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I choose you! –Gaming as a digital learning ecosystem for Early Childhood Education

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Social Services
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Laurea University of Applied Sciences **Abstract**
Social Services
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I choose you! –Gaming as a digital learning ecosystem for Early Childhood Education is an academic study of the current phenomenon of videogames and their constructive outlook based on the theoretical framework of e-learning in juxtaposition with the National Core Curriculum for Early Childhood Education and Care with its regulations and guidelines.

The purpose of this document is to define the status quo of gaming, regarding the use of their technologies to incentivise new abilities in children who attend Early Childhood Education and Care in Finland. On the other hand, the objectives of this thesis are, per se, hand-in-hand with the National Core Curriculum for Early Childhood Education and Care meaning that adults should comprehend how videogames can be considered instruments that upkeep the key components of pedagogical activities stablished by the Finnish National Agency for Education. For this a mixture of various research methods have been use from literature review, case study and non-structured interviews which helped us to analyze how the theory of a digital learning ecosystem & e-learning can be applied in Early Childhood Education always following and respecting the guiding principles of the National Core Curriculum for Early Childhood Education and Care.

The case study, however, emphasize on the prominence of educational partnership between early childhood educators and parents who utilize a common digital learning ecosystem that promotes learning via the Pokémon Go application. The results obtained during the study have been eye-catching and might be of much interest for those who are in search of new methods of implementing multipurpose and integrative pedagogical activities for children in Early Childhood Education and Care.

The literature used on the making of this thesis is of very miscellaneous nature going from very early studies of cultural historian Johan Huizinga which dates from 1938, through the use of electronic sources such as e-books and solid sources of previous researches such as in Harvard, MIT and Forbes; this was intentionally done in order to observe the evolution and transition of the phenomena and see how its perception transforms decade by decade.

In analysis, this thesis concur with many other previous studies that gaming is a tool of growth in many areas of learning without forgetting the neuropsychological and neurocognitive part. Nonetheless, this one should be always supervised by adults or guardians beforehand in order to stablish its suitability for children and their development which concerns their cognitive skills, socio-emotional skills, personal skills and technology education in between others. In conclusion, it's recommended to tackle this study with an open mind and understand that gaming is a singularity that has been present in human's life since early times and no matter the centuries the marvels of gaming will always be here to stay with us, since it's a reflection of our civilization and our journey through digitalization towards the future.

Keywords: Gaming, e-learning, Early Childhood Education

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1 Introduction

"It's dangerous to go alone! Take this." - Old man, the legend of Zelda, 1986

This chapter introduces to the three main notions dealt in this thesis which are "gaming", "early childhood education" and "digital learning ecosystem" and how these three concepts collide and create a hypothesis which is: Are videogames beneficial in any way for children who undergo early childhood education? Do videogames endorse e-learning curricula? And can videogames be related to the core curriculum of early childhood education and care?

What's gaming?

According to Oxford dictionary a game is: "An activity that one engages in for amusement or fun." but in the gerund form (gaming) makes reference to the act of playing games such as playing a role-playing game, in which they participants adopt or personify fictitious characters and must understand perks and abilities of a certain character in depth. Also it's possible to mention playing table top games such as board games, card games, miniature war-games and tile-based games in which players possess a set of rules and strategies in order to succeed. On the other hand, playing videogames with a computer, console or smart device is an electronic method that encompasses communication between a user-interface generating filmic response on an audio-visual manoeuvre. Nevertheless, this thesis' main focus is made on the many forms of digital gaming as the previously mentioned (see figure 1) such as console gaming and portable console gaming, PC gaming, mobile gaming (in smart devices), virtual reality (VR), online gaming and simulation.

Figure 1: digital gaming used in a classroom via a Nintendo Wii (Nintendo Wii Gallery).

In addition, gaming is one of the most global new media subculture that brings together millions of individuals and its popularity has skyrocketed throughout the years. This is one of the reasons why it's imperative to further enquiry how this phenomenon influences significantly in our advancements, popular culture, internet culture and identity of those who profess their passion for gaming and its endless networks. Also, it's essential to understand the grade of flexibility and artistry of videogames and how they create new trends such as forums, memes and e-sports and how they influence social media, television culture, film culture, music aesthetics, etc.

The global gaming community includes children as well and the main objective of this thesis is to find out what games or apps could be applied to their Early Childhood Education in order to take advantage of such intrinsic designs seen within gaming. CNN considers videogames as a delightfully intricate amalgamation of artwork, music, storytelling and engineering that has always provided the self-styled wow factor in entertainment. ("Bold, provocative, inclusive: the new face of game design, 2018). Videogames are bridges to adventures and emotions and no one can deprive children from such wonders full of satirical introspection and exploration that might activate new abilities and inspire children with more modern approaches.

What's a digital learning ecosystem?

A digital learning ecosystem is an e-learning milieu which provides learners an immersive yet insightful environment for metacognitive development (see figure 2). This supports learners to automatically experience a precise curriculum to focus and engage with e-learning activities (table 1) and a provided technology which fundamentally incentivises and assesses in real time (Ravidran & Bacon 2015).

A digital learning ecosystem can have different manifestations such as:

Table of Expressions for digital learning ecosystems:

Formal learning:	Informal learning:
Traditional: • Videos • Documents	Web: • Web searching • Educational sites
Self-Paced Content: • Mobile apps/modules • Simulation	Social learning: • Blogs/Vlogs • Advice/Discussion groups

• Web-based courses	• User/Learner's generated content. • Communities of Practice

Table 1 Table of Expressions for digital learning ecosystems (Ravidran & Bacon 2015)

In addition, virtual classrooms & digital mentoring are very deep theories of e-learning that deliver and endorse new learning strategies and multimedia principles that complement the learning activities and electronic pedagogy. All these previously referenced have affective, behavioural and cognitive effects on the learner, who sets by himself/herself the learning activities, the learning goals and the learning community he or she wants to belong to. However, it's significant to mention that the academic foundation of the digital learning ecosystem requires a huge amount of discipline from the e-learner in order to accomplish the tasks that guide him/her to marvellous learning outcomes (Ravidran & Bacon 2015).

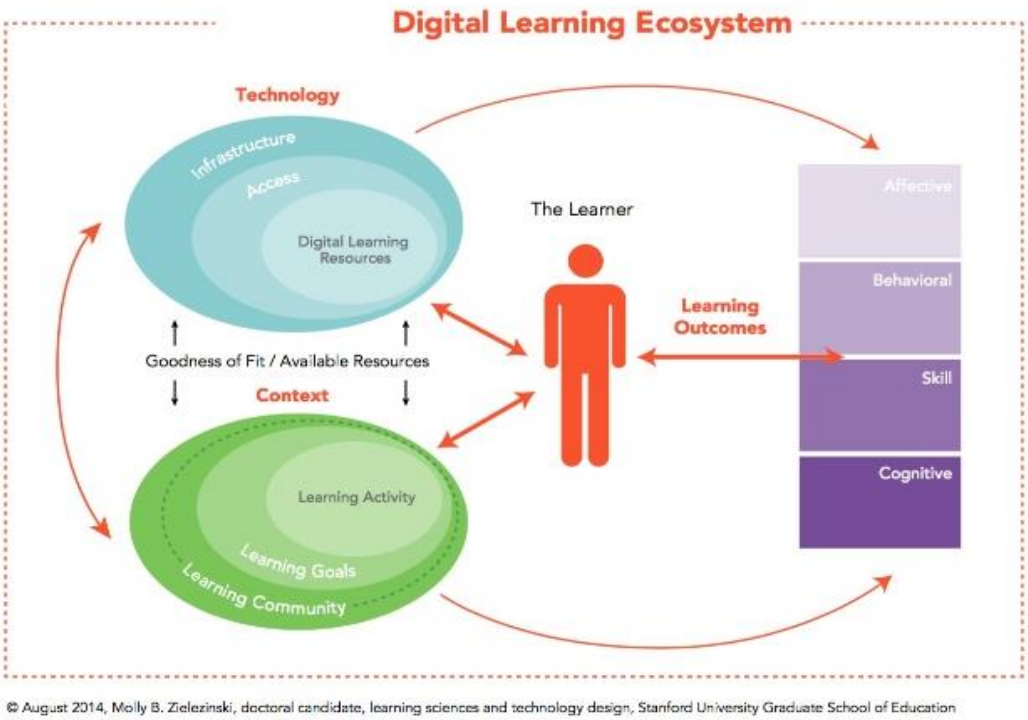


Figure 2: Digital learning ecosystem and its process (LinkedIn slides by Molly B. Zielenzinki)

What's early childhood education?

