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INFORMAL LEARNING AMONG TEENAGERS THROUGH VIDEO GAMES: A QUALITATIVE ANALYSIS OF EXPERIENCES, GAME MODES AND DIDACTIC BENEFITS

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Abstract Povzetek/ The paper analyzes the positive effects of video games on teen development and on teenagers' informal learning. The participants in the research were teenagers. The analysis and interpretation of games and explanations of their pedagogical merit indicate that players recognize their value for informal learning. Latent characteristics of video games include positive elemests such as taking responsibility, teamwork, sense of belonging, creativity, multiculturalism, personal virtues and values, emotion management, learning new information and skills, motor skills development and professional orientation. In that respect, it is possible to conclude that gaming may help in the development of certain abilities important for informal as well as formal learning in today's digital age.

Keywords:
digital media,
informal learning,
teenagers,
video games, a
qualitative analysis.

Najstniki in neformalno učenje z video igrami: kvalitativna analiza izkušenj, načinov igranja in didaktičnih prednosti V prispevku analiziramo pozitivne učinke računalniških video iger na razvoj najstnikov in njihovo neformalno učenje. Udeleženci raziskave so bili najstniki. Analiza in interpretacija opisa iger ter razlaga njihovih pedagoških vrednosti kažejo, da igralci prepoznajo vrednote neformalnega učenja. Ugotovljene so bile nekatere sicer skrite značilnosti video iger, kot so: prevzemanje odgovornosti, timsko delo, občutek pripadnosti, ustvarjalnost, večkulturnost, osebne vrline in vrednote, upravljanje čustev, učenje novih informacij in spretnosti, razvoj motoričnih sposobnosti in poklicne usmerjenosti. Glede na rezultate lahko sklepamo, da lahko igranje video iger pomaga razviti določene sposobnosti, ki so pomembne pri neformalnem in formalnem učenju v digitalni dobi.

Ključne besede:
digitalni mediji,
neformalno učenje,
najstniki,
video igre,
kvalitativna analiza.

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Introduction

The internet and all digital media that rely on the web have brought great changes to the lives and work of young people and adults. These changes have especially astounded experts engaged in educating young people. Children and adolescents are growing up in a significantly different media environment than their parents. The latter find it hard to communicate with their children about digital media in everyday activities, whether in school or outside school.

Children today possess their own smartphones or tablet computers from the very start of their formal education. These powerful and attractive devices have become personal computers, much more powerful than what we used to call the personal computer 10 or 20 years ago. The attractive software and applications used with these computers (smartphones and tablets) have significantly changed the communication and lifestyles of children and adolescents. Children and teenagers attend school for only about 180 days of the year, but use the new digital devices every day of the year (Bratina, 2017). These digital devices contain more attractive and interactive applications that outcompete school activities. Video games are to a great extent responsible for stealing the attention of children and adolescents, which sometimes causes them to neglect their school obligations. Research shows that almost all school-age children in the US play video games (Etuk, 2008; according to Bacon & Ault, 2009). The situation is comparable in Europe. It is rare to find a home which, in addition to satellite TV (with two or more television sets), does not have at least one computer or laptop with a permanent internet connection, while all adult occupants also own smartphones. Considering the time children and adolescents spend throughout the year with digital media (satellite TV, social media, video games, etc.), we should ask who and what is responsible for the education of children and the young?

Because of the great role that digital media play in the lives of adolescents, experts find that many important life skills are developed outside the school and beyond the school curricula. Informal learning poses stiff competition to formal (school) learning. This raises a challenge for experts in the area of learning and education. Some researchers are seeking answers to concerns about the potential dangers of excessive video gaming (Eichenbaum, Bavelier & Shawn, 2014; Bilić, Gjukić & Kirinić, 2010; Duh, 2001; Valković, 2008; Ružić-Baf, Strnak & Debeljuh, 2016; Zhang, Moore, Gu, Chu & Gao 2016). Others are increasingly investigating the possibilities of learning in school and outside school (Ebrahimzadeh, 2017; Eichenbaum, Bavelier & Shawn, 2014; Gee, 2007; Kretschmann, 2010; Matijević, 2016, and others). Some are enthusiastic about the opportunities for learning that

video games present. According to Gee (2003), "Games, not schools, are teaching kids to think!"

The research results presented in this paper show the place of video games in the informal learning of teenagers. Below, we also present other studies focusing on the role of video games in the lives of children and adolescents.

Theoretical Background and Literature Review

Video games are essentially simulations of the real world, so learning through games may serve as learning and practice in a simulated setting. With this type of learning, the learner is without any fear of failure because he is able to repeat the task until he or she is able to accomplish it precisely or fast enough for the desired result. In video games, the player competes with the computer, himself or herself, and other players. Each achieved goal gives the player the satisfaction of winning, safety and self-confidence.

There are several types and groups of computer games (for example, Laniado and Gianflippo, 2005; Prensky, 2001; Whitton, 2010). Several different elements of a game or simulation characterise it as belonging to a certain group or genre. Prensky (2001) gives five elements of computer games, as follows: rules of the game, goals and objectives, outcomes and story. Modern video and computer games can generally be grouped in one of the following categories:

1) adventure games
1) platform games
2) puzzle
3) role playing games (RPG)
4) first person shooter (FPS)
5) sports
6) strategy (Whitton, 2010).

