

Integrating ICT and Education for Administrative Purposes: Analysis of Access to Information at Khazar University, Azerbaijan

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Abstract Globally, ICT has made strides towards becoming an essential part of the education framework, providing a huge potential for teaching and learning, along with the effective management of schools. The Internet has become an integral part of many facets of our everyday lives, and a significant percentage of younger people consider it inconceivable to survive a single day without the Internet and its related technology. The Coronavirus (Covid-19) pandemic has had an effect on learning worldwide, emphasizing the importance of Information and Communication Technology (ICT) for interactive and virtual learning and administration. The study focused on the application of ICT in higher education in the context of its usage and the review of user access to knowledge at Khazar University, Azerbaijan. Related work has been reviewed in previous literature. The research instrument is a questionnaire and the findings have been presented with tables and charts. The findings show the student's diverse responses to the extent of use of ICT at the university for communication and administrative purposes. The findings of the study provide decision leaders with insights into the effective application of ICT for teaching, learning and classroom administration.

Keywords ICT, Education, Online Learning, Pedagogy, Technology Integration, Covid-19.

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Introduction

In the preceding decade, ICT was projected to be central to human daily activities. The use of technology in education is mainly used as a teaching and learning tool, but also as an effective means of administrative organization. Globally, ICT has made strides towards becoming an essential part of the education framework, providing a huge potential for teaching and learning, along with the effective management of schools. ICT refers to technology that provide access to information through telecommunications services. Similar to Information Technology (IT), it focuses mainly on communication technologies such as the Internet, wireless networks, computers, and other means of communication. ICT can, in fact, be characterized as both hardware and software technologies used to capture, store, process and transmit information (Vernon, 2001). The use of technology in institutions like the student information portal has become one of the essential means for school administration to communicate with students and provide them with easy access to information online (Anuyahong 2018). Advances and the global flow of technology achieved in parts of the world, particularly from the playgroup to higher education, have led to huge investments in the new age of change in pedagogical technological globalisation. The year 2019 saw strong growth and technology adoption in education with investments in online education hitting USD18.66 billion and is expected to reach USD350 billion by 2025 (Li & Lalani, 2020). Notably, the first quarter of year 2020 saw an increase in the adoption and usage of innovative technology by educational institutions to enhance their administrative functions, making it more efficient, easy and accessible to learners (Li & Lalani, 2020). This demonstrated the huge potential of online learning.

The Coronavirus (Covid-19) pandemic has spread worldwide at an unprecedented pace and has had an influence on institutions, organisations, shops and companies, among others. This led to the closure of educational facilities with a view to preventing the transmission of the pandemic, with about 91 per cent of students worldwide affected (UNESCO, 2020). Indeed, the virus has spread to every continent except Antarctica (Darlenski & Tsankov, 2020). Likewise, academic institutions in Azerbaijan have not been resistant to this, with disruptions in the country's education sector affecting both local and foreign students in the country (ISC Research, 2020). Still, there are a number of institutions around the world that are opposed to the adoption of technology for their administrative tasks and to promote better communication with their students. Such organisations tend to be more inclined to the more conventional face-to-face pedagogy approaches, often viewed as ineffective (Khan et al., 2015). As a consequence, both learners and educators who are limited to a face-to-face approach can become frustrated and lack motivation.

Previous studies have focused almost entirely on the adoption and use of ICT in other contexts in Azerbaijan (Yusifov & Gurbanli, 2018; Hajiyev & Chang, 2017; Zeynalova, 2014). However, studies on ICT for administrative purpose in Azerbaijani institutions are lacking in the main literature. The aim of this study is therefore to explore students' access to online information at Khazar University and its usage for administrative purpose. This study has implications for higher institutions in Azerbaijan associated with the adoption and use of ICT for the improvement of their administrative functions and effective communication with students. In addition, the findings will help to provide perspectives on how ICT can be effectively used in the delivery of course material, both in traditional classroom settings and online, particularly in the light of the Covid-19 pandemic. In fact, the findings of this study will provide decision-makers with valuable insights into the use of ICT for learning and classroom management.

The remainder of this paper is structured as follows: Section 2 discusses the current literature on ICT inclusion in school. Subsequently, Section 3 presents the study objectives and methods of the analysis. Next, the findings of the study are addressed in Section 4. Finally, Section 5 concludes the article and sets out recommendations and possible future directions for research.

