed the interplay among primary components of learning environments, which mainly include content, pedagogy, and technology in Afghanistan (Mishra & Koehler, 2006). From the authors' observations in the country, the teaching of science and technology is taking place, but is often removed from the environment and not in cooperation with communities, enterprises, business and industry.

VII. TEACHER TRAINING

Training teachers on how to utilize technology is essential to long-term success. Teachers need well-equipped facilities, ongoing technical support, and practice to implement what they have learned during training (Kandari, 2014). Kandari's research in Kuwait, for example, revealed the following barriers in the implementation of technology among teachers: time, training, and resources. He noted that teachers who lack adequate training underutilize ICT resources, while those who utilize computer resources use them primarily for printing test sheets and student handouts.

Teacher training in Afghanistan is being modeled from other systems utilized in developing countries (Islam & Anwar, 2012). One of the major problems for educators in developing countries is access to appropriate hardware and software, and the inadequacy of computer training (Kandari, 2014). Kandari (2013) indicated that in Kuwait computer courses for education majors are generally limited and, for example, science teachers were found to have only two credit hours of course work in the area of computer literacy. In these classes aspiring teachers learned only basic computing skills relating to word processors, spreadsheets, and presentations.

Several models have been developed to integrate ICT into classrooms. "These models stress the importance of trained personnel, sufficient time, the implementation process, and access to appropriate information, skills, and attitudes" (Kandari, 2013, p. 3) and require "a positive attitude toward ICT [for] successful implementation of technology in the classroom" (Kandari, 2013, p. 14). He goes on to point out that "some researchers, however, have documented change resistance among university faculty that impedes the implementation of ICT integration" (Kandari, 2013, p. 5).

Research from Kuwait indicates that among aspiring teachers 96% of survey respondents own a laptop or have a computer at home, with 92% indicating Internet access at home. Furthermore, roughly 58% indicated access to a

computer at college, with 55% indicating access to the Internet at college. Among pre-service teachers in Kuwait, roughly 98.4% indicated they did not take an educational computer course provided by the educational technology department at their college (Kandari, 2013, p. 10).

Among survey respondents in Kuwait, aspiring teachers indicated the belief that computers will increase productivity, can help change their school, and will have a positive impact on their society (Kandari, 2013, p. 10). However, these survey respondents also indicated a relevant amount of anxiety and avoidance related to computers (Kandari, 2013, p. 10).

Overall, research from Kuwait indicated that aspiring teachers are not fully prepared to integrate ICT within their teaching. Researchers found that education graduates lack the proper training necessary to adapt and implement new technologies in their teaching and learning (Kandari, 2013, p. 15).

VIII. ICT TRAINING

An important reason that ICT has not been integrated into the curriculum lies in the fact that extensive, substantive training has not occurred. Acknowledging this fact, the Afghanistan Ministry of Communications has outlined policy recommendations and networking academies to give students and teachers the capacity to design, build, and maintain computer networks as early as 2003 (Information and Communication Technologies (ICT) Policy, 2003: 24). The government even considered developing mobile units that would consist of buses fitted as training centers (Information and Communication Technologies (ICT) Policy, 2003: 23). The government wanted to expose students in remote locations to technology. Over the past 12 years approaches to remote access have included Mobile Internet Units. i.e., buses equipped with computers and Internet access that visit schools and networking academies that give teachers and students the skills to help develop computer networks, and distance education that includes online courses (Information and Communication Technologies (ICT) Policy, 2003: 24). However, the buses were never utilized because of security issues in the provinces. Today, the Afghan government still advocates training to improve ICT applications and management (Roof, 2015). Public/private partnerships have enabled ICT investments and growth in Afghanistan (Wentz et al., 2008, p. 39).

International agencies, in coordination with the Ministry of Education, have stressed the development of proper syllabi in the Afghan education system (Georgescu, 2007, pp. 442-443). One of the primary areas identified for new syllabi development is in the area of technology/ICT. Reports by UNESCO and other agencies indicate that syllabi bring significant improvements to the subject areas.