Generally, video and computer games include action games, action adventure, role playing games (RPG) (Abbreviations used in the text: MOBA - Multiplayer online battle arena; RPG - role-playing game; RTS - Real-time strategy game; MMO - Massive Multiplayer Online), simulations (construction, management, warfare or life situations), strategy games, vehicle simulations (cars, aeroplanes, boats, etc.), sports games (football, basketball, skiing, etc.), educational games (practising

arithmetical operations, language learning, etc.), and others (such as educational games).

Naturally, most games belong to more than one of these genres. Some games can be collaborative and competitive at the same time, and some can be team based, competitive and collaborative (such as board games). Video games follow a similar pattern.

Buchanan and Vanden Elzen (2012) believe that video games should have an established place in 21st-century libraries. Video games differ from other types of library media in the sense that they are visual and interactive and are based on simulation. Players like to use digital interactive media at any time and anywhere (for example, in the library or at home) because such games are both challenging and relaxing, while helping to form new acquaintances.

Ebrahimzadeh (2017) reported the results of research on English vocabulary acquisition through commercially available digital video games. The participants were 241 high school students aged 12 to 18 who were randomly assigned to one of the following groups: "Readers" (those who learned vocabulary through extensive reading); "Players" (those who learned vocabulary by playing digital video games) and a third group called "Watchers" (those who observed two colleagues who played video games). The vocabulary items were pretested and tested again after the experiment. Each group of participants engaged in the planned activities five times over five weeks. According to statistical calculations of the results (ANOVA), "Players" and "Watchers" outperformed "Readers". The author concludes that digital video games can be recommended as complementary activities for vocabulary acquisition in high schools.

Researchers point out considerable benefits in acquiring English vocabulary through video games in non-English speaking countries. These results come from Salvati and Salehi (2016). These authors conducted research on the effects of video games on vocabulary acquisition in Iranian students aged 13 to 31. There were 75 participants (32 males and 43 females) in Iran. The participants of the experimental group learned new words over four weeks by playing video games, while the participants of the control group learned in the traditional way, by reading written text. Statistical analysis showed a significant difference in the retention of vocabulary in students of the experimental group.

These studies show that teachers, counsellors, psychologists and neuroscientists believe that playing video games can be beneficial for learning and development among students and players, irrespective of their age. Playing develops perceptual, cognitive and motor skills. Today's video games are more than just fun because they facilitate the learning of entrepreneurial skills, which makes them suitable for learning and means that they are of benefit to the player (Eichenbaum, Bavelier, & Shawn, 2014).

Bacon and Ault, M. (2009) present educational video games for practising maths and language (http://www.arcademics.com/). The illustrated and assessed games (through the case-study method) allow for an online single player, or for multiplayer modes on multiple computers or mobile devices. The games are intended for students in primary education younger than 12. Well-designed games encourage collaborative learning in students (a community of learning) at home or in school.

Rolf Kretschmann from Germany (2010) studied the development of various competences in players who played digital sports games. He divided the games into sports simulation games, sports arcade games and sports management games. Kretschmann points out that the main competence for decision making and taking responsibility in gameplay lies in the following partial competences: cognitive and metacognitive competence, motor competence, media competence, personal competence, emotional competence and social competence (Kretschmann, 2010, 70).

Video games have an important place in the preparation of future teachers and educators. These are not only future users of video games for learning, but, as experts in the area, they can be expected to participate in the development of such games. Muñoz, Rubio and Cruz (2015) explored the strategies of collaborative learning in the process of making video games. This research examines video game design in the initial education process of teachers. One of the goals was to collect the opinions of students about the process of learning new tools for video game development through collaborative learning. The study is based on quantitative data of opinions collected through a 28-item survey on collaborative learning related to game creation. The survey was administered to 200 second-year students, specialising in pre-school education, at a faculty of teacher education in the academic year 2013/14. The results show that students have generally positive views on the methods of familiarising themselves with game development tools and with the applied collaborative methods of learning.

The results from a sample of adult respondents who started playing games in their childhood show that playing these games contributed significantly to the development of some crucial life and lifelong learning competences (Matijvić. 2016). These competences can be categorised into several groups: entrepreneurial skills, teamwork, creativity, motor competence, effective learning skills, managing emotions, multiculturalism and career guidance. In addition, playing video games affects the development of some important life virtues such as curiosity, resourcefulness, independence, responsibility, persistence, empathy towards other players, mental concentration, a sense of visual aesthetics, and learning how to win and lose. Entrepreneurship requires skills such as the capacity for critical thinking, money management, investment planning, smart investment, risk management, and the development of new ideas. Creativity, as a complex skill, involves learning while playing games, critical thinking, innovative thinking, creative thinking, quick thinking and time management in order to achieve the goal, given that time is usually restricted to seconds in order to achieve top scores. The teamwork and collaborative competences that are learned by playing video games are reflected in the development of communication skills, negotiation and cooperation with other players, acceptance of the other player's opinion (tolerance), and meeting new friends from your country, or around the world. The respondents stated their speaking of a foreign language (English) significantly improved by playing video games, and that by encouraging communication and collaboration with other players, they were able to learn new things about history, geography and technical and other sciences (for more, see Matijević, 2016).

