IMPACT OF EDUCATIONAL TECHNOLOGY ON STUDENTS' PERFORMANCE

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ABSTRACT

The current study is focused on the impact of educational technology on students' performance in the secondary stage. Selection of this stage is attributed to fact that it is impossible to focus on all the stages as there are about 130 thousand students in all stages which is a very big population. Also, students of universities who are about 31 can provide clearer and more accurate data. The sample was selected randomly with the electronic sample calculator showing that the minimum number is 380 individuals. The questionnaire was circulated electronically via university administration in the four governorates. The received responses were 342 indicating that the return rate is 90%. The researchers made use of the descriptive statistical analysis to answer the research questions. The data analysis processes guided the researchers to find out that universities effectively apply technology-based education both in terms of perceived ease of use and perceived usefulness as indicated by the mean scores. It was found out that there is a significant impact of technology-based education on students' performance. Further to that it was found out that technology-based education in terms of ease of use and in terms of perceived usefulness significantly impact students' performance in the Ahlia University.

KEYWORDS

Educational Technology, Students' Performance, Bahrain

1. BACKGROUND

There is an agreement that there is a significant increase in technology investments in the educational sector all over the entire world in the past two decades. The major assumption upon which the vast majority of these investments were made was that "technology-mediated learning environments positively contribute to create endless opportunities for learners to search, analyze, work out problematic issues, communicate other and work in teams" (Lim, et al., 2013). They are then equipped with a multiple competency that make themes much competitive as possible in the twenty first century marketplace. Nevertheless, it is perceived from the history of implementing technology in education that educators tend to abandon any type of technology that is not complaint with the social organization of schooling (Cuban, 2005). The recognized benefits of implementing technology in education created significant interest not only for researchers but governments and agencies responsible for funding as well. Great amounts of money were spent; particularly in Europe and the USA, hoping that integrating computers in the learning process can enable students improve their learning as well as minimizing the workload on instructors. It was found through research that several advancements were reached especially in intelligent tutoring, simulations, advanced learning management systems, automatic assessment systems and adaptive systems (Lim, et al., 2013). It was also found out that dependence on new technologies in education has significant effects on the educational outputs, especially in the field of student schooling. Since multimedia plays a powerful role as a vehicle for expanding learning in the process of educational training, it is being used widely to fulfill the education process in an easy and interesting way (Alroaini, 2012). Technology plays an important role in education. When it is applied properly, it can be a determining factor in influencing students' knowledge and learning (Lister, 2015). Some of the benefits of implementing technology in basic education include making learning more interactive and less boring. It improves students' attitudes towards knowledge and their interest in learning. In addition, technology provides opportunities for learning control as well as it can help students investigate and answer complex questions, develop new thinking skills, and access, evaluate, and synthesize information (Hanus & Fox, 2015). Furthermore, technology can help students set goals, form and test hypotheses. Technology also offers tools to share knowledge and learn in

teams rather than individually. Moreover, education technologies make students more efficient and organized in their way of learning (Delgado, et al., 2015). Thanks to advances witnessed in the information technology, there is now what is known as M-learning (Mobile learning) in which the internet and smart phones are integrated in education. One way through which the internet and smart phones technology impact education and learning is through enabling instructors to enhance their formative assessment abilities (Higgins & Xiao, 2013). instructors grow more likely to assess their students' competencies and knowledge the instructional process. There are various programs and applications that enable instructors to immediate feedback during the formative assessment process, with the aim of improving students' performance (Elmahdi, et al., 2018). Given the uncertainties surrounding any change, education professionals always tend not to breach the status quo.

Thus, we are able to build the study hypotheses as follows:

Hypothesis 1. *There is a significant impact of users' perceived usefulness of technology-based education in Ahlia University on students' performance in the kingdom of Bahrain.*

Hypothesis 2. *There is a significant impact of ease of use of the technology-based education in Ahlia University on students' performance in the kingdom of Bahrain.*

In accordance to the literature review carried out by the researcher in this chapter, the following theoretical framework is suggested for the study. This theoretical model is suggested in light of the Technology Acceptance Model (TAM). It is a fact that several models occurred to interpret and enable researchers identify the basis of which users of any technological system accept it and how impacts those users. This included explaining user's acceptance of the new technologies introduced by the computer and the internet in the different fields of life such as: communication, marketing; e-learning; e-commerce and e-shopping. Technology Acceptance Model (TAM) has proved to be one of the most efficient models in that area.