Early childhood education, frequently abbreviated as ECE, is also known as nursery education. It's a very significant subdivision from the Finnish education system (see figure 3) which is given to all children under school-age (from zero to 5 years old) as part of their subjective universal right to education.

In Finland ECE can be either be given either by public sector or by publicly subsidised private ECE; meaning that families can choose which one of these is the most adequate depending on the family's needs. ECE is predominantly given in day-care centres and family day-care which are organized by municipalities across the country and its main objective is to upkeep children's stable growth, improvement and learning. During this period, children carry out pre-primary education which allows them to adopt rudimentary abilities, understanding and aptitudes according to their age group and such education is given via play which is the most essential aspect of it (Finnish National Agency for Education, 2016).

Early Childhood Education in Finland is directed by the National Core Curriculum for Early Childhood Education and Care and this has been created by the Finnish National Agency for Education and the Ministry of Education and Culture which is an effort to have a legislation up-to-date that synchronises with the European Union Standards and as well the standards agreed in the United Nations (Finnish National Agency for Education, 2016).

Early Childhood Education and Care in Finland focuses on children's development with an approach which emphasises learning through play and always bearing in mind physical development and the children's biological and physical needs; also social development and how children will interrelate to their peers and adults also emotional development and its deep connection with self-esteem, self-confidence and sharing feelings with others. Language development is included as vital part of measuring how the child develops and cognitive skills that are needed in order to explore, trouble-shooting and organizing information of any nature (Finnish National Agency for Education, 2016).

Nevertheless, Early Childhood Education and Care and its National Core Curriculum for Early Childhood Education and Care follow the socio-cultural learning and constructivism theories in a very simple manner making a grand highlighting on the influence of social and cultural involvements the children go through and how this crystalizes their individual thinking and development. Yet, learning is constructed in pedagogical activities based on games that accommodate the framework dictated by National Core Curriculum for Early Childhood Education and Care (Finnish National Agency for Education, 2016).

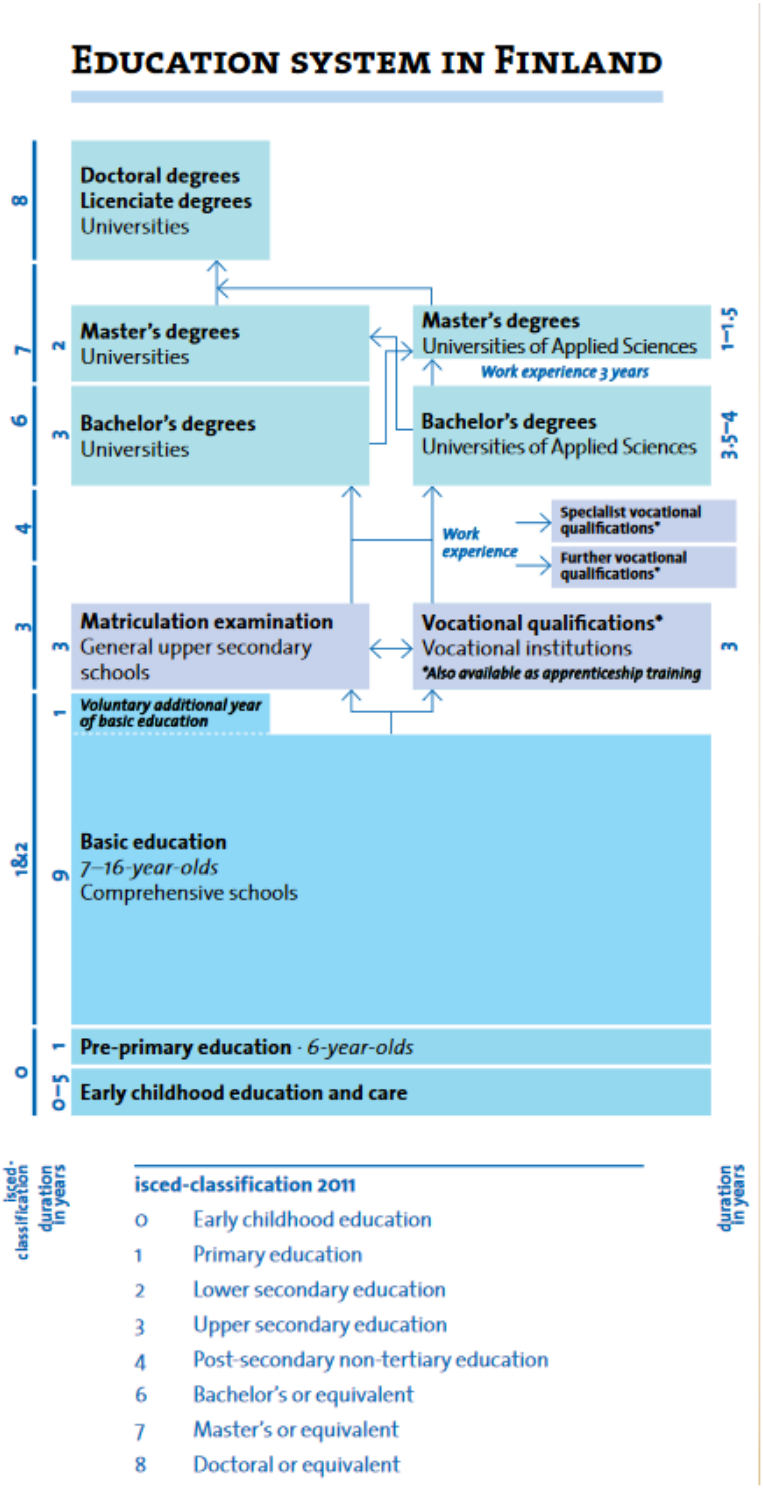


Figure 3: Education System in Finland (Finnish National Agency for Education. "Finnish Education in a nutshell" 2016.)

2 Gaming milestones

"Stay awhile, and listen" -Deckard Cain, Diablo II

2.1 Gaming timeline

Gaming in antiquity

Ethnographical literature and archaeological records of many ancient civilizations chronicle the use of astragalus bones in "leisure happenings", such relics represented amusement, games and divination practices. Games were somehow the apprehension of impressions and worldviews of a definite philosophy that was supposed to be passed to future generations. (Koerper & Whietney-Desautel 1999)

Ancient games such as Senet (See figure 4), astragaloi (see figure 5), Backgammon and Patolli (see figure 6) were found in archaeological excavations which date in 3100 BC, in Ancient Egypt. These so-called artefacts were made out of bones, specifically Talus bones, found globally as a tool of oracular and divinatory functions. Other gizmos could have been shell, stones and sticks and they were a cornerstone of social bonding and also as teaching tools to develop strategic thinking and mental skills related to military practices. (Randoff 2010).

In southeast Turkey, a series of 49 slight yielded painted stones were found at a 5,000-year-old burial, which for many archaeologists are considered the most prehistoric gaming pieces ever found. These early board games were a pastime for the elite and were also given as ambassadorial gifts. (Randoff 2010)

The Dutch cultural historian Johan Huizinga in his book "Homo Ludens" maintained that games were a crucial circumstance of human ethos and they reflected complex anthropological commotions such as language, law, war, philosophy and art. (Liukkonen 2015)

Figure 4: A Senet game board and game pieces from the KV62 tomb of Tutankhamun—originally from Thebes (Brooklyn Museum, Charles Edwin Wilbur Fund).