Literature Review

ICT is currently used in most parts of the world in a broad range of human activities such as health, engineering, economy, agriculture, defence, politics and governance, education, citizen engagement etc. (Kabanda & Brown, 2017; Cabrera & Rodriguez, 2017; Salihi et al., 2018; Mustafa & Sharifov, 2018a; Mustafa & Sharifov, 2018b; Ruben & Ware, 2019; Lim et al., 2020). It has become increasingly difficult for institutions to manage all their activities without the use of technology (Hargreaves, 2003). In this respect, technology offers additional support for administrative purposes through technological innovation. ICT plays a vital role in supporting efficient management and administration in education sector. The concept of educational management refers to the basic administrative functions of educational and learning institutions (Athanasoula-Reppa, 2008).

With technological advancements, learners are often expected to have less physical contact with the school administration in relation to any obstacles they face, as most of these can be handled via different technologies such as e-mail, telephone and the Internet. The Covid-19 pandemic that has limited physical contact among teachers and students and compelled universities to re-evaluate their course delivery methods (Li & Lalani, 2020; Bozkurt & Sharma, 2020; Sun et al., 2020; Sharifov & Mustafa, 2020). To this end, universities have taken a number of measures to prevent and protect students and staff from infection while

faculties in many universities are switching to online teaching and learning management systems (Sahu, 2020, OECD, 2020). In fact, several universities have been conducting lectures, assessments, and thesis examinations online. Nevertheless, in order for ICT to be successful in school administration, an effective communication system should be in place for contact between institutions and learners. It involves communication and dissemination of information among key stakeholders, including students, faculty and staff (Krishnaveni & Meenakumari, 2010). In Learning Management Systems (LMS) for example, the existing internal e-mail system used by educators and learners for communication purposes is replaced by the LMS advanced messaging system. The service allows students and faculty members to send messages, make video and conference call, use online discussion platforms, share documents, and organize and engage in surveys.

ICT should be seen as essential in fostering the learning climate of the 21st century and a knowledge-based technology-driven society. In view of this, numerous research studies in the broader literature have looked at the adoption and use of ICT in education (Krishnaveni & Meenakumari, 2010; Afshari et al., 2009; Zain et al., 2004). For example, Tosun and Baris (2011) found that in the education context, there is an improvement in the efficiency and effectiveness of school administrative activities due to ICT adoption. Similarly, a report by Fu (2013) showed that ICT is extending to education, thereby underscoring its usefulness. In another study, Mikre (2011) made similar observations emphasising that ICT has a positive impact on educational approaches in classrooms. In other words, the use of ICTs in education has improved the efficiency of administration and learning. Oboegbulem and Ugwu (2013) maintain that the use of ICT in school administration has become a necessity and a major project, particularly in the current era of globalisation. Among other things, the contribution of ICT to improvements in teaching approaches, school innovation and civic programs is indeed significant (Mikre, 2011).

In school administration, multiple studies have examined the contribution and benefits of ICT to successful administration in the education sector (Krishnaveni & Meenakumari, 2010; Oboegbulem & Ugwu, 2013; Mue, 2014). Such studies set out the critical role of ICTs in school management, especially in the communication, data management, performance evaluation, reporting and operational impact. Zainally (2008) notes that ICT offers a range of facilities and resources for educational administrators to perform their tasks. Moreover, Maki (2008) argued that ICT adoption in school management facilitates effective and productive learning environments, and so the integration ICT is essential for general administration. In addition, Solar et al. (2013) further highlights the benefits of ICT, that its usage by organisations raises the standard of education and pedagogy.

Many authors assert that technological integration in education has become widespread and is perceived to be an essential asset (Khan et al., 2015; Basri et al., 2018; Sharifov & Mustafa, 2020). In the context of Jordan, a study found that the majority of students in higher institutions have a positive perception of the use of ICT in classrooms (Al-Shboul et al., 2017). In the context of Azerbaijan, a study by Abbasova and Mammadova (2019), on the role of digital technology in teaching English language in Azerbaijan shows that the use of technology in teaching and learning encourages the participation of students in education. Then again, a study by Attewell et al. (2005) noted that, while technology has the potential to make learning more convenient, it requires substantial input from educators, including accessible resources, to have an impact on learning. In another study involving educators, Tondeur et al. (2007) concluded that teachers concentrate primarily on the development of technical ICT skills while ignoring the fact that ICT curricula would focus on the integrated use of ICT in the teaching and learning process.

