



Integrating Technology Into Instruction At A Public University In Kyrgyzstan: Barriers And Enablers

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The purpose of this study was to determine enablers and barriers to the technology integration into education based on the example of the situation at the Kyrgyz-Turkish Manas University as reported by students and instructors. The study employed the mixed-methods research design, combining data obtained from 477 student and 57 instructor questionnaires supplemented by interviews with 11 students and 9 instructors. The study revealed that although technology is being used at the universities all over the country, there still exists the lack of both hardware and software laboratories and the instructors have limited knowledge and experience with technology, which, in its turn, indicates the shortage of qualified technical personnel. The cost of personal computers and problems with the Internet connection were claimed to be the major barriers for students.

Keywords: Information and Communication Technology (ICT), technology integration, barriers, enablers, Kyrgyzstan

INTRODUCTION

In view of technological developments, Information and Communication Technologies (ICT) are becoming more popular, and educational policy makers tend to make great investments in order to integrate ICT into the teaching and learning processes. By investing in technology, educational policy makers expect its use to benefit both instructors and students and, consequently, to increase the quality of education. However, there are a number of factors preventing the use of technology in education, such as lack of training, time, equipment and materials (Beggs, 2000; Newhouse, 1999; Ertmer, 1999; Bingimlas, 2009; Touray, Salminen & Mursu, 2013; Mtebe & Raisamo, 2014; Porter & Graham, 2015; Tarus, Gichoya & Muumbo, 2015; Hossain et al. 2016).

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Studies on the use of ICT in education conducted in developing countries show that the major barriers are: lack of hardware, lack of technical support (Goktas, 2004; Al Senaidi, 2009; Keengwe et al. 2008; Mtebe & Raisamo, 2014; Helm, 2015; Porter & Graham, 2015; Gupte, 2015; Al Gamdi & Samarji, 2016), lack of in-service training on ICT (Willis, Thompson & Sadera, 1999; Shrum, 1999; Goktas, 2004; Muhametjanova & Çagiltay, 2012), inadequate repertoire of knowledge and skills for the integration of ICT into instruction, lack of basic knowledge-skills (Goktas, 2004; Pelgrum, 2001; Ihmeideh, 2009; Ssekakubo et al. 2011, Hossain et al. 2016; Muhametjanova & Çagiltay, 2012; Tarus, Gichoya & Muumbo, 2015), mismatch between ICT and existing curricula and teachers' low level of access to computers (Albirini, 2006; Al Gamdi & Samarji, 2016), lack of time (Al Senaidi, 2009; Albirini, 2006, Helm, 2015).

Kyrgyzstan is a developing country, with a population of 5.582 million (2012) and the total expenditure on education reaching 19.3 billion KGS (390 293 225 USD), and on higher educational institutions-2.9 billion (58 645 096 USD), which accounted for 15% of GDP in 2011. Kyrgyzstan significantly increased its expenditure on education from 3.9% of GDP in 2001 and 5% in 2005 to 6.5% in 2007 (Tempus Report, 2012).

Although according to the Program of International Student Assessment (PISA) report for 2006 and 2009 there is a significant increase in the expenditure on education, Kyrgyzstan is ranked last in the Program of International Student Assessment. The number of computers at schools is very low, and the use of ICT is limited to the teaching of informatics and computer skills. Some of the reasons are a lack of adequate financial resources allocated from school budgets, and lack of technical access to the Internet (Asian Development Bank, 2012).

Based on the findings of a study conducted by Akin (2013) on computer and internet usage in higher education at a Kyrgyz University and having university students as the main participants, 53% of the students do not have personal computers at home. 74% of the students not having a computer at home stated that it is too expensive to buy one. 74% of the students having a computer at home do not have the Internet access, and 62% of them stated that the cost of the Internet connection is too high.

Although it is now commonly accepted that "ICT can act as a tremendous facilitator of the speed with which knowledge is developed...ICT can assume such a role as a result of its ability to package and move around information within the factories of meaning and between them" (UNESCO, 2005, p 49), only a few research studies focused on assessing the general level of ICT use in Higher education in Kyrgyzstan and on discovering the level of ICT use by instructors and students.

