

## The effect of a training program based on the use of information communication and technology in improving the academic performance of mathematics among basic stage students

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### Abstract

The study aimed to measure the effect of a training program based on the use of information communication and technology in education in raising the level of academic achievement in mathematics among students of the basic stage in the public schools affiliated with Al-Salt District. The quasi-experimental approach was used on a sample of 50 male and female students (a control and an experimental group). The study scale consisted of 14 items and a training program consisting of six sessions. The results of the study revealed a difference in the technology pre- and post-test between the mean scores of the experimental group students. They study mathematics according to the proposed training program. However, there was no significant statistical difference between the mean scores of the control group students who study mathematics according to the proposed training program in the information technology pre- and post-test. The results showed that there was a significant statistical difference between the mean scores of the experimental group students who study mathematics according to the proposed training program and between the average scores of the students of the control group who study the same subject according to the usual method in the information technology post-test.

**Keywords:** information technology in education, academic achievement, basic stage

### INTRODUCTION

Educational technology is a sub-system of pedagogical technology through which the problem in human learning is identified, analyzed, implemented, and evaluated to achieve educational goals and manage learning resources and their development (Thomas, 2016), which helped the teacher to deliver the information to the students in a smooth, interesting, and attractive way, as technology in education has become one of the systematic methods of thinking and practice (Nurdyansyah et al., 2017).

Modern technology has occupied a great position at present after entering the educational system in the form of science, especially schools, and it has become a reality that cannot be ignored, and it has taken a wide-dimensional approach in the field of education (Teräs et al., 2020), and all institutions in the governmental and private sectors have competed to find effective educational means that improve the performance of

their institutions and raise their creative abilities (Abu Rabie, 2015).

Salameh (2016) indicated that information communication and technology (ICT) help play multiple roles in education, including the ability to deliver educational content with different and varied patterns and strategies such as educational games, private education simulation, training and practices, dialogue, and simulation.

Al-Zboun and Ababneh (2010) emphasized the role played by educational technology in terms of raising the efficiency of education and improving its quality after the huge population explosion that occurred in the current era and led to a decline in the level of the educational process.

The current stage also requires the use of technology, including its multiple media, smart applications, and various information in the educational learning process, and this is confirmed by the findings of scholars and

### **Contribution to the literature**

- The present study significantly contributes to the existing literature throughout providing a training program that could be implemented over different categories or stages of students and improve their academic performance.
- This study enriches the theoretical literature available about the integration of education technology in the pedagogical context.
- The present study is considered a nucleus for further research studies investigating the training programs based on ICT and its effect on improving different academic aspects including academic achievement.

educators that the use of technology supports the learning process, and separates it through the practice of activities, which contributes significantly to the student's understanding of facts and concepts in addition to the development of its skills (Salama, 2013, 2016).

While Al-Dariush and Abdel Alim (2017) considered that the use of modern technology in the educational process contributes to an increase in the number of learners and helps the teacher to keep pace with the modern educational outlook, at the same time it provides the learner with alternative educational resources, in addition to a wide area of self-learning.

Many modern means and methods of learning have also appeared, which focus on the use of modern technology in learning in all its forms, including educational applications through which information can be provided and stored, which provides the opportunity for the learner to independently discover solutions to one of the issues and reach a result (Saadeh, 2015).

Al-Sartawi and Saadeh (2015) indicated that the necessity of using technology in education lies in the development of higher mental cognitive skills such as thinking, problem-solving, data collection, analysis and installation, finding solutions to problems of learning difficulties, cognitive explosion and information flow, the need for speed in obtaining information, and the need for skill and mastery in the performance of a business and complex mathematical operations, and that its use does not require advanced knowledge or skill to operate and use it.

Educational technology expands to include other factors related to planning, designing and implementing situations capable of achieving goals and elaborately achieving them, so that it raises the adequacy of education, shortens time and effort, and makes the learning process happen faster (Mohammed et al., 2004).

