

THE USE OF NEW TECHNOLOGY IN EDUCATION BY SECONDARY SCHOOL TEACHERS

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ABSTRACT

This study aimed at identifying the degree of using instructional technology innovations by secondary stage teachers' in light of some variables. The sample consisted of 317 male and female teachers from secondary schools in northern region of Jordan; Al-Mazar education directorate, for the second semester of the academic 2018/2019. A descriptive approach was utilized and a convenience sample was chosen as potential participants could be easily recruited. In order to achieve the study objectives, the researchers used the scale of teacher knowledge of technology (TKT) through applying the dimension of using instructional technology innovations.

The results indicated that the degree of using instructional technology innovations among the secondary stage teachers was high. However, there were no significant differences related to gender, experience, and scientific qualification. The researchers suggest the need for intensified training courses for male and female teachers to supply them with new experiences in the field of instructional technology.

Keywords: instructional technology innovations, secondary school teachers.

INTRODUCTION

The world witness great changes because of knowledge and population explosion, and scientific and technological progress as well. Where communication and information technology development showed new d methods in teaching starting from computer based learning, using internet in teaching and electronic education based on using interactivity electronic media such as computers, networks and internet, so as to achieve instructional objectives, and convey instructional content for learner with less time and effort.

Teaching technology is an integral process that concerns with all elements and components of instructional program like: goals, content, methods of presenting information, and suitable evaluation process, to create interactive learning environment

between learner and various electronic learning resources. So, teaching technology became in the forefront of instructional aids that sake developing content, and implementation procedures continuously, to handle teacher and learner needs (Seveen, 2009).

Effective professional development for teachers is one of the most important steps to enhance teaching-process, since the teacher is guiding and implementing educational goals, and using instructional technology to obtain best instructional benefit, since teacher is responsible for conveying the instructional message to his students, and helping them in learning by using appropriate aids and materials (Nasr, 2000).

Hughes. (2005) indicated tha the ideal method to change teachers' educational thoughts is to encourage them using technology to achieve the educational objectives. Also, scholar context is the second main element which offer supportive instructional environment for any innovations in the field of instructional technology. Technical knowledge ultimately helps in providing teachers with knowledge and skills they need to use instructional technology effectively. As teachers need basic technical skills and integral knowledge to operate technologies (Hew & Brush, 2007). Integral knowledge includes teacher's ability to operate and install programs and equipment, interact with basic systems, expect technological skills, and specify students' needs according to context to reinforce teaching process (Bennet & Maton, 2010). Therefore, instructional technology innovations is not an aim in itself, but its importance is explored in educational situations, which cannot be achieved without having different skills. So, it is necessary to eliminating technology illiteracy in instructional innovations field, and illustrate dimensions, concepts and skills (Salih and Hameed, 2005).

Instructional technology innovation improves current teaching methods, prepare qualified teachers, and change some of current teaching practices through the following:

- 1- Replace old and unusable strategies.
- 2- Accomplish instructional task effectively.
- 3- Change the interaction between teacher and student through specifying learning procedures and problem-solving methods (Mishra & Koehler, 2006; Hughes, 2005; Pea, 1985).

Teachers' using instructional technology innovations connects between curricula content in one hand and educational objectives from the other hand. So, if the relation between technology and learning outcomes are more specific, probability of teachers understanding of how students learn will be increased (Schmidt et al, 2009). Figure (1) illustrates this relationship.

