Digital games and their impact in developing students' critical thinking skills

Los juegos digitales y su impacto en el desarrollo de las habilidades de pensamiento crítico de los estudiantes

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ABSTRACT. Nowadays, with technology evolving with leaps and bounds and information being produced and disseminated rapidly without control, children are an easy target for misleading. The school could design and implement ways to impart and refine these skills that are critical to the decisions that make up the essence of life.
Within this context, this research work was shaped and studied the pedagogical value of digital games in developing critical thinking skills with regard to digital security. For this study, a teaching intervention was made using digital simulation games to demonstrate their contribution to the development of critical thinking compared to traditional teaching.
The exploitation of digital games was investigated in the context of an interdisciplinary online health education programme. The results of the research showed that this intervention contributed significantly to the development of critical thinking for the majority of students to whom it was applied.

RESUMEN. En la actualidad, la tecnología avanza rápidamente y la información se difunde sin control, lo que hace que los niños sean más vulnerables a ser engañados. Por lo tanto, las escuelas pueden diseñar y aplicar métodos para enseñar y mejorar las habilidades necesarias para tomar decisiones importantes en la vida.
Se llevó a cabo un estudio para investigar el valor pedagógico de los juegos digitales en el desarrollo de habilidades de pensamiento crítico. Los docentes realizaron una intervención utilizando juegos de simulación digital para demostrar su contribución al desarrollo del pensamiento crítico en comparación con los métodos de enseñanza tradicionales.
Los resultados mostraron que esta intervención fue significativa para el desarrollo del pensamiento crítico en la mayoría de los estudiantes que participaron, especialmente en el contexto de la educación en línea y la seguridad digital.

KEYWORDS: Digital games, Skill development, Critical thinking.

PALABRAS CLAVE: Juegos digitales, Desarrollo de habilidades, Pensamiento crítico.

1. Introduction

The interaction that exists between the student and the digital game contributes to the development of the skills of students, which confirms the pedagogical value of the game. Students through playing digital games acquire strategic thinking, perseverance, observation, learn to recognize and solve problems, skills that school is called to cultivate in students (Klopfer & Squire, 2008). One of the most important skills is critical thinking. According to The Foundation for Critical Thinking, the concept of critical thinking reflects a concept derived from roots in ancient Greek. The word "critical" derives etymologically from two Greek roots: "kriticos" (meaning discerning judgment) and "kriterion" (meaning standards). Etymologically, then, the word implies the development of "discerning judgment based on standards." "Critical thinking is the intellectually disciplined process of actively and skilfully conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness" (Scriven & Paul, 1987). When someone thinks critically, he is encouraged to question hypotheses, to analyse and synthesize the events, to go one step further by developing new hypotheses and test them against the facts. Questioning is the basis of critical thinking. Fisher (2005) states that the skills that make up critical thinking help students: Be able to identify problems, find ways to solve problems, gather relevant information, recognize which assumptions are incorrect, understand and use language clearly, interpret ideas, find evidence and evaluate arguments; recognize logical relationships between sentences and come to conclusions that can be tested. According to Facione (2015), critical thinking is a composite behavior that consists of six skills, namely: critical thinking consists of the following skills:

- interpretation (interpretation is the process of discovering, determining, or assigning meaning),
- analysis (analysis is the ability to carefully examine something, whether it is a problem, a set of data, or a text. People with analytical skills can examine information, understand what it means, and properly explain to others the implications of that information),
- evaluation (evaluation has to do with one 's ability to assess how credible a speaker or author's statements, references, descriptions, judgments are, and whether or not the arguments are reasonably valid. between them. It also has to do with whether one can compare alternative interpretations by identifying the pros and cons of each interpretation and being able to assess whether the evidence justifies the conclusion reached,
- drawing conclusions or inference (drawing conclusions is the ability to find evidence and clues that lead to a logical conclusion. To be able to identify creeping meanings and to be able to predict events based on evidence from what is said or written),
- explanation-justification (explanation is the ability of someone to present and argue his reasoning that led him to the specific results, so that it can be understood by the reader or listener. The ability to accurately describe his thoughts and cite the evidence that led him to a conclusion. To be able to explain the pros and cons of his decisions) and
- self-regulation (Self-regulation is a process; it requires learners to direct their own thoughts, allowing them to apply their cognitive efforts towards specific skills (Zimmerman, 2008).

