

## RESEARCH ARTICLE



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## Using Scratch Program to Design Educational E-Games to raise Technological Awareness and Visual Programming Skills to Face Fatal E-Games

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### Abstract

**Objectives:** To employ the Scratch program for designing electronic educational games in raising technological awareness and visual programming skills to deal with electronic fatal games for first-grade secondary students in Hail-Saudi Arabia. **Method:** To achieve the goal, the researchers utilize the experimental methods by using one of the educational games programs (Scratch) to develop technological awareness of electronic games for first-grade secondary school students in Hail, Saudi Arabia. Whereas, the research problem was explained in the high number of suicides among adolescents due to the use of fatal games. Besides, an observation method was used where a scale of technological awareness values and a visual programming skills card were prepared to be acquired by students through the program. An exploratory sample of (38) students in the first grade of Ha'il secondary school was selected. The experimental group consisted of a random sample of (48) students in the first grade of Al-Mas secondary school. The research tools were applied before and after the experimental group to determine the significance of the differences. **Findings:** The results clearly show that there is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the technological awareness scale in favor of the research group in the post-measurement and there is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the score-card for the skill performance in visual programming for the research group in the post-measurement. **Application:** The research concludes with the importance of employing electronic educational games and the interaction between the values of technological awareness and visual programming to deal with electronic fatal games for first-grade secondary students in Ha'il- Saudi Arabia. **Keywords:** Educational E-Games; Technological Awareness; Visual Programming; Fatal Games; Scratch program

## 1 Introduction

Recently, the world has become a small village, and electronic games have witnessed rapid developments as a result of the tremendous revolution in the field of information and communication. These changes have formed a great challenge for educational institutions to prepare their programs and curricula in a way that suits the preparation of the learner who can adapt and comply with these developments. This is done by providing the learner with appropriate knowledge and information and developing his skills necessary to obtain knowledge from its sources. The requirements of the information age impose on educators and faculty staff-members to work hard to provide learners with the abilities and competencies that enable them to meet these requirements. At the forefront of these requirements comes the ability to distinguish what is useful and what is harmful, especially in choosing the type of electronic games.

Moreover, electronic games have disseminated in many Arabs and foreign countries, as there is hardly a house empty of them. This is because they attract children with imagination, adventure, and sound qualities, in addition to their widespread and unparalleled growth. pinpoints that in the last few years, the websites that sell these electronic games have also spread on the Internet in various forms and many types, and this spread has been met by a growing demand by children and adolescents to acquire these games, which have gained widespread fame and the ability to attract those who play them.<sup>(1)</sup>

President and CEO of the Entertainment Software Federation in the United States of America stated that “the electronic games industry (video games, computers, internet, and mobile devices) is one of the most important economic and investment sectors, as it brings in America alone more than 25 billion dollars annually, and it employs more than one hundred and twenty thousand (120,000) person, with an average annual salary estimated at ninety thousand dollars (\$ 90,000) per employee.”<sup>(2)</sup>

McGonigal (2012) also stated that the American children spend a long time playing electronic games equal to the times they spend in school and that with the arrival of the American individual to the 21-year-old, he will spend at least ten thousand (10,000) hours playing electronic games, and that 170 million Americans play online games.<sup>(3)</sup>

In<sup>(4)</sup> study “Tied the advantages and disadvantages of electronic games and the motives for their practice from the viewpoint of public education students of Riyadh city. The study revealed that playing electronic games resulted in many positive impacts. Electronic games, from their point of view, can be viewed as a rich educational environment that provides a variety of patterns of interaction between players. Where players who play online games can transcend their geographical and social isolation, and discover a kind of collectivism that transcends traditional patterns and transforms the world into a true global village. Accordingly, the electronic games played online on the Internet remove the barriers created by distances and borders, as well as provide new meanings for interaction and social communication. The results of the study also indicated that cooperative play is one of the effective learning methods if it is used and applied well. This is because the electronic games practiced on the Internet contribute to improving some academic skills of players, such as Information search skills, typing skills, writing skills, foreign language acquisition skills, critical thinking skills, and problem-solving skills. The process of gathering, comparing, processing, and evaluating information is an important activity for players who play online games.”<sup>(4)</sup>

Online players who with their peers, may also have a strong motivation to express themselves clearly, and an improvement in conversations with players who speak different languages while expanding their understanding of other cultures. It may also improve the clarity and quality of writing for large-scale players as a result of conversations, discussions, responses, and comments that take place while playing online. Finally, electronic games practiced on the Internet may contribute to reducing social isolation for some players, help them towards independence and encourage them to take an active role in playing.”<sup>(4)</sup>

In 2013 a study introduced NetsX, a semester-long research project developed around gameful design principles to encourage peer-to-peer collaboration and engagement. The paper situates NetsX in recent scholarship on higher education game design, collaborative learning and the use of online tools in teaching and learning. It discusses how gameful principles were used to design a low-cost, highly iterable curriculum that incorporates freely available online resources, namely Google Docs, Wordpress, and Wikipedia. The paper concludes by discussing current limitations and future possibilities for NetsX, proposing that the project be expanded to make the visual components more gameful, and to make student contributions easier to track, navigate and search in a graphical user interface<sup>(5)</sup>.

In<sup>(6)</sup> focused on developing the educational basis for developing technological awareness among public Jordanian universities student in facing the challenges of the information revolution.<sup>(6)</sup>

The study developed the basis of technological awareness among the public Jordanian universities student in facing the challenges of the information revolution.

