

The using technology in teaching mathematics to students in schools

Esraa mohammed basher yahea

Nineveh Education Directorate

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Summary:

One of the most difficult problems facing mathematics curricula at the present time is the effects of information technologies and the profound changes they produce. This new fact will certainly be taken into account, by developing curricula and methods for teaching mathematics and not limiting it to a group of "extra-curricular" side activities, in addition to a curriculum that relies on classical foundations and objectives. The motivation is to integrate information technologies organically into the mathematics curriculum, not only "the desire to catch up with development or to be surprised at the new performance capabilities and to take advantage of the elements of motivation for learning that it offers", but to keep pace with the rapid development taking place culturally, intellectually and economically through a new formulation of the objectives of learning mathematics. And the way to teach it in an easy, simple and likable way for everyone.[3]

Many studies conducted to find out the reasons for the failure of mathematics curricula attributed this failure to the inability of the mathematical skills and operations that they learned during the study stages and their application to the reality of life. It was also found that the students retain their arithmetic skills, algorithms, and mathematical formulas as long as they continue to use them.[4]

Introduction[10]

In recent years, the world has witnessed tremendous developments in technology and communication technology, which led to the emergence of modern methods and techniques for teaching and learning. Researchers and educators are currently interested in finding a sophisticated and simplified technique for learning mathematics because of the great importance of this material in our daily lives, as we find that every individual In the community, he possesses sports skills, which in turn enable him to participate effectively in all activities that serve the community, In addition to the process of mathematical understanding, which is of great importance as a vital factor in shaping the future of students in addition to the future of society as a whole, because the economic future depends mainly on motivating students to be creative and linking different knowledge, which depends on focusing on improving the teaching and learning of mathematics, The teacher also has a great role in how to teach mathematics and communicate the idea to solve the problem in a clear and simplified way for the student, and the curricula in general and mathematics in particular must take into account the continuous developments in techniques that help the student interact and benefit from them in the educational process in a way that guarantees his independence and responsibility.[8]

❖ First: the research problem [7]

One of the most important reasons for employing contemporary technologies in teaching and learning mathematics is the significant improvement in teachers and students' attitudes towards studying mathematics, in addition to the inevitability of our schools and curricula facing the huge explosion of knowledge and technology.

The use of e-learning in teaching mathematics is one of the recent trends that have been recommended by many studies for its feasibility and showed that a person can remember 10% of what he reads, 20% of what he hears, remembers 50% of what he hears and sees, and remembers about 90% of what he hears, sees, and does. , and this actually confirms that the employment of technology in the service of

education, despite its existence as an idea in the minds of teachers, it is not sufficiently employed in the curricula[12].

❖ Second: The problem questions

The researcher noticed through her work that there is a clear decline in the achievement of female students in mathematics, which prompted the researcher to try to employ technology in the field of mathematics teaching in the hope of improving female students' results in mathematics.[14]

In light of this, the study problem can be defined as follows:

- What is the extent of knowledge of mathematics teachers about the modern programs available for teaching mathematics ?

Does the use of modern programs in mathematics teaching contribute to the development of content ?

- Were the teachers able, as a result of the modern programs, to save the time they used to spend in repetitive routine activities?

- What are the opinions of middle school students about the reality of using modern technologies in teaching mathematics? [5]

❖ Third: Analysis of the research problem[13]

The problem was observed by looking at the students' educational achievement tables and conducting a survey of the parents' opinion of the problem, as well as making a questionnaire for female students in the secondary stage and identifying the problem facing the students and proving their existence. The current study reached many results, including[2]:

- 1- Not using a variety of advanced educational means.
- 2- The teachers did not use modern and diverse strategies in teaching.
- 3- Modern programs have helped students understand and excel in the subject.