These skills can be applied in all subjects and later in any area of life, as the student as a later adult will be able to understand the world in-depth (Fisher, 2005). An attractive way to develop these skills in students is through play, as the student becomes a "little explorer and observer", learns to judge and to challenge. The skills that will be researched are a) the Evaluation of the Arguments, b) the Drawing of Conclusions, and c) the Explanation-Justification of the Conclusions.

2. Literature review

2.1. Critical thinking

Various and different definitions have been formulated for critical thinking from antiquity to the present day. And they are different because it can take many different forms since the factors that affect critical thinking are

many (Trilianos, 1998). Further, from the literature review, it is evident that critical thinking is often combined or confused with creative thinking. Therefore, it is imperative to make separation and clarification of these two concepts. Matsagouras (2007) separates critical thinking from creative thinking by saying that "while critical thinking is mainly based on the analysis of data, which is done based on logic, creative thinking is intuition-based". As such, critical thinking is "the inner mental function, by which the human mind processes with logical discipline, through actions of organization, analysis, completion, expansion, rearrangement and misinterpretation, the available information, to discover the relations between them and to come to the formulation of logical conclusions, useful for the solution of problematic situations" (Matsagouras, 2007). According to Trilianos (1998: 100) "Critical thinking is aided by the creative, with which they are inseparable. The first refers to the judgments that people make and the second to the creation and production of speech and works. Both thoughts are very much related to the ability of people to perceive things. Indeed, thought that is characterized as superiority, combines both dimensions. The creative dimension is seen in the design and conception, in the shaping and pioneering, in the creation and production of results suitable for the purposes that have been set ". Thus, it is understood that the two types of skills complement each other, and one is an integral part of the other (Koliadis, 2002). Most definitions of critical thinking refer to the ability and tendency to evaluate information in the collection of information so that it can be used effectively (Potts, 1994).

Based on the above approaches, it becomes clear that critical thinking is a type of thinking that is based on clear evaluation criteria in the process of data analysis and leads to drawing conclusions using predetermined rules and criteria by faithfully applying the laws of logic, so many is sometimes characterized as rational thinking (Koulaidis, 2007).

2.2. Critical thinking skills

As can be seen from the conceptual definitions of critical thinking, it is a composite human ability that consists of a set of skills. These skills are necessary for students to be not just recipients of information, but to be able to process it, so that they can face all the problems they encounter and thus make the right choices (Oliver & Utermohlen, 1995). Thus, learning will have substance and utility and will not be superficial (Rusbult, 2006).

Therefore, teachers should design and implement learning activities, that are enriched with elements of critical thinking, in order to be able to contribute to its development. But in order for the activities to be properly structured, the skills needed to be cultivated must be defined.

According to Facione (2015), critical thinking consists of the following skills: interpretation, analysis, evaluation, drawing conclusions or inference, explanation-justification and self-regulation. This, after all, is the mission of education: to create future citizens capable of interpreting and analyzing any complex situation and dealing with them, finding the appropriate solution each time (Scheffler, 1973; Von Wright, 1992).

Hypothesis1: Digital games help students to develop Critical thinking skills and in particular Evaluation, Drawing Conclusions and Explanation-Justification.

2.3. Digital games

Digital games are part of the so-called Creative Industries sector, an economic sector that includes film production, the audiovisual and digital arts, architecture, design, music, advertising, etc. whose revenue corresponds to 3% of world gross domestic product (GDP) with continuous upward trends. And all this when globally digital games are treated as a vehicle, as the video game industry accounts for more than 100 billion dollars. Since 1947 when the first digital game was played (Winter, 2008), till today with rapid technological advances in hardware and software, the interest remains undiminished. It is quite common that players, independently from age, or occupation, to play games for several hours per day. All this contributes to an attraction exerted by digital games on users, which in combination with the interaction and their other multisensory properties, make them popular in childhood but also in older ages. The digital industry tried to use this attraction to create digital games with educational content. So, in many cases, digital games have been

used for education purposes in all levels of education. The impact of digital simulation games on decision-making is so strong that could help train conflict resolution skills and to be an important tool even for current and future peacekeepers, both military and civilian (Dorn et al, 2020). These games are the so-called serious games. They are characterized as games with educational purposes, supported by entertainment. Their purpose is the same as games, but more complex, as control of the fun that leads to participation and the educational elements that lead to the educational experience and learning must be maintained (Gunter, Kenny & Vick, 2006).

