Jordan Journal of Educational Sciences Vol. 15, No. 4, pp 505-516

Estimated Evaluations of Bring Your Own Device (BYOD) Technology Implementation in Gaza Strip Secondary Schools - Difficulties of Implementation From the Teacher's Perspective

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Received Date: 20/3/2019 **Accepted Date: 23/6/2019**

Abstract: This study aimed to identify the estimated evaluations of secondary school teachers for employing the BYOD technology, in secondary education in Gaza and the difficulties facing the use of this technique, and then it proposed a model for the use of technology in education. The researcher used a descriptive analytical method. The study sample consisted of (100) secondary teachers, selected randomly, from the secondary school teachers in Gaza Governorate. Two scales were constructed; one for the teachers' assessments of the use of BYOD technology in secondary education, and the other for the implementation of BYOD technology in secondary education, from the perspective of secondary school teachers. The study concluded that there is interest by the teachers in modern technologies, despite the lack of requirements to use this technology in education. Moreover, the study concluded the most important difficulties to the use of this technology in education. Based upon that, the researcher developed a proposed scenario for employing BYOD technology in secondary education.

(**Keywords**: BYOD, Estimated Evaluations, Secondary Education)

التقييمات التقديرية لتطبيق تقنية BYOD **في المدارس الثانوية في قطاع غزة -صعوبات التطبيق منوجهة نظر المعلمين-**

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ملخص: هدفت الدراسة الحالية إلى التعرف على التقديرات التقويمية لمعلمي المرحلة الثانوية لتوظيف تقنية BYOD في التعليم الثانوي في غزة، والصعوبات التي تواجه استخدام هذه التقنية، ومن ثم اقتراح نموذج لتوظيف التقنية في التعليم. وقد استخدمت المنهج الوصفي التحليلي. تكونت عينة الدراسة من (100) معلم من معلمي الثانوية العامة، تم اختيارهم عشوائيًا من معلمي الثانوية في محافظة غزة، وتم إعداد مقياسين؛ الأول خاص بالتقديرات التقويمية للمعلمين بتوظيف تقنية BYOD في التعليم الثانوي، أما المقياس الثاني فخاص بمعوقات توظيف تقنية BYOD في التعليم الثانوي من وجهة نظر معلمي المرحلة الثانوية. وتوصلت الدراسة إلى أن هناك اهتمامًا من المعلمين بالتقنيات الحديثة، مع عدم توافر المتطلبات اللازمة لتوظيف هذه التقنية في التعليم، كما توصلت الدراسة إلى أهم الصعوبات التي تحدّ من توظيف هذه التقنية في التعليم، وفي ضوء هذه النتائج وضعت الباحثة التصور المقترح لتوظيف تقنية BYOD في التعليم الثانوي.

(**الكلمات المفتاحية**: (BYOD، التقديرات التقويمية، التعليم الثانوي)

Introduction: Secondary education is an important educational stage, since it is a transitional stage between the primary education and the university. Developing educational system is fundamental to enable students to reach the learning sources, at any time/anywhere, with the highest speed and best efficiency. Digital wireless technologies have become an essential tool of daily uses in different fields, and most of the students, become familiar with these technologies. Therefore, this research attempts to exploit these devices and technical resources, owned by students in the educational process.

Crook, Sharma & Wilson (2015) conclude that the wireless technologies are the solution to many of the problems facing education, since it is effective in many schools all over the world. Moreover, it contributes significantly to the actual implementation of Project 1: 1 "a device for each teacher and student". Furthermore, Bring Your Own Device (BYOD) has received a lot of attention in recent years, because students depend on their personal devices everywhere/every time to make their lives easier and more productive.

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Attewell, Balanskat & Ayr (2015) emphasizes that there is a major change in the infrastructure of the classrooms and lecture halls around the world, as the student's devices have become an essential part of their lives, and thus, will become an essential part of their educational experiences. Therefore, they examined the experience of the Alberta schools in Canada, bringing your own device to the classroom, the researchers created an experimental program to study the effectiveness of bringing the personal devices to the classroom. The sample of this study was a team of 10 schools during the period of 18 months. The researchers founded that, the use of BYOD has an effect on the learning process in general, and on the enhancement of the performance of students learning, where they were more involved and participated in the education process.