The present study was conducted at the Kyrgyz-Turkish Manas University, which was established in 1995. It is a public university with 2 official languages of instruction: Kyrgyz and Turkish. There are 8 faculties at the university (Faculty of

State of the literature

- Faculty members perceived lack of hardware, lack of appropriate software and instructional materials, lack of out-of-class computer access for students, lack of technical support, lack of in-service training on ICT, inadequate repertoire of knowledge and skills for the integration of ICT-assisted instruction, and lack of basic knowledge-skills as major barriers.
- Faculty members have positive attitudes toward ICT and its role in higher education.
- There is a need of National Policy for ICT use in Higher Education, cultural obstacles should be taken into consideration.

Contribution of this paper to the literature

- ICT plays an important role to move to a Knowledge Society. Kyrgyzstan is a developing country, and there is still much to be done in order to enable such a transformation. The number of computers and Internet users at schools is still low in Kyrgyzstan.
- Only a few research studies focused on assessing the level of ICT use in Higher education in Kyrgyzstan and on discovering the level of ICT use by instructors and students.
- This is a pioneering study to gain insight into the current situation of ICT use at universities in Kyrgyzstan.

Education, Faculty of Engineering, Faculty of Economics and Administrative Sciences, Faculty of Communications, Faculty of Agriculture, Faculty of Science, Faculty of Arts, and Veterinary Faculty) and 6 higher vocational schools (School of Foreign Languages, Tourism and Hotel, Conservatory, Physical Education and Sports, and Vocational School). At the beginning of 2013-2014 academic year there were a total of 4481 students enrolled in different faculties and high schools (Manas University, 2013). The total number of instructors is 526, of which 133 are coming from Turkey, 245 are from Kyrgyzstan, and 4 are from other countries (Manas University Report, 2011).

Kyrgyz-Turkish Manas University has the following technological infrastructure: in the 2010-2013 period, 370 personal computers, 37 notebooks, 40 printers and 49 projectors were purchased. Furthermore, 9 existing laboratories were improved, and 29 new laboratories were established (Manas University, 2013). However, even with a clearly-defined technological infrastructure, it is not possible to determine to what extent various types of technology are integrated into the process of instruction, how they are used by instructors and students, and what specific obstacles preventing the efficient and effective use of technology exist.

BACKGROUND INFORMATION

Barriers and enablers of ICT integration in higher education

According to Ertmer (2001) there are external and internal barriers to ICT integration. Lack of equipment, unreliability of equipment, lack of technical support and other resource-related issues represent external barriers, whereas organizational culture, teacher-level factors, their beliefs about teaching and openness to change are the internal barriers to ICT integration (Ertmer, 2001).

Other studies (Beggs, 2000; Newhouse, 1999; Larson, 2003; Al Senaidi, 2009) reported the lack of training, lack of time, and lack of equipment to be the barriers to technology integration. Some faculties are reported to be unable to make appropriate use of technology in their own classrooms and unwilling to try to do so because of such factors as anxiety, lack of interest, and lack of motivation. In a study conducted by Cuban (2001) at Stanford University, the major reported barriers were lack of time and lack of technical support. Nicolle (2005) revealed that faculty members' attitudes and motivation toward ICT and instructional change play an important role in how they integrate ICT into education.

Studies conducted in developing countries on use of ICT in education

Goktas (2004) conducted a study aimed at identifying faculty members' ICT competencies, barriers and possible enablers of ICT in Turkey. The results indicated that faculty members perceived lack of hardware, lack of appropriate software and instructional materials, lack of out-of-class computer access for students, lack of technical support, lack of in-service training on ICT, inadequate repertoire of knowledge and skills for the integration of ICT-assisted instruction, and lack of basic knowledge-skills as major barriers.

Furthermore, another study was conducted by Albirini (2006) to investigate teachers' attitudes toward ICT and the relationship of the attitudes to a set of variables in a large Syrian province. The results indicated that teachers had positive attitudes toward ICT, and there was a positive correlation between their attitudes toward ICT and their perceptions of computer attributes. As for the teachers' perceptions of the barriers to technology integration, there was a mismatch between ICT and the existing curricula, lack of time, low level of access to computers.

Vajargah, Jahani and Azadmanesh (2010) conducted a survey research to measure scope of ICT use in an Iranian University. 231 University academics,

curriculum planners and ICT professionals participated in the study. The results show that the lack of National Policy for ICT use in Higher Education, lack of adequate investments, cultural obstacles, financial challenges, lack of training were the main barriers to ICT use.

