

## Educational technology and its impact on the efficiency of the educational process in higher education

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### Abstract

This study aims to reveal the impact of educational technology on the efficiency and improvement of the educational process at Aqaba University College. The study followed the descriptive-analytical approach, and a random population consisting of twenty-seven (27) faculty members were selected to represent the sample community. The independent variable in this study is *the education technology*, while the dependent variable is *the educational system*. The questionnaire is distributed among all selected twenty-seven faculty members for data collection, and the SPSS software is used to analyze the data. The analysis of the study found that educational technology has a positive impact represented in the highly improved educational process at Aqaba University College. At the same time, the challenges were the material resources needed for educational technology.

**Keywords:** Information technology; Communication; Efficiency of the educational process; Educational technology; Education system

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## **1. Introduction**

Mastering modern technology is one of the required skills in the twenty-first century, which students can acquire through incorporating technology in education. It enables them to learn techniques to use technology in learning and makes them realize its importance. Its incorporation occurs in response to the need for technology in this era, as technological literacy is considered one of the skills of the 21st century (Silva, 2009). Also, technology positively impacts developing countries as one of the requirements for achieving it (Ryu, 2014). The use of technology and its adaptation require the concerted efforts of educational institutions and teachers to enable teachers to transfer technology skills to their students (Tsourapa, 2018). The relationship between educational technology in countries and the efficiency of educational outputs, the expenditure level from revenue to incorporate technology in education, and the development of states are highlighted. This situation indicates the importance of technology in improving educational outcomes at the level of states (Aristovnik, 2012) (Ryu, 2014) (Baliamoune - Lutz, 2003).

Modern technology constitutes a requirement for students of this century that meets their needs and an incentive for self-learning whose impacts are expected to be transferred faster (Daugherty & Funke, 2007). When reviewing the advantages of introducing technology in education, we find that it increases motivation to learn and self-access to information, narrows the gap between communication and skills and provides enrichment activities for learners (Voogt et al., 2013). One of the benefits of learning using technology is enhancing learning for outstanding students, reinforcing students with low achievement, promoting education, and offering a good opportunity for self-learning. It also considers the individual differences between learners, provides the opportunity for distance learning and makes the learning process active and centered around the learner, while the role of the teacher is to provide guidance (Barrow et al., 2009).

These advantages of educational technology demand universities to provide the necessary infrastructure to facilitate acquiring technological skills, provide substantive and technical support, begin actual activation of the e-learning system, and equip laboratories and classrooms with modern technologies (Daugherty & Funke, 2007) (Voogt et al., 2013)

Some obstacles or challenges prevent the utilization of these educational technologies, the most important of which is the financial cost for equipping laboratories and creating infrastructure to harness the advantages of introducing technology in education and activating them to achieve the desired goal (Barrow et al., 2009).

## **2. Theoretical framework and Literature**

### **2.1 Educational technology**

Incorporating information and technology usage in Jordanian educational institutions is an integral initiative and relatively a novel provenance. This step is considered a milestone for the state struggling for recognition and securing rights globally. The country has newly interacted with educational technology to compete with the developed nations. Therefore, it has been strongly suggested that the application and usage of educational technology must be incorporated and encouraged as a routine part of any institute's students and faculty members. Studies have shown that institutions adopting the latest technology in education become more efficient in operating and distributing state-of-the-art scholarships in educational studies (Barrow et al., 2009).

## **2.2 The importance of using technology in higher education**

When discussing the most important goals of university education, providing the labor market with students who have high skills and knowledge comes to mind. In this regard, it is not a mistake to value skills over knowledge because knowledge is available to all. Still, the skills can only be acquired after usage and repetition, leading to professionalism. One of the most prominent things that modern technology can provide is accessing information and knowledge. Furthermore, it plays a role in developing the economy because it leads the economic reform. Developed countries have achieved this and have taken advantage of the benefits of modern technology. As for the developing countries, studies are still searching for the impacts of technology on income or the economy (Baliamoune - Lutz, 2003)

Al-Balqa Applied University seeks to incorporate technology in education. This technology usage in education comes through having it as a separate focus point that is the fifth in order in the strategic plan of 2017/2021; "the use of information technology in education and management." The strategy stated that the university considers incorporating technology in education as one of the strengths; however, the capabilities may be limited in this domain. One of the weaknesses is the university's restricted ability to provide laboratories and modern equipment.

