



THE EFFECT OF USING INTERACTIVE LEARNING GAMES (MAINECRAFT) VIA INTERNET IN THE DEVELOPMENT OF ACHIEVEMENT AND ALGORITHM THINKING AMONG FIRST YEAR SECONDARY STUDENTS IN COMPUTER COURSE

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ABSTRACT

The present study aimed at identifying the effect of using Interactive Learning Games via the Internet (Mainecraft) in the development of algorithm thinking and achievement among First Year Secondary students in Computer Course. To answer the study questions and test hypotheses, the study adopted the quasi experimental design with one group (Pre and Post). The study sample consisted of (30) students who were selected randomly. To achieve the research objectives, the researcher used the following tools: an achievement test and an observation checklist and the data were treated using the suitable statistical methods. The researcher concluded that there were statistically significant differences between the means of the pre and the post test scores of the achievement test in favor of the post test. The researcher also found statistically significant differences in the observation of algorithm thinking between the pre and the post observation after using the interactive game in favor of the post observation. The research recommended the following: the importance of raising teachers' awareness of using interactive games via internet which may help in the perfection of programming basics, and the importance of the availability of using the internet in computer labs ideally to support educational curricula.

Keywords: Mainecraft, Algorithm Thinking, E-Learning Models.

Introduction:

With the beginning of the twenty-first century, there has been a great progress in the field of technology and information and communication technology, where many of the sources and mechanisms of knowledge and so called the age of knowledge and the speed of the transmission of information and data in all ways and means of education.

One of the most prominent methods is the great development in the use of computers and their extension to various fields, especially in the field of education and learning, where he helped to renaissance educational development and improve the performance of educational science using it in the school administration and within the classroom environment of educational tools and a study material as well (Sharhan, 2003)

E-learning models have also emerged to help learners learn at any time and place through an interactive content that simulates the age of knowledge and the modern technology era, drawing on multimedia from images, texts and exciting stimuli for all segments of society, especially students (Salem, 2009). Education and Learning (Sabri, 2010)

One of the most important means of learning and motivating students is the integration of interactive learning tools and learning games into the learning process, which enhances students' thinking skills and helps to increase learner motivation (Combefis, Van, Nootens, 2013).

In line with the Ministry of Education's directives in the Kingdom of Saudi Arabia to develop an electronic learning environment and the frequent use of the Internet by

students and the scarcity of Arabic studies in this field, the researcher prepared a plan for teaching using an online learning interactive game (Minecraft), and its effectiveness in the development of educational achievement and skills Al - Khawarizmi thinking of students of the first grade secondary in the computer curriculum in Jeddah.

Problem of the study:

The techniques and strategies of education in general have attracted the attention of teachers, especially as they have resulted in a variety of learning methods. This interest has increased with the requirements of the 21st century and an attempt to adapt to its requirements to keep abreast of technological innovations and to use the best means, strategies and learning games which helped improve the educational process. Tools in different educational environments.

Where the contribution of modern technologies and the development of the electronic environment and electronic content in solving many of the problems faced by the educational system, is no longer the goal of education in this information age of the twenty-first century to provide the student knowledge and facts, but rather the need to provide skills and abilities and self-reliance to be able to interact with the variables of the age.

(2004), (Salih, 2005), (Charp, 2005), and the researcher's observation of the methods of computer teachers in teaching programming and relying on traditional methods such as conservation and indoctrination (Fahim Mustafa, 2004) 2000) provides that providing an educational environment using new learning tools increases the motivation of students to learn and develop knowledge.

One of the modern learning tools Microsoft officially launched to teach programming is the Mine Craft game in September 2014. The game is available on Code.org and is based on fourteen different programming-based phases that enable the learner to understand thinking The logical algorithm behind the games and the execution of commands sequentially to reach the desired goal.

In line with the directives of the Ministry of Education in the Kingdom of Saudi Arabia in the development of curricula and technologies in accordance with the requirements of the twenty-first century, which is one of the objectives of the King Abdullah project for the development of education, and the large use of software applications in all the computer types and the scarcity of Arab studies in this area, Studying the effectiveness of using the Minecraft online interactive game to develop the skills of Khwarizmi thinking and academic achievement.

