Integration of ICT in the Teaching and Learning Processes in Afghan Public Universities: A Case Study of Kabul Polytechnic University

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Abstract— *Information and communication technology (ICT) has influenced numerous parts of our lives and has become a need for the accomplishment of any organization, such as educational organizations. To provide quality education and to make students prepared for life in the 21st century, countries around the world have made tremendous efforts to integrate ICT into the teaching and learning processes. However, integration of ICT into teaching and learning with the aim to improve the quality of education is not an easy task. Successful integration of ICT requires higher education institutions to firstly assess the current state of ICT as well as the challenges that hamper the process of ICT integration into teaching and learning to determine how better to plan and integrate ICT into the teaching and learning processes.*

This paper aims to examine the current state of ICT integration in Afghan public universities. This involved determining the accessibility of ICT facilities for teachers and students, the level of ICT resources utilization for teaching and learning purposes, and the competency level of teachers and students regarding ICT. The challenges to the integration of ICT in Afghan public universities were also analyzed. The researchers selected Kabul Polytechnic University as a case study area. Both qualitative and quantitative research methods were used and the data was collected from administrators, teachers, and students using questionnaires and structured interviews. The result of the study shows that the accessibility to ICT resources for teachers was on an average level, but for the students the level was low. The findings also indicate that the usage of ICT resources for teaching and learning purposes was at a minimum level and their knowledge about ICT was at a fundamental or basic level. The result also indicates the challenges that hamper the process of ICT integration into teaching and learning interaction in the case study area, for example, lack of infrastructure, lack of stable power supply, lack of technical support, teachers 'negative attitude towards ICT and faculty lack of time.

Keywords— *ICT, ICT integration in higher education in Afghanistan, ICT integration challenges in Afghan public universities.*

I. INTRODUCTION

Today Information and Communication Technology (ICT) is a common term in our lives. The ICT usage is observed in many fields such as banking, medicine, and engineering [1].

ICT can also be an effective educational technology tool as Yelland [2] argued that without the use of new technologies provided by ICT, an educational organization could not claim that their students are prepared for life in the 21st century. ICT has the ability to bring changes in teaching and learning processes, increase the quality of education, and enhance learning environment [3]. The integration of ICT in education can change the teaching and learning paradigm from teacher-cantered learning to learner-cantered learning and facilitate as well the problem-based learning approach providing incentives for students to seek new knowledge and skills and do collaborative works in order to solve a problem structured by teachers. Thus, offering a quality education implies providing students with sufficient ICT knowledge and skills. This not only in the near future can play a vital role in supporting economic growth, but can also provide social and political growth [4]. Therefore, the integration of ICT into teaching and learning must be the main concern of governments.

The Afghanistan government also realized the importance of ICT in education as in the draft ICT policy for Afghanistan the government of Afghanistan remarks the importance of ICT in education and indicates that ICT competency is necessary for students to enter into the global economy of the 21st century [5], [6]. The document states that the government will provide sufficient ICT resources and training to support teaching and learning, but according to [7], the integration of ICT to support teaching and learning is rarely seen in higher education in Afghanistan.

This study seeks to assess the current state of ICT integration in teaching and learning, and then enumerates possible challenges that prevent the effective integration of ICT into higher education in Afghan public universities.

II. LITERATURE REVIEW

Today ICT has multiplied to all parts of the world. This multiplication has influenced all aspects of life including higher education. In many developed as well as some developing countries ICT is right now determinedly highlighted in education for teaching and learning. ICT has great impact on increasing the capacity as well as quality of education [8]. ICT can provide great opportunity for lecturers as well as for students to have access to a rich library of information free of charge via internet [9]. Keeping in mind the end goal to get ready future eras to live in a developing society, which is and will be exceedingly technology oriented, they should be aught suitably as per the necessities of the information age. Unfortunately, the higher education system of Afghanistan is less influenced by ICT as three decades of war and instabilities have had much negative effects on the selection of ICT in instruction and the advancement of ICT in education. But after the Taliban regime was overthrown and the Transitional Islamic Republic of Afghanistan was

established, the government found the opportunity to get benefit from international community's support in order to rebuild the higher education infrastructure and to provide ICT facilities for higher education institutions of the country. Since 2002, a substantial progress had been made in the area of IT infrastructure, IT education and IT management [10]. Some examples are:

1. AFGREN (AFGHAN RESEARCH AND EDUCATIONAL NETWORK): This program is supported by the Ministry of Higher Education and is one of the key instructional projects of MoHE which was launched in 2006 and is still in continuation [11]. The main focus of this program is to provide network infrastructure and high-speed internet connectivity for the MoHE, the Afghan universities and other academic institutions.
2. CISCO NETWORK ACADEMY PROGRAM (CNAP): This program was launched by UNDP in 2002 in Kabul through a partnership between UNDP, Cisco Systems, MCIT, and the International Telecommunication Union (Mikawa, 2006). The aim of this program was to build capacities and train skilled individuals in the areas of information technology, network security and networking/hardware.
3. AFGHAN E-QUALITY ALLIANCES (AEQA): This project was the USAID-founded project of Washington State University launched in 2006. The aim of this program was to build Afghans' capacity in higher education and provide equal access to quality education, e-education resources for university lecturers and students [12].

Besides these achievements, the integration of ICT to support teaching and learning activities is rarely seen in higher education of Afghanistan and the government still fails to give adequate environment for the advancement of ICT and utilization of ICT tools in the field of instruction in higher education in Afghan public universities [7].

A. Challenges of ICT Integration in Higher Education

Integration of ICT into education gives incredible chance to developing countries to enhance their educating and learning processes, but successful integration of ICT into the teaching and learning is a complex process and can face a range of challenges [13]. The followings are some common challenges that hinder the process of ICT integration in higher education.

Lack of infrastructure

ICT infrastructures are defined as a set of hardware, software and network connectivity [14]. ICT infrastructures are the pillars of ICT implementation in education. The successful use of ICT would require the accessibility of ICT resources, proper maintenance of these resources and availability of a solid power supply. In addition, ICT integration into education requires up-to-date hardware and software as well as high speed network connectivity which is unfortunately very poor here in Afghanistan.

Lack of funds

Lack of funds is another barrier for ICT integration in education. Viable integration of technology into education frameworks needs significant funding, that is hard to oversee in developing nations such as Afghanistan, where numerous individuals are living beneath the worldwide neediness line. Productive and successful utilization of technologies relies upon the accessibility of ICT assets, such as hardware and software and the value of access to assets by instructors, understudies, and regulatory staff [15]. These expenses are as a rule expanded and cannot be given by most developing nations like Afghanistan.

Lack of training

Another variable which restricted the use of ICT in education is absence of learners; and instructors; knowledge with regard to the utilization of ICT and absence of ability on ICT apparatuses and software in educating and learning. The accomplishment of instructive developments relies upon the abilities and knowledge of instructors [16]. Therefore, teachers' absence of capacities and competence regarding ICTs is the fundamental boundary for ICT integration into education. Twinomujuni and Kampala [17] state that ICT capabilities are essential for educators to make pedagogical utilization of ICT for instructing across the curriculum.

Professional development and training are required as a solution for effective ICT implementation as Malcolm and Godwyll [18] State that the absence of professional development programs and trainings for instructors to upgrade their abilities on emerging technologies are blocking the way to ICT integration. Therefore, necessary trainings should be provided for educators to build their ICT competency, particularly, in Afghanistan where the capability of lecturers regarding ICT usage is in a very poor condition.

Having fundamental ICT competency is likewise essential for students. Despite all these, teachers may have sufficient ICT knowledge, but with absence of students' ICT competency integration of ICT into educating would not be operative [19].

In addition to students and lecturers, having ICT competency is likewise vital for administrators and lack of ICT capability of administrators also affects ICT integration into education. For viable and sustainable ICT adaption, administrators themselves must be skilful in the utilization of ICT technologies, and they should have a wide understanding of the specialized, pedagogical, managerial, money related, and social measurements of ICTs in instruction [20].

Lack of time

Lack of time is another obstacle that hinder successful integration of ICT in education.