A study on Game mechanics (GMs) suggests encode a game’s rules, underlying principles and overall knowledge. During the gameplay, players practice this knowledge due to repetition and compile mental models for it. Mental models allow for a training transfer from a training context to a different context. The study proposed the Gamified Knowledge Encoding model (GKE) that not only describes a direct knowledge encoding of a specific learning content in GMs, but also defines their training effects. Ultimately, the GKE can be used as an underlying guideline to develop well-tailored game-based training environments<sup>(7)</sup>.

## 2 Research Problem:

The researchers attempted to try some electronic games that have become famous for their negative impact lately. They felt the urgent need to find out what attracts students to these games, so that they can finally reach to teach students the values of technological awareness and visual programming in light of what's engulfing most of the world's cities towards electronic games, including the "Blue Whale", "Mariam", "Pokemon", and the malicious "Fire Pound" games that address children and adolescents and push them to commit suicide according to a very malicious psychological absurdity. The researchers proposed, through their research, the urgent necessity of taking the decisive action in this regard; to protect our children from those fatal games.

The Blue Whale or "Blue Whale Challenge" is an online game, unfortunately, it is available in most countries. It consists of 50-day challenges, and in the final challenge the player is asked to commit suicide, and the term "blue whale" comes from the phenomenon of the beach whales, which is linked to the idea of suicide. It is suspected to be the main reason for committing suicide, especially among adolescents.

Mariam's game is also one of the games that have spread recently and lies in the presence of a little girl named Mariam, who has lost her home and wants help from the user, to come home again. During returning home, Mariam asks several questions, about herself, about political issues, in addition to specific questions to the player "the user".

Then, the girl asks you to enter a certain room, to get to know her father and complete the questions with you. Every question has a certain probability, and each question is related to the answer to the other question. The player may reach a stage where Mariam tells him that she will complete the questions on the next day.

Here, the player must wait 24 hours, to be able to complete the questions again.

Some questions that Mariam asks about through the game are as follows: What is your name? Where do you live? Do you think I am beautiful? Do you want to Know my dad? Do you want to be friends? Is it your real name? ... etc., where the game motivates teenagers and children to harm themselves.

From the aforementioned, it becomes clear to us that there is a real problem facing our students, which may cost their lives. Therefore, we, as educators and specialists in the field of educational technology, have had to face this problem with modern technological methods in the interest of their safety and to protect them from the danger of fatal games.

Based on what has been found in the review of literature, information and field observations, the problem of the current research is represented in the urgent need of the students to learn the values of technological awareness and visual programming In light of what is sweeping the whole world from a real wave of panic of fatal electronic games, to face its danger, through the interaction between the values of technological awareness and the level of visual programming to understand what electronic games are in addition to raising the level of technological awareness of students.

As a result of the multiplicity and diversity of electronic games, there have been various effects on the behavior of children practicing them in many respects, contributed to the call for a study of this phenomenon, to identify the different behavioral, health and social effects on children. Mai (2010) illustrates that due to the weakness of the control devices on electronic game shops and game centers, the lack of families monitoring of what their children see of games, and the lack of awareness of the dangers of electronic games, there is an urgent need to know the values of technological awareness of electronic games<sup>(8)</sup>. Accordingly, the research problem is centered on the following main question:

What is the impact of employing Scratch program for designing electronic educational games in raising technological awareness and visual programming skills to deal with electronic fatal games for the first-grade secondary stage students?

This question is divided into the following sub-questions:

1. What are the necessary values for developing technological awareness among first-grade secondary stage students in Hail?
2. What are the visual programming skills to be acquired by first-grade secondary stage students through the "Scratch" program?
3. What is the effectiveness of using "Scratch" program to increase the values of technological awareness to confront fatal electronic games among first-grade secondary stage students in Hail?
4. What is the effectiveness of using "Scratch" program to increase the visual programming to confront fatal electronic games among first-grade secondary stage students in Hail?
5. What is the interaction between the values of technological awareness and visual programming to confront the fatal electronic games of first-grade secondary stage students in Hail in light of the electronic educational games?

## 3 Objectives of the research

1. Providing a list of the values of technological awareness to be taught to students.

2. Presenting a list of the visual programming skills to be acquired by students through the "Scratch" program.
3. Demonstrating the effectiveness of developing electronic educational games in light of the "Scratch" program to increase the interaction between the values of technological awareness and visual programming for first-grade secondary stage students in Hail.

#### **4 The importance of the study**

1. Providing teachers, educators, researchers and parents with a list of technological values that should be taken into account in choosing the type of games, their specifications, and the methods of their optimal use.
2. Providing teachers and researchers in the field of educational technology with a list of visual programming skills.
3. Directing attention towards electronic educational games to counter the fatal electronic games.
4. Using electronic educational games in developing visual programming skills for secondary stage students.

#### **5 Methodology and research limitation**

The current research utilizes the descriptive approach in preparing the theoretical framework for the research and the quasi-experimental approach in applying the research experiment and interpreting its results. One of its designs is utilized, which is the design of the one experimental group with a pre and post-measurement. The level of technological values and the skillful performance of visual programming is observed through the technological value scale, and the observation card prepared for that, before and after, to verify the significance of the differences. The current research was limited to the following:

- A group (48) student of the first-grade secondary stage, in Hail Secondary Schools and Almas Secondary School in Hail, Saudi Arabia.
- The research tools are applied in the first semester of the academic year 2019-2020 AD.
- The research was limited to using the Scratch program.
- There is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the technological awareness scale.
- There is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the scorecard in visual programming.