The progress of ICT integration in a school is determined by the consistency and preparation of the ICT strategic plan. In view of this, it has therefore become essential for institutions to monitor their progress towards ICT integration and to use the outcome of the evaluation in the planning and implementation of their ICT strategy. This includes identifying requirements, challenges and opportunities along with specific aspects of the programme such as professional development, technical assistance and resources. Accordingly, several studies have explored the adoption of ICT in education and focused on both the opportunities and challenges it presents to institutions. A research by Rice and Miller (2001) indicated that organisations are facing significant obstacles in their attempts to keep up with technological advances. This includes keeping pace with the costs of rapidly changing technologies and providing online resources to students. In another study, Aslan et al. (2018) noted that the introduction of ICT into the educational system requires the training of teachers, redesign of curricula and services, the development of creative classroom practices and the adaptation of new evaluation modes at all levels. Therefore, it is necessary for institutions to recognise in advance the benefits and challenges of ICT uptake in education. In that regard, various studies have shown that the implementation of ICT has several benefits and challenges, including the following:

Benefits of ICT Adoption in Institutions

- Assist students in accessing digital information efficiently and effectively.
- Support student-centred and self-directed learning.
- More creative and interactive learning environment.
- Facilitate and enhance the quality of teaching and learning.

- Promote collaborative learning in a distance-learning environment.
- Potential to mitigate bureaucracy in institutions.

Challenges of ICT Adoption in Institutions

- In developing nations, a major obstacle may be the digital divide due to limited access to affordable internet services and technologies.
- Lack of Infrastructure because of limited resources.
- Lack of working knowledge of ICT applications and new technologies among academic and administrative staff of institutions.
- Resistance to change by staff and management of the institutions and lack of administrative support.
- The fear of ICT innovations mitigating bureaucracy in institutions which may favour certain individuals.
- Administrative staff who wield a lot of power and control, may be in fear of losing such privileges due to ICT adoption by their institutions.

Methodology

In an attempt to answer the research question raised in this study, a quantitative method approach has been used. Review of the social science methodologies suggests that the survey is the most appropriate tool for gathering primary data using questionnaires and interviews on attitudes and perceptions of respondents (Sekaran, 2003). In particular, the questionnaire method is the most commonly employed form of measurement in the social sciences, because surveys are regarded as an effective instrument for assessing attitudes of large groups (Sekaran, 2003). Therefore, methodology used is easily understood while the findings are applicable (Taherdoost, 2016).

To gather information, an online questionnaire was developed utilising the Google Forms survey tool. The questionnaire was divided into the following thematic sections: (1) Use of ICT in classrooms. (2) Communication. (3) Students' Access to information. (4) Students' Access and use of online student portal (5) Students' Access to online help guide. The individuals of interest for the purpose of this study were graduate students of Khazar University. According to the website of the top universities (2019), Khazar University has about 2324 students and 13 percent (n=302) are postgraduate students. Unfortunately, the researchers were unable to verify this information. Thus, the rationale for having only foreign graduate students in this study is that they were much easier to contact than local students. It should be noted that the group consisted entirely of foreign graduate students at the University, which is 74 according to *topuniversities* (Top Universities, 2019). A simple random sampling technique

was used to select and distribute questionnaires to at least 30 percent of university graduate students. A short questionnaire was included with the invitation via email, Facebook and the WhatsApp group. A total of 28 questionnaires were collected between 9 and 23 January 2019. There was no indication that the participants misunderstood the questions. Eventually, the data is analysed using Google Sheets and presented in the form of charts and tables.

Results

This section summarises and discusses the main findings of the work. A total of 28 students completed the online questionnaire using the Google form. The links to the online questionnaire were distributed to students via various social media channels, along with WhatsApp community chat and email. The results are set out below.

Table 1. Gender of Respondents

Gender	Frequency	Percentage (%)
Male	15	53.6%
Female	13	46.4%
Total	28	100.0%

Table 1 shows the gender-based frequency of respondents. Gender findings show that 53.6% (n=15) are male and 46.4% (n=13) female. The mean is 14, the variance is 2 and the standard deviation (SD) is 1.41.

Table 2. Respondents study field

Subject	Frequency	Percentage (%)
Science	12	42.9%
Education	6	21.4%
Humanities	3	10.7%
Social Science	2	7.1%
Business	1	3.6%
Economics and Management	2	7.1%

Computer Science	1	3.6%
Economics	1	3.6%
Total	28	100.0%

Table 2 and Figure 1 indicates the frequency of the field of study of respondents based on subjects. As can be seen in Table 2, out of 28 respondents, 42.9% (n=12) are in Science, 21.4% (n=6) Education, 10.7% (n=3) Humanities, while 7.1% (n=2) in Social Science and Business, with 3.6% (n=1) in Computer Science, Economics and Management, and Economics. The mean is 3.5, median 2, variance 14.57 and standard deviation 3.82.