Instructors need time to figure out how to utilize hardware and software, time to plan, time to team up with different educators and time to develop and incorporate technology into their educational modules [3]. The bustling timetable of the majority of the instructors in Afghanistan made them not give much time to consolidate technology in teaching learning circumstances.

Lack of teacher's awareness and attitude towards ICTs

A lack of educator's mindfulness about how ICT advantages them with regard to their teaching and lack of satisfactory ICT abilities created negative mentality towards ICT integration into teaching and learning. According to [21] one key area of educator demeanour towards the utilization of ICT is their comprehension of how these innovations will advantage their instructing and their understudy learning.

Instructors' low competency level as to ICT makes negative mentality towards ICTs implementation in education. As Mondo [4] state that instructors may not be willing to utilize ICT assets in class since they do not know how to utilize them and students, then again may have a tendency to incline towards the traditional teaching methods, due to their lack of awareness of the power of ICT in learning. Additionally, a lack of awareness on the benefits provided by ICT and lack of ICT skills and knowledge other factors likewise cause teachers' negative attitude towards ICT, such as the lack of technical support, poor internet connectivity, lack of accessibility of required ICT assets needed for their lessons.

Almadhour [22] states that; in order to provide quality education, instructors must have faith in ICT as a profitable instructive apparatus, make a pledge to enhancing their ICT abilities, and coordinate ICT into their consistent educating hone. Therefore, instructors should be encouraged to utilize ICT on their consistent practices through rewards and should make them mindful of the benefits of ICT incorporation in their lessons, furthermore, standard and proficient trainings should be launched for them with a specific end goal to expand their ICT competency that straightforwardly impacts their confidentiality level through ICT usage.

Lack of technical support

Lack of qualified technical staff to maintain ICT facilities and to provide technical support for students and lecturers in class is considered another factor that influences ICT integration into education. Twinomujuni, and Kampala [17] viewed technical support as one of the facilitating conditions that can influence computer usage. Lack of technical support is one of the components that makes both instructors and learners exhausted about the utilization of ICT technologies in educating and learning. Therefore, sufficient technical support is necessary for integrating ICT into education.

III. RESERCH QUESTIONS

This study includes four main research questions. The first research question aims to understand "What are the levels of availability and accessibility of ICT resources to support teaching and learning in afghan public universities?"; The second research question aims to define "What are the competency levels of students and lecturers with regard to ICT usage in teaching and learning in Afghan public universities?"; The third question aims to reveal that "What are the levels of ICT usage in teaching and learning in Afghan public universities?"; And the fourth research question aims to find "What are the challenges affecting integration of ICT into teaching and learning in Afghan public universities?".

IV. RESERCH METHODOLOGY

This study used a case study approach and both qualitative and quantitative methods were used for data collection and analysis. The choice of using a mixed method approach for data collection and analysis was to help better understand the research problem and also it creates a balance between strengths and weaknesses of both methods [23].

The quantitative elements of this study were designed based on using questionnaires as main tools and the qualitative elements of this research were based mainly on interviews. The researchers used questionnaires as a major source for data collection as it is an easy and cost-effective way of collecting data from a large number of population [23]. For increasing the reliability of the study results, the researchers also used interviews for some important research questions.

In order to assess the current state of ICT as well as to find the challenges that hinder the process of ICT integration in teaching/learning in higher education in Afghan public universities the researcher selected Kabul Polytechnic University as a case study area. The total population that was considered for this study includes 150 participants, which consists of 100 students, 40 teachers and 10 administrators from different faculties of Kabul Polytechnic University. The primary data was collected by distributing questionnaires to students, lecturers and administrators from different faculties of Kabul Polytechnic University. The purpose of these questionnaires was to assess the current state of ICT and find the challenges of integrating ICT in teaching and learning processes in higher education in the case study area. Questionnaires mostly include close-ended questions such as Yes/No questions and multiple-choice questions in the form of 6 to 7 Likert scale.

Before the distribution of questionnaires, the researcher did pilot study by sharing the questionnaires with some students and lecturers with the goal to check the understandability of the questionnaires, as Walliman and Buckler [24] suggests that: "the best method of pilot is to test the questionnaire with persons who have relative expertise in the field to anticipate any issues or sources of confusion".