#### **6 Research Tools**

The research tools are exemplified in the following:

##### **First: Scale tools**

- Technological Awareness Scale (prepared by the researchers)
- Visual Programming Skills Scorecard (prepared by the researchers)

##### **Second: Experimental treatment tools**

- Scratch educational games program

#### **7 Research Variables**

##### **First: Independent variable**

Electronic educational games (Scratch games)

##### **Second: Dependent variable**

Technological awareness and visual programming skills

## 8 Research Hypothesis

1. There is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the technological awareness scale in favor of the research group in the post measurement.
2. There is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the scorecard for the skill performance in visual programming for the research group in the post measurement.

## 9 Research Terms

### Electronic educational games

Elajely (2018) defined electronic educational games as individual scientific activities in which the learner interacts with software designed according to certain rules. It aims at stimulating the spirit of competition between the players in a joyful and learning atmosphere, without any harm. The player chooses between several alternatives and the software enhances these choices with graphics, images and attractive sounds to develop basic thinking processes and curiosity of the learners<sup>(9)</sup>.

The researchers defined it as A set of interactive computer programs that are designed to attract the attention and focus of learners, to deliver an educational message in an attractive audio graphic environment in which the highest levels of audio and graphic techniques are used.

### Technological awareness

Mohamed Amin and Wedad Aljamal (2017) defined it as the knowledge, perception, appreciation, and feeling of the secondary stage students about the applications of modern technology, which may affect directing their behavior towards the optimal use of these applications and taking care of them, and preventing the potential impacts resulting from the use of that technology<sup>(6)</sup>.

The researchers defined it as the full awareness of modern technology applications for effective and positive use in their daily lives, and prevention of the potential hazards and harms of their use.

### Visual programming

Pattison and J. Hummel. (2004) defined it as the modern method of programming, in which assistant programs are used to design a graphical user interface (buttons, texts) and linking it with the programming code. These assistant programs are called the Integrated Development Environment (IDE). This type of programming uses visual expressions in the programming process or it may treat the visual information or support visual interaction between the user and the computer<sup>(10)</sup>.

The researchers defined it as Programming that relies primarily on graphical interfaces in interaction. It depends also on seeing graphics and images and interacting with them completely by the user. This may add fun and interaction in the use and creates an atmosphere of positive interaction by the secondary stage students.

### Fatal electronic games

The researchers defined it as "the synchronized electronic games through the Internet, such as social networking sites, video display sites, or dedicated sites designed for this purpose by some parties, intending to inflict damage and harm that may reach to murderer and arouse fear and terror for players, whether children or teenagers).

### Scratch program

It's a program helps young people learn to think creatively, reason systematically, and work collaboratively essential skills for life in the 21st century, With Scratch, you can program your own interactive stories, games, and animations — and share your creations with others in the online community.

## 10 Theoretical Framework

The theoretical framework of the research includes three main axes:

**The First Axis:** Electronic educational games.

**The Second Axis:** Values of technological awareness and visual programming.

**The Third Axis: Fatal games**

The following is a review of the three axes:

**10.1 The First Axis: Electronic educational games:**

This axis deals with the definition of electronic games and their classifications, the psychological and educational foundations upon which the idea of educational electronic games is based, and a review of some related literature dealing with electronic educational games.

Computer games have been recognized for their educational potential for some time now and the number of educational games available has steadily increased in recent years<sup>(11)</sup>.

Salen and Zimmerman (2011) illustrate that The game is an activity in which players engage in a competitive environment, governed by certain rules, in a way that leads to quantifiable results, and any game is called electronic if it is made available in digital form<sup>(12)</sup>.

They can be played on a personal computer or tablet using the Internet, or by using TV, PlayStation, mobile phones, and palm devices.

Electronic games can also be classified according to Salen and Zimmerman (2011) into the following categories:

**10.1.1 The First Type: The Conqueror**

The goal of this type is to compete and win, whatever are the losses and players in this type seek to achieve predetermined goals.

**10.1.2 The Second Type: The Manager**

This type aims at developing specific skills proficiently, and the players' processes are developed to a level that makes them continue playing to the end.

**10.1.3 The Third Type: The Wanderer**

In this type, new and enjoyable experiences are displayed and demonstrated, but the degree of challenge in this type is less than what is found in the previous two types. Players of this type are looking mainly for fun and relaxation.

**10.1.4 The Fourth Type: The Participant**

In this type, players enjoy socialized games or participate in virtual worlds.

According to Hend Al-Khalifa (2009), one of the most popular online gaming sites that are used educationally is the World of Warcraft environment and its website is ([www.worldofwarcraft.com/bc-splash.htm](http://www.worldofwarcraft.com/bc-splash.htm)) that is used by some economics colleges to train students on economic concepts, such as selling, purchasing, bartering etc.<sup>(13)</sup>

As for the Metaverse environment, it is a 3D virtual interactive environment with virtual characters called (Avatar) that is controlled by real people through the device's control tools. Avatar can be formed in the way desired by its owner. There are no limits to controlling the character and changing its appearance, where the player can choose the character, change the skin color and wear various accessories. The Metaverse environment differs from its predecessor in that there are no goals that the players strive to achieve, but any user of this environment can do his own goals, meaning that in such environments there are no competition or wars to reach a specific goal. Hend Al-Khalifa (2009) adds that the Metaverse environment also provides players with the appropriate possibilities for forming, programming and selling objects, through the Internet for other players. One of the most famous environments for Metaverse is the virtual life environment (Second-life) <https://secondlife.com/><sup>(14)</sup>.