2.4. Categories of digital games

Over time, the rapid development of technology has allowed digital game designers to build games that cover more than one category. One commonly used categorization used by Prensky (2007) was the one, where digital games are divided into the following categories:

• Action games. The player directs the hero of the game to overcome all obstacles until he reaches the final goal of the game. Usually, in these games, there is a variety of means (weapons, cars, etc.) that the player uses to complete his mission. It is considered the oldest type of digital game.
• Strategy games. The player uses his strategic skills, as he plans his moves to be able to emerge victorious through battles. Usually, the scenario is based on historical or imaginary battles where groups of people take part and the player is the leader who leads the team.
• Adventure games. Their script is very rich as there are many puzzles to be solved as the game progresses. The existence of the many puzzles is what classifies them in adventure games and not the degree of difficulty of the missions. They usually have rich graphics and fast development and do not require special strategy skills from the player.
• Simulation games. In these games the player experiences situations that are very similar to real-life conditions. With his movements and choices, he changes the course and accepts the effects of his/her choices, and thus acquires experiences that will be useful to him in the real world.
• Role games. The player can take the place of many different characters depending on the characteristics he wishes to have. In role-playing games, the player tries to acquire more and more skills he can to complete various missions.
• Battle games. They have to do with various fighting techniques where the player chooses a hero who has to face another until one of the two emerges victorious.
• Puzzles games. Games without a case or scenario where the player tries to solve puzzles, most often visual. They usually practice observation, memory, and other simple skills of the player.
• Sports games. These games could also be included in action games, where the player takes the side of a team and manages one or more players with the aim of dominating the team he represents.

Finally, there are games that do not belong to a specific category, such as children's toys for younger aged players.

2.5. Advantages of digital games in education

The use of digital games in the educational process is a process that has its supporters and those who react to their implementation. There has been a lot of research on the effectiveness of the use of digital games in education, most of which confirm their pedagogical value. According to Johnson (2005), children learn through playing digital games. Thus, learning comes through continuous interaction with a multitude of activities where the child discovers rules, identifies with characters, tries different ways of acting, and virtually accepts the consequences of his choices. The same claim is made by Gredler (2004), who says that the student through the digital game can try and take risks without suffering the consequences of wrong choices since it is not the real world. And finally, based on the words of Prensky (2001), it is understood that with properly designed activities, which will serve pedagogical principles, the digital game can lead the student to acquire knowledge and cultivate the skills that will be necessary to be able to complete the game, knowledge and skills that he will use in other situations. Digital games were initially designed for entertainment, so they are not all built based on Instructional Design theories. However, some of them intrinsically implement some well-known

pedagogical concepts, as they usually include high intensity of interaction, specific goals, etc. The recent digital games, due to their complexity and their open-ended and collaborative nature, encourage learning. The teacher is the one who will choose the appropriate digital games to educate his students. Before choosing a game, it is important to understand the different genres available and how to identify them. The following lists report some popular digital games and their learning benefits. The first table (Table 1) refers to commercial games that were not built having direct educational objectives and the second table (Table 2) is about serious games that were built having as main objective to teach, train or raise awareness. The learning objectives presented in both tables are according to the information provided on the web sites and according to the statements of the creation team.

Hypothesis 2: Simulations help students interact developing important skills, such as interpersonal communication, teamwork, decision-making.
Hypothesis 3: Digital games in the educational process can bring better results compared to the traditional teaching of information and knowledge.

Game	Learning objectives
Age of Empires II	History, strategy and resource management
Age of Mythology	Mythology, strategy and resource management
Bioscopia	Zoology, cellular biology, human biology, botany and genetics
Chemicus	Chemistry
Civilization	Planning and problem solving
Making History: The Calm and the Storm	History, World War II, economic management and negotiation
Nancy Drew: Message in a Haunted Mansion	Investigation, deduction and puzzle solving, history, geography, mathematics, logical
Oregon Trail	Reasoning, strategy, resource management and reading
Reader Rabbit	Reading and spelling
Return of the Incredible Machine Contraptions	Problem-solving skills and physics
Toontown	Social collaboration
World of Warcraft	Collaborative learning
Zoombinis Logical Journey	Logic and algebra

Table 1. Examples of popular commercial games and their learning benefits. Source: Self-made.