After deploying the pilot study, the researchers applied some minor corrections and distributed the questioners physically. Questionnaires were distributed randomly to 100 students from different faculties in their classes, while teachers and administrators received questionnaires in their offices. After a week, the researchers gathered the filled questionnaires back from the participants. The position of the researchers as lecturers at Kabul Polytechnic University caused to get a good response rate from the target population, particularly, from lecturers and administrators as shown in the Table I. The gathered questionnaires were analyzed by researchers using Microsoft Excel.

TABLE I. Participation in Questionnaires.

Sample	Number of distributed questionnaires	Number of returned questionnaires	Percentage of returned questionnaires
Administrators	10	10	100%
Teachers	40	35	87%
Students	100	78	78%

In order to increase the reliability of data gathered from the questionnaires, the researcher also interviewed 8 students, 4 lecturers and 3 administrators from different faculties.

V.　Findings ane Discussion

This research aimed at clarifying availability of ICT resources for teachers and students to support teaching and learning, the competency level of ICT both of teachers and students, the usage level of ICT resource to support teaching and learning as well as the challenges that hamper the process of ICT integration in teaching and learning in higher education in afghan public universities and the researchers considered Kabul Polytechnic University as a case study area. In this study, data was collected from both qualitative and quantitative methods point towards similar conclusions. Here we discussed the study findings in order to answer the research questions.

A.　Accessibility to ICT Resources

Based on the results of the survey and the interviews conducted with the administrators about the availability of ICT resources for teachers and students, we found that there is a lack of computer availability for both teachers and students as 40% of the administrators acknowledged that they had computers available for teachers and only 20% of them acknowledged that they had computers available for their students at the university. With regard to the internet connection availability for students and teachers, the majority of the administrators acknowledged that they had internet connection available for teachers at the university, while only 30% of the administrators provided their positive answers about the availability of internet connection for students. The result of the survey and the interview conducted with the administrators also revealed that ICT resources such as printer, multimedia projector, photocopier machine, LCD and scanner were highly available for teachers, while only multimedia projector as well as LCDs were available for students at the university.

The result of the survey as well as interview conducted with teachers about the accessibility of ICT resources revealed that some hardware resources such as printers, photocopier machines, LCDs, multimedia projectors and scanners were highly accessible to teachers, while teachers had limited access to some other hardware resources such as computer, CDs/DVDs and digital camera at the university. From the result of the survey we also found that teachers had limited access to software resources as only 51.4% of them acknowledged that they had access to MS office package, 45.7% acknowledged that they had access to email services, 14.3% indicated that they had access to e-journals, 25.7% showed that they had access to softwares for video conferencing and none of them had access to e-leaning platforms. Findings also explores that all the lectures had access to the internet connection, but none of them showed their satisfaction with the available internet connection speed.

Findings from the result of the survey and interviews conducted with the students about the accessibility of ICT resources explores low level of accessibility of ICT resources

for students. As 26.9% of the students showed that they had access to computers and only 39.7% indicated that they had access to the internet connection, but with the very low speed at the university. Additionally, the majority of the students indicated that they had limited or even no access to some other hardware resources such as printer, scanner, digital camera, etc. students access with regard to the software resources were also very limited as only 48.7% of them showed that they had MS office package, 23.1% showed that they had access to email services, 2.6% indicated that they had access to softwares for video conferencing and none of them had access to e-journals and e-leaning platforms at the university.
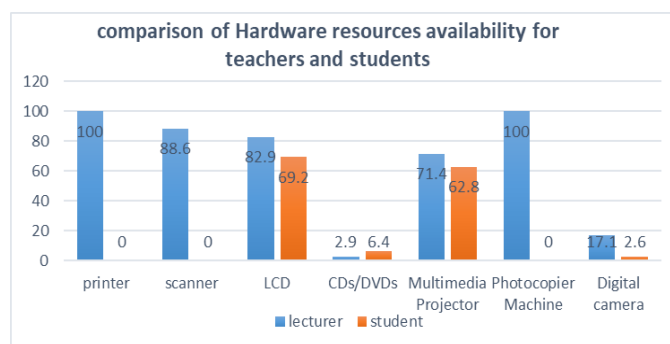