Cohen (2013) emphasizes that BYOD is the best wireless technology in education, which provides 24-hour access to learning environment. Therefore, BYOD is one of the promising global trends in education that allows students and teachers to bring their mobile devices at any time/anyplace, in order to meet their needs. Moreover, BYOD allows students and teachers to make effective use of the technical capabilities of these devices in education, such as improving teaching facilities, enhancing learning processes, and supporting learning by a seamless learning environment.

Alberta (2012) defines BYOD as a strategy for learning, where students bring their own devices (smart phones, tablets or laptops) to school for access to the internet.

Song (2014) pointed out that there is a tremendous increase in the owning of portable devices, and there is a big interest in the use of these devices, by students. Therefore, it is necessary to employ BYOD in education, especially, in secondary education, since it occupies a strategic place at the top of the general education scale towards high education.

The studies of Crook, et al.(2015) were conducted under the supervision of the local government, Sydney - Australia, on a sample of 967 of Grade 9 students, where the sample was divided into two groups, one of them was outfitted by special portable devices, while the other group stayed without portable devices. In this experiment, the measurements of the student estimated effects were taken in physics, chemistry and biology. Results demonstrated that BYOD technique has a lot of effects and motivation for all subjects, while increasing its effect in physics, because of its simulation. Moreover, the implementation of this study on junior high school students in Hong Kong indicated that learning the basic science program through the BYOD technique increased the motivation of students to learn the fish dissection lesson, and hence, increased students' absorption and gain of positive attitudes to the subject, more than the strategies used in the textbook

Kay & Lauricella (2014) studied secondary schools in Canada with the aim of identifying the benefits and challenges of using BYOD. The results of the study showed that 75% of the students emphasized the benefits of this technique, and how supports them in education, and meet their educational needs. Moreover, the study showed a great effectiveness for students in the use of their own devices, in taking notes and completion of tasks and reports. Furthermore, many students said that the use of BYOD increased their focus and improved their organization to learn some special needs, that were not available in the textbook.

Andersson, Hatakka, Grönlund & Wiklund (2014) study showed differences between students of classes that have BYDO and traditional classes. The classes that employ BYOD technology are more responsive and consistent, but these classes have suffered from the difficulty of students' concentration. Therefore, this study recommended a concrete strategy to deal with the problem of distraction BYOD education environment.

The results of the Cheshire Public Schools (2013) study showed the importance and effectiveness of BYOD in education, with some challenges that may hinder its use, such as the difficulty of accessing all sources of learning, at the same time and distracting students.

Mang & Wardlly (2013) showed positive trends among secondary students in the use of BYOD technology in school education, because it increases the concentration and attention of students of different classes, gives higher level of organization within the school, higher achievement rates among students, and enables students to prepare the research assigned to them at the same time and share the information they receive.

Problem of the Study

With the importance of secondary education, it is necessary to develop educational systems that have the ability to access learning sources at any place and time, with the highest speed and efficiency manner. Therefore, the researcher visited some secondary schools and holds meetings with some students and teachers.

Hence, she founded that the vast majority of students and teachers have a good technological knowledge, through owning a personal device such as smart phones, laptops, iPads and other wireless technologies that enable them to have access to the Internet. (DeWitt, 2013) believes that instead of blocking such devices in schools, we should teach students how to use them properly. However, making use of personal technological devices can be considered an economical way to improve education, without additional financial burdens on schools. Moreover, schools are not required to provide such devices for students and overcome the problem of lack of

laboratories and equipment, each student and teacher can bring his/her personal mobile device to school. Therefore, BYOD can be seen as a supportive tool for traditional education model, since it allows students and teachers to use their own devices, in order to record notes, present electronic lessons, take pictures from the blackboard, display videos, communicate inside and outside the classroom, and exchange materials.

Therefore, this study tries to identify the problem by answering the questions, declaring the objectives, clarifying the importance, explaining the terminology, and determining the Determinants of the study as follows:

Study Questions

1. What are the estimated evaluations of the BYOD technology employment in secondary education from teachers' perspective?
2. What are the difficulties of the BYOD technology employment in secondary education?
3. What is the proposed model for BYOD technology employment in secondary education?

Study Objectives

This study aimed at recognizing the assessment evaluations of the BYOD technology employment, from the secondary school teacher's perspective, identifying the constraints that students may faces using BYOD technology in secondary education, and developing a proposed model for the BYOD technology employment in secondary education.