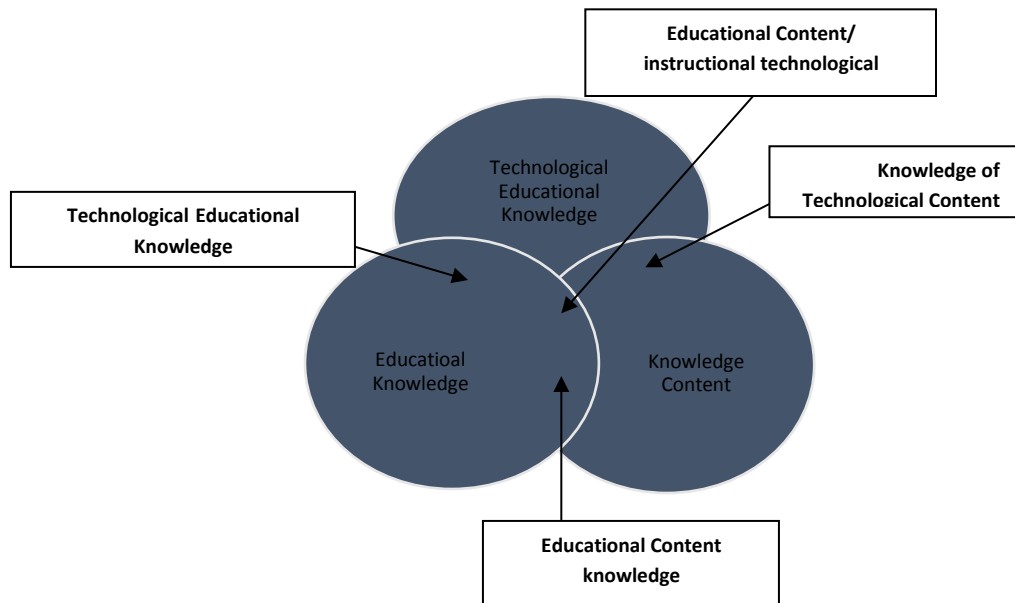


Figure 1: Integration between educational and instructional and content (Schmidt et al, 2009).

Integration among teaching, educational and context or content knowledge enable teachers to have appropriate teaching activities for students' needs. And enable students to have varied skills and knowledge as well. (Mishra & Koehler, 2006). Vannatta. (2004) defined technology innovations as teacher and learner knowledge of some information, skills, and attitudes related to using modern technology media. According to Al Farjani. (1993), it is part of educational systems that cares about using tools and modern equipment in teaching, so as to generalize, apply and evaluate instructional situations. Whereas National center for educational statistic (NCES) indicated in (Gray, Thomas & Lewis, 2010) study defined it as: technology resources merging with daily routine of instructional process and schools' administration, these resources are computers, specialized programs, communication systems based on networks, which includes communication and collaborative work, internet based research, distance control and data transfer through network and retrieval. Further, Al 'Attar. (2011) confirmed that integral system includes new instructional technology such as instructional equipment, software, and instructional machinery. Al Hudabi and Salih. (2019) stated that it is effective utilization of instructional technology in planning and implementing of teaching process on scientific bases.

Advantages of instructional technology innovations:

(Saleem, 2017, Ibrahim, 2002) mentioned some advantages of instructional technology innovations that can be summarized as below:

- **Interactivity:** enables learner to define, processing and interact with information by using computer such as: computer-based learning, interactive media, interactive video, and interactive texts systems.
- **Individualism:** instructional technology innovations allow individualizing instructional situations to suite students' individual differences such as: audiovisual guiding systems and personal teaching systems.
- **Diversity:** instructional technology innovations offer suitable instructional environment to all learners, adequate alternatives and different choices. Also, encourage learner to use all his senses in learning process through audiovisual media Globalization: availability of learning resources and global data bases through using World Wide Web.
- **Integration:** one system, where all its parts working at one unit, to achieve one purpose or more.

Problem of The Study and Research Questions

Several studies confirmed the importance of acquainting teacher with various instructional technology innovations, since it is the most important elements of teaching process success (Akpan, 2010; Yan, Xiao & Wang, 2012; Kocak & Atman, 2013. Recently, Jordanian Ministry of Education represented by Queen Rania Centre for Teachers Training has inserted different technological innovations in many schools such as halls for technical instructional media production, software design, laboratories to display data, smart board devices, loudspeakers, and visual display devices.