Study Questions:

This study attempts to answer the following questions:

What is the impact of the use of Minecraft online interactive game in the development of academic achievement among students of the first grade secondary in the computer curriculum?

2. What is the impact of the use of Minecraft online interactive game in the development of the skills of thinking Alkhwazmi students in the first grade secondary in the computer curriculum?

Objective of the study:

The present study aims to:

1. Measuring the impact of using one of the online interactive learning games (Minecraft) in the development of academic achievement.

2 - measuring the skills of thinking Alkhwazmi students in the first grade secondary in the computer curriculum.

the importance of studying:

The importance of the study is determined as follows:

1. Direct the teachers to use new learning methods for the educational process simulates the skills of the twenty-first century, including focus on the learner and make it the focus of the educational process.

2. The study materials and the tools of computer teachers will contribute to the teaching of 21st century skills

3. The results of the study will benefit officials in the Ministry of Education to develop computer education programs and use strategies that make the learner the focus of the educational process

4. Informing Ministry of Education officials of the importance of using interactive learning games such as Minecraft in the educational process.

5. Informing officials in the Ministry of Education of the importance of developing Khwarizmi thinking.

Study hypotheses:

The study tests the following hypotheses:

1. There were no statistically significant differences at (α 0.05 0.05) between the mean scores of the pre-measurement and post-test scores in the experimental group before and after the use of online Minecraft.

2. There are no statistically significant differences at (α 0.05 0.05) between the average points of the note card in the experimental group's algorithmic thinking skills before and after the use of online Minecraft.

Study Population:

The society of the study consists of all the students of the first grade of secondary school in the fourth year of the academic year 1436-1437H, where this school was chosen by means of coordination with the educational supervisor of the computer course and availability of facilities and equipment. The teachers and students are accepted and ready to conduct the experiment in addition to the cooperation of the school administration.

The study sample:

The sample of the study was in one of the classes of the first grade, which was randomly selected. When the study was conducted, the students who were absent from the tribal test were excluded.

Study Tools

To achieve the objectives of the study, a number of tools were employed:

The first tool: the achievement test

The objective of this test is to measure the academic achievement of the first grade students in the computer curriculum (problem solving formulation). The researcher prepared an objective test consisting of 15 questions, to measure the level of achievement in the following manner:

1. Multiple choice, consisting of a problem and a list of optional alternatives are all wrong except for one correct answer, requiring the student to choose the correct alternative.

The sections of this test were prepared by the researcher based on the Ministry of Education's analysis of the content and setting goals.

Second tool: note card

The purpose of this card is to measure the skill of algorithmic thinking in the experimental group's students. It was prepared through a review of the literature on algorithmic thinking. The researcher relied on the definition of what Al Khwarizmi thought and its advantages. The card consisted of three behavioral units that measure the student's ability to understand the issue And the ability of the student to write the steps of the algorithm solution in a sequential way to solve the issue, and the extent of the student's ability to represent the graphical algorithm).

(4), average (3), good (2), not good (1), did not lead (0) where the performance of students was observed in the

method Play before and after application and monitor results.

Quality of Search Tools (Honesty and Stability):

Honors: The presentation of the achievement test and observation card to a group of specialists in curriculum and teaching methods and in the computer specialty, has been modified according to their instructions and observations, and the final output.

Stability: To measure the stability of the collection test, the Alpha Coefficient coefficient was calculated at 0.76.

In order to measure the stability of the observation card for the thinking skills of the algorithm, the coefficient of correlation between the degree of observation of the researcher and the degree of observation of her colleague was calculated using the Cooper Cooper equation, which reached 86%, which is an appropriate percentage indicating the validity of the skills observation cards and the evaluation of the lessons of interactive learning games (Mainecraft).