Study Importance

This study may enlighten decision makers, planners and developers of secondary education to develop mechanisms, procedures and requirements for the employment of BYOD technology in secondary education. Provides a realistic study of wireless devices and their effectiveness in education. The study may be contribute to shed light on the modern technological trends in the educational process.

Operational Definitions

BYOD Technology: The researcher defined it as a modern learning method that allows both teachers and students to bring their own mobile devices to school, in order to be used into the classroom, in addition to the traditional learning methods.

Employment: The researcher defined it as a set of measures, through which BYOD technology is used in secondary education, in order to increase the effectiveness and efficiency of secondary education, and make it more relevant to technological development.

Estimated Evaluations: The researcher defined it as the estimations that teachers consider, based on their vision; of employing BYOD technology in secondary education; and it is the degree that teachers determine as a result of the responses of the orthogonal scale measures to employ BYOD technology.

Secondary Education: The final stage of compulsory education, including grades 11 and 12 proceeded by basic education (1-10) and followed by higher education. (Palestinian Ministry of Education and Higher Education, 2018)

Study Determinants

The study determinants are as follows:

1. The study is limited to a representative sample of teachers in the governmental schools in Gaza Governorate, during the first semester of the academic year 2017-2018.

2. The two tools are of the researcher's preparation, so the results of this study depend on the accuracy, reliability and validity psychometrics of the tools.

Method

In this study, the analytical descriptive approach is used, since it is the most appropriate research method to conduct such studies. This approach is based on the study of reality or phenomenon as it is and thus, expressed quantitatively.

Study Population

The study population consists of all secondary school teachers in Gaza Governorate secondary schools, (1333) teachers, in the academic year 2017-2018.

Study Sample

A random sample of (100) teachers, was selected, from secondary school teachers in Gaza Governorate.

Study Scales

Many studies and global experiences had been using BYOD technology in education such as (Crook et al., 2015; Attewell et al., 2015; Kay & Lauricellam, 2014; PDST, 2017 & Walmsley 2017). Therefore, the researcher made exhausted survey of some interested opinions in the field of educational technology. Based on these references, the researcher designed two electronic scales to propose the use of BYOD technology in the Gaza Governorate secondary schools.

1. Estimated evaluation of the BYOD technology employment in secondary education, consists of 43 items, after modification, divided into three areas:

- First; the importance of BYOD technology in education (5 items).

- Second; the use of BYOD technology in education (16 items).
- Third; the availability of BYOD technology in education (12 items).

Each item of the scale has given a degree as follows:

Always: (5), Often: (4), Sometimes: (3), Rarely: (2), Never: (1).

In this type of scaling, the answers are divided into five levels:

Always	4.2-5
Often	3.4-4.19
Sometimes	2.6-3.39
Rarely	1.8-2.59
Never	1-1.79

2. Scale of the difficulties of employing BYOD technology in secondary schools, from the teacher's perspective. It consists of 35 items, divided into four areas:

- Difficulties related to BYOD devices (9 items).
- Educational difficulties (11 items).
- Social challenges (7 items).
- Security and privacy challenges (8 items).

Validity and Reliability of the Scales

To ensure the validity of the scales, the study had been offered for arbitration by a number of specialists in the educational technology field. Moreover, the researcher calculated the validity of internal consistency, on the pilot study consisted of (30) teachers, from outside the study sample.

Furthermore, the researcher calculated the validity of internal consistency using Pearson correlation coefficients between the total scores of each area, and the total scores of the three areas. Regarding BYOD employment, the results were (0.45-0.64; 0.73-0.48; 0.76-0.54) and all the values are statistically significant at p=0.01. The internal consistency using the Pearson correlation coefficients for the second scale were (0.68-0.48-; 0.77-0.46; 0.79-0.54; 0.74-0.49) and all the values are statistically significant at p=0.01.

To ensure the reliability of the scales, the researcher used Alpha ronbach test. Regarding the estimated evaluations of the secondary school teachers to employ BYOD, the result was 0.94, with the second scale (0.91). Thus, this result indicates a high reliability.

Procedure

The study scales were modified and developed, to be ready for being applied on the study sample, which is the secondary school teachers in Gaza Governorate. The scales were distributed to the sample of general secondary teachers, 100 teachers, in the first semester 2017-2018.