After reviewing related literature, researchers noticed -since they work in the educational field- that teachers have differences in using instructional technology innovations as using these various technologies are limited to some teachers, this affect the level of teaching process as well as achieving objectives, in light of what mentioned above, this study aims to assess the degree of using instructional technology innovations by secondary stage teachers, and specifying some affecting variables through answering the following questions:

1. To what extent secondary stage teachers are using instructional technology innovations at northern Al- Mazar education directorate schools at Irbid governorate?
2. Are there differences in degree of using instructional technology innovations related to gender, experience, and scientific qualification by secondary stage teachers at northern Al- Mazar education directorate schools in Irbid governorate?

Significance of the Study

1. This study shed light on the extent of availability and the degree of using instructional technology innovations by secondary stage teachers at northern Al-Mazar education directorate schools.
2. Enlighten those who are in charge of instructional process about schools that have shortage of these innovations.
3. Specify training needs for teachers who lack to the required skills to deal with instructional technology innovations.

Study limitations

This study is limited to:

- i. Secondary stage teachers at northern Al- Mazar schools who are regular in their work for the second semester of the academic 2018/2019.
- ii. Applying one item of teacher knowledge scale of technology, that is utilization of instructional technology innovations.

Terminology definition

- i. Instructional technology innovations: an integral system which includes everything new in the field of instructional technology, such as: instructional equipment, software... etc. so as to raise level of teaching process, and achieving desired objectives. And It is the degree of using instructional technology innovations that the respondent obtains according to teacher's knowledge scale.
- ii. Secondary school teachers: all males and females' teachers of secondary schools at northern Al- Mazar education directorate.

LITERATURE REVIEW

A study conducted by Oleimat (2009) to identify the level of awareness of science teachers at fundamental stage for instructional technology innovations. The researcher prepared a questionnaire and apply it to a sample consisted of (80) male and female teachers of science at fundamental stage. The results showed awareness level was high, and there are no significant differences related to specialty variable. Whereas there are significant differences related to experience variable in favour of teachers with short experience.

A study aimed at identifying training needs of teaching staff of academic college at Makkah in instructional technology innovations field. The researcher prepared a questionnaire and apply it to a sample consisted of (71) teaching staff who were randomly chosen. The results showed the majority of training needs in instructional technology innovations field ranged between medium and high for faculty members on all domains, and training needs degree for faculty members in instructional technology

innovations field do not differ according to experience or specialty; whereas it differs according to scientific qualification (Al 'Attar, 2011).

Another study conducted by Awad. (2013) that aimed at defining the degree of instructional technology innovations utilization in continuous education programs at Palestinian universities. The researcher developed a questionnaire and apply it to a sample consisted of (68) male and female students of continuous education program at university of Al Azhar and Islamic university. The result showed the degree of instructional technology innovations utilization in continuous education programs was medium, and there are no significant differences related to gender, University, experience, scientific qualification (Awad, 2013).

A study aimed at defining the required instructional competencies for science teachers in light of some instructional technology innovations. The researcher specified appropriate innovations, and prepared a questionnaire to measure teaching competencies for science teachers. The sample consisted of (13) teaching members. The results indicated the required instructional competencies for science teachers in light of instructional technology innovations ranged between high and very high (Khadir, 2013).

A study aimed at defining teachers' concepts with regard to instructional technology innovations. The researcher collected data through semi organized interviews using content analysis technique. The sample consisted of (10) male teachers of fundamental stage. The results showed that there are differences of teachers' concepts for instructional technology innovations between vocational and personal context. Concerning personal context, teachers find it useful innovation that save time, and raising living standard. Whereas according to vocational context teachers find it a preparation for teaching process and (Saleem, 2017). This study aimed at defining reality of using teaching technology innovations in light total quality criteria by secondary stage female teachers at Jeddah city. The sample consisted of (450) female teachers. The results indicated female teachers' lack of skills to deal with instructional technologies (Kocak & Atman, 2013).