Zhang, Moore, Gu, Chu and Gao (2016) consider that around half the population of children in the US have adopted a sedentary lifestyle. They see video games as the main culprit, leading to obesity in children. This group of experts offers "Active Video Gaming" as a new solution for fighting child obesity and sedentary lifestyles. The authors analyse the factors that contribute to the trend towards low levels of physical activity in children in order to provide arguments for experts in charge of organising educational programmes and other school activities.

Emre Müezzin (2015a, 2015b) gives the results of research on video game addiction in high school students (N=131; 81 female and 50 male). The "Online Game Addiction Scale" was used for the purpose of the study. The first part of the published results (Müezzin, 2015a) gives an analysis according to gender. The results showed a significant difference between the behaviour of female and male participants regarding online game addiction in the form of a subscale (factors) of the problem, success and financial gain. The second analysis (Müezzin 2015b) of the same results compared the results according to how the computer was used

(traditional computer use vs. online gaming). The result of this statistical analysis showed that there was a statistically significant difference between online gaming and traditional computer use. A statistically significant difference was found between the amount of experience of online gaming and traditional computer use. A statistically significant difference was also found between online gaming and the time spent on online games daily, according to the subscales of problem, success and financial gain. Fitness games are games which require body movement and physical reactions.

Oh (2012) assumes that the increased interest in exergames (games which require physical activity such as moving about outdoors, physical exercise or fitness training) comes from the fact that girls aged 6 to 19 have the highest rates of obesity (around 30% are obese in the US). Oh (2012) studied how a support group formed around the video games Pokemon Heart Gold and Soulsilver affect the amount of daily activity and the opinions of girls about physical activity. Drawing on a qualitative analysis of the case (case study) as a methodological approach, this study found exergames provide challenges for girls and bring them closer to the real world and physical activity. It is concluded that social support is an important aspect in community building and for encouraging girls to engage in physical activity.

In contrast to countless video games which require the player to sit over long periods of time staring at the screen, the market for active video games is continually growing. Lee, Huang, Pope, and Gao (2015) show the opportunities for using such video games in extra-curricular activities for encouraging physical activity and teamwork. One type of such games is an interactive dance game (Dance Dance Revolution - DDR), which encourages the player to engage in fast-paced dancing to a given rhythm while looking at the screen. The authors believe that these types of games will significantly increase the intensity of physical activity among teenagers.

Ito, Horst, Bittanti, Boyd, Herr-Stephenson, Lange, Pascoe and Robinson (2008) reported on the results of a synthesis of a three-year ethnographic study on teenagers growing up in the new digital media environment. For the purpose of the study around 10 years ago, 659 semi-structured interviews were conducted, a large number of focus groups were set up, and another 50 different research activities were conducted at separate locations where young people socialise. The researchers devoted more than 5000 hours to systematically observing the activities of youngsters. The ethnographic method was used to create a more natural environment for observing digital media and technology in the lives of young

people. The goal was to understand the cultures of young people. Adults find it hard to understand the lifestyles of the young, their ways of learning and life philosophies, given the size of the generation gap. Today's young generation (the Net generation), a generation that has grown up in the digital era with video games, find it hard to understand that their parents and grandparents lived a very different life. Digital media and online communication have significantly changed the content and form of activities among adolescents. The social and recreational activities of the Net generation are linked to the internet and everything this powerful network stands for (social media, video games and all the services that smartphones and tablet computers offer). Extensive research results reveal four main areas that reflect the context of the everyday lives of young people: homes and family, educational institutions, interconnected interfaces and interest groups of young people.

Marc Prensky (2001) noted certain behavioural patterns and outlooks on life by observing members of the digital gaming generation and observing learning processes through games (Digital Game-Based Learning). Today's teenagers are used to solving problems by short, rapid clicks of the mouse, simultaneously processing different types of information and having a visual display in place of text; they prefer a direct approach to information; they willingly participate in collaborative activities; they want to keep active; they prefer gaming to working; they question the cost effectiveness of everything they do; they appreciate the virtual world and see technology as an integral part of everyday life. All these characteristics of the Net generation or game generation have major significance in school learning, lifelong learning and the capacity to perform in the workplace. Prensky (2010, chapter 10) stresses the importance of Digital Game-Based Learning in the area of training future military experts who will handle expensive weapons and equipment such as tanks, helicopters and jets. Prensky points out that playing digital video games helps train the mind and develop other skills crucial for engaging in real-life war operations, without the dangers and financial costs associated with actual weapons and military equipment.

In the studies outlined above, quantitative methodology dominates (for example Ebrahimzadeh, 2017; Müezzin, 2015a and 2015b), although some believe that qualitative methods could help in finding answers to the behaviours and learning styles of members of the Net generation and the game generation (Ito, Horst, Bittanti, Boyd, Herr-Stephenson, Lange, Pascoe, and Robinson, 2008: Matijević, 2016).

In assessing the usefulness of these research methodologies, the time when these studies were conducted should also be taken into account. The span of five or ten years since the research was conducted is a very long period in terms of digital change. Video games that were played by children five or ten years ago are very different in many ways from today's standards.