Al-Tobji (2000) defined educational technology as a way of thinking as well as a method of work and a method for solving problems that depend on following a systematic scheme or system method to achieve its goals, while Shehadeh (2010) considers it as the process of benefiting from scientific knowledge and research methods in the scientific planning, implementation and evaluation of the units of the educational system individually and as an integrated whole with its

intertwined relationships to achieve a specific behavior in the learner with the help of both man and machine.

The significance of using technology in classrooms is underlined by the fact that it greatly aids in the development of instructional scenarios, supports the teacher's function of carrying out his or her duties, fosters a positive rapport between the teacher and the student but also emphasizes their engagement, as well as aids in the activities such as planning, assessment, and instructional assessment (Shehadeh, 2010).

Where this technology provides multiple advantages if it is used in the classroom including providing an opportunity to watch collectively, exciting and motivating students during the presentation of the educational material, facilitating the ability to retrieve any educational material and ease of storage, allowing students to interact dynamically with the technology in a useful and enjoyable way, adding material and providing an interactive and cooperative environment for quality education (Abu Rizk, 2012).

According to Zembylas and Vrasidas (2005), contemporary educational tech offers a rich teaching atmosphere in the classroom that enables him or her to openly consider, innovate, and choosing the correct function in accordance with his or her preferences, requires, and ambitions. It also enables the student to try new things and make mistakes without harboring any fears of failing. Digital literacy is among the most significant advancements of this era because it altered the role of the teacher.

In light of the technological progress and the huge technical revolution that our age is witnessing today in every field of life, the educational process was one of the most important of these areas, as many teachers turned to employ technology in its various forms in the educational process, in response to the voices that called for the need to keep pace with technological development and make it in the service of the educational process (Al-Mashharawi, 2020).

Academic achievement is one of the topics that have attracted the attention of researchers and educators through the observations that they have collected about the varying degrees of achievement among students, which depend on the student's abilities and the skills, experience and skill he/she possesses, and the circumstances surrounding him/her at home as the first

environment in which his/her attitudes grow and develop towards learning and achievement, or the school environment as the second educational environment, by providing the school environment that is conducive and stimulating to good achievement (Asia, 2010).

Educational attainment significantly influences and defines the educational process, given that the achievement process is complex and is influenced by multiple factors. Hence, the grades that the student obtains are not always a true measure of his/her ability to learn, as often the academic achievement process is linked to several factors, some of which are related to the educational experience and the way of learning. The other is related to the learner, his/her abilities, aptitudes, and temperamental, emotional and motivational qualities (Al-Khalidi, 2003).

Measuring the level of academic achievement aims to determine the result of the student's transition to another stage and the ability to identify the individual abilities of students, and to benefit from the results of achievement in moving from one school to another, and this, in turn, is reflected positively or negatively on the student's behavior towards school and education and contributes to modifying the psychological and social adjustment of students (Sadiq, 2009).

Academic achievement is also characterized by several characteristics represented in its excellence in the content of the curriculum of a particular subject or group of subjects, each of which has its knowledge. It also usually appears through the answers to the written, oral and performing semester exams, and takes care of the achievement that prevails among the majority of ordinary students in the class and does not care about special features. Academic achievement is also considered a collective method based on employing unified collective examinations, methods and standards in issuing evaluation judgments.

There is a group that believes that educational technology is nothing more than the use of electronic devices and machines in education. However, this term is broadened to include all types of interactions that occur between the teacher and the learner and the surrounding environment, including the materials, machines and tools that facilitate the educational process. Education technology is an attractive educational method, with its visual and audio effects that contribute to the consolidation of information and help in understanding, assimilation and ease of retrieving information from memory because it is linked to more than one sensory channel (Al-Khalidi, 2003).

Modern technology is one of the tools that we look forward to using to alleviate the problems faced by students of the basic stage in mathematics, as it includes many technical educational means such as programs, games and portable devices to teach them the skills

required for mathematics to enable those who find it difficult to understand mathematical concepts and symbols. To access the mathematical content of symbols and graphics, accordingly the current study sought to measure the effect of a training program based on the use of ICT in raising the level of academic achievement in mathematics among primary school students in the public schools of Al-Salt District.