Table 3. Use of ICT in Classrooms

Items	Response	Frequency	Percent
1. Do you have modern technologies such as computers, projectors, mass communication devices at the university?	Yes	24	85.7%
	No	1	3.6%
	Sometimes	2	7.1%
	Always	1	3.6%
	Total	28	100.0%
2. Are the computers at the university, sufficient, easily available, and accessible during school hours to all students at the university?	Yes	18	72.0%
	No	7	28.0%
	Total	25	100.0%
3. Do you have easy access to internet at the university?	Yes	23	92.0%
	No	2	8.0%
	Total	25	100.0%

4. Do teachers use projector for lecture delivery at the university?	Always	19	73.1%
	Sometimes	6	23.1%
	Rarely	0	0%
	Never	1	3.8%
	Total	26	100.0%

5. Do teachers at the university have sufficient knowledge of ICT (information and communication technologies) and apply it to their teaching?	Yes	20	80.0%
	No	5	20.0%
	Total	25	100.0%

6. Are teachers at the university open minded about the use of ICT (information and communication technologies)?	Yes	21	84.0%
	No	4	16.0%
	Total	25	100.0%

7. Do you get information or lecture materials through Video Recordings?	Always	1	3.6%
	Sometimes	7	25.0%
	Rarely	9	32.0%
	Never	11	39.3%
	Total	28	100.0%

Table 3 displays answers relevant to the use of ICT in the classroom. As for Q1, 85.7% (n=24) of the respondents responded yes, 7.1% (n=2) sometimes, 3.6% (n=1) no and 3.6% (n=1) always. In Q2, 72% (n=18) answered yes and 28% (n=7) no. In Q3, 92% (n=23) yes and 8% (n=2) no. With respect to Q4, 73.1% (n=19) responded yes, 23.1% (n=6) sometimes and 3.8% (n=1) never. In Q5, 80% (n=20) yes and 20% (n=5) no. In Q6, 84% (n=21) yes and 16% (n=4) no. As for Q7, 39.3% (n=11) never, 32% (n=9) rarely, 25% (n=7) sometimes and 3.6% (n=1) always.

Table 4. Communication with Deans' Office

Items	Response	Frequency	Percent
1. How do you communicate with your deans' office?	Email	11	39.3%
	Telephone	6	21.4%
	Personal Walk in	9	32.2%
	Do not communicate with office	2	7.1%
	Total	28	100.0%

Table 4 displays the answers to the question of students contact with the dean's office. As in Table 4, 60.7% (n=11) communicate with the deans' office by email, 53.6% (n=15) in person, 32.1% (n=9) by telephone, and 7.1% (n=2) do not communicate with the dean's office. More than half of the respondents regularly visit the dean's office for information, which indicates that ICT has not been completely implemented by the administration to disseminate information to students.

Table 5. Students' Access to Information

Questions	Response	Frequency	Percent
1. How do you receive/access useful information about your schools' happenings that is of concern to you?	Print Technology	1	3.6
	Research Bulletin	1	3.6
	Posters	4	14.3
	School Magazine	2	7.1%
	Online Portal	7	25.0%
	School Website	10	35.7%
	Others	3	12.0%
	Total	28	100.0%
2. Do you get information that is useful to you through the university's TV Programs?	Always	0	0%
	Sometimes	3	10.7%
	Rarely	4	14.3%

Never	20	71.4%
YouTube	1	3.6%
Total	28	100.0%

3. Do you get information that is useful to you through the university's Radio Programs?

Always	0	0%
Sometimes	2	7.1%
Rarely	3	10.7%
Never	19	67.9%
Not Available	4	14.3%
Total	28	100.0%

4. How do you get information on course registration, add and drop courses?

Online	12	42.9%
Personal Walk in	15	53.5%
By Proxy	1	3.6%
Total	28	100.0%

5. How do you get information about and apply for collecting your transcript? How do you get information about and apply for collecting your transcript?

Online	10	35.7%
Personal Walk in	18	67.9%
By Proxy	0	0%
Total	28	100.0%

6. How do you get or access information on your personal data at the university?

Online	19	67.9%
Personal Walk in	8	28.5%
Email	1	3.6%
Total	28	100.0%

7. How do you get information on boarding facilities at the university?

Online	17	60.7%
Personal Walk in	7	25.0%
Posters	3	10.7%
Web	1	3.6%
Total	28	100.0%

8. How do you get information on health services provided by the university?	Online	12	42.8%
	Personal Walk in	8	28.6%
	Posters	4	14.3%
	Web	1	3.6%
	Others	3	10.7%
	Total	28	100.0%

9. How do you get or access information on transportation services provided by the university such as shuttle buses or free ride?	Online	6	21.4%
	Personal Walk in	2	7.1%
	Posters	1	3.6%
	Facebook	1	3.6%
	Never receive info	18	64.3%
	Total	28	100.0%

10. How do you get/access information on Timetable?	School Website	8	28.5%
	Personal Walk in	7	25.0%
	Email	11	39.3%
	Online	1	3.6%
	Facebook	1	3.6%
	Total	28	100.0%