Developing ICT skills earlier has been urged, noting "greater effort . . . to incorporate technology and secondary curricula" (Georgescu, 2007, p. 439) given that "ICT has not been incorporated within the public school system in Afghanistan" (Baha &Diakoumi, 2010, p. 8). Citizenship education has been identified as an appropriate place in which to incorporate technology (Geoergescu, 2007). In addition, certification has been proposed as a way to enhance the development of ICT. Currently, there are two labs in Afghanistan that are certified as Cisco Networking Academies with plans to increase the number of these. Despite these advances, ICT-education in Afghanistan is often fragmented and not well coordinated (Wentz et al., 2008, p. 41).

IX. ICT CURRICULA

The government of Afghanistan is recommending ICT curricula for secondary and tertiary level education. This includes courses in computer science, multimedia, communications, and engineering. As early as 2003 the Ministry of Education began seeking to develop teacher-training courses and train the trainer models for ICT related subjects. Some improvement has occurred, but teachers in higher education are still undereducated and lack adequate training (Roof, 2015, p. 83).

X. THE COMMUNITY COLLEGE SYSTEM IN AFGHANISTAN

Afghanistan has developed a network of community colleges across the country (Aturupane, 2013) with the "hope . . . that research and development will accelerate economic development of Afghanistan" (Samady, 2007, p. 63). These formal and non-formal programs, as well as specialized institutes, are adding to the improvement and vision of higher education. As part of this initiative the government is trying to promote the establishment and expansion of technical, vocational, and 2-year tertiary education. The Ministry of Education, as opposed to the Ministry of Higher Education, oversees technical and vocational tertiary education. Technical and vocational education uses the abbreviation TVET. The World Bank, UNESCO, and other world aid agencies are promoting TVET schools in the country. In 2001, around 1500 male students were attending 38 semi-functioning TVET schools. Today, 20,524 students (15 percent female) are attending 61 TVET schools and institutes. In 2009, the government reported that 61 vocational schools were active in 30 provinces. A new curriculum is being developed. However, TVET can absorb only 2 percent of general school grade 9 graduates. Female enrollment is low. There are no TVET schools at the district level. A lack of school buildings and workshops persists. Due to the importance of technical and vocational education for the country, the Technical and Vocational Education Department was upgraded to the level of Deputy Minister in the new Tashkeel (Wardak, 2011, p. 22).

XI. THE NATIONAL INSTITUTE OF MANAGEMENT AND ADMINISTRATION

One such Institute – the National Institute of Management and Administration (NIMA) –served as the sample for our study. NIMA was established in Kabul in 2008 under the Afghanistan Skills Development Program (ASDP). Located in

the western part of the city at Qala-e-Ali Mardan three buildings comprise the campus. Program areas included accounting, information technology, and management. One or more faculty assigned to these program areas also taught English. A director or Senior Faculty member headed each area. There were 10 faculty in accounting, 10 in information technology, and 13 in management. All but one of the regular faculty were Pakistani, a faculty member in accounting was from India. Only 1 of the faculty was Afghan, and an estimated 7 Afghan faculty were in training. The number of Afghans in training was difficult to determine, because some had not been to NIMA for some time, so it was not possible to know if they were actually working in the program.

Junior and Senior faculty at the Institute are required to have a Master's degree in relevant fields, though a PhD is preferred. Teachers are required to have at least five years of teaching experience in a relevant field and fluency in the English language. Faculty is also expected to have experience and basic abilities using basic project management tools and software applications, such as MS Office.

XII. METHODS

An exploratory mixed methods research design was used. Data were collected from multiple sources, including focus groups, classroom observations, semi-structured interviews, and a technology survey of faculty technology skills and use.

Focus Groups

The focus group has been found to be an efficient, productive way to obtain information and insights that cannot as readily be garnered from an individual (Morgan, 1993). It is used not only to obtain data, but also to encourage group interaction that produces the information (Krueger, 2008). An outgrowth of the focus group is the development of themes and patterns of perception (Morgan, 1993).