Results

To answer the first question **"**What are the estimated evaluations of the BYOD technology employment in secondary education from teachers' perspective?", the researcher calculated the means, standard deviations, and the percentages of each item as in Table (1).

Table (1): Means, standard deviations and percentage of estimates to the use of BYOD technology in secondary education

N	item	Mean	SD	%	Degree
	I- The importance of BYOD				
1	I have my own mobile devices (laptops, netbooks, tablets, smartphones, etc.) I always use them.	4.96	0.2	99.1	Always
2	Most of my students have their own devices	4.54	0.63	90.9	Always
3	By using BYOD technology, most of my students participate in learning by their devices used in their daily lives	4.54	0.62	90.7	Always
4	BYOD is cost effective	3.31	0.89	36.6	Sometimes
5	Communication and direct participation can be achieved between the learning process partners by BYOD.	3.07	0.87	61.4	Sometimes
6	BYOD helps improve the quality and effectiveness of teaching and learning.	3.34	0.72	66.8	Sometimes
7	BYOD can be considered as a complement to school computers.	4.43	0.62	88.6	Always
8	All administrators, teachers, students and parents are the target of BYOD.	3.04	0.58	60.9	Sometimes
9	Heavy school bag problem can be solved by reducing the number of books and replace them with electronic books.	4.56	0.63	91.2	Always
10	In teamwork and collaboration, BYOD helps to execute processes and tasks	4.3	0.61	86	Always

N	item	Mean	SD	%	Degree
11	The use of BYOD reduces the damage of the devices that every student bears the responsibility of his device.	4.26	0.26	85.2	Always
12	BYOD helps continuously update the educational sites Practically and technically.	3.14	0.63	62.7	Sometimes
13	BYOD is the most technologically advanced equipment in our lives, so it is familiar to students and teachers.	3.08	0.42	61.6	Sometimes
14	Facilitates the exchange of books and electronic files between learners and teachers	4.18	0.6	83.6	Often
15	BYOD is adding more activities to traditional lessons	4.17	0.69	58.3	Often
	Total	3.93	0.18	78.6	Often
	II- Usage of BYOD				
1	Send and receive announcements and administrative decisions through my personal device	2.02	0.69	40.5	Rare
2	I communicate and discuss the lessons with my students no matter where they are	2.2	0.47	44	Rare
3	BYOD helps use free applications to create chat rooms with students.	2.7	0.82	41.4	Rare
4	Use BYOD to follow up school news and education news	2	0.84	40	Rare
5	Use BYOD to receive and send assignments to students	1.09	0.7	41.9	Rare
6	I can download files for the curriculum on my own	1.99	0.88	39.9	Rare
7	Use my own method to explain some lessons	2.03	0.54	40.6	Rare
8	Do the exercises electronically and send them to students through BYOD	2.65	0.8	53	Rare
9	Use the electronic cloud to store and share information applications and access them	3.11	0.68	62.2	Sometimes
10	I follow the duties of students out of school electronically through BYOD	1.74	0.65	34.8	Rare
11	Use BYOD to set up my completion file	2.17	0.62	43.5	Rare
12	I can test my students electronically through BYOD technology	1.96	0.66	39.3	Rare
13	Use Bluetooth during the class with my students	1.86	0.66	37.2	Rare
14	Use free mobile services to connect with my students	2.46	1.01	49.1	Rare
15	Use email and social networking sites to connect with my students	2.96	0.81	59.1	Rare
16	I can download and upload files from the network and save them on my own device	3.38	0.71	67.7	Sometimes
	Total	2.29	0.29	45.9	Rare
	III- Requirements Of BYOD				
1	The school provides the infrastructure required for BYOD technology	2.07	0.84	41.5	Rare
2	The educational department provides teaching and training materials that are suitable for BYOD technology	2.15	0.83	43.1	Rare
3	The Department of Education is seeking to train a human cadre of participant in the activation of BYOD technology	3.04	0.78	60.7	Sometimes
4	The Department of Education provides a WiFi network at school	1.93	0.72	38.6	Rare
5	The Department of Education offers specialized programs for tests via BYOD	2.01	0.71	40.2	Rare
6	The Department of Education offers educational programs for BYOD	2.76	0.96	55.2	Rare
7	Members of the educational administration, students and parents are interested in integrating the BYOD technology into the learning process	2.97	0.62	59.4	Rare
8	A website is available for my school	3.09	0.91	61.9	Sometimes