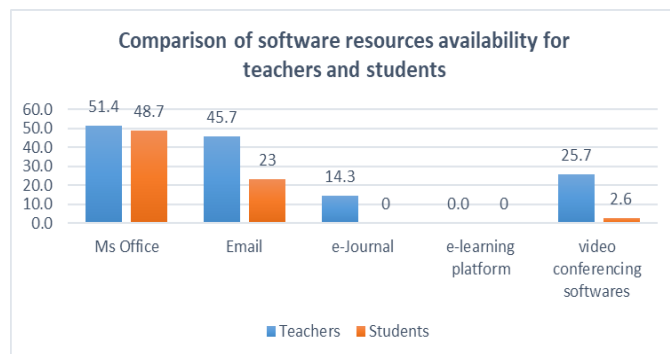Fig. 1. Comparison of hardware resources availability for teachers and students.

Fig. 2. Comparison of software resources availability for teachers and students.

B.　ICT Skills and Knowledge

From interviews and survey results, we found that the majority of teachers and students have the ability to employ ICT in teaching and learning at the fundamental level. According to the findings, both teachers and students were enough competent on basic computer skills such as loading softwares, saving files, printing files, etc. But they are technically not good in solving common hardware and software problems. As most of the students and teachers indicated that they did not know or fairly knew how to solve common hardware and software problems. Thus, provision of training as well as technical support is necessary for them to use ICT in the class.

The result also revealed that both teachers and students were good enough in using applications, such as Word processing, Excel and PowerPoint and also they were on an average degree good in using internet. Teachers and students were also asked about their ability to use email and they

indicated that most of them knew well how to use email. Knowledge about the pedagogical use of ICT is also essential for teachers to integrate ICT into teaching. Teachers' responses showed a lack of knowledge about the pedagogical use of ICT, as 60% of them indicated that they fairly knew, while 20% of them responded that they even did not know how to use ICT in the pedagogy.

Apart from this, they were also asked for the type of training which they attended to improve their ICT skills and the result clarify lack of training for both teachers and students as only 52.6% of the students and 37.1% of the lecturers indicated that they have attended training on basic ICT skills. The majority of the teachers and students described that they did not have attended training on how to use internet to support the teaching and learning activities.

About the pedagogical use of ICT, teachers' responses showed that no one attended training in this regard. Therefore, for the effective integration of ICT into teaching and learning interactions the university should provide training for both teachers and students to help them increase their ICT capacity.
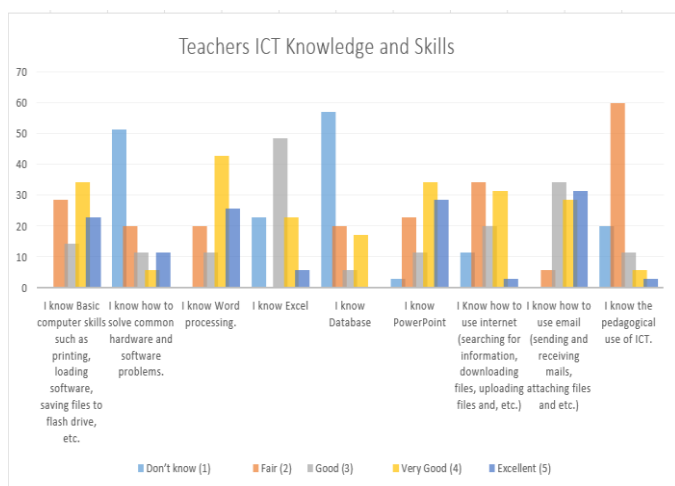