Given the utility of this approach, four faculty focus groups with a total of 21 faculty – 5 ICT, 5 accounting, 7 management, and 4 English – were held in 2013 11-15 September. To provide a convenient time and location, each focus group was held in a NIMA classroom for one hour both in the morning and in the afternoon with chairs arranged in a circle. Two to four team members sat in on each focus group and, on occasion, asked an extended question to explore a topic further, while one of the authors served as moderator.

The moderator posed 10 questions, composed through consensus with the research team and reflecting the different aspects to be studied by team members, covering what it was like to be a NIMA faculty member in terms of personal benefits and challenges; the nature of facilities, curriculum, instruction, and professional development; and whatever else the faculty wished to share. While a pre-determined set of questions had been formulated for the focus group, it is important to note that this was simply a guide for discussion. Participants influenced the direction in which the conversation moved.

However, it is also important to note that the moderator intervened and encouraged a more detailed, descriptive conversation, when responses were too brief or lacked detail. Follow-up, probing, specifying, and direct questions, as recommended by Kvale and Brinkmann (2009) were used when necessary.

Of the 10 questions asked, five of them elicited comments related to technology:

Q2: What are the challenges of being a NIMA faculty member?

Q5: If you could change something at NIMA, other than curriculum, what would it be?

Q8: Describe the most common instructional methods used.

Q9: What types of professional development activities are provided? How satisfied are you with them?

Q10: Are there any other comments you would like to make?

The moderator followed guidelines described by Kamerelis and Dimitriadis (2013) to make sure that sufficient time was provided to allow each participant to respond to the questions, encourage and discuss possible competing points of view, honor follow-up questions so that a deeper understanding might be possible, and respect all views.

Following introductions of participants in a focus group, including the moderator and other team members present, the moderator described his role and shared the following guidelines:

1. There are no right or wrong answers.
2. One person speaks at a time.
3. Participants must wait for a response from at least one other participant before commenting on the topic.
4. Listen respectfully.
5. Agree to disagree.
6. Talk to members of the focus group, not the moderator or assistant.

Interaction and discussion during the focus group was transcribed by one of the research team members who served as a recorder. The recorder later shared the notes with the moderator who prepared a final copy for use.

Classroom Observations

Observations of classroom instruction were undertaken in order to have a more specific understanding of the extent to which faculty used student-centered approaches and taught with technology. In contrast to focus groups, observations have been shown to be an effective method to obtain a more explicit, richer, and realistic description of a phenomenon (Creswell, 2007), in this case, faculty performance. In an initial set of observations in 2013, from 17 September to 1 February, three Ball State University team members and in a second set of observations in 2014 from 15 August 15 to 30

September0, two team members used a 17-item structured observation instrument to rate the performance of faculty on a 5-point Likert scale (5 = strongly agree, 1 = strongly disagree). Content knowledge, level and quality of interaction with students, instructional delivery, and communication were areas assessed. In addition, space for diagramming the organization of the classroom and the spatial relationship and interaction of faculty to students was provided along with space for brief field notes – a strategy recommended by Seyfarth (2006). At the end, a summary page was available for writing notes related to the following questions: (1) What were the major strengths observed? (2) What suggestions for improvement can be made? The initial team visited 27 faculty in their classrooms for approximately 30 minutes each. The second team visited 24 faculty for approximately 30 minutes each.

Survey of Technology Use and Skills

As a follow-up to the focus groups and the observations, a survey of technology use and skills was administered to 27 NIMA faculty. Fifteen instructors (13 males and 2 females) completed the online survey and two (1 male and 1 female) participated in the interview. Self-completed questionnaires have shown to be an effective method of collecting data in an international context (Wilkins, 2013, p. 37).

The survey was developed to determine the extent that faculty used student-centered approaches and taught with technology. The survey included general technology use information (ownership of computers, computer and Internet access), attitudes and beliefs towards technology (degree of agreement on a scale of 1–5), and proficiency and interest in learning technologies (proficiency on a scale of 1–5). The qualitative data from interviews included faculty opinions about technology integration into their classrooms. Sample questions included: What are your experiences with using technology? What is your opinion about technology integration in your classrooms?