In addition, Shaikh and Khoja (2011) conducted a Delphi study to examine the problems faced by the Pakistani Higher Education System in integration of ICT in Pakistan. According to the results, inadequate technological infrastructure, lack of staff skills and training, lack of ICT competencies among support staff were the major challenges to integration of ICT in higher education.

In summary, the following major barriers to the use and integration of computer technology in the classroom were identified: lack of time, lack of funding, lack of computers and relevant quality software, technical problems, teachers' attitudes toward computers, lack of teacher confidence, and resistance to change, poor administrative support and poor training. This information will help in identifying the existing barriers and enablers to technology integration at Manas University and exploring the reasons behind the problem and possible ways to overcome the specified barriers.

Gap in the literature

ICT plays an important role in transition from an Information Society to a Knowledge Society. As mentioned earlier, Kyrgyzstan is a developing country, and there is still much to be done in order to enable its transformation to a Knowledge Society. Furthermore, as the literature review shows, there are only a few studies conducted on the use of ICT in higher education. The number of computers at schools is still low, so is the number of computer and Internet users in Kyrgyzstan.

While the literature shows a number of studies on the use of ICT and its possible barriers, no research has been conducted to gain insight into the current situation of ICT use at universities in Kyrgyzstan. This gap in the literature on the use of ICT is rather notable since ICT offer a great potential to enhance teaching and learning if used appropriately (Cuban, 2001). Meanwhile, according to the studies mentioned above, there are a number of barriers preventing effective integration of technology into instruction, such as lack of time, lack of equipment, and lack of training.

Research questions

The main research questions of this study are presented below:

1. What are the barriers to technology integration into instruction at Manas University?
2. What are the enablers of technology integration into instruction at Manas University?
3. What are the perceived ICT and Computer competencies of instructors and students?
4. To what extent do instructors and students use ICT in education?

METHODOLOGY

A mixed-methods research design was used as a design methodology for this study in order to answer the research questions specified above. The mixed-methods research paradigm allows for acquiring more detailed information by using both quantitative and qualitative data collection techniques and for presenting more complementary data on the topic under investigation. Quantitative data were collected and analyzed following the collection of quantitative data, and qualitative interview guidelines were created on the basis of the quantitative data results. After the implementation of the qualitative interviews, the data were analyzed to help explain quantitative results.

Participants of the study

Prior to collecting real data, a pilot study was conducted in order to check the content validity of the developed instruments. The data were collected from 61 undergraduate students in the Engineering Department (30 males and 31 females), and 11 instructors (6 males, and 5 females) in the spring semester of 2009-2010 academic year.

The main study was divided into two phases: Phase 1 - quantitative data collection, and Phase 2-qualitative data collection.

At the quantitative data collection phase, 477 students (208 males and 269 females) and 57 instructors (35 males and 22 females) agreed to participate. For the students, random sampling technique was used representing each faculty. Questionnaires for instructors were, as well, distributed using random sampling.

For qualitative data collection the following selection conditions were followed:

- 9 instructors were selected based on the criteria of having at least 3 years of teaching experience
- 11 students were selected based on the criteria of being at least a 4th year student or an MS student, as well as being previously enrolled in undergraduate programs at Manas University

Both instructors and students were selected using purposeful sampling to provide more in-depth information about the topic of research.

Quantitative data collection

Both students and instructors had an option to choose the language of the questionnaire: Turkish or Russian. Due to the fact that not all instructors are fluent in the Turkish language, they were provided with the opportunity of completing the questionnaire in Russian. In contrast, all students were expected to be fluent in the Turkish language, since limited Turkish proficient ones had to attend the language preparatory school before joining the mainstream classes.

RESULTS

Demographic information on instructors

57 instructors, out of which 35 were males and 22 were females, participated in this study. Most of the participants were research assistants (29.8%); the rest of the participants were Dr. Instructors (17.5%), Associate Professors (14%), and instructors (14%). The majority of the instructors were from the Faculty of Economics (35.1%), Communication (28.1%), and Engineering (19.3%). 42.1% of the instructors stated that they had completed in-service training on ICT usage, 57.9% had not received any training. 84.2% responded that they had office computers, and 100% of those had the Internet access. While 87.7% had a computer at home, only 59.6% of them had the Internet access, and 40.4% of the instructors did not have the Internet access at home.