Study literature:

First: the axis of interactive learning games through the Internet Mine craft))

Online interactive educational games are one of the most exciting and most popular forms of learner motivation and are widely used to teach students, especially in basic education. The games motivate the learner to learn through training and training (Tsalapatas, Heidmann, alimisi, Houstis, 2012). The learner acquires specific skills, experiences, attitudes, values and principles through play. The following is an explanation of the concept, types and importance of interactive games in educational science:

Interactive gaming concept (electronic):

The game is defined as an activity in which players engage in an artificial conflict, governed by certain rules, in a way that results in quantifiable results. A game is called electronic if it is available in digital form (Salen & Zimmerman, 2004). They are usually run on the computer platform, the Internet, television, video, mobile phones, and handheld devices.

"Educational electronic games are important programs to attract the attention of students and try to teach them different concepts can be used in all educational materials and all levels and stages of education" (Shehab, 2016).

The importance of online interactive games:

Online interactive games, when compared to traditional video games that are not connected to the Internet, have a number of distinctive characteristics. The most important of these features is the sharing and interactivity of players through the various Internet networks around the world (Gallagher, 2011)

Shehab (2016) mentioned in the e-learning magazine some of the characteristics that show the importance of interactive electronic games, including activating mental abilities and improving children's creative talent. And

helps to attract and raise the attention of the learner where the use of visual and audio effects, which drives him to participate actively to continue playing and learning to achieve the desired goal, and thus helps to eliminate the boredom that affects the learner while studying some of the subjects unpopular and complex learners.

He also explained that it helps to increase mental growth, thinking, creativity and more interactive, which makes the learner working to achieve the goal of inventing different ways.

It also helps to break individual differences among students and help them to learn, discover, develop cognitive, social and emotional aspects, free them from stress and solve problems, and help to discover children's feelings, attitudes and values (Derryberry, 2007).

Online education is a method of learning to communicate information to participants, based on modern computer technologies and the World Wide Web of Information and multimedia, such as CDs, educational software, e-mail, discussion and discussion areas, and educational sites. Learning and education, which further reinforces the concept of individual or self-education. Participants learn to learn according to their ability, ability and speed of learning and according to their previous experiences and skills.

As demonstrated by the results of the Anna Dereberry (2007) study aimed at learning the impact of online learning tools and providing solutions to problems that may encounter designers and game developers, as it demonstrated the need to use the tools of online education that represent the need of societies in the 21st century.

Online education is one of the most advanced patterns of so-called distance learning in general, and computer-based learning, especially where online education relies primarily on computers and networks to transfer knowledge and skills. Its applications include web learning, computer learning, virtual classroom and digital collaboration. Lessons are delivered online, audio, video, and CD-ROM.

It is one of the means that support the educational process and its transformation from the stage of indoctrination to the stage of creativity, interaction and skills development. It combines all forms of electronic learning and learning, using the latest methods in the fields of education, publishing and entertainment by the adoption of computers and storage media and networks.

Internet education is an education that aims to create an interactive environment rich in computer-based applications and the global information network, enabling users to access learning resources anytime, anywhere.

Microsoft and Mojun have created a website (www.Code.org) that develops online education and enables teachers and students to integrate content into the curriculum, where the site contains a number of entertainment programs and educational games that can be integrated into the content of the course One of these

programs is a learning program for Minecraft, which aims to expand global participation in computer science and training in the basics of programming and computer skills development (osman, 2015).

Basics and Elements of Interactive Learning Games:

As mentioned by Shihab (2016) interactive games are based on encouraging the learner to continue to pursue learning and play together, as competition and challenge are essential to the learner's interaction with the game. And that its connection to educational and educational goals helps the educational process to achieve its goals towards the learner. The following are some of the key elements in interactive games:

- Be suitable for the age and level of mental, physical and social development.
- To be very complex and simple and to be carried out according to the rules.
- To raise the student's mental thinking, innovation, observation and reflection skills.
- The game develops the use of the senses or some of the student.
- The role of the student is clear and specific in the game.
- Be playable

Areas of use of educational interactive learning games:

One of the factors that helps students change attitudes about the subjects and their various topics is interactive learning online games, which make the educational material enjoyable by providing a virtual environment that is meaningful and interactive, which helps to connect the concepts and mental skills of the student and his real environment through play.

For example, in mathematics, interactive educational games help students to develop free discovery skills, problem-based learning, experimentation and error, which are key elements of the learner-centered, interactive and highly developed mathematical skills. Topics of algebra, geometry, numbers and others.