Figure 5: Roman Statue of a girl playing astragaloi 130 - 150 BCE (Berlin, Antikenmuseum).

Figure 6: Patolli game being watched by Macuilxochitl as depicted on page 048 of the Codex Magliabechiano (Museo Nacional de Antropología, MNA).

Gaming as a socio-cultural phenomenon

Games have undergone a series of continuous yet intriguing fluctuations throughout history. Going from Episkyros to e-sports (see figure 7), games have become critical in the development of our leisure time, imagination and voices that generate values and give a sense of purpose to our society. Also gaming can be considered a catalyser for social evolution and public interpretation (Huizinga 1955).

According to Johan Huizinga (1955), gaming have had an irrefutable role in the progress of culture and it's been an essential fragment of many civilizations' history. Huizinga (1955) gave the public a resumed slant of some of certain vital characteristics any game must have e.g. gaming (also referred as "play" in Homo Lundens) is free, in fact it's an embodiment of freedom; meaning that the act of engaging in gaming activity give humanity a sense of self-determination and empowerment where the individual's imagination is the limit, what bring is to the next point, gaming is not "average" or goes hand-to-hand with "reality", denoting that logic and society's designs can be broken by it. Also, another important aspect that can be linked to the previous argument is: gamin is dissimilar from "conventional" life, both as to vicinity and length. Yet, gaming creates direction and is directive and gaming demands instruction utter and utmost being those last one mentioned a bit paradoxical since gaming for some can be chaotic but still in chaos there's a sense of trend, created by the player/players and last but not least, gaming is associated with no material awareness, and no profit can be done from it. This last one maybe a be outdated since nowadays many people make a living out of gaming related activities such as e-sport athletes, Youtubers, etc. This only shows how capitalism has affected our society, after all these years.

Huizinga (Homo Ludens, 1955) as well denotes the cultural aspects of game as:

Gaming concept in expressed language.

Many languages have been affected by the use of "Play-concept" (Huazinga, 1955) which is big mystery for many anthropological linguistic theorists since the concept of play in each language proceed from innumerable etymological sources for example in Latin and the verb "ludere" (to play, to gamble or to communicate with god) in its infinitive form, transforming into "ludo" as a noun (referring to the board game played by the Greek in ancient times) and "ludus" as a variation with a variety acoustic images such as: school, game, sport or fun depending on the context with alternative forms in its declension e.g. in the case nominative plural "ludus" transforms into "ludi" having its roots in Proto-Indo-European etymology. Nevertheless, it's essential to mention that not only Latin found in this theory but also Greek with words such as "παιδιά" when referring to children's games or "ἄθυρμα" associated with the notion of "playing with words" or talking nonsense. In Sanskrit we find words like

“krīdati” which referrers to games played by animals or in Chinese with words as “赛” to referring to a completion. Such words were created to explain the phenomena of gaming and language underwent transmutation very similar to nowadays words such as: Aimbot, cooldown, JRPG, microtransaction, etc.

Gaming and civilizing functions.

Huizinga (1955) maintained during his dissertation in Homo Lundens that “Gaming turns into culture” due to its crucial nature in human beings; and such statement can be still hold into account if we look at the gamer’s around the world and the way their own culture and subcultures have turned into.

Gaming and law.

Huizinga (1955) used the concept of “three play-forms in the lawsuit” in which he questioned tradition in legal practice and compared it to a role playing game invented by our archaic society, being these three elements: the game of chance, the contest and the verbal battle. These elements can be still observed in our modern society.

Gaming and war.

According to Huizinga (1955), gaming was used by ancient civilizations as a way of training for war or get knowledge of how to act on war. This cultural function for war is observed in Greek, Chinese and Mesoamerican civilizations in which young leaders played war, in order to prepare for real life.

Gaming and knowledge

This aspect makes allusion to riddle-solving and the empowerment by overcoming obstacles with the magic of knowledge. In antiquity, people who for some reason got death-penalty were giving a riddle to solve and save their lives, since it was believed that the knowledge to solve such riddle might come from a sacred or esoteric source in the cosmos which acknowledge destiny.

Gaming and poetry

In ancient Greek tradition, the act of creating something from nothing was known as “poiesis” (ποίησις) which means “making” and this is connected to the area of literature that uses aesthetic and rhythm to create phonaesthetics and sound symbolism (Huizinga, 1955). The person capable of “poiesis” was known as “poietes” (ποιητής) which is translated as “maker” the game of poetry was used for those who decided to be indoctrinated in the art of reciting and it was, somehow, an entry exam into the schools of philosophy, literature and theatre.

Gaming and mythopoiesis.

Myth (μῦθος) is fundamental genre of Greek folklore that consists of narratives that played as the ultimate instrument for society to link belief and sanctity. Huizinga (1955) maintained that creating myths was the product of society's passion and mind's eye that embodied the playful awareness of those who usually wanted to connect with divine beings such as gods, demigods or uncanny humans and their past. However, the cosmogony of myths were somehow gaming exercises of philosophy students in order to explain society's duties, foundations and anathemas (Huizinga, 1955). In between the most well-known mythographers mentioned in history are Euhemerus, Sallustius and Plato. This last one created after his time a big wave of Neoplatonists who contributed to the branches of folklore studies, psychology and philology.

Gaming and philosophy.

Philosophy (φιλοσοφία) is composed of two Greek words "philos" (φίλος) which means "loving" and "sophia" (σοφία) meaning "wisdom" and it translate into "love of wisdom". This makes allusion to the academic discipline of seeking verity via rational thinking instead of empiricism and its main focus is to study fundamental problematics concerning reality, awareness, ethics, motive, cognizance and language. According to Huizinga (1955), gaming had a deep stand in Greek sophists since gaming was the archaic element that let them improvise and be multidisciplinary and for many they were considered prophets, medicine-men, oracles and thaumaturges since they decided to embrace the unknown, the mystic and use it for own personal success. This can be compared nowadays as people having impact over others for being a successful TED talker or influencer who bring new ideas to others who might follow in masses.

Gaming and art.

In this area Huizinga (1955) alludes to the connection of "poesy, composition, dancing and plastic art and how all of them collide in an aesthetic chaos that inflicts by a "creative impulse" and generating social scenes. This can be perfectly exemplified by the Age of Enlightenment also known as the Age of Reason that brought us new artistic and literary movements such as liberalism, Dadaism, neo-classicism, etc. Makin our intellectual heritage richer e.g. poets creating nonsensical yet profound poems by "playing" exquisite corpse (cadaver exquis).