The quantitative data were analyzed using frequency analysis and descriptive analysis. Qualitative data obtained from the interviews were analyzed using Miles and Huberman's (1994) constant comparison approach. First, we coded the data by segmenting and assigning labels to the text passages. Then we categorized similar codes and developed themes. Once we had coded all of the transcripts, we then re-analyzed each category to determine the relationships among the codes and to identify the themes to gain further insights into the results. Results for each of the methods employed are presented in the following section.

XIII. RESULTS

Focus Group

Focus group discussions regarding technology focused largely on infrastructure and software needs. Dependable access to the Internet in the classroom was one issue, as electricity was unpredictable. At the same time, faculty expressed concern about making out-of-class assignments with the Internet, since the number of students who had access was largely unknown, but surmised to be fairly small. Thus, the faculty felt there might be inequities. Similarly, they complained about the inability to predict the availability of projectors in the classroom. Faculty said the projectors might not have power two to three hours at a time. In terms of software, faculty expressed a desire to have an electronic attendance system, such as PowerSchool, to help them track students over time and to save time at the beginning of class. They expressed interest in digital library access for research and developments in their fields of teaching and in the latest and licensed instructional support software packages in the content areas that they taught. They strongly asked that pirated packages no longer be purchased since they only lasted for a short time and were often susceptible to or carriers of viruses. The faculty also indicated that time for professional development was not provided. Yet, they felt strongly that they would commit to training in a variety of web technologies, if given time.

Observations

The observations of classes being taught in Afghanistan reveal teacher-driven lecture oriented classrooms, as well as problems with educational technology. For example, in one observed classroom the instructor's lesson plan indicated that most of the lesson would be "student-centered" but the instructor lectured throughout the entire class time. The authors' time in Afghanistan reveal that many instructors have difficulty understanding the concept of student-centered learning, and how to properly design student-centered learning activities. In observed classrooms there were often problems with LCD projectors and classrooms, often making applications like PowerPoint challenging. Nevertheless, PowerPoint is prevalent in Afghanistan, and used in many classrooms. It is common for instructors to use quizzes and exams as their primary forms of assessment. Instructors in Afghanistan often underused questioning techniques, and/or brainstorming activities. Instructors do not use group work very often, as well.

During an additional session of teacher observations in 2014 the most-often mentioned suggestion was giving learners pre-classroom reading materials – seven observers specifically noted that preparation materials for students would be helpful in beginning the classroom lesson. Allowing individual student practice time as well as small group (two to three learners) practice ran a close second to pre-class preparation. Six different observers noted practice time in class as very important but lacking in these observations. Four observers highlighted the fact that not all students participated in open discussion – they suggest the instructor call upon these non-participating learners to improve learning and interaction. The observations revealed noted 'good' use of student-center activities; they also suggested that uneven distribution of learners across groups was ineffectual. In other words, students needed to be placed in a set number of groupings as opposed to lumped randomly together. Once again, these observers note that small groups (two to three learners) would be more effective for all student participation. A number of the observations noted that lecture time was too long. Although the lesson plan called for shorter lecture times, the instructor went well over the allotted

time in several instances. Observers suggest shortening lecture time to include more student participation/questions/practice. Most observers noted a need for pairing weaker students with stronger students to facilitate further instruction. Two observers noted that instructors either spoke too fast or became difficult to understand at various times during instruction. This also included not demanding that learners speak one-at-a-time or instructors 'speaking over' learners. More than one observer suggested that instructors learn student names to facilitate a more comfortable classroom environment and enhance participation.

The majority of the suggestions revolved around promoting individual student participation – interaction, practice time, and individual and small group discussion were strategies noted by the majority of observers. Very few noted difficulty with the actual classroom environment. There was a room change for one class and hardware problems in another so both of those observers noted difficulty with equipment and/or the classroom itself. One observer noted that software-licensing agreements expired during student practice periods.