Interactive games for Microsoft's Main Craft, and collaboration with Code.org where it helps to learn the basics of programming, repetition, decision-making, and the development of mental skills related to computer science.

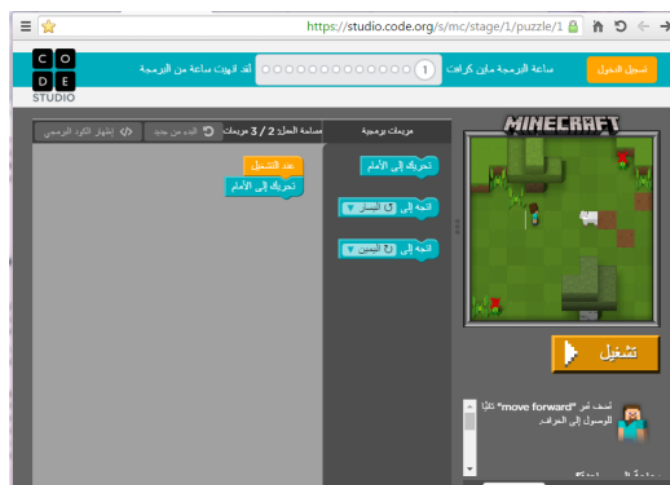


Figure 1: An interactive MineCraft interface

The Uses of Algorithmic Thinking in Education:

The skills of algorithmic thinking in computer and information technology are revealed in research topics and the Internet, such as Google and Bing. They use special search and ranking algorithms that search and sort results in the form of links to websites, text documents, pictures or video. As well as social networking sites (Facebook) and knowledge travel sites (Wiki) as they all contain special algorithms that perform the functions of the site to share and add content and others.

Combefis, Van, Nootens, (2013) in his study aimed at teaching asynchronous programming to high school students in an attractive way compared to the inconvenience of computer teachers in providing programming by traditional means. This study provided an interactive website for teaching Programming for students in their homes, which helps to enhance the thinking skills of students and motivate them to programming and support teachers and their support in the performance of the educational function. The results of this study showed the effect of interactive teaching in enhancing the thinking skills of the students, based on their interaction and enthusiasm during the application of the experiment through play.

Application of the study:

The study was applied according to the following:

1- Selection of the study group

A class of first grade students was selected randomly to apply the study.

2 - tribal measurement procedures

- Application of the tribal test to all sample members of the experimental group on Wednesday, 13-6 / 1437H
- Application of observation card for the skill of thinking Alkhwazmi on the students of the experimental group from 10-6-1437 to 12 - 6 - 1437 e

3. Procedures for applying the experiment

The online Minecraft online demo has been launched as follows:

- Apply the tribal collection test on the sample before introducing the independent variable (one of the interactive learning games) to the group.
- The researcher met the students of the experimental group before starting the experiment to explain the following points using the PowerPoint presentation:
 - o Introducing .code.org
 - o Demonstrate the access to the site and choose one of the existing interactive games (where one game was chosen for the game on the main game)
 - o Explain the ways to enter the game either using the computer or any smart devices.
 - o Encourage students to participate and to learn how to play.
- Application of the independent variable or experimental treatment by teaching the students of the experimental group the unit (problem solving formulation) in the computer curriculum for the secondary students. The courses section using the online Minecraft game. The supervision and follow-up by the female researcher in the method of playing and discovering what algorithms are used in the game.
- Apply the post-test on the sample after introducing the independent variable (one of the interactive kinematics) to the group.
- Apply the note card algorithm to the algorithm on the sample after the introduction of the independent variable (one of the interactive learning games MainKraft) on the group.

Discussion of the study results:

Discussion of the results of the unit test (formulation of problem solving) in Computer Decision 1:

The results of this study show that this finding is similar to the findings of the Rubin study (2006), which aimed to demonstrate the impact of learning through play and its use for educational purposes, where Pitfall and ET were used. A highly efficient learning environment that increases learner motivation towards learning and cognitive development, and learning by playing helps to develop a positive and passionate sense of learning.