11. How do you get information on exam results?	Student Portal	22	81.5%
	Personal Walk in	2	7.4%
	Email	1	3.7%
	Online	2	7.4%
	Total	27	100.0%

Table 5 shows the responses regarding access to information. As for Q1, 35.7% (n=10) of the respondents replied school website, 25% (n=7) online portal, 14.3% (n=4) posters, 12% (n=3) others, 7.1% (n=2) school magazine, 3.6% (n=1) research bulletin and 3.6% (n=1) print technology. In Q2, 71.4% (n=20) never, 14.3% (n=4) rarely, 10.7% (n=3) sometimes and 3.6% (n=1) YouTube. In Q3, 67.9% (n=19) rarely, 10.7% (n=3) never and 7.1% (n=2) sometimes.

With respect to Q4, 53.5% (n=15) replied personal walk in, 42.9% (n=2) online and 3.6% (n=1) by proxy. In Q5, 67.9% (n=18) personal walk in and 35.7% (n=10) online. With regard to Q6, 67.9% (n=19) online, 28.5% (n=8) personal walk in and 3.6% (n=1) email. In Q7, 60.7 % (n=17) online, 25% (n=7) personal walk in, 10.7% (n=3) posters and 3.6% (n=1) web. As for Q8, 42.8% (n=12) never, 28.6% (n=8) personal walk in, 14.3% (n=4) posters, 10.7% (n=3) others and 3.6% (n=1) web. In Q9, 64.3% (n=18) never receive information, 21.4% (n=6) online, 7.1 % (n=2) personal walk in, 3.6% (n=1) posters and 3.6% (n=1) Facebook. In Q10, 39.3% (n=11) email, 28.5% (n=8) school website, 25% (n=7) personal walk in, 3.6 % (n=1) online and 3.6% (n=1) Facebook. In Q11, 81.5% (n=22) student portal, 7.4% (n=2) online, 7.4% (n=2) personal walk in and 3.6% (n=1) YouTube.

The majority of the responses reveal a satisfactory level of access of information for students. It is interesting to observe that a large percentage of the respondents (67.9%) do not receive information about transportation services provided by the university or absence of it.

Table 6. Students' Access to Online Services

Questions	Response	Frequency	Percent
1. Does the university offer you with the option of taking online classes?	Yes	1	3.6%
	No	22	78.5%
	Campus Based Only	5	17.9%
	Total	28	100.0%
2. Does the university offer you online administrative services?	Yes	5	17.9%
	No	21	75%
	Campus Based Only	2	7.1%
	Total	28	100.0%
3. Does the university provide you with full access to online library services?	Yes	12	42.9%
	No	14	50%
	Campus Based Only	2	7.1%
	Total	28	100.0%

Table 6 displays responses concerning online student portals in which 78.6% (n=22) agree that the university does not offer the option of online classes while 3.6% (n=1) disagree and 20% (n=5) indicated only campus-based courses are provided. In response to the question on online administrative services offered by the university, 75 % (n=21) disagree, 20 % (n=5) agrees, while 7.1 % (n=2) suggest that only campus-based courses are offered. Students were asked whether the university provided complete access to online library services with 50 % disagree, 42.9 % agreed, and just 7.1 % indicated campus-based access.

Table 7. Students Access' to Online Help Guide

Questions	Response	Frequency	Percent
Does the university provide you an online platform through which you get help with your studies?	Yes	15	53.6%
	No	13	46.4%
	Total	28	100%

In Table 7, respondents were asked if they had been provided with an online platform to assist in their studies. Responses suggest that 46.4% (n=13) disagree, but 46.4% (n=13) agree, while only 7.2% (n=2) agree. The online platforms identified by the respondents are Khazar sims (sims.khazar.org), Facebook (www.facebook.com), Google Classroom (classroom.google.com), Edmodo (www.edmodo.com) and Khazar University Website (www.khazar.org).

Discussion

In line with previous studies (Laabidi, 2017), the effective implementation of ICT in classrooms cannot be achieved without mitigating the barriers to its effective use in classrooms. There is also a need to implement a more inclusive and forward-looking ICT strategy that will promote the process for the successful use of ICT in the management of educational programmes in schools (Mwadulo & Odoyo, 2020). The policies will support the successful implementation and use of ICT in institutions. In this study, the overall findings are consistent with that of Somekh (2008) and Fluck & Dowden (2011) which suggest that educational institutions need to make more efforts to enable their staff to participate in digital transformation. This is also in agreement with the findings of Baharuldin et al. (2019) who argues that school administrative support has a direct effect on the

growth of ICT literacy among instructors. However, for this to be effective, instructors need have competence in ICT. Though, this report highlights that not all instructors fully utilise ICT for administrative purpose. Therefore, staff should be supported by management to develop their ICT literacy to enable them effectively use ICT for school administrative purposes.