It is assumed that Technology Acceptance Model (TAM) constitutes one of the most widely implemented models through which users of any system attitudes to accept or reject technology can be investigated. As matter of fact, such research presented verified empirical evidence for the effects of perceived ease-of-use and perceived usefulness and they both significant contribute to explain the online adaption intention (Majid, et al., 2016). TAM was initially introduced by Davis (1989) so that the computer usage behavior becomes an understandable thing. The model assumes that perceived usefulness and perceived ease-of-use do actually have influences on the acceptance attitudes of the individuals towards technology. It was indicated that such attitudes of technology users and intentions are influenced by perceived usefulness and perceived ease-of-use (Khatibi, et al., 2002).

2. STUDY SAMPLE

The population of the present research includes all the students of the secondary school's stage in the government schools in the four governorates of the kingdom of Bahrain. In accordance to the statistics of the ministry of education in Bahrain, there are 35 secondary schools including 31,519 students. The calculated sample size was 380 according to Roasoft electronic sample size calculator. Thus, 380 students were targeted in the secondary stage schools in the four governorates (Manama, Muharraq, the Southern, and the Northern). The questionnaires were sent to the students by what's app on their mobile phones by the school's administrations. The returned questionnaire responses to the researcher's Google account were 342. This means that the rate of the returned questionnaires is 90%.

3. IMPACT OF EDUCATIONAL TECHNOLOGY

This part is made up of two sub-sections where there are 24 items. The first section casts light on the status of technology-based education in terms of ease of use and includes 12 items while the second section casts light on technology-based education in terms of users' perceived usefulness and includes 12 items. Mean scores and standard deviations are used.

3.1 Impact of Educational Technology in Terms of ease of use

From the descriptive statistical analysis (see table 1) for the twelve items representing the status of technology-based education in terms of the perceived ease of use, it is evident that there are educational means applied in facilitating the educational processes in the secondary school stage in the kingdom of Bahrain. This

is because the average mean score of is 3.08. Students perceive that they can use technology-based education by 61.6%. This is the relative weight of 3.08. And the average standard deviation is 1.30. The item that comes in the first rank is the 10th. Since its mean score is 3.86, this means that there is an agreement that "Applications and programs used in our classes are easily downloaded and are for free". The item that can be ranked in the 2nd place is the 12th since its mean score is 3.62. This means that there is an agreement that "All our courses, sample exams, and previous exam questions are all available for us online to train". The 1st item whose mean score is 3.58 comes in the 3rd rank. There is an agreement that "Classes are equipped with technological equipment as overhead projectors". The third item comes in the 4th rank as its mean score is 3.54. There is an agreement that "instructors prepare material that is presented on smart boards". Item seven comes in the 5th rank since its mean score is 3.40 indicating that there is an agreement that "We have easy access to moodle". The item that comes in rank 6 is the 11th since its mean score is 3.01. This means that the respondents are neutral towards the content stating "There are training sessions for making use of electronic facilities for better educational experiences". Items four whose mean score is 2.95 comes in rank 7 indicating that the respondents are neutral about the content stating that "Different educational programs and applications are easily used in classroom". The 9th item comes in the 8th rank as its mean score is 2.80. This also shows that the respondents are neutral about the content indicating "We are given the required assistance to make use of the available technologies to fulfil our tasks". The 8th item whose mean score is 2.74 comes in the 9th rank indicating the respondents are neutral about the content stating "instructors communicate us via moodle to inform us about projects, assignments, grades, and observation about our performance". The 5th item is the one that comes in the tenth rank as its mean score is 2.62 indicating the respondents are neutral about the content stating "We are given the opportunity to prepare presentations and projects online at university and at home". Item two comes in the 11th rank as its mean score is 2.49. This means that the respondents disagree that "Internet accessible is available at university". The items with the lowest mean score 2.39 is the 6th. This shows that the respondents disagree on the content showing that "Sometimes our homework assignments are placed on our pages on moodle".

Table 1. Impact of educational technology in terms of ease of use

	N	Mean	Std.	Interpretation	Rank
Classes are equipped with technological equipment as overhead projectors.	342	3.58	1.22	Agree	3
Internet accessible is available at university.	342	2.49	1.33	Disagree	11
instructors prepare material that is presented on smart boards.	342	3.54	1.31	Agree	4
Different educational programs and applications are easily used in classroom.	342	2.95	1.33	Neutral	7
We are given the opportunity to prepare presentations and projects online at university and at home.	342	2.62	1.23	Neutral	10
Sometimes our homework assignments are placed on our pages on moodle.	342	2.39	1.30	Disagree	12
We have easy access to moodle.	342	3.40	1.29	Agree	5
instructors communicate us via moodle to inform us about projects, assignments, grades, and observation about our performance.	342	2.74	1.28	Neutral	9
We are given the required assistance to make use of the available technologies to fulfil our tasks.	342	2.80	1.29	Neutral	8
Applications and programs used in our classes are easily downloaded and are for free.	342	3.86	1.35	Agree	1
There are training sessions for making use of electronic facilities for better educational experiences.	342	3.01	1.37	Neutral	6
All our courses, sample exams, and previous exam questions are all available for us online to train.	342	3.62	1.25	Agree	2