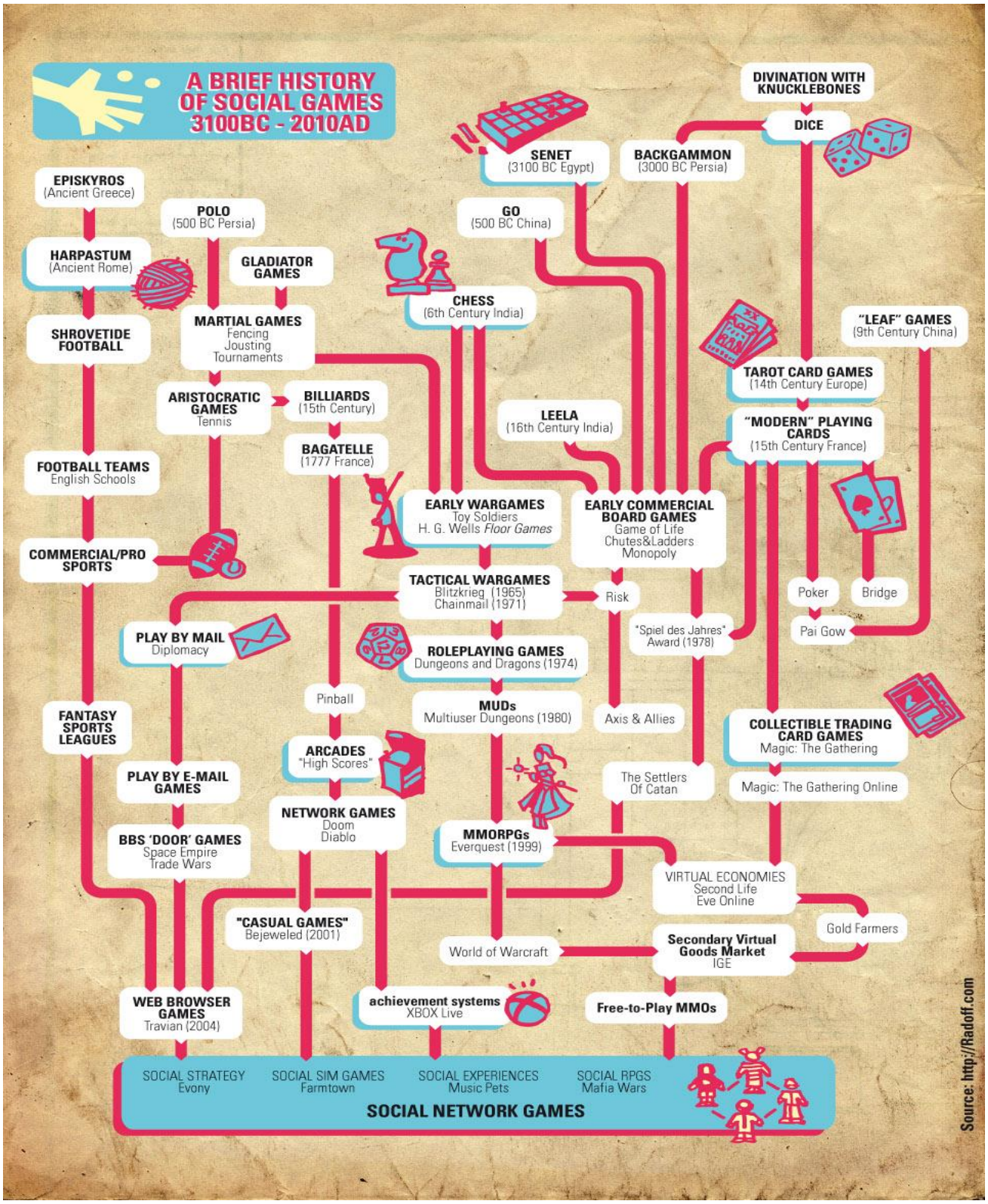


Figure 7: A mind map that describes the story of social games (Randoff's blog).

Gaming in the digital era

Early history (1948-1972)

During World War II the first electronic digital computers were built in an effort to service the Allied against the Axis forces. Subsequently, once the war was over academic stuff from University of Pennsylvania, Cambridge University, the University of Manchester and Princeton decided to use such technology for advancement. Computers were commercialized by companies such as IBM and many academic institutions adapted computer science to their curricula (Rabin 2005).

The first electronic games were known as “electronic displays” with the invention of the cathode-ray tube amusement device in 1947 which was patented by the United States. Many of these early videogames were enthused by radar display technology e.g. games like “Tennis for Two” (see figure 8) concocted by William Higibotham in 1958, used an oscilloscope for display and it consisted of a simulated tennis game (Rabin 2005).

In 1962 Steve Russell together with his MIT classmates, Martin Graetz and Wayne Wiitanen created Spacewar! (See figure 9) a game that simulated a series of spaceships who mêlée each other on a DEC PDP-1 computer. Later on in 1972 the hit ping-pong game “Pong” (see figure 10) was developed by Atari, becoming an immediate commercial success and making a technological renaissance in the videogame industry by becoming one of the earliest arcade videogames created by Allan Alcorn (Rabin 2005).

Figure 8: Tennis For Two on a DuMont Lab Oscilloscope developed in 1958 (National Videogame museum).

Figure 9: Spacewar! A space combat video game developed in 1962 by Steve Russell (National Videogame museum).

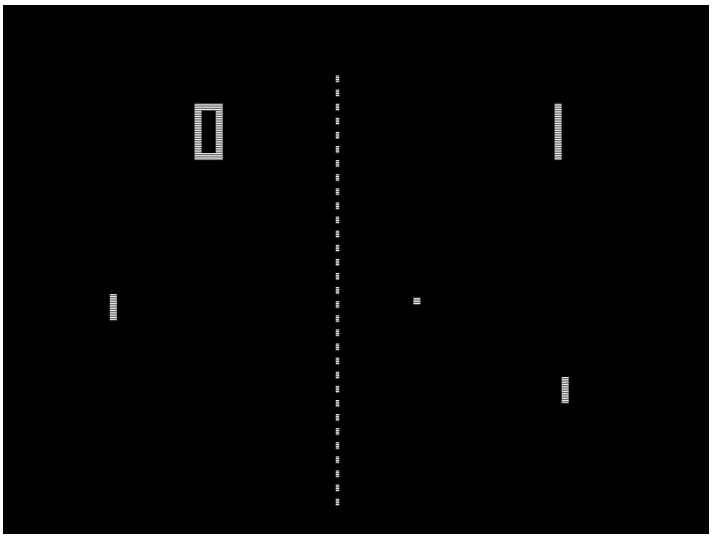


Figure 10: Pong a two dimensional sport game that emulated table tennis (National Videogame museum).

Golden age of video games (1972-1982)

After the profitable accomplishment of “Pong” in 1972, an enormous amount of “clones” from such game were created leading to a crash in 1977. This was a sad event for the gaming engineering. Nonetheless, in 1978 the Japanese company Taito Corporation (株式会社タイトー) created a cult classic called “Space invaders” (スペースインベーダー) (see figure 11) becoming one of the earliest shooting games in which the main objective was to overthrow aliens with a laser. This inspire many manufacturers to enter the market (Rabin 2005).

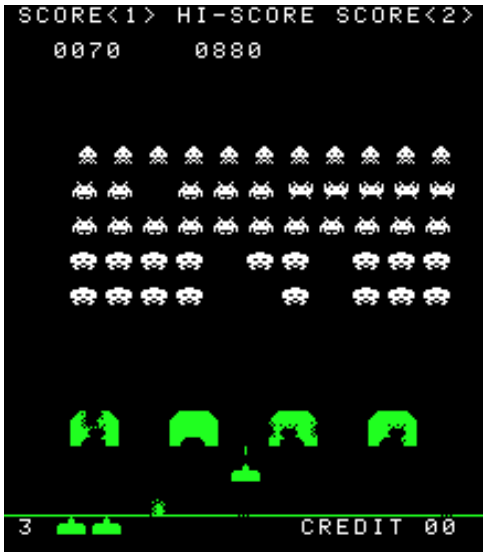


Figure 11: Space Invaders スペースインベーダー (National Videogame museum).

The evolution of home consoles and gaming computers (1983- present day)

Around 1983, the videogame trade have suffered many losses, many companies faced bankruptcy e.g. Atari conveyed an estimated of 536 million U.S. dollars in loss. Even though the gaming the market's atmosphere was not the best lower cost devices such as Commodore 64 and ZX Spectrum adopted a more belligerent strategy of marketing to indorse the educational value of their products, in comparison to the home consoles (Rabin 2005).

Nonetheless, in 1985 Nintendo decided to introduce their American friendly version of the Nintendo's Family computer (also known as "Famicom") which was called Nintendo Entertainment System (abbreviated as NES) (see figure 12) which was released on October 18, 1985 in the United States; bringing the gaming market to its peak between 1987 to the early 1990's. Nintendo's attainment was due to the creation of franchises with rich and simple storytelling which made a huge impact of many e.g. Mario Bros & The legend of Zelda (Rabin 2005).

Figure 12: Nintendo Entertainment System (NES) (Nintendo's archive).