Similar to Al-Hunaiyyan et al. (2016), awareness campaigns for the effective incorporation, adoption and implementation of ICT in higher institutions are important. These will aim to increase awareness on the several benefits of the use of ICT in institutions. These benefits include cost-effectiveness, enhanced service delivery, efficiency, increased student engagement, improved communication between institutions and students, and strengthened institutional cooperation. In conclusion, the key contribution of this study is to provide useful insights for administrators and educators to make their information systems more accessible and beneficial to learners. The overall goal of ICT adoption in education is to further improve communication, service delivery and processes. The findings may therefore encourage further investigation of issues related to ICT integration and use in higher institutions.

Conclusion and Future Work

The use of ICT for educational management in the developing world has significantly transformed the school system with respect to data collection, knowledge management and decision-making. Literature on the use of ICT for administrative purposes in education management in Azerbaijani universities lacks new applicable perspectives and needs to be further studied and reviewed. In view of this, we have undertaken this study to provide additional insights into this context. In summary, the study examines the use and integration of ICT at Khazar University, including student access to information. From the survey questionnaire, 28 responses were received, analysed and presented as tables and charts. It is clear that there is a lack of appropriate policies that educators can use as a reference for the use of ICT in institutions, and this may pose a number of challenges (Hinduja and Patchin, 2013). Mitigating the inhibitors to the successful application of ICT in classrooms would help to promote its effective use in classrooms. Finally, to enhance communication and efficiency or the management of school data, resources, staff and students, educational institutions need to focus on making greater efforts to encourage their staff to adopt digital transformation (Somekh, 2008; Fluck & Dowden, 2011).

Recommendations

Based on the findings of this study, a set of recommendations was provided as follows:

- Implementing a fully functional and interactive institutional website that can serve as an effective communication platform for staff and students, considering the needs of all stakeholders for improved services.
- Provision for online course registration, syllabus, timetables for the courses and the timetable for the academic sessions.
- There is a need for more computers in the university library and additional computers in the classrooms.
- Enhanced access to more extensive internet services and improved online support for students.
- Improved access to online learning resources and e-books.
- Provision of more innovative classroom technologies, such as interactive whiteboards.
- There is a need to improve the existing student information system.
- Effective use of social media to disseminate information and increase the visibility of the institution.
- Implement smart cards and chip cards for students to improve access to university buildings, libraries and student dormitories.

Limitations and Future Work

The findings provide a basis for future research into the impact of the adoption and use of ICT in higher education in Azerbaijan; however, a number of limitations need to be considered. For example, the response was limited only to international graduate students at the university. Additionally, the issue of non-response by some students led to sampling issues that hindered the ability of the researchers to generalise the results of the study. Future research will aim to reproduce findings in greater population sizes and consider integrating online and conventional surveys to increase the response rate. Furthermore, several interesting aspects may be explored further by applying technology acceptance and adoption models such as Technology Acceptance Model 2 (or TAM 2, Venkatesh & Davis, 2000), Unified Theory of Acceptance and Use of Technology (or UTAUT 2, Venkatesh et al. 2003; Venkatesh et al., 2012), and Task Technology Fit (or TTF, Goodhue and Thompson, 1995). Finally, longitudinal studies to understand the potential moderating effects of both external and internal factors and their impact on the adoption and use of ICT at other higher institutions in Azerbaijan will prove to be an important area of potential research.