The last type of virtual worlds is the (MMOLE) environment, which acts as an extension of Learning Management Systems, but in an interactive 3D environment. The main goal of such environments is interactive learning, so one can find that the environment surrounding the learners is sometimes represented in the form of a classroom environment, allowing the teacher to control the scientific content displayed. It also allows the learner to interact with the surrounding environment and communicate with his colleagues. As an example of such environments, the Photosphere environment and its website ([www.potonmedia.com](http://www.potonmedia.com)) can be customized to work with learning management systems or be linked with electronic content.<sup>(13)</sup>

**10.1.5 The psychological and educational foundations upon which the idea of educational electronic games is based:**

10.1.5.1 First: Malone-Lapper's theory of educational electronic games: Epstein (2009) points to the view of Malone-Lapper theory of educational electronic games, as it is a "comprehensive theory of educational electronic games design" based on three axes (challenge - imagination - curiosity). The theory aims at "obtaining the resonant arguments that can be

referred to when designing educational environments” through electronic games<sup>(15)</sup>.

Challenge — imagination — curiosity

10.1.5.2 Second: Gagne theory . Kenny and Vick.H, (2006) refer to Gagne Theory of educational electronic games, which is based on three main principles:

1. Interest in learning outcomes: This means that the learner must pass through a pyramid of simple to complex skills while playing. Among the most important learning outcomes in this type (perception - acquisition of information access strategies - acquisition of intellectual and motor skills - situational skills).
2. Develop some internal and external conditions that should be met to succeed in the games, namely: (develop specific instructions towards the ultimate goal of the task - ensuring that all elements of the task are fragmented - the sequence of tasks shall be logical - arousing the learner’s curiosity).
3. Nine events are developed as a guide for developing and implementing educational units in light of electronic educational games.<sup>(16)</sup>

10.1.5.3 Cognitive imbalance theory of VanEck, R (2006). VanEck, R. (2006) illustrates that Cognitive Imbalance Theory indicates that intellectual maturity depends on (perception - comprehension - adaptation) and the absence or deficiency of one of these elements may cause what is a so-called cognitive imbalance. He believes that this is the key to learning in electronic games, where the learner feels a state of Cognitive dissatisfaction and a desire to win. So, the learner begins to try to explore the game to achieve awareness and understanding and finally, he adapts and immerses himself in it .<sup>(17)</sup>

10.1.5.4 Fourth: Prensky’s Theory of Motivation:. According to Prensky, M. (2001), the motivation to learn is one of the most important things that affect learning, as learning requires effort, and the learner rarely exerts this effort without motivation, which can be exemplified in electronic games, knowing the essential goals, obtaining rewards, and getting rid of some psychological factors such as fear Prensky, M. (2001) refers that the motivations in electronic educational games can be:

- The desire to play for long hours.
- The desire to win continually  
Offer rewards such as: Get treasure, or accumulate points.
- Action, thinking, and decision-making are among the things that support self-motivation (ibid).<sup>(18)</sup>

10.1.5.5 Fifth: (The Principle of Storytelling by Chee Ang. Ang C.S. (2005) indicates that the electronic game is formulated in a narrative framework that is the organizational structure of the game, to create a kind of interaction with the game, to achieve the element of fun and excitement, to allow the player to construct a way of playing within the story to interact with the events, and confirms that the image in computer games is available through the narrative frame of the story.<sup>(19)</sup>

## 10.2 The Second Axis: Values of technological awareness and visual programming:

This Axis deals with the definition of the values of technological awareness, the three general foundations of technological awareness, the definition of visual programming, some visual programming languages, and literature review in this field.

### 10.2.1 Values of technological awareness definition:

Technological awareness is defined as follows: According to Imad Shawky (2011), technological awareness is the ability to provide the individual with the minimum level of knowledge, skills, and attitudes that enable him to deal with technological innovations<sup>(20)</sup>.

Salem Khawaldeh (2012) illustrates that technological awareness seeks to develop plans to deal with information phenomena, their technologies, and effects, broadcasting facts, interacting with different generations, evaluating experiences and refining them from defects by knowing the faults contained in them, and drawing methods for treating them. This prompts governments and ministries to develop information in addition to information centers and websites on the Internet, to ensure the development of technological awareness of individuals to be able to face the difficulties associated with the information technological revolution, in light of the accelerating knowledge revolutions<sup>(21)</sup>.

### 10.2.2 General bases of technological awareness:

The general bases of technological awareness, whether primarily skillful, cognitive, or digital, had to be clarified, and the three bases could be clarified as follows:

**Knowledge base:** It includes the information needed to understand the nature, characteristics, principles, and relationship of technology, and its relationship to science and society.

**Skillful base:** It includes the mental, practical and social skills needed to deal with technology and its applications.