A study conducted by Ghuneim. (2017) aimed at specifying awareness degree of instructional technology innovations of higher Diploma students in education faculty in light of some variables. The researcher developed a questionnaire and apply it to a sample consisted of (326) male and female students of education faculty at Qassim University. The results showed awareness level was high, and there are no significant differences related to gender, training courses, scientific qualification at the awareness degree of instructional technology innovations.

A study aimed at identifying special education teacher's competencies in using instructional technology innovations via social communication media. A questionnaire was prepared and applied to a sample consisted of (114) special education teachers. The results indicated there are no significant differences in special education teacher's competencies in using instructional technology via social communication media related

to gender variable. Whereas, there are significant differences related to experience variable (Al Qahtani, 2018).

A recent study conducted by Al Hudabi and Salih, 2019 to identify the perfection extent of instructional technology department students at IBB University for instructional technology innovation skills. The researcher designed a list of instructional technology innovations skills using observation tool consisted of five basic and minor skills. The sample consisted of (20) male students of instructional technology department, chosen by the purposive method. The results indicated that students' perfection extent of instructional technology innovation skills was medium.

A recent study aimed at identifying instructional technology innovation for students' independent activities, and develop their creation. The researcher used supportive note technique that allow students to retrieval information through supportive signs of specific software. The sample consisted of control group included (1590) students and experimental group included (1067) students. The results indicated the group that learned by using supportive note technique showed high levels of independent individual activities, high levels of creation, and acquired best knowledge of curriculum content as well (Maltabarova, Kokoshko, Abduldayeva, Shanazarov & Smailova, 2019).

DISCUSSION OF PREVIOUS STUDIES

Reviewing related literature showed a clear variance of awareness degree or using instructional technology innovations, while Al Sharqawi. (2003) study showed a low awareness level of innovations, Oleimat. (2009) study showed awareness level of using innovations was high. As well as (Ghuneim, 2017) study. Also, previous studies reflected demographic variables such as: gender variable, specialty, scientific qualification and experience, and their relation with using instructional technology innovations, some studies showed significant differences (Oleimat, 2009), (Al 'Attar, 2011) and (Al Qahtani, 2018). Whereas some studies did not establish significant differences (Ghuneim, 2017) and ('Awad, 2013). Hence, results of previous studies agreed that awareness degrees and using of instructional technology innovations were different, and other factors may affect both awareness and utilization.

Therefore, the importance of current study comes from concentrating on degree of using instructional technology innovations in new instructional environment and on a sample with different characteristics and different technology innovations. So, this study is similar to the previous studies in concentrating on degree of using innovations and the influenced factors, and it differs by using new sample and new context.

STUDY METHODOLOGY

The researchers used descriptive survey methodology to convenient with study purposes.

Variables of the study

- **Independent variables:** gender, experience, scientific qualification.
- **Dependent variables:** the degree of using instructional technology innovations.

Population of the study

Study population consisted of all secondary stage teachers at northern Al-Mazar schools, distributed on (15) schools that included 450 male and female teachers for the second semester of the academic 2018/2019.

Study sample

The sample consisted of (317) male and female teachers, chosen by a convenience method for the second semester of the academic 2018/2019 and distributed according to study variables as shown in Table 1.

Table 1: Frequency Distribution of Study Sample According to Gender Variable, Scientific Qualification and Experience Variable

Variable level	Frequency	Percentage
Gender		
Male	180	56.8
Female	173	43.2
Total	317	100.0
Scientific qualification		
Bachelor degree	231	72.9
Graduate studies	86	27.1
Total	317	100.0
Experience years		
1-5	36	11.3
6-10	87	27.4
11-15	134	42.3
16 years and more	60	19.0
Total	317	100.0

Study Tool

The researcher used the scale of teacher knowledge of technology (TKT); where “Technology” terminology of this scale indicates the following: laptops, computers, smart boards, Ipad equipment, videos presentation equipment, this scale consisted of (37) paragraphs answered using a 5-point scale distributed on five dimensions as follows: teacher knowledge of technology which included (3) paragraphs, knowledge of technology related to teaching and learning which included (5) paragraphs, Using instructional technology innovations which consisted of (11) paragraphs, and cultural components, which included of (3) paragraphs , and teachers' thoughts about Technology which consisted of (15) paragraphs. And to achieve the purpose of the study, the researcher used instructional technology innovations dimension (Hutchison & Reinking, 2001).