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References

4. Abbasova, M. and Mammadova, N. (2019). The Role of Digital Technology in English Language Teaching in Azerbaijan. *International Journal of English Linguistics*, 9(2), 364-372.
5. Afshari, M., Bakar, K. A., Luan, W. S., Samah, B. A., & Fooi, F. S. (2009). Factors affecting teachers' use of information and communication technology. *Online Submission*, 2(1), 77-104.
6. Al-Hunaiyyan, A., Al-Hajri, E., Alzayed, A., & Alraqqas, B. (2016). Towards an Effective Distance Learning Model: Implementation Framework for Arab Universities. *International Journal of Computer Application*. Volume, 6, 2250-1797.
7. Al-Shboul, M., Al-Saideh, M., and Al-Labadi, N. (2017). Learners' perspectives of using ICT in higher education institutions in Jordan. *Instructional Technology*, 14(3), 27-86.
8. Anuyahong, B. (2018). Needs of Technology in Education Perceived by Thai Undergraduate Students in 21st Century. *The 11th International Conference on Educational Research*, September 2018, Khon Kaen University, Thailand, 677-677.
9. Aslan, A. and Zhu, C. (2018). Starting Teachers' Integration of ICT into Their Teaching Practices in the Lower Secondary Schools in Turkey. *Educational Sciences: Theory and Practice*, 18(1).
10. Athanasoula-Reppa, A. (2008). Educational administration and organizational behavior: the pedagogy of educational administration.
11. Attewell, J. (2005). From Research and Development to Mobile Learning: Tools for Education and Training Providers and their Learners. Available from: <https://www.cin.ufpe.br/~mlearning/intranet/m-learning/mlearn2005/Training%20Providers%20and%20their%20Learners.pdf> [Accessed 2 December 2018].
12. Basri, W. S., Alandejani, J. A., & Almadani, F. M. (2018). ICT adoption impact on students' academic performance: Evidence from Saudi universities. *Education Research International*, 2018.
13. Bozkurt, A., & Sharma, R. C. (2020). Emergency remote teaching in a time of global crisis due to CoronaVirus pandemic. *Asian Journal of Distance Education*, 15(1).
14. Cabrera, J. R. S., & Rodriguez, N. R. C. (2017). The Use of ICT for Learning in Agricultural Engineering Mechanics: UACH Case, Mexico. *Revista Ciencias Técnicas Agropecuarias*, 26(1), 78-85.

15. Darlenski, R. & Tsankov, N. (2020). Covid-19 pandemic and the skin-What should dermatologists know? *Clinics in Dermatology*.
16. Fluck, A., & Dowden, T. (2013). On the cusp of change: examining pre-service teachers' beliefs about ICT and envisioning the digital classroom of the future. *Journal of Computer Assisted Learning*, 29(1), 43-52.
17. Fu, J. S. (2013). ICT in Education: A Critical Literature Review and its Implications. *International Journal of Education and Development using Information and Communication Technology*, (9)1, 112-125.
18. Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly*, 213-236.
19. Hajiyev, J., & Chang, C. T. (2017). Gen y members' mobile banking adoption intention and actual use in Azerbaijan and turkey: the technology acceptance model and social cognitive theory Approach. *Journal of Internet Banking and Commerce*, 22(S7), 1.
20. Hargreaves, A. (2003). *Teaching in the Knowledge Society. Education in the age of insecurity*. United Kingdom: Open University Press.
21. Hinduja, S. and Patchin, J. (2013). *Connecting with Students Online: Issues to Consider When Educators "Friend" Students. Identification, Prevention, and Response*. Available from: http://www.cyberbullying.us/Friending_Students_on_Facebook.pdf [Accessed 2 December 2018].
22. ISC Research (2020, June 1). *International school updates by key countries. Coronavirus COVID-19 update*. ISC research, Oxfordshire, UK. Available from: <https://www.iscresearch.com/coronavirus-covid-19-update> [Accessed 6 June 2020].
23. Kabanda, S., & Brown, I. (2017). Interrogating the effect of environmental factors on e-commerce institutionalization in Tanzania: a test and validation of small and medium enterprise claims. *Information Technology for Development*, 23(1), 59-85.
24. Khan, M. S., Khan, I., Din, S., Ismail, M. H., Khattak, R. and Jan, R. (2015). The impacts of ICT on the students' Performance: A Review of Access to Information. *Research on Humanities and Social Sciences*, 5(1), 85-94.
25. Krishnaveni, R., & Meenakumari, J. (2010). Usage of ICT for Information Administration in Higher education Institutions–A study. *International Journal of environmental science and development*, 1(3), 282-286.
26. Laabidi, H. (2017). Investigating the Influence of Teaching Experience on the Use of ICT in Education. *Journal of EFL, Linguistics and Literature*. 2(1), 15-31.
27. Li, C. and Lalani, F. (2020, April 29). *The COVID-19 pandemic has changed education forever. This is how*. The World Economic Forum COVID Action Platform. World Economic Forum. Available from: <https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/> [Accessed 6 June 2020].