3.2 Impact of Educational Technology in Terms of Perceived Usefulness

Table 2. Impact of educational technology in terms of perceived usefulness

	N	Mean	Std.	Interpretation	Rank
Using education technology facility is an enjoyable thing.	342	2.93	1.456	Neutral	11
Lessons presented by smart board and PowerPoint presentations are more exciting than traditional lessons.	342	4.04	.932	Agree	4
There is a chance for gamification in our lessons which increase our attention for the lessons.	342	3.66	1.028	Agree	8
We finding participating in such technological activities is a useful thing.	342	3.18	1.138	Neutral	10
Doing our assignments online is more interactive.	342	3.50	1.092	Agree	9
Being assessed by applications as Kahoot and Flickers provides instant feedback about our understanding of the taught material.	342	3.99	.938	Agree	5
Being assessed online is a fantasy for us.	342	3.84	1.122	Agree	6
Participating in online games in class is more motivating.	342	2.56	1.309	Neutral	12
We feel enthusiastic and real challenge when we compete to win electronic games in the class.	342	3.74	1.019	Agree	7
Our instructors are available online when we are at home doing our assignments and provide us with remarks.	342	4.08	.935	Agree	2
We are allowed to create and innovate when we use technological facilities in our lessons.	342	4.15	.927	Agree	1
We are granted opportunities to think critically and reached creative solutions through electronic lessons.	342	4.07	1.051	Agree	3

From the descriptive statistical analysis (see table 2) for the twelve items representing the status of technology-based education in terms of the perceived usefulness, it is evident that students as users of the technology-educational means feel these technologies are useful for them. This is because the average mean score of is 3.62. Students perceive that technology-based education is useful by 72.4%. This is the relative weight of 3.62. And the average standard deviation is 1.07. The item that comes in the first rank is the 23rd item. Since its mean score is 4.15, this means that there is an agreement that “We are allowed to create and innovate when we use technological facilities in our lessons.”. The item that can be ranked in the 2nd place is the 22nd since its mean score is 4.08. This means that there is an agreement that “Our instructors are available online when we are at home doing our assignments and provide us with remarks.” The 24th item whose mean score is 4.07 comes in the 3rd rank. There is an agreement that “We are granted opportunities to think critically and reached creative solutions through electronic lessons”. The 14th item comes in the 4th rank as its mean score is 4.04. There is an agreement that “Lessons presented by smart board and PowerPoint presentations are more exciting than traditional lessons”. Item 18 comes in the 5th rank since its mean score is 3.99 indicating that there is an agreement that “Being assessed by applications as Kahoot and Flickers provides instant feedback about our understanding of the taught material”. The item that comes in rank 6 is the 19th since its mean score is 3.84. This means that the respondents agree on the content stating “Being assessed online is a fantasy for us”. Items 21 whose mean score is 3.74 comes in rank 7 indicating that the respondents agree on the content stating that “We feel enthusiastic and real challenge when we compete to win electronic games in the class.”. The 15th item comes in the 8th rank as its mean score is 3.66. This shows that the respondents agree on the content indicating “There is a chance for gamification in our lessons which increase our attention for the lessons”. The 17th item whose mean score is 3.50 comes in the 9th rank indicating the respondents agree

on the content stating “Doing our assignments online is more interactive”. The 16th item is the one that comes in the tenth rank as its mean score is 3.18 indicating the respondents are neutral about the content stating “We finding participating in such technological activities is a useful thing”. Item 13 comes in the 11 thrank as its mean score is 2.93. This means that the respondents are neutral that “education technology facility is an enjoyable thing”. The items with the lowest mean score 2.56 is the 20th. This shows that the respondents are neutral on the content showing that “Participating in online games in class is more motivating”.

3.3 Descriptive Statistics for Impact of Students’ Performance

This part is made up of three sub-sections where there are 17 items. The first section casts light on the status of students’ performance in terms of participation and includes 7 items, the second section casts light on students’ performance in terms of oral representations and includes 6 items, and the third section casts light on students’ performance in terms of written work. Mean scores and standard deviations are used.