❖ Fourth: Technology Employment:[9]



There have been many trends that demanded the necessity of introducing the use of technology into schools through studying the computer subject and training in its use, or by using ready-made programs or using innovative methods by the teacher himself. in the UK, and CAMP and SOL in the USA.[1]

Technology has helped to enrich the quality of investigation and research by providing means of viewing mathematical ideas from multiple perspectives, and has provided an opportunity for focus when students engage in dialogue with each other. On the other hand, technology has provided opportunities for teachers to adapt teaching to students' special needs. Those who are easily distracted can focus more attentively on computer-related tasks, and those with organizational difficulties can benefit from the limitations of a computer environment.[3]

The computer programs designed for education depend on the basis that the educational program must be an expert program, meaning that the program is able to solve problems, follow the steps of the solution, criticize solutions, identify errors and suggest solutions. Teaching mathematics[10].

❖ Fifth: Research Objectives:[4]

Detecting the impact of the use of modern mathematical programs on students' academic achievement in mathematics.

- Recognizing the effectiveness of modern sports programs in raising the level of achievement for secondary school students.
- Comparison between the results of students who followed the traditional method of studying mathematics and those who used modern mathematical programs[19].
- Finding and employing computer programs that benefit the teacher in fixing concepts, facts and generalizations in the learner's long-term memory.[1]

❖ Sixth: The importance of using modern technologies in education[13]

The importance of using modern technologies in education has been "highly hoped by many who work in the field of educational technology on the role it plays in the educational process. Educational technology enthusiasts believe that its use will lead to:

First: Improving the quality of education and increasing its effectiveness. This improvement is the result of:

- Solve the problems of overcrowding in classrooms and lecture halls.
- Facing the shortage of qualified academic and educational staff.
- Taking into account the individual differences between students.
- Combating illiteracy, which stands as an obstacle to development in its various fields.
- Training teachers in the areas of preparing objectives, educational materials and appropriate teaching methods.
- Consistency with the modern educational outlook, which considers the learner the focus of the educational process.

❖ The importance of educational aids in facing the problems of contemporary changes:

The National Council of Teachers of Mathematics in the United States of America NCTM National Council of Teachers of Mathematics has adopted the principle of technology as one of the principles on which school mathematics is based. Improving student learning, facilitating the organization and analysis of data, the ability to perform arithmetic operations accurately and quickly, and helping to research all branches of mathematics[2].

Some of the reasons why it is reasonable to expect computers to be successful in learning mathematics even though other advanced technology has not:

- The student's success and sense of transcendence, as the computer improves students' attitudes towards mathematics and makes them deal with it as analysts and computer experts.
- Education and motivation to use computers in schools, as it helps students achieve self-realization. Many students like to create computer programs and run it, whether through programs they prepare themselves or ready-made programs, which makes them feel fun and comfortable[11].

• Controlling his learning environment, as most of the learning strategies used put students in negative situations, while the computer puts them in the role of controlling what the computer does and they have an active role, participation and management of the learning environment itself.

❖ Seventh: Types of computer software[11]

And educational software means those lessons or activities that have been organized, produced and computerized to achieve specific goals in a prescribed learning-learning situation and for a specific audience of learners. Examples of computer software used in school mathematics include[17]:

- Microsoft math 2007 is a program for solving math problems with explanation of the solution steps.
- Universal Math Solver is a program to solve math problems even if they are taken from books or recent.
- Mathematica is a computer program widely used in the field of mathematics, physics, engineering and various sciences. The program deals with almost all branches of mathematics, and has the capabilities of drawing, solving equations, solving algebraic problems, solving triangles, integration and calculus, series and matrices...etc. In addition to the possibility of allowing modification or building additional information[19].

Geo Gebra software, which is a free program based on the Java language on the computer and based on the Windows and Mac operating system as well as Linux and supported by a large fan base, because this program is translated into more than fifty languages, and was installed on means of sharing and building via the Internet, in addition to It is subject to rapid development with time, and it is made up of a dynamic mathematical database that aims to teach and teach mathematics from the intermediate level in schools to the college level, and combines algebra, geometry, and calculus. In addition to the possibility of using it online or using[6]

The computer is directly connected with technologies that support workshops and group work. It supports smart electronic devices such as smart phones and (IPad).