Methodology

The key research questions of this study are as follows: What pedagogical benefits of playing video games are seen by experienced players and future school teachers of primary and secondary education? What are the main features of modern video games that attract teenagers to spend a large part of their free time playing? What opportunities do players see for informal learning in video games?

The study used a combination of methods, combining case study, interviews and introspection (Kolesarić, 2016). The case study involved analysing games that were chosen by the players as representative examples to show and understand their didactic and pedagogical value. The games were presented in writing (introspective text records) by the participating video game players (N=30). The players were teenagers aged 14 to 19 and students at the Faculty of Teacher Education in Split (Croatia). If the participant did not play the game, the interview referred to another student or teenager interviewed by the researcher. In other words, the interviews provided depictions and descriptions of the games. A transcript of the interviews was made. The interviews were conducted as open interviews with two general questions: 1) *Describe the game you are playing.* 2) *Explain what you think makes the game beneficial for school and learning.*

The games and the respective descriptions of their pedagogical and didactic value collected from the interviews were first transcribed and then analysed. Each individual summary (or interview) formed one unit of analysis.

Given that some players depicted and described the same game, a total of 25 different game titles (Table 1) were analysed, with the repeated game descriptions grouped.

Table 1: Video games in the analysis

	GAME TITLE	GENRE
1	Age of Empires II: The Age Of Kings	RTS, multi-player, strategy
2	Assassin's Creed II	Single-player, adventure, fighting
3	Battlefield	Online shooter, team play, first-person
4	Call of Duty 4: Modern Warfare (Cod4)	Online shooter, team play, single-player
5	Clash Royale I	Strategy, team play, RTS
6	Command & Conquer 3: Tiberium Wars	RTS, strategy, multi-player
7	Counter Strike: Global Offensive	Strategy, shooter, team play and MMO
8	Crusader Kings II	Strategy, simulator, multi-player
9	Dota 2 (Defense of the Ancients 2)	MOBA, team play
10	Euro Truck Simulator 2	Driving simulator, single-player
11	FarmVille	Farm simulator, creative
12	Final Fantasy XV	RPG, action
13	Just Dance 2016	Rhythm, dancing, sport
14	League of Legends (LoL)	Strategy, team play
15	Nintendo Fire Emblem	RPG, strategy
16	Online Chess	Strategy, PVP, sport
17	Overwatch	Shooter, multi-player
18	Planetside 2	MMO, shooter, action
19	Tribal Wars	RTS, MMO, strategy
20	Pokémon Go	Mobile, RPG, adventure, sport
21	Stronghold	Strategy, RTS
22	Total War: Rome II	Strategy, RTS
23	Township	Creative, online, simulation
24	Virtual Villagers: The Lost Children	Life simulation, Creative
25	World of Tanks	Online, strategic, team play and action

These games have in common that they are played by teenagers, they belong to a range of game genres, they can be played in single player or multiplayer format, and can be played online or offline. In some cases, players had playing experience ranging from a couple of hours to thousands of hours or spanning several years, a range that was impossible to measure in hours. The study was conducted at the end of 2016 and beginning of 2017.

Results

Summaries of the games analysed

Short depictions of the relevant games are presented below for the purpose of this study in order to better understand the pedagogical values pointed out by the research participants.

Age of Empires II: The Age of Kings: The game is set in the Middle Ages, spanning four periods closely resembling real periods in history. The player starts his adventure in the Dark Age and moves on to the Feudal Age, followed by the Castle Age, to end up in the Imperial Age, which the authors of the game claim resembles the Late Middle Ages and the beginning of the Renaissance. By advancing into each new age, the player gains access to new technologies distinctive of the individual age.

Assassin's Creed II: This historical game starts in modern times with a character named Desmond Miles who uses a program called Animus to go back in time. The player controls a character called Ezio. Ezio lives in Italy in the Renaissance period (15th century) and becomes an assassin after his brothers and father are killed by Templars, who are depicted in the game as evil characters. Ezio is taught how to kill by his uncle, after which he goes on a mission to kill all Templars one by one. The goal of the game is to become a powerful assassin, to weaken and kill the Templars and avenge the death of family members.

Battlefield: This online game (Figure 1) supports a large number of players. The game is based on creating war zones where players can test their military, gun-firing and other skills. The highlight of the game is teamwork, which is rewarded with points for successful group missions. The most important task is performed inside a helicopter cabin, and if this task is successful, a prize is awarded. An important detail in the game is setting up voice communication with other team players in order to communicate one's position. Nine maps can embrace up to sixty-four players, who can perform battles in different urban, industrial and military locations.

Call of Duty 4: Modern Warfare (Cod4): The main theme of the game is modern warfare. The player is a member of a Special Forces unit who goes on various war missions. The player only sees his weapon, but not his character. The player communicates with other players from around the world during gameplay in English. Players form teams in order to win together. Teamwork, communication, trust and tolerance of other players are critical in this game.

Figure 1: Image captured from *Battlefield*
Source: https://www.battlefield.com/

Clash Royale I: The game starts by dealing a deck of different cards to each player. The cards are grouped into four categories: common, rare, epic and legendary. Players of this game from around the world are divided into clans with a maximum of 50 players. One clan may include your peers from class or another school. Naturally, a group may also include players who have never met before. They compete one-on-one against each other in order to win as many trophies as possible and increase the rank of the clan on a clan scoreboard. All communication is in English, so players who do not normally speak English are able to learn new words and phrases without consciously knowing it.