**Values basis:** According to Mohamed Alamin and Wedad Algamal (2017), values basis establish moral boundaries for dealing with technology and its applications, adhering to those boundaries and not exceeding them, and resolving controversial, sharia, and legal issues that may exceed those boundaries.<sup>(6)</sup>

Jamal Al-Zanin (2002) illustrates that a follower of the development of means of communication and information finds that there is a revolution in this field, especially in recent times with the emergence of many social networking sites such as: (WhatsApp), (Chat Messenger), (Twitter), (Instagram), (Facebook), (LinkedIn). These examples are one of the most important examples on contemporary social networking sites and can increase soon. The problem lies in the technological awareness of the use of such tools and others<sup>(22)</sup>

Given that social networks are the main platform that is advertised and through which the game "Blue Whale", as I mentioned earlier one of the most popular games at the moment, is played. Therefore, some of these networks have taken measures to limit the spread of the risks of this game and to educate adolescents in particular, to avoid falling into a suicide trap: The Russian social network "Vkontakte" decided to ban the players registered in the game and is committed to banning and deleting accounts that promote the game.

For its part, "Instagram" has programmed an automatic message that appears when some keywords related to the game are searched in the search bar. Some different network users also multiply their initiatives to counter this game, for example, the (PinkWhaleChallenge) hashtag was promoted in which 50 ideal and harmless challenges are published, such as providing a service to others or watching the favorite movie as an alternative to the fatal game.

Some Internet users also create "false" web pages that deliver awareness messages and testimonials from people who were about to lose their lives as a result of this game. Therefore, the researchers in this research is interested in the development of the values of technological awareness of the first-grade secondary stage students, to protect them from those dangers that have spread among the technological innovations in social media and electronic games.

### 10.2.3 Visual programming:

Visual programming languages use drawing, graphics, and a graphical interface (GUI: Graphical User Interface) to issue instructions for the computer. It can be said that the field of visual programming develops as a result of a wonderful integration between three fields which are Programming Languages, Computer Graphics, and Human-Computer Interaction (HCI).

In visual programming languages, we can distinguish between two types of icons, (Process Icons) which denote accounts, and (Object Icons) which in turn consist of two types: The (Elementary) represents basic objects and (Composite) represents composite objects that are formed from several simple icons using specific operations.

Visual programming is a relatively modern method of programming, in which assistant programs are used to design a graphical user interface (buttons, texts ...) and linking it with the programming code. These assistant programs are called the Integrated Development Environment (IDE). This type of programming uses visual expressions in the programming process or it may treat the visual information or support visual interaction between the user and the computer.

Among the most popular graphic development environments are Visual C ++, Visual J ++, Delphi, Visual Basic, Visual Basic.net, Java Builder, etc.

A programming language is known in more than one way, it can be said that it is a language that uses the (mouse) and (icons) on the screen and (menus) to prepare or develop programs. It can also be said that it is a language that uses Visual Representation of Logical Objects to process visual information and supports visual interaction in the programming process and uses visual expressions.

### 10.2.4 Some visual programming languages:

Visual programming languages can be classified into several classes as follows:

1. Form-based languages: This type is observed in dealing with electronic tables and their uses and is used to influence a group of related cells, for example, the Forms / 3 language.
2. Integrated Languages (Textual and Visual) As the name indicates, it mixes text and image, for example, Rehearsal World, C, C++.
3. Programming-by-Example Language: Through which the user provides the system with a method or mechanism to perform a specific task, for example, Rehearsal World, and the language of Pygmalion.

4. Constraint-Oriented language This type deals with physical objects in the visual environment within specific constraints equivalent to natural laws. These languages fit the Simulation Design process, for example, the Thinklab language and the Alternate Reality Kit (ARK) language.
5. Pure visual programming languages: Matthew Revell (2019) illustrate that this type of language fully supports the programming process with pictures, for example (Cube Lab View, Prograph, PICT / D) software. It is worth mentioning that the program here is produced entirely by processing icons and other graphics, and it is compiled directly through visual representation and it is linked here to the term (Executable Graphics).<sup>(23)</sup>

### 10.3 The Third Axis: Fatal electronic games:

Through this axis, the researchers reviewed the concept of fatal games, some fatal games that have recently spread and become popular (Blue Whale, Mariam), in addition to some early warning signs of the seriousness of fatal electronic games.

#### 10.3.1 Fatal electronic games definition:

The researchers defined it procedurally in light of the information he found during his research as follows: "The synchronized electronic games through the Internet, such as social networking sites, video display sites, or dedicated sites for games designed for this purpose by some parties, to inflict damage and harm that may reach to murderer and arouse fear and terror for players, whether children or adolescent).

10.3.1.1 Blue whale game: Most of the world's cities have been overwhelmed by a real panic over the malicious "Blue Whale" game aimed at children and adolescents that drives them to commit suicide in a very malicious psychological mess. Voices are rising again to call the concerned authorities to take decisive action in this regard. Here is the almost complete frightening file of the Blue Whale game that drains our children's lives.

Ramamurthy, P (2017) illustrates that the Blue Whale or "Blue Whale Challenge" is an online game. Unfortunately, it is available in most countries of the world. The game consists of challenges for 50 days. In the final challenge, the player is asked to commit suicide. The term "Blue Whale" comes from the phenomenon of the beach whales, which is linked to the idea of suicide. It is suspected to be the main reason for committing suicide, especially among adolescents.<sup>(24)</sup>

#### Origin of the game:

It is difficult to determine the origin of this game, but its media coverage began in May 2016 through an article in the Russian newspaper Novia Gazeta suspecting a link between dozens of teenage suicides that took place in Russia between November 2015 and April 2016.<sup>(25)</sup>

Philip Hingston (2013) pinpoints that according to French newspaper Le Monde, the instigators of this game are likely to be three young Russians: Philip Podikin (also called Philip Fox), Philip Lees, in addition to Kitov. He was first arrested and placed on the investigation.<sup>(26)</sup>