The program has won many European and American awards, including the European and German award for educational software. The characteristics of the program and its software features are as follows:

❖ **GeoGebr Software Features and Features[6]**

It is a program designed in a way that enables the student to develop mathematical theories and facts through practical application and discovery of concepts by himself. It is a program based on the scientific standards of mathematics and the curriculum approved by the Ministry of Education and not a substitute for it[18]. This program was developed by (Markus Hohenwrtter) with an international team of programmers (University of Florida Atlantic), which is a set of tools that contribute to the student's acquisition of mathematical skills, and this is fully consistent with the constructivist approach to learning.

❖ **Hubs covered by GeoGebra[6]**

The program covers most of the topics identified by the National Council of Teachers of Mathematics (NCTM)

which is next:

- Measurement.
- Engineering.
- Algebra.

GeoGebra consists of three windows with different elements:

- Graphic View window.
- Algebra View.
- Spread sheet View.

This is to represent the mathematical elements in different ways graphically and algebraically, or through the data sheet and these windows are related to each other for the same mathematical element regardless of

The window in which the math object is created, any change that occurs in any of the windows is automatically updated in the others[18].

❖ Objectives of the Geo Gebra program[6]

This program aims to:

- Helping the student to link mathematics with life by employing it with life issues.
- Helping the student to realize concepts and embodying them in a tangible way and building the student's confidence in himself and his ability to learn mathematics.

Giving every student the opportunity to show their fullest potential.

- Helping the student to link mathematical ideas to each other.
- Improving student achievement in mathematics.
- Improving thinking skills
- Develop the skill of self-learning.

The areas covered by GeoGebra are:

- Effective engineering.
- Points, lines (arrows and signs), circles, polygons, functions, cones.

It is an engineering program presented in an algebra method.

- Transformational geometry, translation, reflections, breadth, participation, extension.
- Text box.
- Building, parallel lines, points of intersection, midpoint, circles.
- Measurements, distances, places, angles.
- cartoons.

Text control buttons.

- All existing topics can be written by clicking on them and developing them.
- Three-dimensional images.
- Histogram, a three-dimensional graph.
- Derivation and integration, difficult and easy problems, difficult numbers where they can be displayed algebraic and geometric, schematic algebra, sets, vectors, matrices, discrete mathematics.

• Statistics, random numbers, probability calculations, multiple distribution probabilities, graph probabilities, theory testing, and many different mathematical uses. This is a brief summary of the uses of this program.

I chose this program because I think that it can be suitable for teaching mathematics to middle school students, as it suits the mental and intellectual level of the students, because they have sufficient experience to deal with this program, in addition to the advantages that distinguish this program from other programs[6].

Ninth: Analysis of the results of the questionnaire:

By analyzing the questionnaire, I noticed the following:

- 70% of the class's female students confirm that the use of modern technology benefits female students in understanding mathematics better than the traditional method.
- The recent programs helped the students to understand the subject and excel in it.
- Changing the methods of teaching mathematics from the "traditional" method to the "modern" method is helpful for female students, and more than 60% confirmed that, and thus the sample members have unanimously agreed on the validity of this.
- There is almost unanimity that using the program encourages female students to cooperate with each other in studying mathematics, as 68% of the sample reported this.

Female teachers do not always use modern technologies in teaching, as reported by 80%, and this indicates that there are obstacles to a high degree that female teachers see preventing them from using the innovations of educational technology in teaching on an ongoing basis.

Taking measures:

By analyzing the results of the questionnaire and listening to the answers of the students and parents about this problem and coming up with the results that were associated in their entirety with the problem, it was necessary to point out that the

apparent results depend mainly on the reality through which it helps to get rid of this problem, Therefore, given the current reality of the students, it was necessary to compare what we offer as teachers with the most important reasons that are associated with us, because it is noticeable that some of the reasons are related to the role of the teacher in the classroom and his ability to change the method of subtraction for the subject, In addition to directing students towards learning resources, moving away from the traditional method of teaching, and involving female students in advance preparation for lessons, it enhances the spirit of competition among female students, and thus increases their academic achievement in mathematics. As for the remaining role, it is summed up in communicating with the students and their parents in order to raise their educational attainment. Hence, at the conclusion of this research and after presenting the most important results presented, recommendations should be made that mostly help in raising the level of academic Students' achievement.