Command & Conquer 3: Tiberium Wars: This game is set in the first half of the 21st century and follows a made-up story. The game accepts up to 8 players for individual battles. It can be played in a team or against the computer. The goal is to build your base, exploit energy and create enough of a resource called Tiberium. The battles revolve around money and valuable materials. Only with the use of Tiberium can you construct buildings, build tanks, recruit new soldiers and make advances in technology. You can only defeat the enemy with a well-developed base. *Counter Strike: Global Offensive:* online FPS (First Person Shooter). The game is played in two teams: terrorists and counter-terrorists (special police). There are 6 different maps to compete in. The goal is to improve your skills and increase your personal rank in groups. By improving his or her skills, the player has a higher chance of being invited into a better and more skilful team. The game is based on teamwork and communication among players.

Crusader Kings II: This game involves the simulation of a dynasty that shows various events from the Middle Ages. The player can build his or her dynasty through strategic warfare, arranged marriages and assassination. The game is based on realistic historical maps and real historical events. It is possible to browse through historical and geographic maps of Europe, parts of Africa and Asia in which the player can see historical territory borders in the Middle Ages, the locations of religious and ethnic groups of the age, and the configuration of land and vegetation.

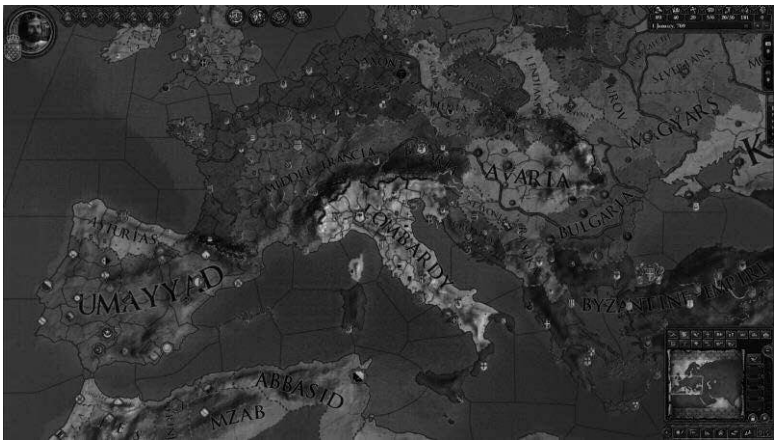

Figure 2: Image capture from *Crusader Kings II*
Source: http://www.crusaderkings.com/

Dota 2 (Defense of the Ancients 2): An online game on Steam. It supports two teams of 5 players; the names of the teams are *Radiant* and *Dire*. Each of the ten players chooses their "hero" from a large selection of characters. Each hero has predefined skills and roles for which they are designated in their team. The player controls his character with the mouse and keyboard. The two main roles of each character are to "*carry*" and "*support*". At the start of the game, the characters are weak and vulnerable, but they become increasingly strong through the game and can lead their team to victory. For this they need the support of other team players. Each team has its own base – *Ancient*. The goal of the game is to destroy the opponent's *Ancient* and defend your own.

Euro Truck Simulator 2: The goal of the game is to deliver cargo to its destination using a large trailer truck. The player can choose the truck design, company logo and language for communicating. If the player reaches his or her destination without damaging the cargo or breaking the rules, he or she can advance and become a professional truck driver. The player scores points after each individual

delivery. The player can choose to be employed by a company or to run his or her own company with his or her own employees. The player has a choice of cargo and destinations.

Figure 3: Image capture from *Euro Truck Simulator 2*
Source: https://www.eurotrucksimulator2.com/

FarmVille: The player controls his or her own farmer, who starts off with an empty piece of land which he or she can later expand and develop according to needs and available funds. During gameplay, the player has to collect points in order to earn more money, achieve a higher level or invest in necessary farm equipment. The primary means of earning money is by tending the land and visiting and helping your neighbours.

Final Fantasy XV: The game is based on a story about Prince Noctis, who explores, fights and conquers the land of Luctis with his three companions. The game demands that the player pay attention to several things at the same time. At first he or she has to master the skill of quickly navigating the game with the keyboard, observe the time limit and solve a range of tasks. The tasks sometimes mimic real life situations, so the player has to think about the amount of fuel in the car, places to stay and food to eat, all while looking out for his or her general safety. Apart from the main goal of exploration, the game also includes various missions that require searching for weapons, fighting monsters, exploring dungeons, etc.

Just Dance 2016: This is an entertaining simulation game played by several players simultaneously. The game is controlled by a hand-held motion sensor "Wii Remote". The screen shows the dance movements for the player to mimic accompanied by music chosen from a large library of songs. It is possible to install

support for your smartphone, which then functions as the motion sensor remote when connected to the game device. Scores are given according to grades: for each move, the player can receive OK, GOOD or PERFECT, and if the player gets several perfect moves in a row, he or she is graded STAR. Apart from single player mode, the game can support a group of players or a group party session.