During the 1990's the novelty and advancement of videogames was massive, graphics went from raster graphics to 3D graphics favouring genres such as first-person shooters, real-time strategy and MMO (Massively multiplayer online). Gaming culture has now become more mainstream and many games were very notorious due to their high vehement environment e.g. Mortal Kombat & Doom. This led to the creation of the Interactive Digital Software Association and their Entertainment Software Rating Board (ESRB) which took the responsibility of rate and qualify videogames depending on how suitable their content might be for a specific demographic (see table 2). Nevertheless each country has the right to overrule given rating and choose what they consider it's more suitable going from a higher to lower rating and vice versa (Rabin 2005).

Table 2: ESRB ratings and labels plus descriptors.

Icon	Rating	Active since	Description
	Rating Pending (RP)	1994	Used for promotional material which haven't been assigned an ultimate rating by the ESRB.
	Early Childhood (EC)	1994	These games are aimed for preschool audience.
	Everyone (E)	1994	Also known as "suitable for all ages" might contain "mild" cartoon or fantasy violence and mild language.
	Everyone 10+ (E10+)	2005	Suitable for public aged 10 years and older. It might include a larger amount of violence, mild language crude

			humour or suggestive content.
	Teen (T)	1994	Suitable for public aged 13 years or older and it might content mild to moderate use of language, suggestive themes, sexual content and crude humour.
	Mature (M)	1994	Suitable for public aged 17 years or older realistic violence, sexual themes, partial nudity and strong language.
	Adults Only (AO)	1994	Suitable for public aged 18 years and older and it might accommodate strong sexual themes and content, explicit nudity, extreme violence. The majority of these titles are pornographic adulvodeogames

Table 2: ESRB ratings and labels plus descriptors. (ESRB ratings, http://www.esrb.org/)

The mid-1990's was a huge boom for home consoles taking the 3D computer graphics to 64-bit with consoles such as Sega Saturn, PlayStation and Nintendo 64 such 3D-focused hardware made the gaming experience more immersive and made the digital storytelling precise. The popularity of this 3D made also that the arcade world to have an evolution, racing games

adopted steering wheels and first person shooters offered plastic replicas, making the gaming involvement deeper and more real (Rabin 2005).

In 1999 Sega Dreamcast (see figure 13) incorporated for the first time online features such as built-in modem and a web-browser, since technology allowed more suitable and stable Internet connections. This became a standard feature for many future consoles in the future.

Figure 13: Sega Dreamcast, 1999 (SEGA's archive).

In the 2000's gaming has jumped from Pixels to polygons and its environments resemble wide open spaces in which the player could explore. This was in home consoles and also in PC gaming where the decreasing cost of processors, the higher quality of sound and video cards and the irrefutable advances in artificial intelligence made games more alluring, collaborative and with accurate dynamics (Rabin 2005).

On the other hand, mobile gaming gave its first baby steps, when Nokia bed in "Snake" (See figure 14) into mobiles in 1997. Even though they were only installed for "killing time" the popularity of this installed games grew at a fast pace (Rabin 2005).

Figure 14: Nokia 6110 with "Snake" game (Nokia's archive).

In 2010's the possibility of gaming has become endless from casual gaming such as Candy Crush or social network gaming (especially via Facebook) as Farm Ville and Café World and to e-sport gaming as in Overwatch; gaming is nowadays an irrefutable daily activity in the life of many and with more and more advances in terms of software and platforms we just might expect, in the near future, that this 23 billion worth industry will be part of our society and guide us through new paths via their consoles (see figure 15), art, storytelling and beloved characters in a journey to new horizons (Rabin 2005).

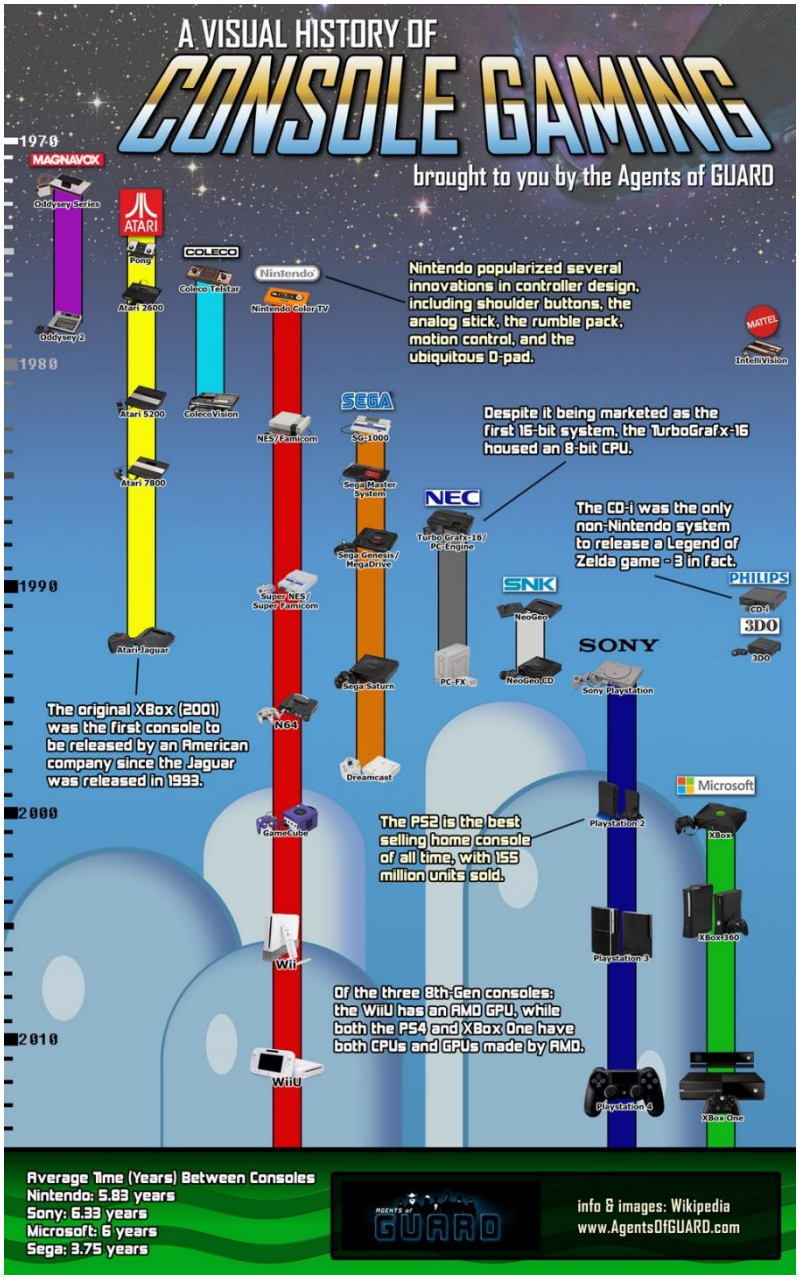


Figure 15: A visual representation of consoles evolution (Eurogamer).

2.2 Gaming key components

Gaming platforms

A gaming platform is the combination of a variety of automated mechanisms or hardware in juxtaposition with software that allows a videogame to be activated. Colloquially, the term "system" is used e.g. Nintendo Entertainment System (NES). Plus laptop, desktop and mobile devices are able to run videogames even though they're not predominantly videogame apparatuses (Kent 2001) (See table 3).

In between the most common gaming platforms we can list (see figure 16):

Table of Gaming Platforms:

Gaming Platform	Description
PC	This mean of gaming got famous since 1960's and brought lots of game to people especially during the Pong era.
Home console	It's a device especially utilized for playing videogames. Nowadays many of these home consoles are capable of playing DVDs, connect to the Internet and even share in social media.
Handheld	It's a form of portable console that can be used for playing videogames on-the-go.
Arcade	Also known as coin-operated entertainment machine; got very famous during the late 1970's and mid-1980's having a great come back in 1990's.
Web browser	Also referred as "browser", it's a software application that allow us access info on the world wide web and is also used by many gamers to play on-line games. In the most common web browsers we can mention: Chrome, Firefox, Safari, Internet Explorer, etc.