### Statement of the Problem

The utilization of information technologies in the instructional context leads to creating intellectual environments that motivate the student to explore topics that do not exist within the curriculum, and the ability to provide experiences and educational opportunities through modelling and simulation and to make a change in the role of the learner from a recipient of information to a seeker, and helps him/her to provide various sources that suit his/her abilities and desires to learn, as the educational material is presented skillfully under the supervision and guidance of the teacher, and takes into account the individual differences among students.

It is also considered a means of developing traditional methods of learning, which makes the learned material easier to understand and less likely to be forgotten, as it helps the learner's learning, encourages thinking processes, strengthens his/her motivation, increases his/her self-satisfaction, and contributes to retaining what he/she has learned, which is reflected in the overall educational process on his/her academic achievement.

The problem of the study stems from the presence of shortcomings sometimes in some teachers and school administrations related to the employment of teaching skills, related to how to organize and use learning and teaching materials to reach educational goals through materials, devices and tools that contribute effectively to clarifying the concept of educational technology to change skills, capabilities and the learner behavior associated with the use of educational technology, whether in its introduction as a modern method of teaching by teachers for primary school students, or by some students in its use, and the researcher noted that there may be shortcomings in the teaching methods and aids used in teaching mathematics to students to meet the needs and characteristics of these students in such an educational stage, where the usual methods of teaching focus on memorization, and move away from the use of modern technological methods and tools in education.

As an outcome, this research intends to address significant issues; its findings provide a concise assessment of the effect of a training program based on the use of educational technology (ICT) in raising the level of academic achievement in mathematics among schoolchildren in the basic stage in public schools connected to the Al-Salt District.

## **Significance of the Study**

The importance of the study is, as follows:

- 1- The current study hopes to show the importance of using information technology in education (ICT) through the inclusion of a set of programs and modern technological methods in the teaching process with the aim of teaching and developing basic mathematics skills for primary school students.
- 2- The current study hopes to show the importance of using and employing information technology in education (ICT) in developing and improving mathematics skills for students and raising the level of achievement among basic-stage students.
- 3- Identifying the effectiveness of the proposed program and its contribution to the development of teaching methods in mathematics, so that it can acquire different skills faster and more efficiently.
- 4- Providing mathematics course authors with contemporary issues that help them choose the appropriate content to face the present, keep pace with technology and knowledge progress and address challenges, thus opening the way for researchers to develop.
- 5- Facilitating ongoing research on the topic of the work by academic scholars, relying on the results and recommendations of the current study.
- 6- Expanding the tests used and related to them in the Jordanian environment and presenting some suggestions and recommendations in the results of the current study.

## **Objectives of the Study**

The current study aimed to reveal the effect of a training program based on the use of information technology in education (ICT) in improving the academic performance in mathematics among primary school students in government schools in Al-Salt District.

## **Conceptual and Procedural Definitions**

### *Information technology in education*

It is a broad spectrum of technologies: such as automated computers, information systems, virtual learning environments, audio-visual devices, and other media that allow communication and dissemination of information, the aim of which is to develop, improve and refine the educational process through the use of technology.

It is defined procedurally, as follows: It is an interactive technological application related to mathematics that the researcher used in the study on the students of the basic stage, and it presents the basic skills

in mathematics in a fun and attractive technological way, which helps to raise the level of academic achievement among students.

### *The level of academic achievement*

Al-Khattab (2006) believes that academic achievement is the result obtained by the student through his/her studies in previous years, that is, the sum of experiences and information obtained by the student.

It is defined procedurally, as follows: It is the score obtained by the study sample members on the study scale prepared by the researcher for the study.

### *The basic stage*

It is a base for education and a basis for building national and local unity, fostering the child's strengths and natural tendencies while directing them according to their own light. Within that phase, the instructional goals are accomplished, and the individual is prepared in a variety of areas related to his or her physically, mentally, spiritually, emotionally, and socially personalities (Jordanian Ministry of Education, 2019).