Game	Learning objectives
Timez Attack	Improve algebra skills
Virtual Leader	Understand leadership
3D World Farmer	Understand the difficulties faced by farmers in Africa
DimensionM	Improve algebra skills
SimPort	Understand the challenges involved in constructing large infrastructures
Missing	Understand how to surf the Web safely
Virtual U	Understand the management of American universities
DoomeD	Learn about science

Table 2. Examples of popular educational games and their learning benefits. Source: Self-made.

3. Methodology

3.1. Research methodology

Digital games, when properly designed and utilized in a pedagogically appropriate manner can be utilized as learning tools to improve the effectiveness of the learning process at all levels of education. The aim of this research paper is to investigate the possibility of educational use of digital games in the development of students' critical thinking in primary education about safe internet browsing. Experimental research was selected for the present study as the most appropriate method to study the application of a digital simulation game with the aim of developing specific critical thinking skills since the experiment is suitable for social science research and is in the form of a classic experiment. According to Saunders et all (2014):

(1) A sample of participants is randomly assigned to the experimental group or the control group

(2) In the experimental group, some form of planned intervention or manipulation is tested

(3) No such intervention is made in the control group

(4) Random matching means that groups must be similar in all aspects of the research, except whether they are exposed to the planned intervention or handling

(5) The control group is subject to the same external influences as the experimental group, except for the planned intervention

The research was conducted in a primary school with 270 students and staff consisting of 25-30 teachers with different specialties. The level of learning of students is high with very good performance and many successes in student competitions. Two teams were created, the Experiment Group (EG) and the Control Group (CG). The Experiment Group consists of 23 students, of which 13 are boys and 10 are girls. The Control Group consists of 21 students, of which 12 are boys and 9 are girls. In terms of student performance, the two groups are equivalent. Each group is a separate part of the 6th Grade of the school. The teams were chosen at random. The two groups are as similar as possible in the characteristics of the research so that the research design is properly implemented (Creswell, 2016). This research attempts to exert some influence on an existing situation and to examine its results. The experimental process has two stages, pre-testing, and post-testing. In other words, a measurement of the results is made before and after the implementation of the action-intervention. The EG is the group of units of analysis in which the intervention takes place, i.e. the experiment, while in the CG the units of analysis are counted, without any intervention to make the comparison with the EG. The assessment of how digital games can improve students' critical thinking skills were carried out in the context of an interdisciplinary program "Health Education for Internet Safety". The experiment started in October 2019 and ended in December of the same year, that is, as long as the Health Education program lasted.

One hour a week was dedicated to the experiment. The EG dealt with digital simulation games related to safe internet browsing. CG was taught through the technique of discussion about potential dangers they may encounter as internet users. In the same group, brochures on the internet security from the Hellenic Center for Safe Internet were also used. A total of two digital simulation games were used. Interland and eFollowMe. The expectation from the students' involvement in these games is that the students will be able, through various adventures, to manage various challenges, thus acquiring safe internet browsing skills after they have developed the skills of critical thinking. eFollowMe is an experiential simulation game, which is a microcosm. Students interact with real-world scenarios, immerse themselves in complex situations that evolve according to their own choices, and are themselves functional elements of the script (Gredler, 2004). Interland is part of Google's "Be Internet Awesome Program", which teaches youth the fundamentals of digital citizenship and provides parents and educators with resources to help youth navigate the web and their online interactions. The program, called "Be Internet Awesome" is part of Google's effort to instil the youth with digital savvy and to encourage people to be good Internet citizens. The company teamed up with YouTube stars like John Green, the author and popular video blogger, to promote the initiative, which includes educational materials aimed at students in the third to fifth grades.