It is noted that the incorporation of technology in education came to meet the needs of learners, being an essential element in the educational process. Of the conditions that meet technology, flexibility provides sending information and receiving responses regardless of time and location. Also, it promotes knowledge through diversity in the presented knowledge. Moreover, it enables the exchange of opinions and talking through electronic discussions as it breaks the distance barrier; You do not need to navigate to reach faculty members, indicating a decrease in material costs. All this motivates learners to learn (Arkorful & Abaidoo, 2015).

## **2.3 Challenges facing the incorporation of educational technology**

Modern technology excites students and attracts their attention; therefore, this generation has a technological character as technology has conquered all of their interests and has become an essential requirement. Therefore, efforts must be made, and challenges must be dealt with to invest this technology for educational purposes, qualify faculty members for this stage, and to create facilities eligible for this purpose and all of these requirements are challenges to universities (Baliamoune - Lutz, 2003; Daugherty & Funke, 2007).

Among the challenges that demand additional efforts are preparing and developing the skills of faculty members so that they can use modern technology and use them correctly in education. In addition to being knowledgeable in the fundamentals of technology and the mechanism of its use, to minimize the wasted time during the learning process (Talebian et al., 2014). Moreover, a particular budget must be allocated to provide the infrastructure needed to benefit from and employ technology. This may impose an additional and fundamental burden on incorporating technology as a tool and source of learning (Arkorful & Abaidoo, 2015; Geoffrey, 2010).

One of the biggest challenges is the lack of good investment in technology, and incorporating it with limited and weak capabilities represented in old devices and the lack of technical support which may cause reluctance to use them, and generate negative feelings and barriers towards dealing with technology (Kelentric, 2013).

## 2.4 Research Hypotheses:

Among previous studies that examined the technology of education and communication, according to Arkorful & Abaidoo (2015), a study was conducted to uncover the positive impacts and challenges facing the incorporation of technology in higher education. It was found to improve the educational process and enhance social relations between students, thus increasing interaction between them and giving them access to different points of view. Furthermore, it offers flexibility in learning and submission of assignments. At the same time, one of the most critical challenges mentioned in the study is the material cost of incorporating technology in education.

The study of Ryu (2014) revealed the effects of information and communication technology in education. The study results concluded that information and communication technology is closely related to the outputs of the educational process. It was also found that technology positively affects academic results, while it had an undesirable effect when used at home due to the lack of necessary tools. Moreover, it was concluded that the educational outcomes related to information and communication technology might differ depending on the national income.

According to Talebian et al. (2014), it was indicated that using technology in education has advantages. It makes learning active, changes thinking patterns, enrich the learner with extensive knowledge, and characterizes the learning process as individualistic, independent, and flexible. However, among the most prominent challenges are the equipping of infrastructure, the fact that some subjects in the Faculty of Agriculture are uncomputerizable, and the maladjustment of the faculty members to using technology as a teaching tool.

In Kelentric (2013), information technology application in educational technology aimed to reveal how to incorporate information and communication technology in education. The results of the study showed the presence of external problems, such as the lack of hardware and software equipment, insufficient professional training and technical support, which are essential for learning how to use modern technology, and the mismanagement, which affects the flexibility of Technology-related procedures and the obstacle solving measures. All these challenges have harmed technology in education.