N	item	Mean	SD	%	Degree
9	Training and qualification of teachers, students and staff is planned to use BYOD technical skills	2.46	0.69	49.1	Rare
10	I have the ability to use BYOD applications skillfully	2.69	0.69	53.7	Rare
11	I have received training in the use of modern technologies	3.24	0.77	64.8	Sometimes
12	The educational administration encourages the policy of acceptable use of BYOD technology	2.25	0.61	44.9	Rare
	Total	2.56	0.26	51.1	Rare
	Grand total	2.94	3.78	58.5	Sometimes

It is clear from table (1) that the mean of the study sample responses, regarding the importance of BYOD technology in secondary education range from (3.04-4.96), and the mean was (3.93) with personage (78.6%). The item "I have my own mobile devices (laptops, netbooks, tablets, smartphones, etc.) I always use them", occupied the first rank, with mean (4.96), with high level of importance. Regarding the usage of BYOD area, the mean was (2.29), ranging from (1.74-3.38) with percentage (45.9%), which considered as low level of importance. For the area requirements of BYOD technology in secondary education, the mean was (2.56) with percentage (51.1%), and mean range (1.93-3.25), also considered as low level of importance. The whole mean was (2.94) and the percentage (58.5%).

To answer the second question "What are the difficulties of the BYOD technology employment in secondary education?", the researcher calculated the means, standard deviations, and the percentages of each item Table (2).

Table (**2**): Means, standard deviations and percentage on the area of impediments to the use of BYOD technology in secondary education.

SN	item	Mean	SD	%	Degree
	I-Area 1: Difficulties related to BYOD				
1	Lack of personal equipment for all students	2.41	0.63	48.2	Few
2	BYOD technology needs to be charged continuously	3.3	0.75	66	Medium
3	Difficulty transferring large files to personal computers	4.54	0.62	90.8	Very large
4	High prices of personal appliances	3.17	0.68	63.4	Medium
5	The small size of personal monitors reduces the amount of information displayed on the screen.	3.07	0.87	61.4	Medium
6	Storage is limited to personal computers.	3.86	0.79	77.2	Large
7	Requires infrastructure and wireless network development	3.56	0.1	71.2	Large
8	The proliferation of models and the continuous development of personal devices leads to a lack of quick familiarity with the devices	2.94	0.75	58.8	Medium
9	Transmission efficiency decreases with the number of users of wireless networks.	3.88	0.8	77.6	Large
	Total	3.45	0.3	69	Medium
	II-The second area: Educational difficulties				
1	It is difficult to download files for the curriculum on my own	1.79	0.68	35.8	Few
2	Lack of design and curriculum development for BYOD	4.45	0.69	90.8	Very large
3	Difficulty facing students while using BYOD	4.62	0.61	92.4	Large
4	Differential abilities of students in dealing with BYOD devices in the classroom	4.53	0.64	90.6	Large
5	Lack of appropriate education programs for BYOD	3.99	0.79	79.8	Large

SN	item	Mean	SD	%	Degree
6	Personal appliances are not suitable as an educational tool, they are just for fun	3.25	1.23	65	Medium
7	The use of BYOD increases student distraction and lower concentration in the quota	2.65	1.6	53	Medium
8	BYOD technology needs to has good English language skills to support and facilitate BYOD handling	4.53	0.61	90.6	Very large
9	Lack of Arabic educational applications for BYOD	4.62	0.59	92.4	Very large
10	Lack of specialized cadres qualified to build courses in proportion to BYOD technology	3.99	0.76	79.8	Large
11	Teachers and students need to be trained to use these devices efficiently and effectively.	3.07	1.18	61.4	Medium
	Total	3.76	0.33	75.2	Large
	III-The third area: Security and privacy challenges				
1	Using BYOD technology leads to health problems	3.62	0.81	72.4	Large
2	BYOD devices may facilitate cheating when used	4.51	0.55	90.2	Very large
3	BYOD devices may be used in non- educational purposed.	4.04	0.72	80.8	Large
4	Personal computers may be subject to security breaches	4.56	0.58	91.2	Large
5	Some schools prohibit bringing personal equipment to school	4.6	0.58	92	Very large
6	Difficulty finding secure sites to download programs from them	3.73	0.92	74.6	Large
7	Easy to lose or steal more than desktop computers.	3.58	0.89	71.6	Large
	Total	4.07	0.35	81.4	Large
	IV-The fourth area: Social challenges				
1	BYOD management software is still in its early stages.	4.56	0.61	91.2	Large
2	Some teachers are not convinced with the importance of BYOD in education.	3.54	1.08	70.8	Large
3	Lack of awareness in the educational administration of the importance of using BYOD technology in education.	2.79	0.99	55.8	Medium
4	Some teachers are not familiar with the skills of using modern technologies.	3.86	0.79	77.2	Large
5	Lack of awareness from the parents regarding the importance of BYOD technology in education.	3.67	1.09	73.4	Medium
6	There is difficulty communicating with students and colleagues through BYOD.	4.26	0.99	85.2	Large
7	Different types of personal computers in students may leave a gap and inequality among students	4.51	0.69	90.2	Very large
8	Some teachers find it difficult to adapt to the BYOD culture	4.59	0.64	91.8	Very large
	Total	3.87	0.32	77.4	Large
	Grand total	3.77	0.24	75.4	Large