3.2. Experemint tools

The game "Be Internet Awesome" (https://beinternetawesome.withgoogle.com/) from Google is a versatile program that includes a fun and free online game called Interland an educational program to teach children how to be safe and responsible explorers of the online world. The game teaches children the basics of digital citizenship and security to explore the digital world with confidence. Interland is a whole virtual world and includes four games, each focusing on one aspect of digital security. Each game is a different island. The Riality River teaches them to distinguish fake news, the Mindful Mountain through which they learn to carefully share personal data by teaching the consequences of overexposure and the dangers of overdoing it by uploading their personal information to the internet deals with how to choose or build secure passwords, and finally Kind of Kingdom which teaches them how to deal with cyber-bullying.

EFollowMe is an online game in 3D environment and is about the digital footprint. It has been implemented by the University of Cyprus in the framework of the CYberSafety project. The purpose of the game is to teach students to carefully manage their personal data and their digital footprint. Utilizes the educational method of SBL (Simulation-Based Learning) to develop critical thinking skills. Through the feedback they receive methodically they acquire their own point of view, their own personal experience for the added value of the specific simulation regarding the safe use of the internet.

3.3. Evaluation tools

The tools for assessing the level of critical thinking of students are: pre-test and post-test which were used before and after the teaching intervention. The test consists of three questions that students must answer on safe internet browsing in order to assess their level of critical ability. The questions were selected from the knowledge game of the Hellenic Center for Safe Internet SaferInternet4Kids (https://saferinternet4kids.gr/?s=quizdom), which is based on the platform of Quizdom, one of the most well-known knowledge digital games. The game contains over 600 questions divided into categories, which concern internet security, computers and technology knowledge. The questions are multiple choice. The correct answers to the multiple-choice questions are in the Quizdom test from the knowledge game of the Hellenic Safe Internet Center SaferInternet4Kids of Institute of Technology and Research. There are also clarifying remarks about what everyone and especially children should do in any case of underlying danger while browsing the internet and based on these remarks it will be judged whether the children have acquired the specific skills being studied. After the suggested answers there is a series of questions addapted (Questions to fire up CT skills by Facione, 2013), that correspond to specific component of critical thinking and through their answers and in combination with the rubric that will be used it will be shown if the students acquired the specific skills and to what extent (Table 3).

Pre-test and post-test Questions (Example)

1. You meet a friend in a chat room with the same age and many common interests. He asks you to meet to become friends in the real world. What are you doing?

A. You arrange to meet him in a park. **B.** You suggest him to come to your house when your parents are away.

C. You suggest that you meet him, taking a friend with you. **D.** None of the above.

After choosing your answer, try to justify it by answering the folowing questions.

- Why do you think you can not trust what this person claims? (Evaluation skill)

....

- Are there any side effects that you can and should predict? (Drowing Conclussions skill)

....

- How would you explain why you made this particular decision? (Explanation skill)

....

Table 3. Pre-test and post-test questions. Source: Self-made.

The experiment was structured in four phases for the EG and in three phases for the CG, with the teacher having the role of animator, and supporter of the process (Table 4).

PHASES OF EDUCATIONAL SCENARIOS

Experiment Group -Simulation | Control Group- Discussion Model

Phase 1: Presentation of the Topic to be explored and the concepts that emerge during simulation -Pre-test

Phase 1: Introduction to the topic under discussion - Pre-test

Boti, E.; Fitsilis, P.; Damasiotis, V. (2023). Digital games and their impact in developing students' critical thinking skills. *Campus Virtuales*, 12(2), 163-174. https://doi.org/10.54988/cv.2023.2.1399

Table 4. Phases of educational scenarios. Source: Self-made.

4. Results

As mentioned above, students were asked three questions, which they had to answer by choosing one of the four options available and justifying the answer they gave to each question by answering three questions, which were related to the three skills being researched. From the analysis of the results of the pre-test it is found that the students of CG had almost the same percentages of possession of the skills of Evaluation and Drawing Conclusions with the EG, while they were far superior in the skill of Explanation-Justification (Figure 1).
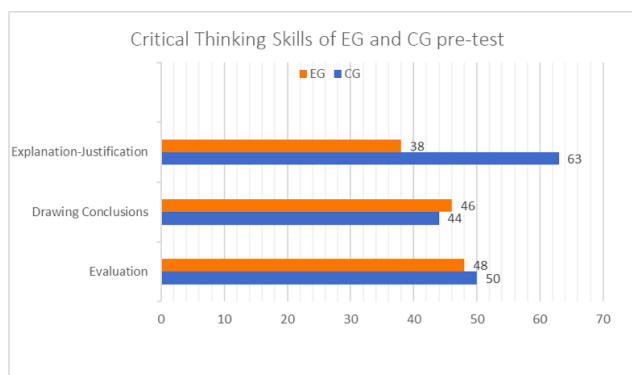

Figure 1. Critical thinking skills of Experimental Group and Control Group pre-test. Source: Self-made.