Moreover, the study of Noor-Ul-Amin (2013) aimed to identify the impact of using information and communication technology in learning and the extent of its effectiveness in making a change in the learning process. It was found that there is a positive impact on teaching, the learning process, and researching because it affects the delivery mechanism of learning materials. Also, it makes education reach a broader scope, increases the flexibility of the process, as students can engage in the learning process from anywhere and at any time, and makes a difference in the way students learn, which will enhance their motivation towards studying due to the presence of the rich environment that drives them towards that.

Geoffrey (2010) examined the impact of information and communication technology in education at Gulu University. It investigated the relationship between technology and student learning regarding the availability, accessibility, and use of information and communication technology resources. According to the findings, there is an impact of educational technology on the educational process. The university was recommended to be equipped and supported with more computers and other technologies and create a center to make this technology available to students.

Based on these previous studies, the following hypotheses can be formulated:

- There is a positive impact of educational technology on improving the educational process from the viewpoint of faculty members.
- There is a positive impact of the material and human resources available to faculty members on the effectiveness of educational technology.

### 3. Methodology

#### 3.1 Research Method

The researchers adopted the descriptive-analytical method using the survey method to answer study questions. The questionnaire was divided into three main criteria: the first measures "learning and thinking skills," the second measures "technology skills," and the third measures "communication skills." Five-item Likert scale was used (strongly agree = 5, somewhat agree = 4, disagree and disagree = 3, somewhat disagree = 2 and strongly disagree = 1). The hypothesis test was also based on the results of a single sample test conducted by the researcher.

#### 3.2 Research Framework

The independent variable in this study is *education technology*. In contrast, the dependent variable in this study is *the educational system*, and the dimensions included in this variable are the progress and efficiency of the system.

#### 3.3 Population and study sample

The study's population consists of (46) faculty members at Aqaba University College. A questionnaire was distributed randomly to (27) study community faculty members at Aqaba College / Al-Balqa Applied University.

#### 3.4 Data Analysis

Researchers used SPSS, version 16, to analyze data. Therefore, the reliability coefficients, frequencies, average, standard deviation, and one T-sample test were used.

#### 3.5 Reliability Statistics

Table 1 shows the Alpha Cronbach measured value for the four dimensions, ranging from 0.525 and 0.865; therefore, we can conclude that the test is correct.

Table 1. Stability coefficients of the impact of educational technology on the educational process at Aqaba University College

No.	Domain	Alpha Cronbach
1	Educational purposes	0.718
2	Research purposes	0.595
3	Material resources	0.865
4	Human resources	0.525

#### 4. Findings and Discussion

The results after SPSS analysis from the collected data show that almost all participants thought and agreed that technology must be used in the educational process to enhance the efficiency and capacity building of the teachers and students of Aqaba University College. Arithmetic averages, standard deviations, and ranks for the impact of using educational technology on improving the educational process in Aqaba University College in descending order. The following table 2 shows the arithmetic averages, standard deviations, and ranks for the impact of using educational technology.

No.	Domain	Arithmetic averages	standard deviations	ranks	Level of Significance
1	Educational purposes	4.22	0.41	1	High
2	Research purposes	4.07	0.50	2	High
	<b>Total value</b>	4.14	0.38		High

As for the statements for each domain, the results were as follows in table 3.

Table 3. Arithmetic averages, standard deviations, and ranks for the educational purpose's domain in descending order.

No.	Statements	Arithmetic averages	standard deviations	ranks	Level of Significance
3	Using the e-learning system for marking	4.61	0.5	1	High
1	I use the internet to enrich my lectures	4.27	0.75	2	High
2	Downloading some educational programs from the Internet	4.22	0.55	3	High
6	Implementing feedback between my students and me	4.22	0.55	4	High
4	I use of presentations for my lectures	4.05	0.87	5	High
5	Using the e-learning system to prepare the tests	4	0.48	6	High
	<b>Total value</b>	4.23	0.41		High

Table 3 shows that the educational purposes domain was high, as the arithmetic average reached (4.23) with a standard deviation (0.41). The statements of this domain had a heightened significance as the arithmetic averages ranged between (4- 4.61). Statement (3), which states "using the e-learning system in marking," was first in rank with an arithmetic average of (4.61), a standard deviation of (0.5), and a high significance. While statement (5), which states "Using the e-learning system to prepare the tests," was ranked last with an arithmetic mean of (4), a Standard deviation of (0.48), and a high significance.