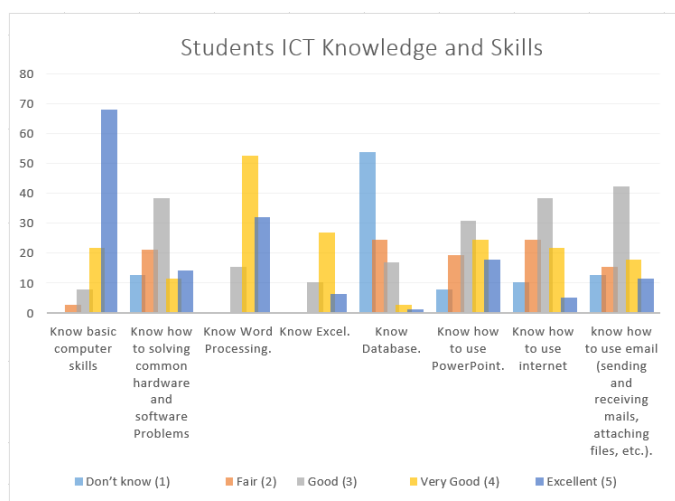Fig. 3. Teachers ICT knowledge and skills.

Fig. 4. Students ICT knowledge and skills.

C. Extent of ICT Resources Utilization for Teaching and Learning Purposes

The result of the survey as well as the interviews conducted with faculty members revealed that the extent of ICT resources utilization in teaching and learning interaction at the selected institution was relatively low.

The result showed that the usage of computer and its application such as PowerPoint and Spreadsheet, usage of search engine for searching learning materials and usage of email for communication with other students and lecturers among students were on an average degree, while usage of Word processing is quite high, as 23.1% of students indicated that they sometimes used Word processing, 38.5% showed that they often used and 14.1% responded that they very often used the mentioned application.

The findings also revealed that the majority of the students never used e-Journals and email for the purpose of receiving the assignments given by teachers and online forum for communication and informal discussion on course topics with teachers and other students.

According to the findings, usage of computer and its application such as spreadsheet and PowerPoint, usage of search engines, usage of email for the purpose to communicate with other lecturers and students and to send assignments to students, and usage of multimedia projector or LCD for delivering lecturers in the class was relatively low among teachers. It is also notable form the result that teachers never used online forum for communication and informal discussion on course topics with students at the selected institution, the only application which was used to a high extent among teachers was Word processing.

As teachers' attitude towards ICT has a direct impact on the usage of ICT in teaching/learning processes, thus, we also assessed teachers' attitude towards ICT and we found that the majority of the lecturers at the selected university did not have so positive attitudes towards ICT which is really a weak point for ICT integration into teaching/learning processes.

D. ICT Integration Challenges

From the survey result, we found that Lack of adequate ICT resources, lack of technical support, lack of infrastructure, lack of ICT knowledge, lack of training and teachers' negative attitude towards ICT are the most important challenges on the way of ICT integration into teaching and learning. Lack of time, Lack of orientation on how to Integrate ICT into the educational program, lack of stable power supply, lack of policy, and lack of teachers' confidence and lack of students' motivation are secondly the most important challenges that hamper the process of ICT integration into teaching and learning at the selected institution.

The results of the interviews also support the results of the survey, as most of the interviewees pointed at the challenges mentioned in the survey form, the interviewees also pointed to some additional challenges which have not been mentioned in the survey, such as lack of rewards, lack of content in the local language, lack of pedagogical support and lack of financial support for maintenance.