3.3.1 Descriptive Statistics for Impact of Students’ Performance in Terms of Participation

Identifying the status of students’ performance in the Ahlia University in Bahrain (table 3) shows that students are neutral about their performance level in terms of participation. Thus, it can be concluded that their level of performance in terms of participation is average as the percentage is 63.4%. The item with the highest mean amongst all the seven of this sub-section is the 25th since its mean score is 3.95. This shows that there is an agreement that “We contribute effectively in classroom tasks”. The 29th item comes in the 2nd rank as its mean score is 3.50. Thus, there is an agreement that “We demonstrate knowledge gained from the presented material”. Item 28 comes in the 3rd rank since its mean score is 3.47. Thus, there is an agreement that “We provide creative solutions for questions”. The 26th item comes in the 4th rank as its mean score is 3.20 showing the respondents are neutral about the content stating “We prepare material to be presented in class”. The 31st item comes in the 5th rank as its mean score is 2.80. Thus, the respondents are neutral about the content stating “We remain focused throughout the class time”. The 30th item comes in the 7th rank as its mean score is 2.74 indicating the respondents are neutral about “We are able to communicate with our classmates or instructors effectively whether we work in groups, pairs, or individually”. The item with the lowest mean score 2.58 is the 27th as its mean score is 2.58 indicating that the respondents are neutral about the content stating that “We work in groups effectively where everyone has a specific mission”.

Table 3. Impact of Students’ Performance in Terms of Participation

	N	Mean	Std.	Interpretation	Rank
We contribute effectively in classroom tasks.	342	3.95	1.049	Agree	1
We prepare material to be presented in class.	342	3.20	1.186	Neutral	4
We work in groups effectively where everyone has a specific mission.	342	2.58	1.341		7
We provide creative solutions for questions.	342	3.47	1.280	Agree	3
We demonstrate knowledge gained from the presented material.	342	3.50	1.069	Agree	2
We are able to communicate with our classmates or instructors effectively whether we work in groups, pairs, or individually	342	2.74	1.287	Neutral	6
We remain focused throughout the class time.	342	2.80	1.295	Neutral	5

3.3.2 Hypotheses Testing and Discussion

In accordance to the outcomes of the Pearson’s correlation test (table 4) between technology-based education in terms of the perceived ease of use and perceived usefulness (independent variable) and students’ performance (dependent variable), it is found out that the Pearson correlation value between technology-based education in terms of perceived ease of use is 0.707 which is a high and significant correlation value indicating that technology-based education in terms of perceived ease is correlated with students’ performance at the

level 0.01 as the sig. is 0.00 ≥0.01 where both of them impact each other negatively and positively. likewise, the Pearson correlation value between technology-based education in terms of perceived usefulness is 0.582 ** which is a high and significant correlation value indicating that technology-based education in terms of perceived usefulness is correlated with students' performance at the level 0.01 as the sig. is 0.00 ≥0.01 where both of them impact each other negatively and positively.

Table 4. Pearson's Correlation test

		Perceived ease of use	Perceived usefulness	Students' performance
Perceived ease of use.	Pearson Correlation	1		
	Sig.			
Perceived usefulness.	Pearson Correlation	.413**	1	
	Sig.	.000		
Students' performance	Pearson Correlation	.707**	.582**	1
	Sig.	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

As a result of the data analysis process that has just been carried out through this chapter, the researcher was able to reach a number of findings that are worth given due attention and being discussed for the purpose of more clarity for the audience of the study. The data analysis shows that technology-based education is given attention in the Ahlia University in the kingdom of Bahrain. Employing technology is the domain of teaching and learning is being adopted in terms of the devices being used and the applications and programs that are applied by the instructors. In accordance to the findings, Ahlia University equips classes and university with different types of technological sets such as overhead projectors, smartboards, and instructors use their own laptops and or the university. Making use of smartboards and overhead projectors create more fund within the class and motivates students to pay too much attention. instructors present their lessons in a virtual manner where there are sound effects, visual effects, and other technological effects that bring students to be part of the lesson. Some funny videos may add more excitement and enthusiasm to students (Al–Ammary, 2012). One of the most important, and accessible programs in Ahlia University in Bahrain depend on moodle through which students are linked with their instructors at university and at home. The students assured that all their courses, sample exams, and previous exam questions are available for them online on moodle in order to follow and train. Instructors place assignments, project requirements, grades, notices, etc. for the students on moodle. instructors play the most important role in facilitating students' usage of the technological aspects in the teaching and learning process (Majid, et al., 2016). For example, they are committed to prepare material that is presented on smart boards. They train students on making use of technology in learning. They are also committed to encouraging students to use moodle. Thus, it is concluded that students of the Ahlia University in Bahrain perceive that there is a good level of ease of use of technology in education in Bahrain. These findings go along with the outcomes of the study of (Razzaque, 2016). Making use of technology in learning and teaching in the Ahlia University in Bahrain has been proved to be of perceived usefulness. This is attributed to a number of factors. The first of which is that students are allowed to create and innovate when they use technological facilities in their lessons. The contribution of technology to innovation and creativity is something assured through prior research. Students are given opportunities to innovate and create when they prepare materials to be presented in class especially in subjects as science and math. This is proved to be compliant with the outcomes of the study of (Xu, et al., 2011). Another thing is that when instructors and students are connected through internet applications as moodle of the Ahlia University in Bahrain, instructors are available online when the students are at home doing our assignments and provide them with remarks. This is consistent with the findings of (Backåberg, 2016). One of the most perceived fruits harvested from the implementation of technology in education is that student are granted opportunities to think critically and reached creative solutions through electronic lessons. Further to that, technology-based education where instructors present their lessons via smart board and PowerPoint are more exciting than traditional lessons. Moreover, incorporating technology in education helped instructors to integrate more tools for the assessment