Table 3 further shows that using e-learning to improve the quality of the educational system in Aqaba University College was highly significant, with an arithmetic average of (4.14) and a

standard deviation of (0.38). Furthermore, the values of all domains were highly substantial, with arithmetic averages ranging between ( 4.02-4.27. The domain “educational purposes” came first, with an average of (4.22) and a standard deviation of (0.41). In contrast, the domain “research purposes” was last in rank with an average of (4.07) and a standard deviation of (0.50).

Research purposes Domain has been discussed in table 4 in the following:

Table 4. Arithmetic averages, standard deviations, and ranks for the Research purposes domain in descending order.

No.	Statements	Arithmetic averages	standard deviations	ranks	Level of Significance
9	I use the internet to review some books and periodicals within my field	4.61	0.5	1	High
8	I use the internet to find out the latest scientific research developments in my field	4.22	0.55	2	High
7	I communicate with my students to be updated on some of the topics concerning the learning process	4.11	0.58	2	High
11	I use social media to have access to the most critical research issues that concern me	3.94	1.16	4	High
10	I participate in online forums within my field of specialty	3.44	1.04	5	Medium
	<b>Total value</b>	4.06	0.50		High

Table (4) shows that the total value of the research purposes domain was high, as the arithmetic average reached (4.06) while the standard deviation (0.5). The significant level of the statements was either high or medium, as the arithmetic averages ranged between (4.61 - 3.44). Statement (9), which states, “I use the Internet to review some books and periodicals within my field,” was ranked first with an arithmetic average of (4.61), a standard deviation of (0.5), and a high degree of significance. While paragraph (10), which states, “I participate in online forums within my field of specialty.” was ranked last with an arithmetic average of (3.44), a standard deviation of (1.04), and a moderate degree of significance. Thus, the first hypothesis is valid, which is “There is a positive impact of educational technology on improving the educational process from the viewpoint of faculty members.”

Moreover, table 5 highlights the arithmetic Averages, Standard Deviations, and Ranks for the effect of material and Human resources available to Faculty Members on the Effectiveness of Education and Communication Technology in descending order.

Table 5. Arithmetic Averages, Standard Deviations, and Ranks for the effect of material and Human resources.

No.	Domain	Arithmetic averages	standard deviations	ranks	Level of Significance
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2	Human resources	3.5	0.53	1	Medium
1	Material resources	2.91	0.90	2	Medium
<b>Total value</b>		3.20	0.64		Medium

Table (5) shows that the effect of the material and human resources available to the faculty members on the effectiveness of education and communication technology had a medium level of significance with an arithmetic average of (3.20) and a standard deviation of (0.64). The two domains had a middle degree of relevance, as the arithmetic averages ranged between (2.91 - 3.5). The “human resources” domain was ranked first with an arithmetic average of (3.5) and a standard deviation of (0.53). In contrast, the “Material resources” domain was rated last with an arithmetic average of (2.91) and a standard deviation of (0.90).

As for the statements for each domain, the results were as follows:

The material resources domain

Table 6. Arithmetic averages, standard deviations, and ranks for the domain of the material resource in a descending order

No.	Statements	Arithmetic averages	standard deviations	ranks	Level of Significance
2	The availability of internet in the faculty	3.33	1.18	1	High
5	Speed and efficiency in communicating with students	3.27	1.01	2	Medium
3	The availability of support services in case of hardware or network malfunctions (logistical support)	3.11	1.27	3	Medium
4	The presence of educational software and drivers that serve the material I study	2.72	1.07	4	Medium
1	The availability of sufficiently modern computers for teachers	2.11	1.02	5	Low
<b>Total value</b>		2.9	0.90		Medium