According to Philip Hingston (2013), the game is based on the relationship between competitors (as they are also called players, participants, or administrators). It involves a series of duties that are given by supervisors, with players being urged to complete them, especially since there is one task per day. The game is based on the relationship between competitors (as they are also called players, participants, or administrators). It involves a series of duties that are given by supervisors, with players being urged to complete them, especially since there is one task per day. Some of these tasks involve self-mutilation and harm. It is observable that some tasks that are given daily to a group of users are not given to others until after two or three days. In conclusion, the last task is given to the player which is to commit suicide. The tasks given vary between good, bad, permissible, dangerous, and other instructions. They vary to end with a suicide request by jumping from a building, stabbing a knife, or hanging.<sup>(26)</sup>

#### Cases reported around the world, until the preparation of this research:

##### Tunisia:

Until 12 march 2018, 7 children from Tunisia committed suicide as a result of the game.

##### India:

In 2017, it is reported in the media in India that several children have committed suicide as a result of the Blue Whale game. It is indicated that the second cause of death in India is a suicide, according to published in 2016. The Supreme Court has asked the Indian Central Government to ban all sites that may link to the Blue Whale game.

##### Italy:

Several reports confirmed that several suicides were due to the game, particularly the case of a teenage girl from Livorno, and subsequently increased media coverage of the subject on 22 May 2017. The Italian police announced that they had received 40 warnings regarding the game, and then the number of warnings increased to 70 over 24 hours rang only.

**Russia:**

On 26 May 2017, the State Duma (Russian Parliament) approved a bill granting the court the right to bring criminal charges against anyone who attempts to encourage suicide or create tools to help, after 130 deaths suspected of being linked to the Blue Whale Game Challenge. On 07 June 2017, President "Putin" signed the Law to impose criminal sanctions on anyone who incites minors to commit suicide.

**Algeria:**

On 17 November 2017, an 11-year-old child committed suicide in Setif, eastern Algeria. The results of the investigation confirmed that the cause of suicide was due to the Blue Whale game, where he spent most of his time for a month. On December 8, two secondary stage students committed suicide in the state of Bejaia, after using the Blue Whale game. This game is also the main reason for the death of 7 young people in Algeria in 2017.

**Saudi Arabia:**

On 06 May 2018, a 13-year-old child committed suicide by hanging by tying his neck with a rope pulled in the closet in his family home in Jeddah. After investigations, the police discovered the presence of a Blue Whale game on his phone.

**Morocco:**

The "Blue Whale game" has recently spread in Morocco, especially among adolescents and it caused many suicide attempts. The most prominent case is the death of a teenager in the city of Agadir in southern Morocco. It is mentioned that after implementing the challenges of the game, he committed suicide by throwing himself from the roof of the building in which he lives, in response to the last challenge in the game.

**Egypt:**

The suicide of the son of Egyptian parliamentarian Hamdi Al-Fakhrani due to the blue whale game has attracted media attention to this game, while some other cases have emerged, so the Egyptian parliament has discussed enacting legislation to punish those involved in this type of cybercrime.

10.3.1.2 Mariam Game. The name of Mariam game was a trend in Saudi Arabia that spread on the social networking site Twitter during 2017. There has been a wide debate about the impact of the game, and the details it provides that need answers from its players, which may address political questions in its content. This raised fears of tweeters who analyzed the possibility that the game could be a target to hunt personal information for its players, or their phones and files that may be accessed while playing.

The story of the game lies in the presence of a little girl named Mariam, who wandered from her home, and wants help from the user to return home again. During returning home trip she goes through the following:

**Collecting Data:**

Mariam's game asks the user several personal questions that have worried many experts. In the journey of helping Mariam to return home, the user of Mariam's game is asked to answer many personal questions about his life.

**Sound effects:**

These questions are not the only source of concern for Mariam game users, but the atmosphere of the game that is full of mystery and excitement, and the sound and visual effects that dominate the nature of the game, stir terror and fear in the hearts of users, especially children.

**Suicide fears:**

As soon as Mariam's game proceeded and spread, the link between it and many cases of suicide and suicide attempts began. She was threatening the players if they wanted to quit the game with the information that she had about them, and disclose it to their family.<sup>(27)</sup>

**Some early warning signs of the danger of the aforementioned games on children:**

The following are some early warning signs that indicate the need for intervention among adolescents who are indulging in fatal games to prevent a disaster:

1. At the beginning of the game, the player writes the word "YES" on his hand using a razor blade, then photographed it and sent it to the game's organizer. Parents, friends and close people must observe these early signs.
2. Be careful when noticing the tendency of children to hear the narcotic music they use as a channel to express something they are struggling to disclose in other ways.
3. Low level of performance in school or other study activities.
4. Children spend more time in isolation, or avoid interactions, even with family and friends.
5. Children's online activities are strange and unusual, and the type of content they deal with is abnormal.
6. Activities that take place too early.

- 7. Strange updates via social media.
- 8. Mood swings, depression, and unhappiness.
- 9. Empathy for other suicidal people.