process (Bates & Martin, 2013). One method is the usage of internet applications as Kahoot and Flickers and Socrative where the students are provided with instant feedback about their understanding of the taught material. Making use of internet-based formative assessment is currently one of the most enjoyable means that eliminated fear from being assessed and brought more fun to the assessment process students can be assessed individually, in pairs, or in groups. The students assure that being assessed online is a fantasy for them. They feel enthusiastic and real challenge when they compete to win electronic games in the class. There is a chance for gamification in their lessons which increases their attention for the lessons. Gamification is a recent issue whose positive impacts are well perceived on the processes of teaching and learning (Hanus & Fox, 2015). Interactivity is very significant thing that is too much assured through the usage of technology in education these days. Students assure that doing their assignments online is more interactive. When students interact with each other and with their pairs at university and even at home when doing assignments on moodle they learn better and get highly motivated (Graham, 2012). Performance is actually one of the most ambiguous concepts especially when it is related to performance in relation to teaching and learning. Prior research assured that performance can be measured in different manners. When students are meant, it is better to measure it in terms of their participation in the class, their oral representation, and their written work. For one thing, students' performance in the Ahlia University in Bahrain is found to be effective in terms of students' classroom participation. They assure that they contribute effectively in their classroom tasks. They grow more likely to demonstrate knowledge gained from the presented material. When technology is applied in class, students' opportunities to gain knowledge increase as they can easily search the internet, their tables, etc to gain knowledge. When they are equipped with the essential tools, their ability to provide creative solutions for questions is maximized. This is compliant with the findings of (Al–Ammary, 2012). Students are allowed to prepare material to be presented in class. This is an evidence that when technology is applied, they are given opportunities to increase their self-dependence. This may be opposed to what was concluded by (Stakkestad & Størdal , 2017). Inconsequence the students remain focused throughout the class time. In addition, they are able to communicate with their classmates or instructors effectively whether they work in groups, pairs, or individually. The students work in groups effectively where everyone has a specific mission. Participation is a very important indicator for student's attentiveness and positive existence within the class. This is actually achieved in a more effective manner when technological means are applied in the class as the students find the class a more enjoyable area. When it comes to students' performance in terms of oral representation, their performance level is good they have opportunities to play roles and present everyday life situations clearly. This of course can take place via recorded videos. Sometimes instructors ask students to act videos representing some lessons or some of their classroom situations. In addition, students can make use of audio-visual aids presented in class to enhance their oral presentation abilities. This directly supports their abilities to analyze situations and provide recommendations. Using the internet maximizes their ability to do thorough research and respond when particular answers are required. Their ability to express their points of view clearly is enhanced. This is compliant with the findings of the research presented by (Bates & Martin, 2013). Students' performance in terms of written work is found to be effective. The students participate on online games to assess their performance in a written manner. They are more likely to produce lengthy essays about specific topics.

4. CONCLUSION

It can be concluding that technology has become an additional common feature of education globally, over the past twenty years, and Bahrain is not an exception. Indeed, the kingdom has turned more and more towards the implementation of technology-based education. The results of testing the study hypothesis of the study show that there is a significant positive relationship between Educational Technology and students' performance. The results also show that there is Ahlia University that predominantly working with emerging technologies. However, instructors, classrooms, etc. are improvised although there is a quality or quantity of resources. In Bahrain, Educational technology has evolved as a teaching tool, then as a learning aid, and finally as a systems approach. instructors are responsible and committed to find innovative ways to generate improved learning situations for the students. The findings of the study can be used as a basis for future research about the relationship e-learning and effective educational outcomes.

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