Demographics of students

In total, 477 students, 43.6% males and 56.4% females, participated in the study. The results indicate that the majority of the students were from the department of Economics (42.6%), others were from the departments of Communication (27.7%), Engineering (11.5%), Science (10.5%), and Education (7.8%). 42.8% of the students had a personal computer at home; however, 57.2% did not have one. As shown in Figure 5, 65.7% of the students having a computer at home have the Internet access, and 34.3% do not have the Internet access at home.

Barriers to technology integration into the instruction at Manas University according to the instructors

The first research question in this study was about the barriers to technology integration into instruction according to the instructors and students. The data from both instructors and students were collected through the questionnaire and a series of interviews.

Instructors' perceptions regarding the barriers preventing use of technology in instruction

Table 1 presents the results on the barriers to technology integration from the instructors' point of view. They argued that the most significant barriers to integrating ICT into instruction were "lack of in-service training on ICT" ($M = 3.47$), "inadequate repertoire of knowledge and skills related to the integration of ICT into instruction" ($M = 3.42$), "lack of basic knowledge and skills to use ICT" ($M = 3.39$), "lack of out-of-class computer access for students" ($M = 3.32$), "lack of technical support" ($M = 3.25$), "lack of appropriate software" ($M = 3.21$), and "lack of instructional materials" ($M = 3.18$).

Table 1. Barriers of technology integration according to instructors

Barriers	<i>M</i>	<i>SD</i>
Lack of in-service training on ICT	3.47	.97
Inadequate repertoire of knowledge and skills for the integration of ICT into instruction	3.42	.90
Lack of basic knowledge and skills to use ICT	3.39	1.01
Lack of out-of-class computer access for students	3.32	1.04
Lack of technical support	3.25	.97
Lack of appropriate software	3.21	1.08
Lack of instructional materials	3.18	1.02
Lack of physical environment for integrating ICT in classroom	3.11	.99
Lack of hardware (computer, printer etc.)	3.07	1.19
Inappropriate course content	2.88	.87
Lack of time for integrating ICT in classroom	2.70	.91

Qualitative interview results indicated that the main barrier according to instructors is lack of in-service training. Most of the instructors complained about the lack of training and stated that they would like to attend it and expect the university to provide such training. Furthermore, the instructors complained that, due to absence of training in the workplace, they had to learn certain skills on their own, but they did not have the opportunity to improve those skills because of the lack of time and course overload. In addition, instructors mentioned their inability to integrate ICT in their classrooms due to the lack of time, technical support, and technical personnel.

Another barrier was the shortage of materials for instruction. The instructor participants mentioned this and stated that the lectures are taught in the Kyrgyz and Turkish languages. Instructors from Kyrgyzstan prepare lectures in Kyrgyz, but due to the lack of resources and materials in the Kyrgyz language, both instructors and students are experiencing difficulties. In addition, instructors have to translate the resources from Russian to Kyrgyz, and provide students with resources in Russian, since there are few or no materials in the Kyrgyz language.

Moreover, the instructors stated there was lack of financial support from the university for inviting instructors familiar with the new technology and being able to introduce it to others. The instructors would like to learn from more experienced instructors coming from abroad, and especially from Turkey. They mentioned that the teaching styles suggested by the Kyrgyz education system were very old,

outdated, left from the former Soviet System, whereas instructors from Turkey possessed a completely different teaching approach and were acquainted with a wide range of materials and various resources.

Qualitative interview results indicated a shortage of hardware, such as lack of computer laboratories for students, projectors, printers, and photocopy machines at the university.

Barriers to technology integration according to students

Students were asked to complete a checklist including statements on barriers to technology integration. The most commonly reported barrier to technology integration into education was the high cost of technology (41.7%). Also, 41.3% of the students argued that they do not have the technical support they need, which is another important barrier. 37.1% of the students stated that they experienced problems while connecting to the Internet. The students reported that they did not have enough technical abilities to use computers (35.8 %). 31.7% of the students stated that they experienced problems while connecting to the Internet and the same percent of students mentioned they did not have enough access to computers as a barrier to technology integration (Table 2).