Evidences of Scale validity and reliability

External validity

In order to make sure of content validity of the scale of teacher knowledge of technology, paragraphs content were translated to Arabic and presented to (15) reviewers in the fields of (Teaching Technology, measurement and evaluation, Arabic language and English language) from (Yarmouk University, Jordan University, Jadara University and Philadelphia university), to get their opinion of the scale in terms of language formulation and clarity, and paragraphs cohesion according to learning technique inserted in it, and any other suitable modifications. The researchers relied on the paragraph chosen by (12) reviewers and more, i.e. (80%) of reviewers. So, the dimension (semi-final) still consisted of (11) paragraphs.

Construct validity

Study tool was applied on exploratory sample of (50) male and female teachers at northern Al- Mazar education directorate and from outside of the targeted sample. After calculating modified correlation coefficient of paragraphs' relationship with the measurement dimension (0.41- 0.55) none of the existing paragraphs were deleted according to 'Odeh's. (2010) criterion. So, the final dimension is still consisted of (11) paragraphs.

Scale reliability

In order to calculate internal consistency reliability for using instructional technology innovations by male and female teachers at northern Al- Mazar education directorate, (Cronbach's α) were used depending on data of the first application of exploratory sample, and to calculate repetition reliability. (Test- Retest) method was used with a time break for two weeks between the first and the second application, where Pearson correlation coefficient were used for figure out relationship between the first and second application of the exploratory sample, as illustrated in Table 2.

Table 2: Values of Reliability Coefficient of the Dimension of Teacher Knowledge of Technology

Scale dimensions	Internal consistency	Repetition reliability	No. of paragraphs
Using Innovations	0.82	0.84	11

Cronbach's alpha is a measure of internal consistency.

Procedures of the study

In order to achieve study objectives, the following procedures were adopted:

1. Study tool were adopted after reviewing related literature (Appendix A).
2. To examine external validity, study tool was sent to some specialized reviewers (Appendix B).

3. to make sure of validity and reliability of study tool, it was applied on exploratory sample using the (Test-Retest) method.
4. The researchers prepared a list of schools using instructional technology innovations, which includes various collection of instructional technology innovations (Appendix C).
5. Study tool (questionnaire) was applied on the targeted sample of (317) male and female teacher after briefing them of study aims and how to answer paragraphs. The application has taken (30- 40) minutes, and (23) questionnaires were excluded as it lacks either personal data, or validity.
6. To answer study questions, Excel Program was used to insert and analyse data statistically.

RESULTS

1. Results related to question 1 which is: “To what extent secondary stage teachers are using instructional technology innovations at northern Al- Mazar educational directorate schools at Irbid governorate.

Table 3. Frequency Distribution, Mean, and Standard Deviation for the Degree of Using Instructional Technology Innovations by Secondary Stage Teachers

Rank 1	Level	Frequency	Percentage	Mean	Standard deviation
	Using instructional technology innovations				
	Low	17	1.7	-	-
	Medium	93	9.3	-	-
	High	207	20.7	4.26	0.67

Table (3) indicates that using of instructional technology innovations came at high level where mean was (4.26) and standard deviation was (0.67). The researchers refer the above result to the following reasons: availability of instructional innovations at northern Al- Mazar education directorate schools. And concentration of Jordanian Ministry of Education on preparing specialized programs of using instructional technology innovations. Encouraging teachers to attend specialized training courses by defining privileges and overpayment. Teachers concerns of instructional technology innovations and pursuing technological development and integrate it with vocational and specialized domain. Seize opportunities to work with professionals of technology domain. Using what is new in this field even if it not available at schools. So, this result agreed partially with Kocak and Atman. (2013) study, whereas disagreed with Al Sharqawi. (2003) and Saleem. (2017) studies.