28. Lim, D., Low, C. C., Chew, C., Blebil, A., Dujaili, J., & Alrasheedy, A. A. (2020). Positioning and utilization of information and communication technology (ICT) in community pharmacies: a cross sectional study from Selangor, Malaysia. *JMIR Medical Informatics*.
29. Maki, C. (2008). Information and Communication Technology for Administration and Management for secondary schools in Cyprus. *Journal of Online Learning and Teaching*, 4(3), 18-20.
30. Mikre, F. (2011). The Roles of Information Communication Technologies in Education Review Article with Emphasis to the Computer and Internet. *Ethiopian Journal of Education and Sciences*. 6(2).
31. Mwadulo, M. W., & Odoyo, C. O. (2020). ICT Adoption in the Educational Management of Primary Schools in Kenya.
32. Mue, J. S. (2014). Application of Information Communication Technology in school administration in public secondary schools in Langata Division, Nairobi County, Kenya. Unpublished M. ED Thesis.
33. Mustafa, A. S., & Sharifov, M. (2018a). The Challenges of e-Parliament Adoption and its Mitigation. *International Journal of Computing and Technology* 5 (6), 78-87.
34. Mustafa, A. S., & Sharifov, M. (2018b). Towards Enhancing Citizens Engagement: A Review of Parliamentary Websites in the 36 State Houses of Assembly in Nigeria. *JeDEM-eJournal of eDemocracy and Open Government*, 10(2), 97-111.
35. Oboegbulem, A. and Ugwu, R. N. (2013). The Place of ICT (Information and Communication Technology) in the Administration of Secondary Schools in South Eastern States of Nigeria. *A US-China Education Review*, 3(4), 231-238.
36. OECD-Organisation for Economic Co-operation and Development (2020, March 23). Education responses to COVID-19: Embracing digital learning and online collaboration. *OECD Policy Responses to Coronavirus (COVID-19)*. Available from: <http://www.oecd.org/coronavirus/policy-responses/education-responses-to-covid-19-embracing-digital-learning-and-online-collaboration-d75eb0e8/> [Accessed 6 June 2020]
37. Rice, M. and Miller, M. T. (2001). Faculty involvement in planning for the use and integration of instructional and administrative technologies. *Journal of Research on Computing in Education*, 22(3), 328-337.
38. Reuben, J. A., & Ware, N. (2019). Approach to Handling Cyber Security Risks in Supply Chain of Defence Sector. *Industrial Engineering Journal*, 12(7).
39. Sahu, P. (2020). Closure of universities due to Coronavirus Disease 2019 (COVID-19): impact on education and mental health of students and academic staff. *Cureus*, 12(4).
40. Salihi, M., Sharifov, M., & Mustafa, A. S. (2018). Evaluation of Official Governmental (e-Government) Websites for Accessibility in the Middle East. *International Journal of Computer Applications*, 181 (18), 39-43.
41. Sekaran, U. (2003) *Research Methods for Business A Skill-Building Approach*. 4th Edition, John Wiley & Sons, New York.

42. Sharifov, M., & Mustafa, A. S. (2020). Review of Prevailing Trends, Barriers and Future Perspectives of Learning Management Systems (LMSs) in Higher Institutions. *The Online Journal of New Horizons in Education*, 10(3), 166.
43. Solar, M., Sabbatin, J., & Parada, V. (2013). A maturity model for assessing the use of ICT in school education. *Journal of Educational Technology & Society*, 16(1), 206-218.
44. Somekh, B. (2008). Factors affecting teachers' pedagogical adoption of ICT. In *International handbook of information technology in primary and secondary education* (pp. 449-460). Springer, Boston, MA.
45. Sun, L., Tang, Y. and Zuo, W. (2020). Coronavirus pushes education online. *Nature Materials*, 1-1.
46. Taherdoost, H. (2016). Sampling Methods in Research Methodology; How to Choose a Sampling Technique for Research. *SSRN Electronic Journal*.
47. Tondeur, J., van Braak, J. and Valcke, M. (2007). Curricula and the use of ICT in education: Two worlds apart? *British Journal of Educational Technology*, 38(6), 962-976.
48. Top Universities (2019), Khazar University. Available from: <https://www.topuniversities.com/universities/khazar-university> [Accessed January 1, 2019].
49. Tosun, B. and Baris, M. F. (2011). Using information and communication technologies in school improvement. *Turkish Online Journal of Educational Technology*, 10(1):223-231.
50. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.
51. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 425-478.
52. Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 157-178.
53. Vernon, R. (2001). *Knowing where you are going: Information System for Agricultural Research management*. The Hague: International Service for National Agricultural Research.
54. Yusifov, F., & Gurbanli, A. (2018). E-services evaluation criteria: The case of Azerbaijan. *Informacijos Mokslai*, 81, 18-26.
55. Zain, M. Z., Atan, H., & Idrus, R. M. (2004). The impact of information and communication technology (ICT) on the management practices of Malaysian Smart Schools. *International Journal of Educational Development*, 24(2), 201-211.
56. Zainally, H. (2008). Administration of faculties by information and communication technology and its obstacles. *International journal of education and information technologies*, 2(1), 24-30.
57. Zeynalova, K. Z. (2014). Information and Communication Technologies in Azerbaijan and Importance of Their Use. *International Journal of Business and Social Research*, 4(1), 121-123.