## **PREVIOUS STUDIES**

Forgasz (2003) conducted a study to identify teachers' use of computers in teaching mathematics for the secondary stage. A sample of 1,631 male and female students from the seventh-tenth grade was selected. The results of the study showed that 89% of teachers in the year 2001 considered their skills in the computer as a medium, compared to 81% in the year 2003, and it included the factors that encourage teachers to use the computer, the most encouraging factors are related to software, computer hardware and teachers' skills, while the factors that hinder or discourage the use of computers focused on the difficulty of accessing the computer laboratories, and the need for professional development for teachers and computer technology workers in schools.

In order to understand why British elementary school children' scholastic proficiency in mathematics is so poor, Gorard and Smith (2008) conducted a research project. There were 2,312 male and female students in the research group. The survey's findings demonstrated that math pupils had a really limited effect and that factors like gender, grade, and ethnicity had little impact on how well they performed academically in arithmetic.

A study carried out by Bedouins (2017) aimed to identify between smart learning and creative thinking in mathematics for the basic stage in smart learning schools in Amman, on a sample of 100 male and female students from the tenth grade. The study tool was the Torrance test of creative thinking. The results of the study showed that the number of students who had an excellent degree

**Table 1.** The study design

Groups		Pre-test	Intervention	Post-test
EG1	Experimental group	O1-O2	Training program	O1-O2
CG1	Control group	O1-O2	No training program	O1-O2

of creative thinking was 37.5%, the percentage of creative thinking had a medium degree of 58%, and who had achieved a degree of creative thinking with a good degree of 12%, which proved that there is a relationship between smart learning and creative thinking.

Mezyad and Al-Fraihat (2018) also conducted a study aimed at identifying the effect of training employment based on TRIZ theory to develop creative thinking in mathematics among students of the lower basic stage in the Gaza Governorate. The results showed that there is a difference between the mean scores of the students of the experimental group and the scores of the control group in the post-application of the test of creative thinking in mathematics in favor of the experimental group.

Omeishat (2019) carried out a research with the goal of evaluating how well the Todo Math application helped basic mathematics pupils build their capacity for creative thought. A quasi-experimental methodology was applied. The research population included 52 male and female pupils from the Islamic Scientific College School's second grade. An assessment sheet with 32 questions was created and delivered to creative thinking skills in order to meet the goals of this research. The findings revealed that the interventional group that learned mathematics through Todo Math outperformed the control group in terms of productivity average scores on the note card based on creative thinking skills (fluency, flexibility, and originality), while there were no discrepancies in pupil average score due to gender.

## METHODOLOGY

In this study, the researcher followed the quasi-experimental approach. To examine the effectiveness of a training program on the basis of using ICT in improving the academic performance in mathematics among primary stage school children. **Table 1** shows the design of the study with symbols.

### Study Population and Sample

The study population consisted of all students of the basic stage of grades (fourth, fifth, and sixth) in public schools affiliated with the Directorate of Education in Al-Salt, and their number was 2,278 male and female students in 21 public schools. As for the sample of the study, it was recruited using the purposive sampling strategy, and it consisted of 50 male and female students, of whom 25 male and female students for the control group, and 25 male and female students for the experimental group. The researcher applied the academic achievement scale to the study sample who

**Table 2.** Study population & sample distribution on study variables

Variable	Categories	Sample	Percentage
Gender	Male	26	52
	Female	24	48
Grades	Fourth	15	30
	Fifth	17	34
	Sixth	18	36
Total		50	100

obtained low scores on the scale. **Table 2** shows distribution of study population and its sample.

### Data Collection Tool

The researcher developed a questionnaire to measure the role of information technology in education (ICT) in raising the level of academic achievement among students of the basic stage in mathematics, consisting of 14 statements, through the review of the relevant literature, such as the study of Al-Hamawi (2010), Al-Mashharawi (2020), and Najem (2012), as well as based on the theoretical background in the light of the definition of the level of academic achievement, and seeking the opinions of the referee professors. The scale also included five alternatives for each item as follows: Strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1), for positive items, and vice versa for negative items.