Table 2. Barriers to technology integration into instruction according to students

Barriers	Frequency	Percent
Computers are too expensive	199	41.7%
Do not have technical support they need	197	41.3%
Experiencing problems connecting to the Internet	177	37.1%
Do not have enough technical ability to use computers	171	35.8%
Experiencing problems while connecting to the Internet	151	31.7%
Do not have enough access to computers	151	31.7%
Feel extra responsibility using computers	137	28.7%
No barrier	110	23.1%
Applications do not work on the computer	76	15.9%

Furthermore, they felt they had extra responsibilities not related to the courses when using computers (28.7%). 15.9 % of the students stated that some software programs did not work on their computers. Interestingly, 23.1% of the students reported that there were no barriers to technology integration.

Qualitative data obtained from the interviews with students indicated that the major barriers to technology integration included lack of hardware, such as photocopy machines, printers, and laptops. In addition, the respondents mentioned a shortage of ICT-related knowledge and skills among the faculty members. They complained that instructors did not use computers in teaching; instead, they made a general statement that a computer could be used to present the instructional material. The resistance of elderly instructors to learn how to use ICT appeared to be another barrier. Instructors from the Soviet period are hardly familiar with computers; and, moreover, they resist learning how to integrate computers in their instruction. Lack of technical personnel was another identified barrier; the students complained that they did not have the technical support they needed. The next barrier was the lack of access to computers since most of the students did not have a laptop or a personal computer at home; consequently, they needed to have the opportunity to use computer facilities at the university. The computer laboratories, however, are crowded during the day and closed in the evening, so students experience problems with the general access to computers. Furthermore, during the laboratory working hours there are not enough computers for each student.

Enablers of technology integration into instruction at Manas University

Possible enablers of ICT integration according to instructors

The enablers most strongly agreed upon by the majority of instructors were “In-service training about ICT should be improved in quality and quantity” ($M=3.96$), “More budget funds should be allocated to ICT” ($M=3.91$), “Technology plans for implementing ICT at universities should be prepared” ($M=3.89$), “Specific units and personnel should be allocated to peer support” ($M=3.89$), “Specific units and personnel should be allocated to public use of ICT tools” ($M=3.88$), “The faculty members who integrate ICT in their courses should be supported (e.g. with additional resources, education, etc.)” ($M=3.82$), and “The course content should be redesigned to gain more benefit from ICT” ($M=3.79$). They moderately agreed with the statements that “The faculty members who integrate ICT in their courses should be supported (e.g. with an incentive payment)” ($M=3.58$) and “The course load of the faculty members should be decreased” ($M=3.04$) (Table 3).

Table 3. Enablers of technology integration according to instructors

Enablers	<i>M</i>	<i>SD</i>
More budget should be allocated to ICT	3.91	.85
In-service training on ICT should be improved in quality and quantity	3.96	.92
The course content should be redesigned to gain more benefit from ICT	3.79	.90
Specific units and personnel should be allocated to peer support	3.89	.92
Specific units and personnel should be allocated to public use of ICT tools	3.88	.91
Technology plans for implementing ICT at universities should be prepared	3.89	.79
The course load of the faculty members should be decreased	3.04	1.03
The faculty members who integrate ICT in their courses should be supported (e.g. with additional resources, education etc.)	3.82	.95
The faculty members who integrate ICT in their courses should be supported (e.g. with an incentive payment)	3.58	.94

According to the qualitative interview results, instructors stated that in-service training should be improved in quality and quantity. Furthermore, instructors who integrate technology in their courses should be supported and encouraged. Course content should be redesigned from the old Soviet system to a more modern one in order to benefit from ICT to a greater extent. In addition, course content should be reduced because due to the course overload, instructors do not have any opportunity or time to prepare the electronic materials. The instructors are not motivated to prepare electronic materials because they are not sure they will teach the same course next year. Instructors propose to divide the courses and to set permanent courses to motivate instructors to prepare electronic materials.

Enablers of technology integration according to students

43.4% of the students stated that the most important enabler of technology integration is the fact that technology helped them to improve and enhance their learning. 22% of students noted that technology saved their time, 20% believed that it helped them in the process of planning course activities, and 18% stated that technology gave them comfort in their studies. However, 10% of students thought that technology was not useful at all in education.