In Afghanistan the authors observed under resourced computer labs and outdated unlicensed software. The outdated unlicensed software makes it difficult for students to be adequately prepared to properly use the software. Most schools, including universities in Afghanistan, lack air-conditioning and heating. This makes the environment very challenging in the colder parts of winter in the warmer parts of summer. The authors observed computer lab sessions that were not conducted due to overwhelmingly hot conditions. In addition, it was common to observe computer lab sessions where several computers were not working. Students often have to work together in large groups on one single computer. The authors also observed expired licenses on software that restricted practice among students.

These conditions notwithstanding, ICT is one of the few areas where students do have practice before entering the workforce. Universities in Afghanistan are working on redeveloping their computer labs and technology resources for students.

The authors observed that although most instruction is commonly teacher-centered and lecture oriented, instructors are attempting to integrate new approaches to teaching and learning in their classrooms. One example would be the integration of case studies in business and accounting.

Technology Access

All (100%) the faculty surveyed reported that they have access to computers at home and most (87%) have computer access at work. Many (60%) faculty members reported having Internet service at home. The majority (77%) of faculty reported a computer being available and convenient for use at work. Also, some faculty reporting a lack of Internet access might be referring to the limited and generally unreliable Internet service in Afghanistan. It is not uncommon for the Internet to be unavailable for extended periods of time. In addition, the government of Afghanistan restricts many websites they consider to be inappropriate.

Some faculty members (15%) reported that the computers are not available to them at work and only a few (8%) reported that a computer is available, but not convenient. This would be consistent with what the author's observations in Afghanistan. If a faculty member does not own a personal computer, it is unlikely that one is made available consistently.

Time Spent on Computers and Internet

The majority (87%) of faculty reported using a computer and Internet for more than four hours on a daily basis. The faculty used the Internet for a broad range of activities. The entire faculty spends the most time every day using a computer for teaching activities and sending emails; 93% search work-related information and communications activities, 87% read news about the world, and 67% perform social networking.

Strong Beliefs and Interests

Participants were asked to rate their degree of agreement on a series of statements about beliefs related to technology use (see Table 1). In general, faculty reported strong positive beliefs about technology. All faculty (100%) agreed or strongly agreed they will be better educators when they use technology in their work, they are more effective when they utilize technology, and technology can help them teach better and improve student–teacher interaction. In addition, the faculty reported a strong interest in technology. All participants agreed or strongly agreed with the statements that "I am interested in using computers and Web-based technologies" and "I am interested in learning technologies that will help me better."

Table 1: Beliefs about technology use (n=27)

	Strongly Agree/ Agree	Neutral	Strongly Disagree/Disagree
I will be a better educator when I use technology for my work	100%	0%	0%
Teachers are more effective when they use technologies	100%	0%	0%
Technologies can help my students learn better	92%	8%	0%
Technologies can help me teach better	100%	0%	0%
Technologies can improve student–teacher interaction	100%	0%	0%
Technologies can improve student-student interaction	92%	8%	0%
I am interested in learning technologies that will help me teach	100%	0%	0%
I am interested in using computers and Web-based technologies	100%	0%	0%

High Confidence in Use and Low Confidence to Facilitate Student Learning

All faculty participants reported confident in their capacity to use technology to teach. However, their confidence was low with their ability to facilitate student learning. In addition, all survey participants indicated a high level of confidence in using technology to teach; to teaching students how to locate, retrieve, and retain content related information from a range of technologies; and using technology to perform administrative tasks such as taking attendance, maintaining grade books, and facilitating communication. However, a few (13%) of the participants reported they disagree or strongly disagree with the statement, "I am confident in planning and implementing instruction that allows students to use technology in problem-solving and decision-making."