Table (6) shows that the domain of the material resource had a medium level of significance with an arithmetic average of (2.9) and a standard deviation of (0.90). Moreover, the statements of this domain had a high and medium degree of significance, as the arithmetic averages ranged between (3.33 - 2.11). Statement (2), which states “The availability of internet in the faculty,” was ranked first with an arithmetic average of (3.33), a standard deviation of (1.18), and a high degree of significance. While statement (1), which states “The availability of sufficiently modern computers for teachers,” was ranked last with an arithmetic average of (2.11), a standard deviation of (1.02), and a low degree of significance.

The human resources domain



Table 7. Arithmetic averages, standard deviations, and ranks for the human resources domain in descending order.

No.	Statements	Arithmetic averages	standard deviations	Ranks	Level of Significance
10	The desire and attitude of the faculty member towards educational and communication technology	3.94	0.99	1	High
6	The preparedness of faculty members to use educational and communication technology	3.88	0.76	2	High
7	The high confidence in the quality of the information found on the Internet	3.33	0.97	3	Medium
9	The availability of sufficient time to incorporate educational and communication technology to achieve the goals of courses	3.33	0.84	4	Medium
8	The excellent and sufficient competence of students to use educational and communication technology	3	0.91	5	Medium
	<b>Total value</b>	3.5	0.53		Medium

Table (7) shows that the human resources domain had a medium level of significance, as the arithmetic average reached (3.5) while the standard deviation (0.53). The statements of this domain had a high and medium degree of significance, as their arithmetic averages ranged between (3.94-3). Statement (10), which states, "The desire and attitude of the faculty member towards educational and communication technology," was ranked first with an arithmetic average of (3.94), a standard deviation of (0.99), and a high level of significance. Whereas statement (8), which states: "The excellent and sufficient competence of students to use educational and communication technology," was ranked last with an arithmetic average of (3), a standard deviation of (0.91), and a medium level of significance. Thus, the second hypothesis is valid, which is: "There is a positive impact of the material and human resources available to faculty members on the effectiveness of educational technology."

### 5. Results and Discussion:

It is clear from the above data analysis that the area Al-Balqa University seeks to improve and develop is incorporating educational technology. Al-Balqa University, by using educational technology, improves the educational process and increases its efficiency, which will positively reflect on the quality of the entire educational process.

The results after SPSS analysis from the collected data show that almost all participants thought and agreed that technology must be used in the educational process to enhance the efficiency and capacity building of the teachers and students of Aqaba University College. Arithmetic averages, standard deviations, and ranks for the impact of using educational technology on

improving the educational process in Aqaba University College in descending order. The data compiled in seven tables indicate the vitality of the subject.

The study results indicated that Aqaba College University employs and integrates information and communication technology in the educational process. Furthermore, it works to raise and improve its educational outputs, especially in the educational field. This indicates that the university is keen to use technology for educational purposes and activate electronic sources, which ultimately reflects the quality and efficiency of the educational process. These findings are consistent with a study conducted by Geoffrey (2010), Noor-Ul-Amin (2013), and Talebian et al. (2014).

This study also indicates that the university employs educational technology for research purposes, which improves the university's educational process, makes the learning process more interesting for the learner, and entrenches the essential skills of the 21st century, namely research, thinking, and mastery of modern technology.

Furthermore, it shows the most prominent challenges facing universities in Jordan: the material and human resources concerning the availability of modern software that facilitates and develops the educational process and the provision of internet services and devices for students to complete their assignments using technology. And here, we must realize the importance of having the necessary infrastructure and components to actively incorporate technology in an integrated manner because the type of infrastructure either promotes using technology or excludes it from the educational process.