It is clear from Table (2) that the mean of the responses of the study sample members on the scope of the BYOD constraint was the first, " Difficulties related to BYOD" between (2.41-4.54); for " Educational difficulties" (1.79-4.62); for "security and privacy challenges" (3.62-4.56); and for "social challenges" (2.79-4.59). The mean of the first area was (3.45); the second area was (3.76); the third area was (4.07); and the fourth area was (3.87). All of which were significantly higher than (3.5). Overall, the arithmetic means of the scale as a whole (3.77) was significantly offset. It is clear that the performance of the study sample on the scale areas indicated that there were significant obstacles.

To answer the third question "What is the proposed model for BYOD technology employment in secondary education?", the following scenario was developed by the researcher based on the results of this study, and in order to achieve a clear vision for the BYOD technology employment in secondary education, and after revision of others experiences, programs, and applications of the mobile learning techniques such as (LaPoint, 2014; Robinson, 2012; Dixon; Tierney & Sweenet, 2012).

Objectives of the Proposed Scenario

The objective of this proposal is to allow teachers and students to bring and use their own personal devices, to perform their teaching tasks. Moreover, they are able to connect to the school's internal network. This technology contributes to the implementation of the "Device to every teacher and student project". Consequently, the school becomes an easy and accessible learning medium for all. In addition to fostering self-learning, and group learning. Furthermore, it can provide teachers and school managers, who have limited technical knowledge of information technology a good scale, which enables them to analyze the basic requirements, planning and ongoing supervision of the technical aspects, and its implications.

Proposed Scenario Requirements

The proposed scenario has seven requirements, which will be described as follows:

I- Technological Requirements:

The technological requirements of the proposed model relate to two parts; one related to the technological infrastructure, which is the BYOD infrastructure (material requirements), and the other to the operational requirements associated with the technology users as follows:

A. Material requirements of technological infrastructure:

- Sufficient budget that ensures the success of the proposed model.
- Providing the required devices, including all wireless devices for teachers and students that are easy to navigate, such as smart phones and tablets or mobile.
- Wide range of Wi-Fi.
- Mobile accessories (chargers, printers and headphones).

B. Operational requirements

- Operating systems suitable for mobile devices in education.
- Records for students and teachers that include the necessary data and information.
- Student registration system and grade system.
- Educational content serving BYOD technology including: Texts written in the form of pdf, doc, ppt, illustrations and photographs, sound recordings and sound effects, video and animation, mental maps and minds maps.
- Icon to connect students' devices, teachers, and management with each other.
- Educational content management software.
- YouTube clips related to BYOD and tablet devices in schools.
- One learning platform for BYOD devices and setting the minimum specification of the BYOD

II- Social Requirements

- Enhancing the community digital awareness for educational administration, teachers, parents, and students taking account of digital learning and the importance of BYOD.
- Convincing the educational administration, students and parents with the necessity and the importance of integrating and using BYOD technology in the school education system.
- Getting parents involved in pre- discussions of BYOD employment, and familiarizing them with BYOD benefits and difficulties, before starting BYOD employment in order to overcome these difficulties.
- Providing systems to communicate with parents.
- Developing a social networking service to the proposed model.
- Developing a real time chat programs to communicate with teachers and colleagues of other schools.
- Informing the concerned community of the model and the mechanism of its implementation.