2. Results related to question 2, which is: “Are there differences in degree of using instructional technology innovations of secondary stage teachers at northern Al-

Mazar education directorate schools at Irbid governorate?" related to gender variable, experience, and scientific qualification.

In order to answer this question, the mean and standard deviation were calculated followed by the results of single variance analysis, as shown in Table 4.

Table 4: Mean and Standard Deviation of Gender Variable, Experience and Scientific Qualifications

Variable	Level/ Category	Number	Mean	Standard Deviation
Gender	Male	180	1.7626	.43300
	Female	173	1.8215	.44624
	Total	317	1.7881	.43904
Experience years	1-5	36	1.7601	.44278
	6-10	87	1.7847	.44083
	11-15	134	1.8005	.44080
	16 years and more	60	1.7818	.44036
	Total	317	1.7881	.43904
Scientific qualification	Bachelor degree	231	1.7855	.43956
	Higher studies/ Post graduate	86	1.7949	.44013
	Total	317	1.7881	.43904

A) Gender influence

Me mean and standard deviation were calculated followed by the results of single variance analysis, as shown in Table 5.

Table 5: Results of Single Variance Analysis of Gender Variable

<u>Sig.</u>	F	Mean - Square	df	Total square	
.238	1.401	.270	1	.270	Among groups
-	-	60.641	315	-	Inside groups
-	-	60.911	316	-	Total

B) The above table shows that there are no significant differences at level of significant ($\alpha = 0.05$) related to gender variable. The researchers indicated both male and female have taken the same training on using instructional technology innovation, availability of innovations and tools of training at secondary schools for both male and female teachers. So, this result agreed with Awad, (2013) study, whereas disagreed with the results of Ghuneim. (2017) study.

C) Experience

The mean and standard deviation were calculated followed by the results of single variance analysis, as shown in Table 6.

Table 6: Results of Single Variance Analysis of Experience Variable

Sig.	F	Mean - Square	df	Total square	
.966	.090	.017	3	.052	Among groups
-	-	.194	313	60.859	Inside groups
-	-	-	316	60.911	Total

The above table indicated that there are no significant differences at level of significant ($\alpha = 0.05$) related to experience variable. The researchers refer the above result to the following reasons: teachers face the same circumstances, make adaptation within one teaching environment at educational institution which offers all facilities, training and the required needs to develop their skills of using instructional technology innovation which is not limited to teachers with high or few experiences. This result agreed with Awad. (2013) study, whereas disagreed with the results of Oleimat. (2009) study.

D) Scientific qualification

Table 7: Results of single variance analysis of Scientific qualification variable

Sig.	F	Mean - Square	df	Total square	
.866	.029	.006	1	.006	Among groups
-	-	.193	315	60.905	Inside groups
-	-	-	316	60.911	Total

The above table indicates that there are no significant differences at level of significant ($\alpha = 0.05$) related to Scientific qualification variable. The researchers refer the above result to the following reasons: all teachers with various Scientific qualification are attending training courses in the field of instructional technology innovations, and they have adequate experience enable them to use instructional technology innovations regardless of the scientific qualification. So, this result agreed with the studies of (‘Awad, 2013) and (Ghuneim, 2017).

RECOMMENDATIONS

In light of the above results, the researchers recommend the followings:

1. Intensified training courses for both male and female teachers to supply them with new experience in the field of instructional technology.
2. Insertion of new instructional innovations to the Ministry of Education such as: visual simulation equipment, interactive digital texts, and interactive voice programs.
3. Performing future studies, which should include the difficulties of using instructional technology innovations at northern Al Mazar education directorate.

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