Recommendations:

- 1 Using a variety of different and advanced teaching aids by the teacher.
- 2- Use software languages to facilitate the teaching of mathematics as a java and other diverse software.
- 3- Take advantage of the results of this study and its educational program, for the impact of programs in improving students' collection.
- 4- Provide teachers with a list of websites that offer computerized educational programs in mathematics, in order to enrich their computer information and encourage them to be used in mathematics teaching.
- 5- Giving parameters for modern training courses provided that such programs are applied (and are not the current sessions given to some parameters and did not benefit from them).
- 6- Preparation of schools in all requirements for the use of modern education (as a large area, as well as provide the computer and provide the Data Show ...).

- 7- Providing teachers with a list of websites that offer computerized educational programs in mathematics, in order to enrich their computer information and encourage them to use it in teaching mathematics.
- 8- Giving female teachers training courses for modern curricula, provided that these programs are applied (and not like the current courses that were given to some female teachers and did not benefit from them).

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استخدام التقنية في تدريس مادة الرياضيات في المدارس

م.م. اسراء محمد بشير يحيى

مديرة تربوية نينوى

esraa_math@nan.epedu.gov.iq

الكلمات المفتاحية: التقنيات. طرائق التدريس الحديث، البرامج الحاسوبية، برنامج GeoGebra

الملخص:

من أصعب المشاكل التي تواجهها مناهج الرياضيات في وقتنا الحالي هو تأثيرات التقنيات المعلوماتية وما تنتجه من تغييرات عميقة، ففي عصر المعلومات يتسارع فيه تطور التكنولوجيا حيث يتغير فيه مقومات العمل والتعلم والتفكير، ومع هذه التغييرات تزايد الحاجة الى مناهج وطرائق تدريس تلائم التطور الحاصل، لقد أصبح من المؤكد أخذ هذا المعطى الجديد بعين الاعتبار، من خلال وضع مناهج وأساليب لتدريس الرياضيات وعدم اقتصرها على مجموعة الأنشطة الجانبية "اللاصفية" تضاف الى منهج يعتمد مرتكزات واهداف كلاسيكية. فالدافع هو دمج تقنيات المعلومات بشكل عضوي في منهج الرياضيات ليس "الرغبة اللحاق بركب التطور" أو "الدهشة أمام قدرات الأداء الجديد والاستفادة من عناصر التحفيز على التعلم التي تقدمه" فحسب، وانما من اجل مواكبة التطور السريع الحاصل ثقافياً وفكرياً واقتصادياً من خلال صياغة جديدة لأهداف تعلم الرياضيات وطريقة تدريسه بشكل سهل ومبسط ومحبيب للجميع. لقد أصبح دور الكمبيوتر (الحاسوب) مهم جداً في كثير من المجالات الحياتية للتعلم والعمل والتسلية، فالكمبيوتر هو على حد التعبير "حامل لبذور ثقافية متى تجذرت في العقل لم نعد بحاجة الضرورة الى الأداة التكنولوجية المادية لتعطي نتائجها الفكرية.

إن الكثير من الدراسات أجريت لمعرفة أسباب فشل مناهج الرياضيات عزت هذا الفشل الى عدم قدرة المهارات والعمليات الرياضية التي تعلموها خلال مراحل الدراسة

وتطبيقها على واقع الحياة، فهم يتعلمون الرياضيات عبر مسائل مصطنعة بمعزل عن سياق context ما يعتبرونه مسائل مرتبطة بحياتهم اليومية. كما تبين أن التلاميذ يحتفظون بمهاراتهم الحسابية والخوارزمية والصيغ الرياضية ما داموا مستمرين باستعمالها، وما أن يتم اختبارهم في الامتحانات حتى يبدأ الطالب بنسيان الصيغ الرياضية أو البعض منها لعدم الاستفادة منها عمليا.