III- Professional Requirements

- Enhancing teachers and supervisor's qualification and capabilities to employ BYOD through mobile devices.
- Updating new technologies in the mobile devices field.
- Providing professional supporting teams.

IV- Management Requirements

- Ministerial decision in lunching BYOD technology is required.
- Forming a digital education plan.
- Extensive communication is required on the part of the school.
- Determining the acceptance policy of BYOD technology use, and the clearance of responsibility of the teachers, students and parents regarding mobile devises.
- BYOD infrastructure is needed.
- Providing a number of tablets "permanently" for specific cases.
- Integrating BYOD in learning process, in order to support the curriculum.
- Converting educational and training materials into a BYOD suitable format.
- Changing school policies and regulations, to be appropriate to BYOD.
- Human resource training.
- Adequate planning and suitable rules to control usage of BOYD.
- Offering devices for students, who are unable to have their own device by special loans, or by working in pairs or small groups.
- Establishing online classes to determine the working system, work storage, and work evaluation.
- Supporting teams and encouraging students and teachers on the implementation of the BYOD.

V- Teacher's Requirements

- Work organization, recalling of students tasks must be done through some applications (my Homework Student Planner).
- Technical training for teachers through workshops.
- Monitoring and tracking students' path and evaluation through multiple applications.
- Adapting the class form according to the BYOD needs.
- Using alternative activities when internet is off (internet- off applications).
- Experience exchange between teachers regarding BYOD.
- Sufficient knowledge in the tools, software, and applications that students will use through BYOD is to be available.
- Publishing and tracking the educational process through BYOD technology.

VI-Students Considerations

- Students have their own devices (either privately or through the school payment program if they prefer).
- Connect student device to the school's wireless network.
- Providing students with a school-based e-mail account.
- Login with a user name and password for school's educational platforms.
- Providing students with a Google Account to access Google Apps and cloud-based storage.
- Providing a digital platform for the school to enable access to the student.
- Providing students with e - textbooks.

VII- Security and Privacy Requirements

- Technical support staff determines security arrangements, to enable BYODs to access the school's internet and restrictions such as filtering of some blocked sites.
- Protection of the school network.
- Detecting unauthorized access points.
- Users and devices authentication.
- Access to school systems and data from outside school.
- Providing technical protection tools and strategies by developing a technology for students to educate them about electronic safety.
- Identifying student's devices, and the possibility of downloading educational applications on them.
- Reviewing data policies, information security, privacy and safety.
- Informing students that BYOD technology should not be used to cheat on school assignments or tests.
- Preventing students from using their own devices, to make personal calls, or to capture, or exchange pictures and videos, without permission from the teacher or the school principal.
- In the case of abuse or breaking one of the rules or instructions, the teacher or administrator has the right to withdraw the device.

- The school has the right to inspect or monitor mobile devices of students, during school hours.

IIX-Assessment and Control Requirements

- Collecting feedback on the employment of BYOD technology in education.
- Continuous assessment by considerable indicators.
- Disseminating results and experiences to teachers and parents.
- Continuing training.

Recommendations for activation of the proposal

- Conducting courses, seminars, lectures and work-shops for secondary school teachers, to introduce them to the applications of various mobile devices, and how to employ them in education.
- Developing a plan to improve the financing model, such as infrastructure financing, and improvement of the Wi-Fi network, and providing devices for those who are unable to bring their devices to school.
- Reviewing BYOD school experiences.
- It is recommended to start the implementation of BYOD in stages:

• Starting with one or several categories (using existing infrastructure) and informal experimentation.

• Experimenting with a full group of secondary students, after preparing the infrastructure, and training students and teachers on the mechanism of using BYOD applications in education.

• Evaluating learning outcomes. If the project is successful, it can be generalized gradually to the entire school (with monitoring control and evaluation).

• Giving as much as possible of BOYD homework and tasks.

• Establishing a special unit in the Directorate of Education, on behalf of the BYOD teaching support unit, to follow up and activate BYOD technology.