## 11 Methods and procedures:

### First: Research tool preparation:

#### 11.1 Technological awareness scale

- **The validity of the arbitrators:** To answer the first question “What are the necessary values for developing technological awareness among first-grade secondary stage students in Hail?” The researchers formulated the phrases of the Technological Awareness Scale. The scale is presented in its initial form to 11 arbitrators who are selected from experts in the field of educational technology, methodology, and teaching methods, to express their views on the validity and comprehensiveness of the phrases to measure what it set for and in light of the opinions and proposals made by the arbitrators. The following adjustments are made: The phrases that obtained an agreement from the arbitrators (80%) are retained while some expressions are amended. Some expressions are also deleted so that the scale is (50) words.
- The scale was shown to 20 secondary stage students in Hail schools, to verify the clarity of instructions and phrases, and to identify the accuracy in their formulation, where the unclear phrases were reformulated for them
- Conducting an exploratory study to verify the reliability and validity of the scale in its dimensions by applying it to a sample of (38) secondary stage students in Hail, who were randomly selected.
- **Internal consistency:** To verify internal consistency, a correlation coefficient (Pearson) was calculated between each phrase of the scale and the overall degree of the scale, to find out the extent of the relevance and consistency of the scale’s terms. The following [Table 1 ] shows these results:

**Table 1.** Correlation coefficients between statements and the overall scale score (n = 38)

Statement	Correlation coefficients								
1	**919.	11	**702.	21	**836.	31	**654.	41	**877.
2	**746.	12	**609.	22	**878.	32	**780.	42	**786.
3	**648.	13	**860.	23	**833.	33	**784.	43	**784.
4	**849.	14	**880.	24	**628.	34	**694.	44	**679.
5	**855.	15	**839.	25	**859.	35	**820.	45	**852.
6	**941.	16	**844.	26	**837.	36	**715.	46	**619.
7	**792.	17	**866.	27	**917.	37	**790.	47	**802.
8	**522.	18	**877.	28	**821.	38	**835.	48	**864.
9	**562.	19	**888.	29	**739.	39	**791.	49	**538.
10	**704.	20	**725.	30	**839.	40	**696.	50	**930.

\*Significant at (0.05), \*\*Significant at (0.01)

It is evident from the previous table that the technological awareness phrases have strong correlation coefficients and statistically significant with the score of the scale, and this indicates that the scale has high internal consistency.

- **Stability with the Alpha-Cronbach method:** The value of coefficient alpha is calculated for the scale as a whole, and its value is (0.824). This is sufficient evidence that the scale has a high stability factor.

#### 11.2 Visual programming notecard

##### The validity of the arbitrators:

To answer the second question “What are the visual programming skills to be acquired by first-grade secondary stage students through the ”Scratch” program?”, the researchers prepared a skill performance notecard to observe the skill performance in visual programming through the program. To verify the internal consistency, a correlation coefficient (Pearson) is calculated

between each phrase of the card, and the total score of the card, to find out the extent of the relevance and consistency of the card's items, and the following [Table 2 ] shows these results:

**Table 2.** Correlation coefficients between statements and the overall scale score (n = 38)

Statement	Correlation coefficients						
1	**834.	6	**807.	11	**691.	16	**800.
2	**847.	7	**895.	12	**775.	17	**742.
3	**803.	8	**830.	13	**781.	18	**866.
4	**870.	9	**866.	14	**707.	19	**834.
5	**757.	10	**855.	15	**829.	20	**830.

\*Significant at (0.05), \*\*Significant at (0.01)

It is evident from the previous table that the notecard phrases have strong correlation coefficients and statistically significant with the score of the card, and this indicates that the card has high internal consistency.

**Stability with the Alpha-Cronbach method:**

The value of coefficient alpha is calculated for the card as a whole, and its value is (0.812). This is sufficient evidence that the card has a high stability factor.

**Results and their interpretations**

To perform the statistical treatments to verify the study hypotheses, the following statistical methods are used:

- Independent Samples (T) Test to measure the differences between the mean scores of students in the experimental group in the pre and post applications.
- Measurement of the effect size of independent groups by calculating Eta squared ( $\eta^2$ )

To answer the third question, “What is the effectiveness of using ”Scratch” program to increase the values of technological awareness to confront fatal electronic games among first-grade secondary stage students in Hail?” The researchers used the (T) test to indicate the differences between the averages of two related groups, and their results are shown in [Table 3 ] following:

**Table 3.** (T) test and its level of significance for the differences between the post and pre-measurement of the experimental group in the technological awareness scale as well as the effect size (square value ( $\eta^2$ )) and the impact strength (d) (n = 46)

variable	post-measurement		Pre-measurement		T	$\eta^2$	d
	m	a	m	a			
Technological awareness	168.57	31.670	98.17	13.462	13.55	0.80	3.93 High

\*Significant at 0.05 \*\*Significant at 0.01

It is evident from [Table 3 ] that there are statistically significant differences between the average scores of the students in the pre and post applications in favor of the post-application in the technological awareness scale. This is an indication of the experiment's achievement of its objectives in raising the level of technological awareness of the experimental group.

It is evident from the previous table also that the impact size on the technological awareness before and after the experiment of the experimental group according to the value of the ETA square (0.80), and the impact strength (d) amounted to (3.93). These values indicate a very significant impact of developing technological awareness through the program that the students were trained on, as Fouad Abu Hatab and Amal Sadiq (1996, P. 443), and Reda Asr (2003, P. 672) state:

- If the value of Eta square = 0.15, then this indicates a large value (0.15) of the variance in the dependent variable that can be traced back to the impact of the independent variable

If the value of Eta square = 0.20, then this indicates a large value (0.20) of the variance in the dependent variable that can be traced back to the impact of the independent variable, [Figure 1 ] shows the results of technological awareness at the different level of the experiment.