Mobile Device	Also known as “smart devices”, this one allow us to play games on-the-go as well with the only difference that this might also do other functions than just gaming e.g. many smart phone are used for gaming but also they are used for making phone calls, text messages, etc.
Virtual Reality	This is an interactive computer spawned experience that submerges gamers in a digital environment and it incorporates audio-visual feedback.

Table 3: Gaming Platforms (Statista Sweden).

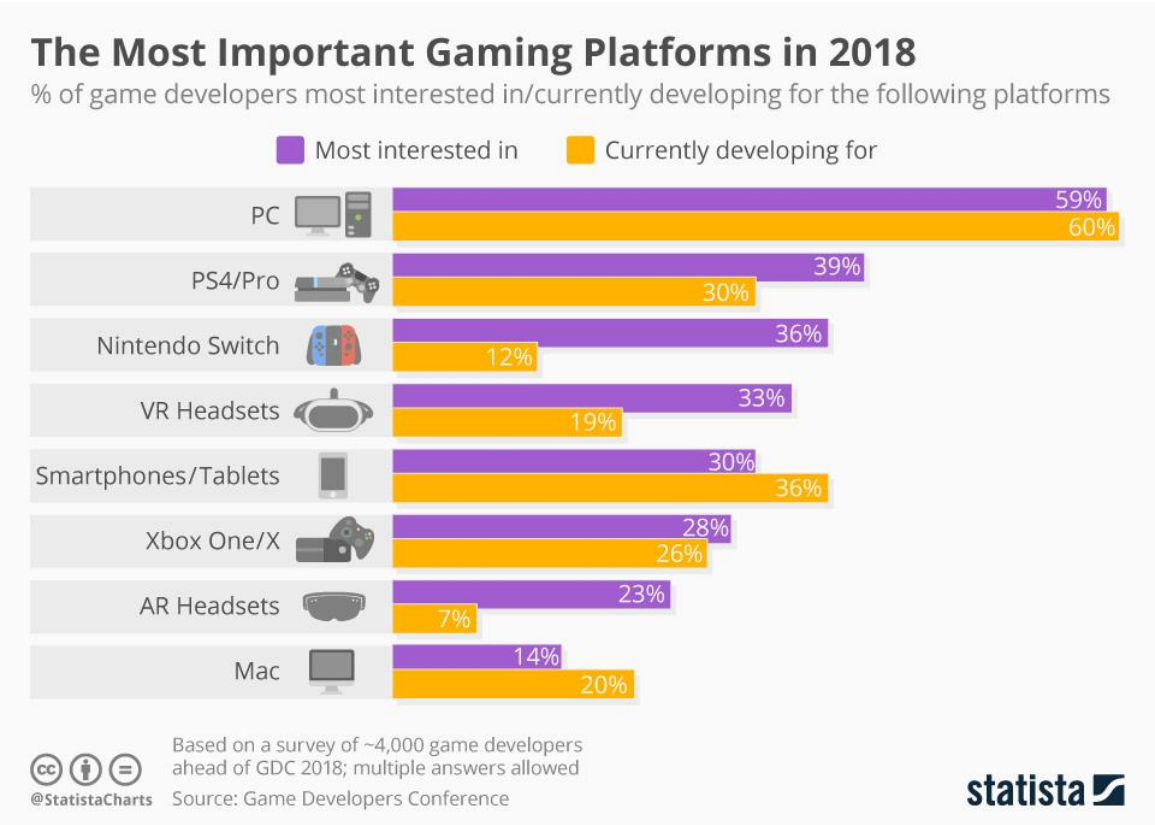


Figure 16: The most important gaming platforms in 2018 (Statista Sweden).

Gaming classifications & Genres

According to Kent (2001) gaming nomenclature can be divided into four meek groups which are casual gaming, serious gaming, educational gaming and by controllers.

Gaming nomenclature:

Type of Gaming	Description
Casual Gaming	This referrers to gamers who play casual videogames and engage only in short sessions e.g. games as The Sims, Nintendogs and Candy Crush Saga. Many studies shown that casual gaming is practice predominantly by female gamers.
Serious Gaming	This referrers to gamers who engage in longer sessions and do gaming as a form of living as it is the case of e-sports.
Educational Gaming	This referrers to games that teach as in the e-learning strategy of the digital learning ecosystem.
By Controllers	This makes allusion to games that have a special hardware to play e.g. VR glasses or kinetic cameras.

Table 4: Gaming nomenclature (Kent, 2001. “the Ultimate History of Video Games: From Pong to Pokémon”).

Also Kent (2001) give us some of the most common gaming genres arranged in rank of popularity.

Action

This genre is one of the most popular in the gaming industry and demands a lot of hand-eye coordination and motor skills to overcome. The player is the main focus of the exploit and inside this genre has many sub-genres such as platform games, shooter games, fighting games, beat em up games, stealth games, survival games, rhythm games, etc. All of them have in common the twitch gameplay scenario style which consists on a gameplay that tests the player’s response time (Kent, 2001).

Adventure

Also known as “Action-adventure” games, started as a sub-genre and later on it separated itself from the action genre due to the nature of development. These games focus on extensive term hindrances to overcome and encourage exploration/puzzle solving. In between the sub-genres found in this genre there is adventure survival horror, metroidvania (portmanteau of Metroid and Castlevania), text adventures, graphic adventure, visual novels, interactive movie and real-time 3D adventure (Kent, 2001).

Role-playing

This genre of videogames were popularized by “Dungeons & Dragons” and their main goal is to set the player with a character who possesses a distinctive skill set that might mutate or get upgraded as the predetermined storyline develops in between this genre’s sub-genres there is Action RPG, MMORPG, Roguelike, Tactical RPG, Sandbox RPG, First-person party-based RPG, WRPG, JRPG, choice RPG and fantasy RPG (Kent, 2001).

Simulation

This game genre is designed to thoroughly mimic aspects of actual or illusory reality. In between the most common thematic of simulation there is construction and management simulation, vehicle simulation, flight simulation, life simulation, educational simulation, pet-raising simulations (similar to the concept of digital pet popularized by Tamagotchi in the 1990’s), social simulation and social interaction; being the last one utilized by children and adults with autistic spectrums for learning purposes in a safe digital environment (Kent, 2001).

Strategy

This game genre main emphasis is challenging thinking and planning abilities of the player. This genre gives the player god-like view of the world and challenge him/her to overcome situations based on team-based tactics. The nature of the strategy genre is either turn-based or real-time and many of these games are compatible with online playing. In between this genre’s sub-genres it’s possible to mention 4X (getting its name from the concepts of explore, expand, exploit and exterminate), artillery, real-time strategy (RTS), real-time tactics (RTT), multiplayer online battle arena (MOBA), tower defence, turn-based strategy (TBS), turn-based tactics (TBT), wargame and grand strategy wargame.

Sports

This genre, as it name says, feign real life sports. The player can be either engaged by other's players via multiplayer or online as well as artificial intelligence within the videogame the most common sub-genre there is racing, competitive and sport-based fighting. Many of these subgenres are present in the e-sport community in competitive level (Kent, 2001).

Idle

Idle gaming is a genre of videogames that's pretty much new and it involves a series of trivial tasks that progresses gradually, that's why they can be also called incremental games; the term idle is used since the player doesn't have much freedom to explore or invent and the games seems to play itself (Kent, 2001).

Purpose

This genre was designed as entertainment with a finality that can be to apprise, coax or kindle. These games mix and match different genres and subgenres in between the most common there is advergame, art game, casual game, Christian game, educational game and exergame (Kent, 2001).