As shown in Table 4, enablers most strongly agreed upon by the majority of students were: “Grades should be available online” ($M=3.71$), “More opportunities should be provided for use of technology by students during instruction” ($M=3.66$), “Instructors should be encouraged to use technology during instruction” ($M=3.66$),

Table 4. Enablers of technology integration according to students

Enablers	<i>M</i>	<i>SD</i>
More opportunities should be provided for use of technology by students during instruction	3.66	1.07
Each course should have its own website	3.63	1.11
Instructors should be encouraged to use technology during instruction	3.66	1.02
Instructors should be evaluated on how they use ICT during instruction	3.63	.96
Grades should be available online	3.71	1.09
All courses syllabi should be available online and be updated	3.60	1.03
Courses prepare me for use of technology in a career field	3.65	1.17
Instructors are responsible for the use of technology during instruction for the purpose of communication and explanation	3.57	.99

“Courses prepare me for use of technology in a career field” ($M=3.65$), “Each course should have its own website” ($M=3.63$), “Instructors should be evaluated on how they use ICT during instruction” ($M=3.63$), and less widely agreed upon statements included: “All courses syllabi should be available online and be updated” ($M=3.6$), and “Instructors are responsible for the use of technology during instruction for the purpose of communication and explanation” ($M=3.57$).

DISCUSSION AND CONCLUSIONS

The purpose of this study was to investigate the major barriers and possible enablers of the technology integration into instruction at the Kyrgyz-Turkish Manas University according to instructors and students. The study aimed to explore whether instructors and students use ICT, in what ways and to what extent ICT is used in education, what ICT competencies are required, what perceptions of possible enablers and barriers to the integration of ICT exist, and what students' ideas and beliefs are regarding a modern university organizational structure and the use of ICT by instructors.

The results of the study show that the majority of instructors and students had a positive perception of using ICT during instruction. Instructors wished to integrate technology into instruction, but needed specific training and technical support from the university administration.

The results show that major barriers according to the instructors are:

- Lack of in-service training on ICT
- Lack of computer access for students out of class
- Lack of basic knowledge and skills about ICT
- Lack of technical support
- Lack of appropriate software
- Lack of hardware
- Lack of time for ICT integration in classroom
- Lack of materials for instruction.

The identified barriers are consistent with the findings from the reviewed literature resources, specifically, the studies by Ertmer, 1999, Lee (2000), Goktas (2004), Beggs (2000), Newhouse (1999), Tarus, Gichoya & Muumbo (2015), Helm (2015), Porter & Graham (2015), Gupte (2015), Al Gamdi & Samarji (2016), and Hossain et al. (2016).

Similarly to the present study, lack of training was identified as a major barrier in other investigations conducted by Willis, Thompson & Sadera (1999), Shrum (1999), Goktas (2004), Tarus, Gichoya & Muumbo (2015), Hossain et al. (2016); lack of hardware (Beggs, 2000; Butler & Sellbom, 2002, Hossain et al. 2016); lack of time and lack of technical support (Cuban, 2001; Larson, 2003; Brill and Galloway, 2007, Helm, 2015); lack of software and technical support (Cuban, 2001; Goktas, 2004; Al

Senaidi et al, 2008; Gupte, 2015; Helm, 2015; Porter & Graham, 2015; Al Gamdi & Samarji, 2016). As Cuban stated, technical support and professional development need to be redesigned to make it more “responsive to the organizational incentives and workplace constraints teachers’ face” (Cuban, 2001, p. 183).

Nicolle (2005) found that faculty members’ attitudes and motivation toward ICT play an important role in how they integrate ICT. Furthermore, the following barriers to the use of technology more innovatively were mentioned by Cuban, Kirkpatrick, and Peck (2001): (1) lack of time for teachers to find and evaluate software; (2) lack of training; (3) available training did not meet the needs of the teachers.

For the students the major barriers are:

- Lack of access to computers outside the classroom
- Cost of computers
- Lack of hardware
- Lack of knowledge and skills of faculty members in ICT.

The reason for the instructional materials shortage might be rooted in the system of education of Kyrgyzstan, which is inherited from the Soviet Era. Most of the materials are poorly designed and outdated (World Bank and OECD, 2010).