## 6. Conclusion

The study showed Aqaba College University utilizes ICT in education. It aims to improve educational results. Demonstrates the institution's eagerness to use technology to teach and activate electronic sources, ultimately impacting educational quality. Additionally, this study demonstrates how the institution utilizes educational technology to promote student engagement and embed inquiry-based learning, critical thinking, and technical competence. It also emphasizes Jordanian universities' major challenges: a lack of modern instructional software, internet connectivity, and technological devices for students to complete tasks. The infrastructure either promotes or discourages the use of technology in education.

## 7. References

- Aristovnik, A. (2012). The impact of ICT on educational performance and its efficiency in selected EU and OECD countries: a non-parametric analysis. *Available at SSRN 2187482*.  
<https://doi.org/10.2139/ssrn.2187482>
- Arkorful, V., & Abaidoo, N. (2015). The role of e-learning, advantages, and disadvantages of its adoption in higher education. *International Journal of Instructional Technology and Distance Learning*, pp. 12(1), 29-42.
- Barrow, L., Markman, L., & Rouse, C. E. (2009). Technology's edge: The educational benefits of computer-aided instruction. *American Economic Journal: Economic Policy*, 1(1), 52-74.  
<https://doi.org/10.1257/pol.1.1.52>

- Al Njadat, E. N., Al-Ja'afreh, S., & Almsaiden, A. H. I. (2021). Educational technology and its impact on the efficiency of the educational process in higher education. *Cypriot Journal of Educational Science*. 16(4), 1384-1394  
<https://doi.org/10.18844/cjes.v16i4.5987>
- Daugherty, M., & Funke, B. (2007). University faculty and student perceptions of web-based instruction. *International Journal of E-Learning & Distance Education/Revue Internationale du e-learning et la formation à distance*, 13(1), 21-39.
- Geoffrey, O. (2010). Effects of Information and Communication Technology on Students' learning: A Case Of Gulu University. *Doctoral dissertation, Makerere University*.  
[http://news2.mak.ac.ug/documents/Makfiles/theses/Opira\\_Geoffrey.pdf](http://news2.mak.ac.ug/documents/Makfiles/theses/Opira_Geoffrey.pdf)
- Kelentric, M. (2013). Integration of ICT into Initial Education of Classroom Teachers: The Case of Two Regions in Croatia. *The Case of Two Regions in Croatia (Master's thesis)*.  
<https://www.duo.uio.no/bitstream/handle/10852/35814/2/CIExMasterxThesix-xMarijanaxKelentric.pdf>
- Noor-Ul-Amin, S. (2013). Effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience. *ICT as a Change Agent for Education. India: Department of Education, University of Kashmir*, 1-13.  
<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.469.375&rep=rep1&type=pdf>
- Ryu, J. (2014). of thesis ICT and Educational Outcomes. Department of Economics Aalto University School of Business. (Master's thesis).  
[http://epub.lib.aalto.fi/en/ethesis/pdf/13692/hse\\_ethesis\\_13692.pdf](http://epub.lib.aalto.fi/en/ethesis/pdf/13692/hse_ethesis_13692.pdf)
- Silva, E. (2009). Measuring skills for 21st-century learning. *Phi Delta Kappan*, pp. 90(9), 630-634.  
<https://doi.org/10.1177/003172170909000905>
- Talebian, S., Mohammadi, H. M., & Rezvanfar, A. (2014). Information and communication technology (ICT) in higher education: advantages, disadvantages, conveniences, and limitations of applying e-learning to agricultural students in Iran. *Procedia-Social and Behavioral Sciences*, , pp. 152, 300-305. <https://doi.org/10.1016/j.sbspro.2014.09.199>
- Tsourapa, A. (2018). Exploring teachers' attitudes towards the development of 21 st century skills in EFL teaching. *Research Papers in Language Teaching & Learning*, p. 9(1).  
<https://rptl.eap.gr/images/2018/09-01-006-Tsourapa.pdf>
- Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digitally networked world of the 21st century. Journal of computer-assisted learning. *Journal of Computer Assisted Learning*, 29(5), 403-413. <https://doi.org/10.1111/jcal.12029>