According to the analysis of the post-test results, it was found that there is an increase in the percentage of possession of the skills that are researched after the interventions that were made in both groups of students. This increase is small for CG, while for EG it is quite large. Specifically, for CG there is an improvement in terms of

- in the "Evaluation skill" by four (4) percentage points for the whole team
- in the "Drawing Conclusions skill" by thirteen (13) percentage points and finally
- in the "Explanation-Justification skill" by four (4) percentage points.

For EG the improvement seen is much greater,

- in the "Evaluation skill" by twenty-nine (29) percentage points
- in the "Drawing Conclusions Skill" by thirty-four (34) percentage points and finally
- in the "Explanation-Justification skill" it exceeds 100% of the initial one, since from 38% it reaches 78%,

an improvement that is by forty (40) percentage points in the whole group (Figure 2).
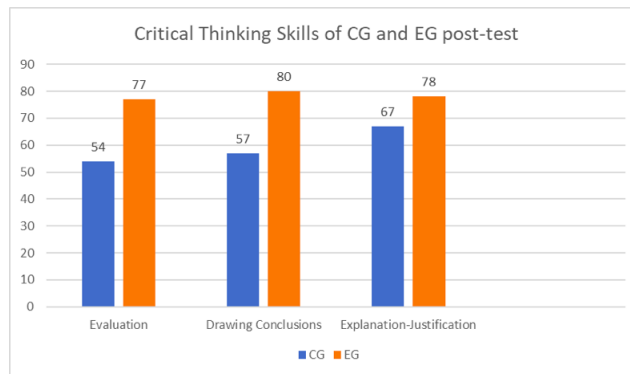

Figure 2. Critical thinking skills of Experimental Group and Control Group post-test. Source: Self-made.

The above analysis shows that both forms of educational intervention brought positive results in students' performance in terms of critical thinking skills. However, the positive influence of a digital game on the development of critical thinking skills is obvious and remarkable compared to the model of discussions that had positive but negligible results (Figure 3).
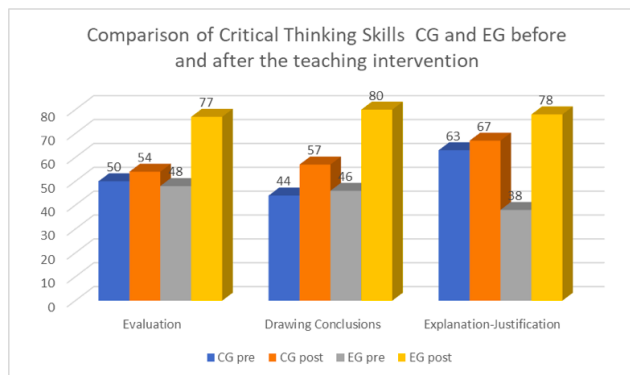

Figure 3. Comparison of Critical Thinking Skills CG and EG before and after the teaching intervention. Source: Self-made.

The interaction between the student and the digital game contributed to the development of skills in the student, something that confirmed the pedagogical value of the game (Akritidis & Tokatzoglou, 2017). The students through the simulation worked in a virtual experimentation environment that mimicked real-life conditions. They experienced various situations, experimented, made assumptions, controlled them, and by changing various variables of the phenomenon they studied, they became the protagonists who defined the developments. Through simulation they gained experience, communicated, collaborated, managed crises, and solved problems (Gredler, 2004). Experiencing through the game the consequences that may have from wrong actions while browsing the internet, they became concerned, as a result of which they were argumentative when they were asked to answer the post-test for similar situations. All this was achieved in a very pleasant atmosphere for the students, who showed great enthusiasm throughout the experiment. Students have embraced education through the use of technology, something that digital play can accomplish, breaking away from obsolete teaching methods (Chandel et al., 2015).