This result is similar to that of Anna Derbieri (2007), which aims to identify the impact of online learning tools and provide solutions to problems that designers and game developers may encounter, as it demonstrates the need to use online learning tools that represent the needs of societies in the 21st century.

(Brad, miller, daived, jamies, 2000). The aim of the study was to explore the effect of integrating students into virtual classes and dealing with interactive learning over the Internet. The results showed that the experimental group of students who received the teaching integrated

interactive learning performance Better than the control group that has traditionally been taught in the classroom environment.

(Kossiak, 2004), which aims to study the effect of e-learning and non-cooperative education on facilitating the solution of the problems of the mathematics course and the academic achievement. The study reached a number of results, the most important of which is the superiority of the experimental group on the control with significant differences from (0.05) In collection.

These results can be explained by the following:

- The use of the online game "Mine craft" in the study of the unit (formulation of problem solving) has had a great impact on stimulating the motivation of students towards learning, where the researcher noted a great enthusiasm of students during the stages of the training program, while applying the experiment, (Understanding the problem, identifying its inputs, output, and required operations, writing the appropriate algorithm that leads to the correct solution, the graph representation of the algorithm).
- The immediate feedback received by Minecraft online students has contributed to their effectiveness in learning through the site itself and by interacting positively with each other and with the teacher more than what happens in the classroom using the traditional method.
- The researcher helped the students during the application on the game to explain some processes such as repetitions and condition, which facilitated the use of the game for students.
- The students were keen to formulate problem solving for each stage of the Minecraft game, where it played a role in the development of the algorithm skills and the development of academic achievement among the students of the experimental group (sample study) because it was not limited to information from the teacher and the textbook.

Discussion of the results of the note card for the unit (formulation of problem solving) in the development of the skills of thinking Alkhwarzmi decision PC 1:

It was found that the results of this study are similar to those of Buckley and Voskoglou (2012), which aims to use the technical methods in the educational process to solve problems and develop computer thinking skills of all kinds, including Khawarizmi thinking and critical thinking and finding the relationship between them, The use of computer technical tools in the learning process is a powerful boost to learning processes.

It also agreed with the study of Tsalapatas and Heidmann (2012), which aimed to use visual virtual learning tools (cMinds) to develop thinking skills in programming instruction for primary school students. The results of the study indicated a high motivation for learners to learn

Programming, creativity, entrepreneurship and problem solving.

(Combefis, Van, Nootens, 2013). The aim of this study was to teach programming asynchronously to high school students and attractively against the inconvenience of computer teachers in providing programming by traditional means. This study provided an interactive website for teaching Programming for students in their homes, which helps to enhance the thinking skills of students and motivate them to programming and support teachers and their support in the performance of the educational function.

These results can be explained by the following:

- The use of interactive learning games in the study of the unit of formulation of the issues had a significant impact in enhancing the skills of thinking Alkhwazmi students, depending on their interaction and enthusiasm during the application of the experience through play.
- Develop problem solving skills, creative thinking, constructive criticism, and a sense of pleasure when using computers, motivation and desire to learn.

Recommendations:

In view of the importance of employing technological innovations in education and the simulation of tools and means of learning in the 21st century. Based on what was reviewed in this study and the results indicated, the study recommends the following:

- Conducting training sessions to sensitize teachers to take advantage of online interactive learning games in particular and online learning tools in general and use them for educational purposes.
- Holding workshops for students and teachers and introducing them to how to use interactive learning games and what is new and used in the educational process.
- Providing the Internet in the computer labs in schools to deal with interactive learning sites in the educational process.
- Encourage and encourage educational institutions, teachers and computer trainers to integrate learning sites in various scientific disciplines.

Proposals:

In light of the current study objectives and findings, the researcher suggests conducting further research and studies in the following areas:

- Conduct a study on the attitudes of female students towards the use of online interactive learning games.
- Conducting surveys on the views of teachers in the use of interactive learning games in education positive and negative.
- Study the effectiveness of interactive learning games to develop the skills of creative thinking and innovation.

- Conduct similar studies of the current study on other approaches and topics.
- Conduct similar studies for the current study at different stages of study

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