These categories have been broken down from the best-selling games brought to the market. However, Shooter, Action, Role-playing and Sports together with Platformer and Racing have grown more and more in popularity in the last decade while puzzle games have dropped down in popularity, yet, it reigns the mobile gaming industry especially on those free-to-play (also known by its portmanteau "Freemium") worldwide gaming application (see figure 17) who make most of their earnings via banner commercials and micro transactions (Kent 2001).

Figure 17: Candy Crush Saga & Plants vs Zombies examples of Freemium puzzle games (Apple's app store).

Gaming development

Developing is the practice of fashion a videogame. This exertion is commenced by a game developer who can be integrated from one person to a massive intercontinental team. A publisher is normally an entity that funds videogame development, however, so-called “indie” (an endearing abbreviation for independent) games have grown in popularity and even become crowd-funded, giving a spin-off to the development process. Programmers, graphic designers, musicians, as well other kind of technicians work as equally hard to cultivate different games titles in order to supply the demanding market (Steinkuehler, Squire, & Barab 2012).

In between the most challenging aspects of game production we can mention the game’s story, this part sometimes takes into consideration many writers who have to come up with an innovative yet immersive story in order to create a game; as well as trying to create the in-game lore. What brings up the game’s digital narrative, in this phase the whole team faces a very sturdy challenge trying to balance elements of audio-visual and cinematography within graphics in order to deliver the main storyline. Yet, trying to remain faithful to the game’s art & aesthetics in which artists and technicians to work together and translate an art style into its digital form therefor creating a multimedia projection. In the game’s character design, writers and artists work together in order to present gamers with likable and multidimensional characters that will advance in the main storyline. Also, the game’s music and sound; from main menu music to climatic compositions, musicians, sound engineers and artists labour together in order to make the audio-visual and the sounds go hand by hand (Steinkuehler, Squire, & Barab 2012).

According with Steinkuehler, Squire & Barab (2012) videogames have become a learning apparat whose design features should be scrutinized in order to develop the e-learning culture in human-computer interaction and create bridges in between metacognition abilities and virtual environments. They theorize that educators should be aware of the potential pedagogical possibilities in this digital era.

In between some other elements of gaming development: Downloadable content (Also known as DLC), Expansion packs (EP), Modifications (Colloquially known as “Mod”), Cheating or the practice of breaking the game rules and mechanics via “cheat codes”, Glitches and Easter Eggs being archaic references to pop videogame culture.

Gaming social & cultural aspects

Nowadays, gaming and gaming culture constitute an essential part of our society and pop culture. Videogames have become artefacts that mirror our civilisation and status quo. Nevertheless, gaming self-governance is a thematic that intrigue many, when do games altered our life style? Where will games take us? And how videogames will affect the future of our collective social behaviour? These are questions made by those who study gaming and its phenomena since this is a sociological worldwide so-called "new media" that generates many subcultures and evolves together with Internet Culture and smart devices (Steinkuehler, Squire, & Barab 2012).

The average age of a "gamer" is 35 and it's a number that gets bigger and bigger with each year since many of the first gamers came along first generation arcades, consoles and home computers who have stayed loyal throughout the pass of time. In 2016, a study showed that 59% of gamers were male and 41% female; a percentage that keeps on growing and showing that the gaps between genders in gaming becomes smaller and smaller (Steinkuehler, Squire, & Barab 2012).

Between the socio-cultural phenomena in gaming culture there is:

a) Local Area Network gaming (Also known as LAN parties)

A LAN party is a social gathering organized by gamers for gamers. It consists of a domestic or public gathering where gamers create a social event with the main objective playing videogames together. Digital socialization have been debated by many experts in terms of being a truthful way of interaction but many have also found empowering and social network opportunities (see figure 18) in such events e.g. The Dream Hack, it's one of the biggest LAN parties in the world (Steinkuehler, Squire, & Barab 2012).

Figure 18: The Dream Hack LAN party in Stockholm, winter 2004 (The Dream Hack's webpage).

b) Online Gaming (with or without voice chat)

As technology advances and the access to Internet becomes more and more quotidian, it has allowed many to come together and play no matter the geographical location or time. Online gaming has allowed socialization via real time voice chat as well; being this one of the most ground breaking additions to the online experience.

“Clan” or “guild” based games promote acceptance and team work as well as offering income opportunities with cash-prize tournaments. Allowing players to get organized and be empowered by the support of their “online family” (Steinkuehler, Squire, & Barab 2012).

c) eSports

Esports is one of the newest additions for the phenomena created by videogames. Esport consists of a multiplayer videogames competition, where professional players get challenged in order to showcase the best gameplay during matches (See figure 19). Although online and offline competitions have always been part of the gaming culture. Esports popularity has grown due to spectators eager to watch matches via live streaming e.g. Many American Universities offer scholarships based on eSports (Steinkuehler, Squire, & Barab 2012).

Figure 19: Madison Square Garden held in 2016 League of Legends World Championship with an estimated of half a million viewers in the Internet (Madison Square Garden’s archive).

d) Slang and terminology

Gaming culture have brought up a huge wave of neologisms which are used inside and outside games. Gaming slang, however, overlaps with Internet slang and leetspeak creating a new way of language for convenience in communication with fellow gamers. Some examples can be (the infamous) LOL which means “laughing out loud” or the derogatory “noob” which refers to a new and unskilful player and GL HF (Good luck, Have fun!) the list goes on (Steinkuehler, Squire, & Barab 2012).

e) Identity tourism

The concept of Identity tourism refers to avoiding exclusion by traveling to a certain location where gaming culture is more concrete, visible and/or accepted. For example festivals like Los Angeles ComicCon, San Diego GamingCon and New York MMORPGCon are perfect examples where millions congregate to express themselves via gaming (in many of its forms), Cosplay and Network with those who share the same interests. Identity tourism is escapism to its max where groups who seem underground congregate and create an extensive social network which is rich in multiculturalism and embodies the philosophical idea of globalization and global culture. (Steinkuehler, Squire, & Barab 2012).

f) Internet shows

The Internet via channels of diffusion such as Youtube and Twitch have transformed the gaming community. Many of this gaming shows online consist of diverse programmes in which pro gamers give players tips on how to be successful in game play, live streaming of championships and gaming celebrities commentary (see figure 20) , gaming celebrities answering fans' questions, etc. This shows us how media evaluates he consumers' needs and capitalize on them; as well as pushing the envelope for merchandizing, digital marketing, etc (Steinkuehler, Squire, & Barab 2012).

Figure 20: The Swedish Youtuber Feliz Arvid Ulf Kjellberg also known as PewDiePie is one of the biggest gaming Youtubers with a total of 66 million subscribers and a networth of 210 million US dollars (Kjellberg's website).

g) Gaming music

Videogame music has evolved from the 8-bit, 16-bit era and the 64-bit eras to incorporate elements of hip hop music, synth pop and electro as well as classical arrangements (see figure 21). In 1992, the English experimental electronic artist Aphex Twin, sampled Pacman's music into one of his ambient master pieces. This created an entire genre called "chiptunes" or gamewave which currently still goes strong and fills many music arenas around the globe (Steinkuehler, Squire, & Barab 2012).

Figure 21: The Legend of Zelda: Symphony of the Goddesses concert celebrating the 25th anniversary of The Legend of Zelda by the composer Koji Kondo ("Ballad of the goddesses' tour" archive).

h) Gaming and film crossovers

Many games have gotten the self-proclaimed "Hollywood treatment" with franchises such as Resident Evil, Silent Hill, Warcraft, Tomb Raider and even angry birds (see figure 22) becoming blockbusters in all over the world. Film adaptation are only one form of movie making also we have the rise a sub-genre called "Interactive movies" which offer a unique experience for each viewer (Steinkuehler, Squire, & Barab 2012).