Figure 4: Image capture from the game *Just Dance*
Source: http://www.justdancenow.com/)

League of Legends (LoL): The game supports two teams of five players each. These teams fight against each other. The goal of the game is to destroy the fortress of the opponent's team. To form a team, the players have to choose their champions ("animals with different superpowers"). During the game, the player has to pay attention to obstacles in order to reach his or her goal. In order to accomplish this, it is important that the player has well developed motor skills and kinaesthetic intelligence for solving problems. The game demands that the player develop coordination of both hands. It is also important for the player to react quickly to avoid obstacles on the way and to reach the finishing line. The player needs to be good at spatial orientation and has to develop good perception.

Nintendo Fire Emblem: This is an online game with a protagonist called Ike, who is a paid mercenary belonging to a kingdom from long ago. The only real life character in the game is Princess Elincia who befriends the mercenary protagonist who later becomes a lord. Only two or three characters appear at the start of the game, but the player later meets about 10 characters. A touch of realism is added to the game by making it impossible to undo the deaths of characters. It is crucial for each player

to stay focused on every detail and on his or her own reactions. The goal is to deploy an army in the best possible way and to complete the level.

Online Chess: Chess can be played online on a number of different websites. It provides the opportunity to earn virtual points and to advance in a similar way to the real *FIDE* rating system. The free website offers a choice of opponents from all around the world and uses a similar scoring system to the one used in real chess. The game offers players an online chess course from beginner to advanced level.

Overwatch: The game is based on teamwork by 6 players. Each player chooses his hero from one of the four available groups: "Offense", "Defense", "Tank" and "Support" (players who can enhance their team or weaken the enemy team). The resulting team plays against another team, and the goal is to secure and defend predefined points on a map presented to the players at the start of each game. The players can unlock prizes while playing, which can enhance their character and lead them to the top of the scoreboard, where they are challenged by increasingly more advanced enemy teams. The game can only be played in a team because the players have to divide roles in the team by choosing the corresponding hero with predefined goals and powers.

Planetside 2: A first person shooter, online multiplayer game. The player is a soldier whose mission is to conquer as much land as possible on a planet called Auraxis, together with his team. There are three nationalities (Terren Republic, New Conglomerate and Vanu Sovereignty). Terren Republic is a military force that aims to resolve conflicts and establish peace on the planet. The New Conglomerate are rebels, who resist authority and are self-proclaimed freedom fighters composed of rejects, pirates, thieves, etc. Vanu Sovereignty is made up of scientists who use space technology and only conquer land that holds technological potential. One team can have a total of 48 players, and each team is divided into four groups of 12 players.

Tribal Wars: The game is set in the Middle Ages. To start, each player is given a small village, which he or she uses to conquer other villages and extend the empire. Advancing in the game allows the player to open new "worlds" or levels. Money can be earned, and points can be bought by paying the server. The game is controlled with the mouse, except for chatting, where the keyboard is used. The player assigns to each member of the tribe a task, such as processing materials or manufacturing weapons. This merchandise can then be sold to other villages or used in battle. It is common for teams of players to group together and help each other.

Pokémon Go: A game application intended for mobile use on smart phones. The game is based on your mobile device's GPS signal in order to use your real location and project it onto a virtual map based on Google Maps. The game is played in the open where a GPS signal is reachable and used to associate with real world landmarks. The player seeks Pokémons in the real world environment. The goal is to find and catch as many Pokémons as possible.

Stronghold: A strategic historical game which simulates life in a kingdom in the Middle Ages and teaches you how to build, manage and defend your castle and kingdom. The story is set in eleventh-century mediaeval Britain. The player plays the role of master in charge of managing and making important decisions for the kingdom. The main goal of the game is to create a strong and stable military force to successfully fight against the enemy, defend the kingdom and conquer new territory though various war missions. After the war, the player goes through a phase of economic recovery and rebuilds his destroyed kingdom. The winner is the one with the largest army at the end of the game, but the leader must stay alive; otherwise, the game is lost.

Total War: Rome II: A strategic video game based on events and locations from Ancient Rome. The player starts off in the role of commander of a warring faction in that period, and goes on to win supremacy over other factions which are controlled by the computer. The main goals of the game are to accomplish economic, cultural, territorial and military domination over one's enemies. The player can develop infrastructural, economic and military strength in his or her territorial units, and only by consistently developing all three aspects can he or she win. There are three different methods of beating the opponent: by military, economic or cultural domination.

Township: The game is about constructing and developing your own town, including the choice of name, infrastructure, residential areas, factories, land and agricultural products, institutions and corporations. Constructing certain areas can make the town's population grow and the size of the land expand. The player starts with a plot of land which he or she uses to cultivate various crops, later processing them on farms and in factories in order to earn money. The money can then be used to develop the town by buying residential or corporate buildings or improving the landscape. The player exports goods by train, helicopter or aeroplane, earns profit in the process, and advances in the game.

Virtual Villagers: The Lost Children: The game simulates life on a desert island and follows the development of a new civilisation from the very beginning to one that is highly advanced. There are no special rules in the game, and the player can individually control the development of his or her civilisation. The goal is to ensure the stability of the civilisation or tribe. In order to achieve this, the player must carry out various tasks and train his or her people to perfect their skills at certain jobs, while promoting the development of the tribe and giving social roles to different members.