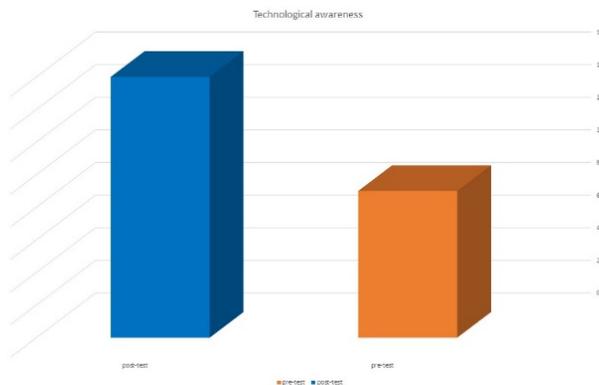


Fig 1. Technological awareness at the different level of the experiment. The results of technological awareness

To answer the fourth question, “What is the effectiveness of using ”Scratch” program to increase the values of technological awareness to confront fatal electronic games among first-grade secondary stage students in Hail?” The researchers used the (T) test to indicate the differences between the averages of two related groups, and his results are shown in [Table 4 ] following:

Table 4. (T) test and its level of significance for the differences between the post and pre-measurement of the experimental group in the visual programming as well as the effect size (square value ( $\eta^2$ )) and the impact strength (d) (n = 46)

variable	post-measurement		Pre-measurement		T	$\eta^2$	d
	m	a	M	a			
visual programming	48.43	8.107	25.98	2.679	18.30	0.88	High

\*Significant at 0.05 \*\*Significant at 0.01

It is evident from Table 4 that there are statistically significant differences between the average scores of the students in the pre and post applications in favor of the post-application in the visual programming scale. This is an indication of the experiment’s achievement of its objectives in raising the level of visual programming of the experimental group.

It is evident from the previous table also that the impact size on the visual programming before and after the experiment of the experimental group according to the value of the Eta square (0.88), and the impact strength (d) amounted to (5.30). These values indicate a very significant impact of developing visual programming through the program that the students were trained on. [Figure 2 ] illustrates these results.

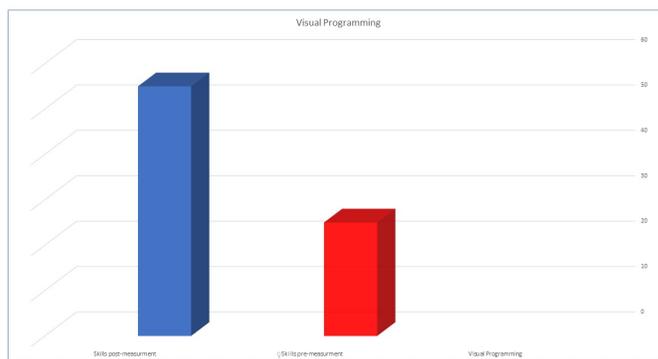


Fig 2. Significant impact of the values through developing visual programming on the experimental group. The results of the visual programming

To answer the fifth question “What is the interaction between the values of technological awareness and visual programming to confront the fatal electronic games of first-grade secondary stage students in Hail in light of the electronic educational games?”

The researchers used the Pearson correlation coefficient between technological awareness and visual programming and its value is (0.78), which is a positive value and statistically significant at the level of significance (0.01), which indicates the existence of a strong statistically significant correlational relationship between technological awareness and visual programming.

## 12 Recommendations and suggestions:

1. State governments should look at the different factors that encourage internet suicide, and then look for ways to address these factors. Here, the main focus should be on developing the appropriate technology to deal with the problem. There is also a need for collaborative efforts of the media, legal systems, education and child development to prevent suicide.
2. Educators should take note of the most important positive and negative aspects of electronic games, to enhance the positive aspects and reduce the impacts of the negative aspects in the school
3. Parents should be aware of the negative aspects of electronic games practiced by their children to reduce the negative effects of them, and even stop them immediately, especially if they are dangerous and life threatening.
4. Emphasizing the importance of electronic educational games in facing the threat of fatal games.
5. Working on the establishment of a classification system for electronic games similar to the Entertainment Software Rating Board (ESRB) to be a reference concerned with classifying games by ages, as well as to clarify the content of each game through brief descriptions, in accordance with the religion, customs and traditions of Islamic and Arab societies.
6. Adopting and embedding the elements of attraction and excitement that are included in popular electronic games in the design of electronic educational games, in order to conform to the customs and traditions of Islamic and Arab societies, and are used to limit fatal games.
7. The production of educational computer software includes the elements of attraction, excitement and suspense involved in the popular electronic educational games.
8. Parents should befriend their children and participate with them in playing electronic games.
9. Ensuring that the tools used in playing are as consistent with medical specifications as possible, such as the height of the computer holder shall be proportional to the size of the child, in addition to ascertaining the geophysical factors, such as seating, room lighting and ventilation.
10. Develop national strategies and guidelines for suicide prevention and how news about this critical phenomenon appears in the media. Of course, this is particularly important because suicide is a very sensitive issue, and highlighting how these incidents are committed.

## 13 Conclusion

The research concludes with the importance of employing electronic educational games and the interaction between the values of technological awareness and visual programming to deal with electronic fatal games for first-grade secondary students in Hail- Saudi Arabia.

The results of the research show there is a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the technological awareness scale in favor of the research group in the post measurement. Also, there exists a statistically significant difference at the level of (0,01) between the average scores of the research sample students in the post and pre-measurement of the scorecard for the skill performance in visual programming for the research group in the post measurement.

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