### Apparent Validity

The scale was presented to five jury members specialized in educational sciences, curricula and teaching methods, and specialists in assessment, evaluation and educational administration. They were asked to express their opinions on the validity and clarity of the statements to measure the role of information technology in education (ICT) in raising the level of academic achievement among students of the basic stage. The referees agreed on all statements of the scale with some minor linguistic modifications.

### Internal Consistency Validity

Items' correlation coefficients shown in **Table 3** with the total scale were extracted to ensure the indications of the internal consistency of the scale on a sample of 20 male and female students from the study population and excluded from the study sample. The correlation coefficients of the items with the tool as a whole ranged between 0.428 and 0.669 (**Table 3**).

It is clear from **Table 3** that the correlation coefficients of the statements with the total score were statistically

**Table 3.** Correlation coefficients' matrix for the scale items

No	Correlation with scale	No	Correlation with scale
1	.563**	8	.617**
2	.489*	9	.532**
3	.428*	10	.583**
4	.462**	11	.473*
5	.529**	12	.482*
6	.469*	13	.669**
7	.608**	14	.482*

Note. \*Statistically significant at 0.05 & \*\*Statistically significant at 0.01

significant at the significance levels,  $\alpha=0.05$  and  $\alpha=0.01$ , so none of them was deleted, which indicates that the scale is suitable for measuring the level of academic achievement of basic stage students, it has high validity and is appropriate for the current study.

### Instrument Reliability

The reliability coefficient was used according to Cronbach's alpha equation, and the test-retest reliability of the tool as a whole was used for the purposes of verifying the reliability, where the total internal consistency coefficient by the Cronbach's alpha method was 0.91, while it reached by the test/re-test reliability method of 0.93.

### Information Technology-Based Training Program in Education

The training program aimed to show the importance of using information technology in education (ICT) and its role in raising the level of achievement among the basic stage students participating in this program along with the mathematical knowledge it provides in mathematics. Its importance and the characteristics of its use and its implications for the educational and teaching process, and its important role in raising the level of thinking, technical and skill abilities and academic achievement of students, which the researcher reached by reviewing educational theoretical literature from previous books and studies dealing with educational technology, in addition to benefiting from the Mathematics curriculum and its broad outlines in the basic primary education, including its general and specific objectives related to the development of ways to use information technology in education (ICT) for students under study.

Where the mathematical content was presented by employing educational technology through a set of activities, means and methods such as linking new learning with previous learning, presenting the educational material, presenting mathematical topics on a data display device and audio-based technology such as tapes, radio and television broadcasts, electronic graphics such as electronic board and fax, the computer and its networks such as the educational computer and

the Internet, and showing how easy it is to use them as a coherent and connected chain with each other, and presenting interesting and exciting life situations and applications for the student, making the student feel that mathematics is useful and related to its daily life.

Accordingly, a program consisting of six sessions was developed, the duration of each session is 45 minutes, a specialized center was applied, and the following is a presentation of the sessions of the program:

The first meeting subtitled "overview and familiarity," had the purpose of trying to introduce the plan, outlining its goals and what could be accomplished through it, and communicating the partaking pupils. It also clarified and discussed the method for carrying out the program, set up meetings and sessions for the training program.

The second session (information technology in education [ICT], its concept, and the importance of linking it to mathematics) included giving a clear and comprehensive conception of the concept of information technology in education (ICT) in general, identifying its importance and characteristics, and examining the effects of its use and employment in the educational process appropriately, through providing students with the skill to perform the tasks.

The third session (information technology means in education and its types linking it to mathematics) included giving a clear vision of the most prominent means used in educational technology and linking them to mathematics, giving clear examples, and using a set of strategies related to education and learning for information and technological media skills, learning skills and innovation, and the use of technological means in teaching.