World of Tanks: An online team game inspired by armoured combat. Players have a choice of over 200 different armoured vehicles (tanks) from 8 different nations. Apart from being divided by nation, the vehicles fall into 5 categories: light tanks, medium tanks, heavy tanks, tank destroyers and SPGs (self propelled guns). The game is divided into 10 levels of difficulty, through which the player passes by winning battles.

Video games and their use in learning and education

Video gamers receive only limited understanding from the social environment in which they live. Naturally, most criticism comes from their parents and teachers. Parents and teachers have (mostly) never played video games. Most people in Tony's social circle (parents, sister and school friends) thought he was a loner and asocial because he spent so much time playing Call of Duty 4:Modern Warfare. Yet, while playing, Tony communicated with other players around the world in English (as a foreign language). He had his own team to cooperate with and to solve virtual problems. An important aspect of his everyday communication was multicultural. After several years of playing this game, Tony is now a successful, healthy and outgoing student, who sees only positive outcomes from his hobby: good communication in English, teamwork with many friends, coping with everyday success and defeat and successfully solving real-life problems. Below we present some of the main concepts identified in these games or featured in the respondents' answers.

Age of Empires II: The Age of Kings: negotiation, cooperation, good communication, creativity, building your own world, innovation, entrepreneurial skills, being fair, accepting help, helping others, persistence, learning to lose, learning to win, getting to know different cultures and nationalities, thinking about your career, motor skills, orientation in space and time. Assassin's Creed II: Encourages curiosity and resourcefulness, provides a rush of adrenalin, is fun and relieves stress, promotes motor skills and kinaesthetic intelligence, improves

entrepreneurial skills, encourages construction, promotes multiculturalism, helps learn about history and culture, improves communication in English. Battlefield: Resourcefulness and orientation in space, gives practice in tactical thinking, develops motor skills and fine coordination of hands, persistence, altruistic feelings, flexibility and readiness to adapt, helping others, cooperation with team members, patience, attractive themes, observation skills, and the opportunity to meet new friends. Call of Duty 4: Modern Warfare (Cod4): Socialising, communication with peers from different cultures, trust in others and mutual respect, connection with the world, multiculturalism, helps learn about geography and history, responsibility in decision making, practising planning and development strategies, teamwork, players develop self-control or lose their fear, promotes orientation in time and space, experiential learning in virtual reality. Clash Royale I: Socialisation, communication in English (as a foreign language), critical thinking, memory, making comparisons. Command & Conquer 3: Tiberium Wars: Develops risk assessment, quick reactions, mental concentration, critical thinking, relieves stress, helps you learn how to lose, satisfies the need for adrenalin, develops entrepreneurial skills, teaches risk management in decision making, develops the skill to quickly solve problems, teamwork and cooperation, improves spoken English (as a foreign language). Counter Strike: Global Offensive: Multiculturalism, communication with players from different cultures, improves coordination of hands (mouse and keyboard), teamwork, negotiation, quick strategic thinking, tolerance, critical thinking, rapid response, risk taking, adapting to stressful situations, gives a sense of satisfaction, reflexes, self-control, entrepreneurial skills, learning to manage money. Crusader Kings II: Helps learn about history and geography, communication in English (as a foreign language), promotes critical thinking, decision making, managing people, money management, creativity and divergent thinking, cooperation. Dota 2 (Defense of the Ancients 2): Quick decision making, communication skills, cooperation, persistence, coping with losing, coordinating hand movement, relieves stress, offers an escape from (hard) reality, develops entrepreneurial skills, money management and creativity. Euro Truck Simulator 2: Innovation, creativity, improves driving skills, teamwork, reversing a trailer, accuracy, precision, patience, helps learn about geography, improves driving reflexes, entrepreneurial skills, money management and work organisation. FarmVille: Gaining knowledge of agriculture, entrepreneurship, teamwork, creativity, originality, responsibility, relaxation, stress relief, fun, patience, self-control, money management, independent decision making, communication in English (as a foreign language). Final Fantasy XV: Quick decision making, orientation in space, communication in English (as a foreign language), problem solving, time management, creativity, responsibility, learning