The application of the didactic intervention with digital simulation games with the aim of promoting critical thinking by developing the skills that make it up brought positive results. All students involved in digital games showed an improvement in the skills surveyed, at various levels. Significant improvement was observed to the whole group of students. Through playing digital games, students acquired strategic thinking, perseverance, observation, learned to recognize and solve problems, skills that the school is called to cultivate in students. With the simulation, they simultaneously gained the empathy by entering the position of the protagonist and

thus managed to discover for themselves what is usually offered ready by the teacher with the traditional teaching.

Although there was an improvement in the development of critical thinking skills in the group that applied the discussion model, which is a traditional way of teaching, its size is not significant compared to the group in which the digital game simulation method was applied. Although the subject of digital security was of interest to the students, the discussion technique did not excite them, so many students did not participate in the discussion. Many of what was said during the debate were considered meaningless because they already seemed familiar to them. As a result of this situation, most students did not go through the process of thinking about what they would do if they encountered a digital security problem themselves, so they did not have to think critically and so their critical thinking did not improve much. On the contrary, the students through the simulation experienced the problems and dangers that they encountered as if they were their own. Students involved in digital games learned indirectly through practice, experientially and through interaction with other users or with the game itself. They experimented, they discovered following their own way of learning, without the intervention of external factors. Through the digital game they learned how to learn. The results of the present study unequivocally confirm the advantages of the use of digital games in the educational process. So, as today's children grow up with digital devices as their companions, teachers should take advantage of children's technology experiences and introduce into their teaching the use of digital games that are so familiar to children, helping them to cultivate a variety of skills that school is required to develop (Prensky, 2006). This is possible even though the teachers themselves are digitally literate, technologically trained and have understood the pedagogical value of new technologies and their contribution to education (Nikolopoulou & Koutromanos, 2010).The text included in the sections or subsections must begin one line after the section or subsection title. Do not use hard tabs and hard returns.

5. Conclusions

The results of the research prove the success of the research goal of the work, since the research questions asked were answered clearly. So:

• The combination of the virtual environment with simulation helps students to develop Critical thinking skills and in particular Evaluation, Drawing Conclusions and Explanation-Justification. The learning process in virtual worlds makes learning not only more enjoyable and exciting but also more effective (Prensky, 2003).
• Simulations create a scenario-based environment, where students interact developing important skills, such as interpersonal communication, teamwork, decision-making (Flanagan, 2004). The practical scenario leads to collaboration and knowledge sharing. Interaction and collaboration help develop skills critical thinking. This can be proved because in the experimental group, which is dominated by cooperation of trainees there is a greater increase in skills critical thinking than in the control group in which individuals work individually (Loes & Pascarella, 2017).
• The application in the educational process of a didactic intervention with digital games can bring better results compared to the traditional teaching of information and knowledge (Hendriks, 2016).

The small sample of application of the experiment does not allow generalizations to be made and conclusions to be drawn safely, which could not be disputed. The fact that there is a lack of tools for measuring and evaluating critical thinking makes it difficult to evaluate the results of the experiment accurately. Also, the lack of time is a particularly inhibiting factor for the implementation of this experiment. Additionally, the large volume of curriculum in these classrooms greatly limits the time that teachers desire and need to devote to carrying out similar programs.

Based on the results and conclusions of this research, it is necessary to apply similar research experiments to a wider level in order to investigate the effect of digital games on the development of skills, which the school is required to cultivate in students, on various subjects. New technologies, such Mobile technologies and multimedia interact with human learning processes, facilitating learning activities (Marengo & Pagano, 2016). All these in the hands of a digitally literate teacher can be very powerful tools to make learning an experience

and to equip students with the necessary skills to become responsible adults. This perspective can be applied if and only if research is done that will confirm the usefulness of digital games in the development of skills in all subjects. By conducting similar studies and based on their results, a collection of tools could be created, which each teacher will have at his disposal and will be able to use to achieve the goals he sets. In this way, education will be able to prepare citizens capable of facing the challenges of the 21st century.

Cómo citar este artículo / How to cite this paper

Boti, E.; Fitsilis, P.; Damasiotis, V. (2023). Digital games and their impact in developing students' critical thinking skills. *Campus Virtuales*, 12(2), 163-174. https://doi.org/10.54988/cv.2023.2.1399

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