The fourth session (educational technology and its role in solving problems in mathematics) included giving a clear vision of the role of educational technology in overcoming many problems facing the educational process, such as radio, television, e-mail, educational films, photographers, and others that contribute to confronting individual differences between students and provoking them. Learners modify their behavior in addition to the formation of new concepts, which can fall within its framework.

The fifth session (technological interaction with the components of mathematics teaching and creating an interactive and cooperative environment among students) included the selection of teaching methods, educational techniques and effective assessment methods in proportion to achieving the goals of successful education, and giving a clear vision of how to deal with many educational sites related to mathematics, the possibility of exchanging dialogue and discussion, improving the use of technological skills, using various teaching aids and teaching aids, and giving clear

**Table 4.** Means and standard deviations for the student's performance on the study pre-scale according to the study group variable (control and experimental)

	Group	Mean	Standard deviation	n	t	Significance
Academic performance	Experimental	3.83	.534	25	.569	.738
	Control	3.97	.498	25		

**Table 5.** Paired samples t-test to compare the mean scores of the experimental group members on the pre- and post-test

Experimental group	n	Mean	Standard deviation	df	t		Significance
					Calculated	Tabulated	
Pre	25	19.963	3.68	48	8.569	2.070	Significant
Post	25	26.826	2.89				

**Table 6.** Paired samples t-test to compare the mean scores of the control group members on the pre- and post-test

Control group	n	Mean	Standard deviation	df	t		Significance
					Calculated	Tabulated	
Pre	25	17.945	2.93	48	0.754	2.060	Non-significant
Post	25	19.138	2.86				

**Table 7.** Significance of the differences between the control group and the study group on the post-test

Post-test	n	Mean	Standard deviation	df	t		Significance
					Calculated	Tabulated	
Experimental	25	27.495	2.97	48	8.524	2.020	Significant
Control	25	20.720	2.68				

examples to enhance students' abilities, guided by objective rules and data.

The last session, which served as the program's culmination and evaluation, featured a debate among the group's participants about the program's benefits and drawbacks, the degree to which they felt improved after completing the sessions, the identification of benefits and drawbacks, and, at the conclusion, a time for praising those who had taken part in the training.

### Groups' Homogeneity

The averages and standard deviations of the learners' conduct on the study scale were calculated per the group variable (intervention, controls), and the "t" test was used to determine if the subgroups were homogeneous (Table 4).

Table 4 shows that there are no statistically significant differences at the significance level 0.05 attributable to the group variable in the total score of the pre-academic achievement scale, and this result indicates the homogeneity of the groups.

## RESULTS

It is clear from Table 5 that the mean scores of the experimental group students in the pre-test of the impact of information technology use were 19.963 with a standard deviation of 3.68, while the post-test was 26.826 with a standard deviation of 2.89, while the value of computed t for two paired samples was 8.569, which is greater than the tabular value of 2.07 with a degree of freedom 48 and at a level of significance 0.05, which indicates the existence of a statistically significant

difference at a significance level 0.05 between the mean scores of the experimental group students who study mathematics according to the proposed pre and post-training program.

This result indicates existence of a significant effect of the independent variable (the training program) on the dependent variable (information technology in education [ICT]) among students of experimental group.

It is clear from Table 6 that the mean scores of the students of the control group in the pre-test of the impact of information technology use were 17.945 with a standard deviation of 2.93, while the mean scores of the students of the same group in the post-test were 19.138 with a standard deviation of 2.86. The calculated t-value 0.754, which is smaller than the tabular value of 2.06 with a degree of freedom 48 and at a significance level 0.05, which indicates that there is no statistically significant difference at a significance level 0.05 between the mean scores of the control group students who study mathematics according to the proposed training program in the pre- and post-test.