how to lose, self-control, patience, self-discipline, cooperation, new friendships, resting, and relaxation. Just Dance 2016: Motor skills, quick reaction time, mental concentration, cooperation, creative learning with your whole body, teamwork, creative expression, security, self-confidence, sport. League of Legends (LoL): Motor skills, mental concentration, teamwork, multiculturalism, perception of time and space, communication in English (as a foreign language), development of kinaesthetic intelligence, quick reaction time, orientation in space, coordination of hands. Nintendo Fire Emblem: Critical thinking, concentration, planning future action, cooperation, friendship, helping. Online Chess: Sport, problem solving, persistence, critical thinking, creativity, learning how to win and lose, time management, managing emotions, independence, developing communication skills in English (online mode). Overwatch: Teamwork, cooperation, respect for others' opinions and cultures, communication in English (as a foreign language), critical thinking, accuracy, persistence and mental concentration, creativity, time management, orientation in space.Planetside 2: Orientation in space, developing language skills in English (as a foreign language), quick reaction time, decision making, mental concentration, managing emotions, critical thinking, creativity, teamwork, cooperation, persistence. Tribal Wars: Learning about history, responsibility, multiculturalism, the sense of belonging to a group, communication in English (as a foreign language), negotiation skills, tolerance, patience, time and money management, mental concentration, creativity. Pokémon Go: Exploration, gathering information, movement, play, purchasing, fantasising, risk, persistence, learning about cultural and historical landmarks, physical activity, finding unknown places and buildings, problem solving, sport. Stronghold: Entrepreneurial skills, money management, understanding politics and economic rules, political decision making, critical thinking, fun, curiosity, risk taking, quick reaction time, cooperation, teamwork, negotiation, communication in English (as a foreign language), multiculturalism, managing emotions, cartographic literacy. Total War: Rome II: Knowledge of history, entrepreneurial skills, decision making, critical thinking, taking responsibility for decisions made, mental concentration, time management. Township: Time management, coordination of motor skills, autonomy in decision making, teamwork and cooperation, money management, entrepreneurship, sense of nature, freedom, persistence. Virtual Villagers: The Lost Children: Ecological education, taking responsibility for decisions, importance of mutual assistance and help, teamwork, socialising, basic human values, organisation skills, critical thinking, patience. World of Tanks: Teamwork, cooperation, tolerance in a team, emotional self-control, mental concentration, orientation in space, taking responsibility for one's actions, money management, entrepreneurship, risk taking, coordination of hands (mouse and keyboard).

Discussion and Conclusion

A total of 25 video games were analysed and discussed with players (N=30) with vast experience of playing (some of them over several years and thousands of gameplay hours). The key question of the study was, which values or benefits did players see in the time they spent playing video games?

Through an analysis of the main concepts used by players to express the values and benefits of playing video games, the most prominent terms were found to be entrepreneurship, creativity, time and money management, critical thinking, teamwork and cooperation. The importance of persistence, motor skills, mental concentration and money are noted an additional eight or nine times.

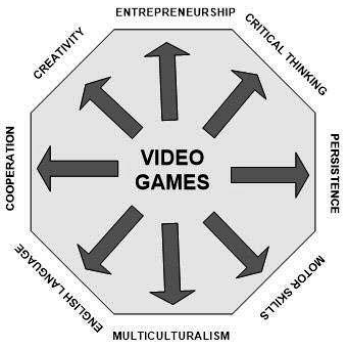

Figure 5. Main pedagogical values as a result of playing video games

Although sport is mentioned in three of the games (Pokémon, Just Dance and Online Chess), all three game descriptions and player interviews underlined the importance of mental and physical skills for playing, and motivation to reach a higher score or level. The player's desire to play against himself or herself seems to be a strong motivator to spend large amounts of time playing video games. What motivates players to play is not just the interesting stories on which the games are based or the attractive graphics, but also the fact that the players can interact and communicate with people from different cultures around the world.

Since all of the games in the analysis were in English, which is not the participants' native language, all players showed improvement in their speech and writing in the language, thanks to the time spent playing video games.

Most uninformed observers and those who know little about the nature of video games assume that players are reserved and not sufficiently physically active, but our research suggests that they are very social, open, cooperative and empathetic (ready to help, compassionate towards other players, even to opponents). In order to play intricate video games, or complete difficult tasks, players have to concentrate, be persistent, cooperative, tolerant, independent, decisive, and critical, while possessing well-developed motor functions. All such skills are also crucial for their future jobs or lifelong learning and work.

In summarising the results of the collected descriptions, the analyses and their interpretation, it is possible to draw certain conclusions and possible practical applications. It is evident that teenagers and students play a variety of video games that can develop skills needed for informal learning or for later in life. These skills are often not taught in the classroom, and rarely form part of the school's learning programme. The results show that students recognise the value of communication skills, decision making, multiculturalism, critical thinking and entrepreneurship in video games and that these competences are crucial in everyday life. It is important to note that video games are not just ways of "playing" and "wasting" time, but are also latent factors in the development of life skills. Major skills are developed in a wide range of strategy games and in the role playing that forms part of certain games. Kinaesthetic games are a relative novelty in the world of games and motivate the player to take part in physical activity. On the one hand, all this helps to eliminate the prejudice that games are a major predictor of obesity, and, on the other hand, it suggests that these games provide significant didactic potential.

Drawing from existing theories and research, teachers, educators and parents should not be indifferent to some potentially negative aspects of video games. The negative aspects and the effects of video games should be managed, and the greatest influence here comes from media education, and consequently from teachers, educators and parents. To support this view, it is recommended that the formal education system implement cross-curricular activities to develop critical thinking and the use of digital media. With this recommendation, it is highly desirable to implement more ways for learning through play as one of the constructivist learning strategies. Strategies for learning though play also include video games.

Finally, the potential limitations of this research should be recognised. One limitation is that the study focused only on video game descriptions and introspective records, or players' statements. More complete information could be collected by systematically observing video game players during play. Furthermore, the interaction between players was not investigated, so more precise insight into

the development of their social competences was not obtained. Another limitation of this study is that the data on the playing of video games were not disaggregated by gender, age and type of school of the participants. In addition to a qualitative approach, a quantitative approach should also be used on a larger sample of respondents. The cited limitations also indicate new opportunities for future research on this subject.

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