As the analysis of the students’ responses indicated, a computer cost is still the most important barrier to ICT integration. Most of the participants do not own a personal computer due to its relatively high cost. The Internet access is another obstacle since the students are still experiencing problems with the Internet connection. The results are in line with the report of the Asian Development Bank (2012) and the study conducted by Akin (2013). The Internet connectivity in Kyrgyzstan was only 3-5% due to the lack of adequate financial resources allocated from school budgets and the lack of technical access to the Internet. The use of ICT at schools is limited to the teaching of informatics and computer skills (Asian Development Bank, 2012). The results obtained from the survey showed that 53% of the students do not have a personal computer at home, and 74% of them stated that it was too expensive to purchase one. Furthermore, 74% of the students having a computer at home do not have the Internet connection, and 62% of them stated that the cost of the Internet was too expensive (Akin, 2013). Furthermore, there is only 1 computer for 38 students in one of the best-equipped resources public Higher Education Institutions (Reviews of National Policies for Education, Kyrgyz Republic 2010).

The possible enablers of technology integration according to the instructors are:

- In-service training on ICT should be improved in quality and quantity
- More budget should be allocated to ICT
- The faculty members who integrate ICT in their courses should be supported (e.g. with an incentive payment)
- Technology plans for implementing ICT at universities should be prepared
- Specific units and personnel should be allocated for peer support
- Specific units and personnel should be allocated for public use of ICT tools
- The faculty members who integrate ICT in their courses should be provided with necessary facilities (i.e. additional resources, education, etc.)
- The course content should be redesigned to benefit more from ICT

As one of the instructors mentioned during the interview, there is a big difference in teaching methods of Turkish and Kyrgyz instructors. Most of the Kyrgyz instructors are from the old Soviet generations having never used the Internet. She stated: “Most of the courses in our department are taught in the Kyrgyz language, and there are only a few instructors who teach in Turkish. Students complain and claim that they want their lectures to be in Turkish. Moreover, the system of education is very old; it is the Soviet system which cannot be applied nowadays. We

need to change this system and start using modern systems instead of the old ones. However, most of the instructors in some departments are very old, and due to their age they do not want and they cannot use the modern system or the Internet". The results are in line with the report of the World Bank and OECD (2010).

Moreover, course load of the instructors in the Computer Engineering Department should be reduced. As stated by one of the instructors, due to the course overload, instructors in the Computer Engineering Department neither had the opportunity nor the time to prepare electronic materials. There are some instructors who had to teach 19 courses because of the lack of instructors. The instructors are not motivated to prepare electronic materials, because they may be given some other course to teach in the future:

"I think that if every instructor prepared their subject in an electronic format, and if they were sure that they would teach that course, they would try. But if tomorrow another instructor teaches that lecture, then no, they aren't motivated".

As a solution the respondent proposed computer education courses to be separated from the mainstream courses in the Computer Engineering Department, so that instructors would have more time to concentrate on their special subjects and would be more motivated to prepare the electronic materials for their courses.

As evident from the findings, there is a definite lack of instructional support services at Manas University. So, as in case with other developed universities, Manas University has to establish a center or an office to provide instructional technology support for faculty members. The lack of knowledge of the faculty in technology integration into education can be decreased by providing hands-on seminars, handouts and training courses. In addition, a sound technical support unit is necessary to eliminate the hardware and software problems of both instructors and students. As seen from the students' requests, they want their course materials to be more interactive. For this purpose, an open courseware portal can be prepared. As in the MIT's OCW (Open courseware) site, Manas university course materials can be shared by all universities in Kyrgyzstan. The university should also prepare a strategic plan to make long-term instructional technology decisions. Furthermore, course content can be restructured in a way to provide additional online information through the local OCW or in any other ways.

The results of this study can be generalized to the Kyrgyz-Turkish Manas University, since the study presents the situation with ICT from both instructors' and students' perspectives. Overall, the situation with the technology integration and technological base at Manas University can be considered 'better' than that of other state universities of Kyrgyzstan but there is still a lot to do. The results of this study can be used by Manas University as a guideline for future improvements. Furthermore, the results of the study present the current picture of ICT in one of the most developed universities in Kyrgyzstan that is believed to have a good technological infrastructure. However, if Kyrgyzstan wants to be a part of Knowledge societies, the use of ICT in education should be improved not only at Manas University, but at other universities across the country. Manas University might play a crucial role in the development of a Knowledge Society in Kyrgyzstan by providing necessary training to instructors, being a guideline for the improvements at other state universities.

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