Discussion of Results

Regarding the first question, "What are the estimated evaluations of the BYOD technology employment in secondary education from teachers' perspective?", and regarding the importance of BYOD employment in secondary education, the results showed that most of the secondary school teachers in Gaza schools (99.1%) and the students (90.9%) have their own devices. This high percentage may reflect the increasing interest in using modern technology. The accompaniment of mobile devices for teachers and students constantly in and out of school, the conviction of most teachers of the importance of using the BYOD technology, the internal motivation to the ability, and the desire to use their personal devices in education; all of which stimulates interest in BOYD technology in education. This confirmed by the study results, where the importance of BYOD employment in education came from the point of view of teachers by (78.6%), which indicated a high level of importance. This result may be attributed to:

- The awareness of most teachers in the importance of using personal devices in education, motivation and love of technology.
- The accessibility to information and knowledge anywhere and anytime, that most of teachers have their own personal accounts on the social media sites, and through it they can follow-up the educational pages.
- The availability of many applications and tools that facilitate learning by personal devices, and facilitate collaborative learning and participation.
- Students enabled to interact freely with each other and with the teacher.
- Easy handling of personal devices in the classroom, compared to desktops computers that require special requirements to work.
- Personal devices are relatively inexpensive, compared to desktop computers, which considered, as an important advantage of learning BYOD.

This result is consistent with many studies that have confirmed the effectiveness of BYOD in many schools around the world, (Attewell, et al, 2015, Kay & Lauricella, 2014; Song, 2014).

Regarding the usage of BYOD in secondary education domain, the results showed that (45.9%) of the teachers used their own devices BYOD in education, which considered low percentage, and does not reflect the increasing interest in the employment of modern technologies in education, and also the positive role played by BYOD technology in the educational process. which can be attributed to:

- Some restrictions, by educational institutions on students, in bringing personal device, and the negative attitudes towards personal devices, as considered as a time wastage.
- The fear of misusing personal devices by students.
- Lack of knowledge of some teachers about the free educational applications that can be installed in personal devices, which facilitate and improve educational process.
- General weakness of students in the use of English language, that BYOD technology needs to support and facilitate its usage.

- Unavailability of physical and human infrastructure of the training needs for teachers and students to employ BYOD in education.

Regarding the availability of BYOD requirements in secondary schools, the results showed that the availability of requirements for employing BYOD from the teachers' point of view are (51.1%). This level is low and unsuitable for employing BYOD in secondary education and this can be attributed to:

- BYOD required special infrastructure, including wireless networks, digital environments (devices, educational applications, digital educational lessons compatible with BYOD).
- The needs to qualified teachers, technicians, that increases the burden on financial budget, especially at the beginning of its application.
- Inappropriate administrative support in schools to employ personal devices in education.
- Negative attitudes from educational administration that personal devices is only for recreation and a waste of time.
- The implications of these requirements have been used to develop a proposed scenario for employing BYOD technology in secondary education, based on the requirements, required from the point of view of teachers to employ this technology in education.

Regarding the second question "What are the difficulties of the BYOD technology employment in secondary education?", the results of the study showed that the difficulties to security and privacy challenges ranked first (81.4%); the obstacle of social challenges came in second place with (77.4%); and the difficulties related to BYOD are (69%.) Therefore, the researcher referred this to:

- Poor efficiency of transmission and penetration of mobile devices that may expose the owner to security issues, and easy loss, and the possibility of use by students for non-educational purposes.
- Lack of awareness among some of the educational parties and some parents about the role that BYOD can play in education, and their belief that BYOD is only a waste of time and technology obsession.
- Lack of the availability of mobile learning sites, lack of specialized and qualified staff who have the ability to build appropriate courses with BYOD technology and teachers and students' personal variation regarding ability to deal with BYOD devices in the classroom.

These results agreed with Andersson et al., (2014); Cheshire Public Schools (2013); Mang & Wardlly (2013).

Through the advantages and disadvantages of employing BYOD, there is an urgent need to go through that experience, to identify strengths and reinforce them, and weaknesses to avoid them, by following the instructions outlined in the proposed scenario.

Recommendations

In light of the study results and the proposed scenario, the researcher recommends the following:

- Using the proposed scenario in employing mobile devices in education, for all levels of education.
- Conducting practical workshops for teachers and students, to introduce the applications of mobile devices and how to use them.
- Dissemination of the electronic culture towards teachers and students, and encouraging them to use modern technology, to improve their academic achievement.
- Further in-depth studies and experiments around the BYOD technology employment in public and higher education.

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