During the interviews, in addition to asking the target population about the ICT integration challenges, we also asked the interviewees to provide their views on how to enable successful integration of ICT into teaching and learning processes at their university and they provided suggestions saying that the government should provide adequate ICT facilities and should give us financial support for maintenance, internet facilities should be improved, appropriate training should be provided to both teachers and students to enable them use ICT in teaching/learning interactions, the university should provide rewards for lecturers to encourage them to use ICT in the class, the administrators should force teachers to use available ICT resources in the classes, the university should provide technical as well as pedagogical support for teachers, while using ICT in the class.
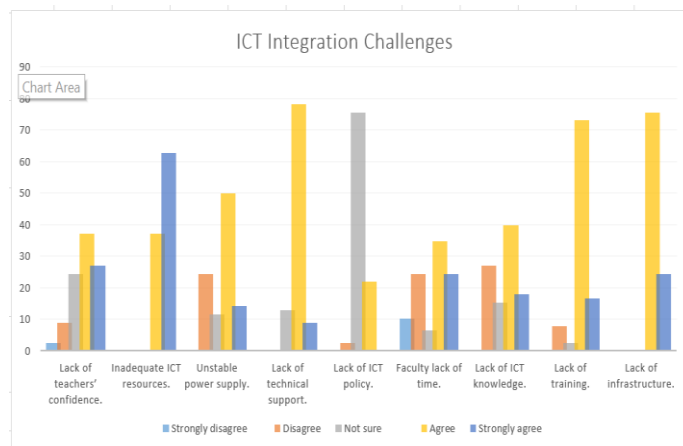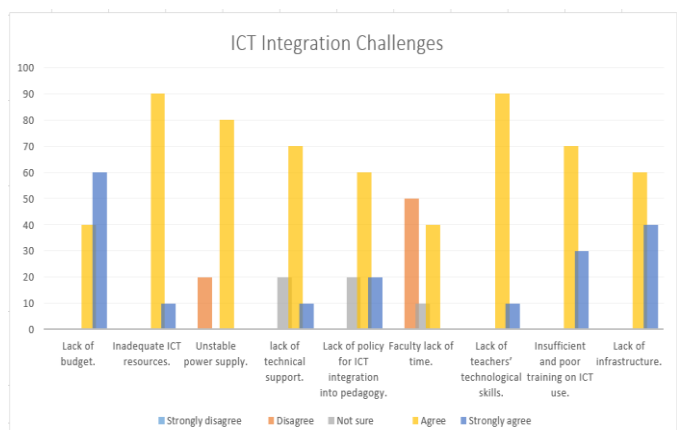

Fig. 5. Administrators' responses about the challenges that hinder the process of ICT integration into teaching and learning.

Fig. 6. Teachers' responses about the challenges that hinder the process of ICT integration into teaching and learning.
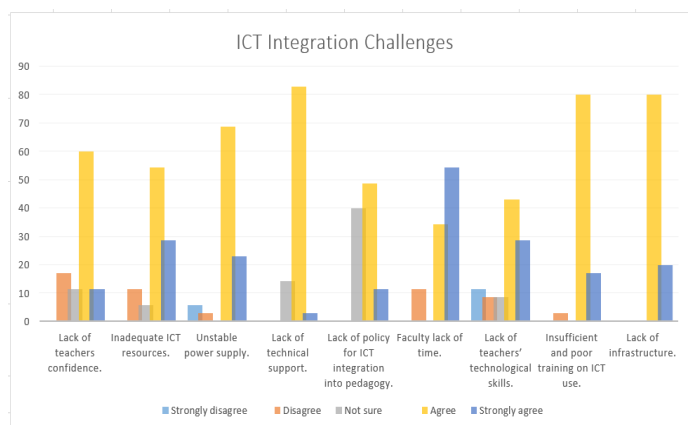

Fig. 7. Students' responses about the challenges that hinder the process of ICT integration into teaching and learning.

VI. CONCLUSION

In this study we analyzed the current state of ICT from different perspectives and aspects, such as the accessibility of students and professors to ICT resources, the competency level of the students and the professors regarding ICT, the current usage level of ICT in teaching and learning processes as well as the existing challenges on the way of ICT integration.

The findings of the research indicated low accessibility of ICT resources for students, while the teachers had access to ICT resources on an average level, as their accessibility to some ICT resources, such as printer, photocopier machine, and the scanner was high, while their access to some other ICT resources was limited.

The findings also revealed that the usage of ICT for the purposes of teaching and learning among students and professors was at a minimal level. Moreover, both the students' and professors' knowledge about ICT was at a basic level, as most of them acknowledged that they knew enough about the basic computer skills, such as loading softwares, printing, saving files to drives and using some MS Office applications.

The study also revealed the challenges that hinder the ICT integration into the educational system at public universities in Afghanistan, such as: a lack of infrastructure, lack of knowledge, lack of trainings, lack of time, lack of policy, lack of teachers' self-confidence, etc.

Findings of this study will help people involved in planning, designing, and implementing ICT in the process of teaching and learning in higher education in how to better plan and integrate ICT in the teaching and learning processes in Afghan public universities.

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