Table 2: Faculty confidence in using technology (n=27)

	Strongly Agree/ Agree	Neutral	Strongly Disagree/Disagree
I am confident in using technology to teach	100%	0%	0%
I am confident in using technology to facilitate student learning	87%	13%	0%
I am confident in teaching students how to locate, retrieve, and retain content-related information	100%	0%	0%
I am confident in using technology tools to perform administrative tasks such as taking attendance, maintaining grade books, and facilitating communication	100%	0%	0%
I am confident in planning and implementing instruction that allows students to use technology in problem-solving and decision-making	87%	0%	13%
I am confident in solving computer problems when my computer doesn't work	40%	0%	60%

XIV. CONCLUSIONS AND IMPLICATIONS

Learner-centered pedagogical approaches and use of technology to enhance classroom instruction in Afghanistan are strongly supported by the World Bank. Developing countries often have added challenges of a lack of infrastructure and technical support. The Afghan faculty have strong beliefs and interest yet moderate confidence in technology use for facilitating student-centered learning. The results provide evidence that the faculty strongly believe in the potential of technology to help teaching and learning. Although they reported to be confident in integrating technology, they reported low confidence in solving computer problems. The faculty use computers and Internet extensively; however, their use is mainly focused on sending emails, searching for information, and communications activities. While most of the classrooms are teacher-driven lecture oriented, faculty indicated interest in learning technologies to improve their teachings in the future. The findings from this study suggest that technology preparation training should be available to the faculty in Afghanistan to promote student-centered learning. Baha and Diakoumi (2010) suggested that to achieve the potential of technologies in education, it is essential that Afghan faculty be trained to meet the needs of the 21st century learning. More emphasis upon ICT capacity building is needed, including establishment of educational institutions, training facilities, and increased capabilities. San Diego State University faculty identified capacity building as a primary issue in its work at Nangarhar University in its partnership, Strengthening Higher Education Program (SHEP), developed through the Afghanistan Ministry of Higher Education and the World Bank (Aturupane, 2013).

There is a high level of demand around the world for competent faculty and leadership in the areas of management and instruction (Roberts & Mancuso, 2014). With international faculty a gap in culture and learning styles can appear (Lemke-Westcott & Johnson, 2013). In addition, research indicates that not all international teachers make explicit connections between their growing intercultural understanding and their professional practice (Savva, 2013).

Technology professional development in Afghanistan should be focused on a variety of technologies that can be used to support student-centered learning. As noted, our research indicates that teachers in the country are not adequately prepared for student-centered learning or technology integration in their teaching. For example, professional development around using technology for constructivist learning and teaching can help Afghan faculty to think more about how technology may promote their teaching objectives (MacKinnon & MacKinnon, 2013). More knowledge and experiences with using technology during technology training will help them understand that technology can be used for inquiry and construction of knowledge. Therefore, build stronger confidence in using technology in their classrooms. Moreover, it is important to help instructors make meaningful connections between technology and teaching. As pointed out by Mishra and Kolher (2006), educators need to develop a sound understanding of the technology, subject matter, pedagogy, and how these work together. Hence, the faculty should be taught how to make connections among the technology, content, and pedagogy.

This study contributes to the extremely limited body of knowledge related to the educational technology skills and uses in Afghanistan. Additionally, ways in which faculty use educational technology for instruction along with their perceived level of comfort and access to technology. Such findings enhance the development of a technology-training program for moving toward a more student-centered approach to instruction and more effective use of technology for instruction.

XV. LIMITATIONS AND FUTURE DIRECTIONS

The research presented here is somewhat limited by the number of surveys. Future research on technology in higher education in Afghanistan should include more widespread assessment of stakeholders, including interviews and surveys.

Currently, this type of research is limited because of the security situation and various logistical constraints. For example, Internet access is intermittent and most universities in Afghanistan currently lack email systems making the electronic surveys nearly impossible. However, schools are currently working on developing these systems and as they develop email distribution more surveys should be administered. Secondary sources are often slightly dated, due to the gap in research conducted during the Taliban control of the country. It is incumbent upon researchers to rebuild this knowledge base. Future research might also compare Afghanistan with other countries, especially those that have dealt with underdeveloped technology infrastructures in higher education and taken successful measures to address the associated challenges. Another area for cross-national comparisons would be with countries that have sought to promote student-centered pedagogy through technology in higher education.

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