Table 7 shows that the mean scores of the experimental group students in the post-test of the impact of information technology use were 27.495 with a standard deviation of 2.97, while the mean score of the control group students was 20.720 with a standard deviation of 2.68 and the calculated t-value 8.524, which is greater than the tabular value of 2.02 with a degree of freedom 48 and at a level of significance 0.05, which indicates that there is a difference between the average scores of the experimental group students who study mathematics according to the proposed training program and the average scores of the control group

students who study the same subject via the usual method in the post-study test, and this means that teaching using the proposed training program was more effective in raising the level of academic achievement of students of the basic stage (fourth, fifth, and sixth) in mathematics than teaching by the usual method.

The result is due to the effective integration of teaching implementation between technological knowledge, knowledge of the content of mathematics and knowledge of teaching methods, which emphasizes the need for a radical change in the educational process preparation systems to include the addition of educational technology as an important and integral dimension of the development of skills, attitudes and cognitive abilities of students must also be integrated into the decisions of the teaching and educational process regulations for mathematics to provide students with innovation and creativity skills, and the process of assigning students to homework and assignments in the context of using as many devices and technological methods as possible, such as the Internet and computers, will develop their cognitive and scientific skills, which will be reflected on their achievement and expand the circle of knowledge they have.

## **DISCUSSION**

The current research sought to see if a training program based on information technology in education (ICT) was beneficial in boosting math learners' performance levels at the basic stage in public schools connected to the Al-Salt District. Our findings revealed that training basic-stage students on the integration of ICT significantly improve their academic achievement.

The effectiveness of integrating ICT might be referred to that the use of technology in education has a clear impact on the development of the educational system because it is one of the modern educational means used to enhance the level of awareness among students and enhance their skills and achievements, as technology has been able to create an advanced and more interactive educational environment than the use of old technologies.

The results of the current study are attributed to the ability of technology to develop communication skills between the two parties and teamwork, as it helped to enhance students' skills and teach proper pronunciation. In addition to promoting creativity in thinking and trying to create correct ways and means of thinking to solve problems, and the possibility of obtaining purely positive results.

Several studies have indicated that the effectiveness of educational technology lies in its ability to promote positive behavior in participation among students, work to promote correct concepts and develop language development. It also has an important and key role in providing a rich source of information that the student

and teacher must be aware of. Recent studies have indicated that communication and information technology have facilitated the application of modern curricula and have opened new horizons between the student and the teacher so that they can be in direct contact through the use of private Internet networks.

Omeishat (2019) pointed out that employing technology in education increases interaction in the educational process by using means that contribute to the achievement of learning and by increasing scientific expertise related to the use of multiple scientific methods and methods. It also contributes to maintaining the learning effect for as long as possible, helping to remember the scientific material. Educational technology helps in measuring and evaluating the educational process on an ongoing basis, as well as introducing new updates that will ensure greater effectiveness of the educational process, in addition to its multiplicity of learning methods, considering individual differences among learners. Educational technology saves time and effort and invests it in increasing the effectiveness of learning and broadening the learner's perceptions by providing the learner with information related to the educational material and what is related to it in all aspects and its impact on practical life.

The findings of the study are consistent with the findings reported by Al-Bedouin (2017), Forgasz (2003), Gorard and Smith (2008), Mazyad and Al-Fraihat (2018), and Omeishat (2019) who reported the remarkable effectiveness of ICT-based training programs on improving the academic achievement of the basic stage students.

## **CONCLUSION**

The study concluded that ICT-based training programs are effective in improving the academic achievement of basic-stage students in the mathematics curriculum. In addition, the study concluded that students' gain of more knowledge about integrating modern technologies in the learning process significantly improves their performance in the educational process. The present study had a number of limitations. Therefore, The attributes and how well it represents the group of which it was selected will determine how broadly the findings can be applied, the study tools, its dimensions and characteristics.

## **Recommendations**

Based on the findings reported in this study, we recommend the following: Intensifying the teaching of educational courses (mathematics) technologically through more educational technology tools. In addition, the study recommends giving more attention to teaching mathematics through the Internet and computer programs, as students are keen to use these materials and move from the good category to a higher category.

Finally, the study recommends intensifying the integration of the library and the Learning Resource Centre into the educational process and the use of educational technology applications within those libraries, with increasing training for all its employees in this framework.

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