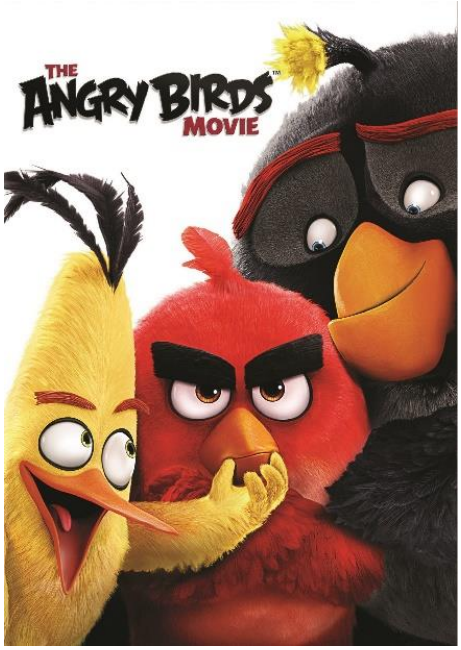


Figure 22: The Angry Birds Movie (2016) from the success mobile game franchise “Angry Birds” by the Finnish company Rovio Entertainment (Rovio’s archive).

Gaming as a multisensory experience

Technological advances challenge many on how to incorporate these innovations in our everyday life. Facilitation is one of the main objectives in gaming and how it affect us as a wholesome experience. Videogames and the Multisensory Classroom share many similarities (Räty 2018):

Both make learning more meaningful and encourages the use of technology and can become bridges between generations since both methods are useful in an eclectic assortment of activities that go from creating, exploring, experimenting and socializing; as well, engaging individuals in a personal level by being a jubilant and flexible learning experiences that promote sociocultural empowerment and social integration.

It’s important to mention that according the theory of the multisensory space (Räty, 2018) many senses (taking into consideration that smell and taste are a bit tricky to accomplish with gaming, due to its digital nature) should be activated in order to harmonise in an “inspirational learning environment”, nevertheless, this is also a way to create a meeting point and this is conceived perfectly via online gaming where people share memories and dialogues while exploring a digital simulation. Also it’s essential to mention that Gaming and the Multisensory Space Method sponsor wellbeing either psychologically and emotionally and both can fund social networking and reflect on our societies’ current paradigms.

Gaming and e-learning

Videogame are considered as “transformational experiences” similar to books and movies. Play and learning share a huge number of similarities and both absorb in the concept of diegesis (Freitas & Maharg 2011).

Gaming and e-learning are based on the same principles as referred by Freitas & Maharg (2011), since both are learner Specifics, meaning that the profile, role and competences of the learner/player are linked to a certain digital pedagogy that’s associative, cognitive and social/situative. The context in which the e-learner/player circulates is the digital environment, which gives access to learning and supporting resources as well as the principles of representation fidelity, interactivity and Immersion.

And by going through these points players/learners conceive, according to Freitas & Maharg (2011), “transactional learning” which is the dynamic of learning new things by playing a videogame. E-learning is an unprejudiced practice which is born from exceptional pedagogical practice and the accurate implementation of educational technology into design. Videogames fulfill this criteria and also gamers apply concepts of e-learning without knowing it (Freitas & Maharg 2011).

Social-constructivism is one of the most common principles found in gaming and e-learning. This pedagogy can be seen in forums, blogs/vlogs, niche wikipedias and online cooperative gaming which provide content created by gamers/learner for gamers/learners. Another significant aspect is the conversational model, this learning theory emphasizes in the dialogue between gamers/learners and a common objective and this is well-known especially during real-time online sessions. The cognitive perspective in gaming and e-learning make allusion to the cognitive procedures involved in e-learning and how the learner’s/ gamer’s brain work while performing. Also, the emotional perspective focuses on enthusiasm, commitment and how enjoyable e-learning/gaming can be. Nevertheless, the behavioral perspective tries to cognize role-playing and hand-on settings on how e-learners/gamers perform and behave while performing e-learning/gaming. Contextual perspective remarks conservational and communal aspects that can contribute to e-learning/gaming and how students/gamers give peer support to each other by a variety of multimedia in a very multicultural network (Freitas & Maharg 2011).

3 Integrating gaming in Early Childhood Education

"It's super effective!" -Pokémon series

Early Childhood Education in Europe

Europe is a continent that fanfares with diversity since it's made out of a great variety of countries, each of them rich with culture, habits, languages and antiquity. Therefor the European Union decided to create an entity that monitors that all of its affiliated countries maintain an unchanging standard for Early Childhood Education and Care (ECEC). This also helps to carry out and ongoing examination in order to collect data and discover what are the pros and the cons of certain pedagogies or methods used across Europe and what would be the most suitable way to implement Early Childhood Education and Care in Europe.

All over Europe there are many curriculums that differ in language, pedagogical approach and methods of implementation but all of them concur in certain aspects such as "a holistic approach", meaning that children's wellbeing as a whole thing composed of many areas of development, each of them being equally imperative and compulsory. (Curriculum Quality Analysis and Impact Review of European Early Childhood Education and Care, 2014)

According to a review written by the European Early Childhood Education and Care, the purpose of ECEC is "to promote the quality for individual and social and economic benefits" for ECEC given on how this would affect strongly children's development and ability to integrate to the school life. This means that the European authorities have boundless expectations when it comes to ECEC and its recognized characteristics which are now a European standard.

Europe also denotes that ECEC should be up to date and be modernized according to the needs of our times and hand to hand with the new technologies in order to achieve cognitive, language and social development. ICT technologies should also be part of the daily life of children since these ones become tools for a better way to integrate into the school system and at the same time develop their metacognition and be more independent and autodidactic at the time of studying. (Curriculum Quality Analysis and Impact Review of European Early Childhood Education and Care, 2014)

Early Childhood Education in Finland

Finland is one of the leading countries in the world and one of its rudimentary standards is that similar educational opportunities should be obtainable to all inhabitants unrelatedly of their racial origin, age and affluence. All education is free of charge from pre-primary to higher education and this is part of an established structure to make the most of each student (Finnish National Agency for Education. "Finnish Education in a nutshell" 2016. p. 6-8).

According to the National Core Curriculum for Early Childhood Education and Care (2016) early childhood education is a scheme that sustains and safeguards children's development and learning and upkeep children's well-adjusted growth and development. In between the unquestionable values of Early Childhood Education we can mention:

Values of Early childhood Education in Finland:

The intrinsic value of childhood	This value shows us the way ECEC should guard and uphold the right of Children to a respectable and innocuous childhood.
Growth as a human being	Human dignity is the main factor for supporting children's growth.
The rights of the child	This makes allusion to the UN Convention on the Rights of the Child and all the thorough rights within it.
Equity, equality and diversity	Children have the right to cultivate their democratic values, independence and skills.
Diversity of families	To be uncluttered and dutiful towards children's families and their diversity.
Healthy and sustainable way of living	To indorse vigour and welfare so the child has the necessary tools to be a great citizen.

Table 5: Values of Early childhood Education in Finland (National Core Curriculum for Early Childhood Education and Care. 2016 p. 21-23) in accordance with the UN Convention on the Rights of the Child (1989), the Act of Early Childhood Education and Care (Sections 2 a, 2 b, 7 a and 7b).

All from the previously mentioned are the core values of ECEC, in Finland, which constitutes an indispensable provision for children and their families.

The National Core Curriculum's pedagogy is grounded on the previous mentioned underlying values plus the transversal competences (table 6) which stated to a methodical and determined set of doings based on the ECEC's view of integrative understanding that promotes and upkeep children's welfare and education. Nonetheless, a holistic approach for ECEC is incorporated in the structure on the daily activities, aiming always to make prominence in these 3 aspects:

Education: this entails activities that benefit, contour and modernise cultural values, routines and standards. The main objective is to pass on diverse guidelines of heritage such as ethics, manners, the consequences of their acts and their own personal competence.

Instruction: this one makes reference on how children get to know themselves and their miscellaneous learning environments. Children are encourage to be curious, explore and experiment with the finality of ripen their own expertise and assets.

Care: this involves their physical, psychological and socio-emotional care. The main target is to make children feel respected and understood and promote positive emotional experiences through a joint and polite relationship with everyone around. (National Core Curriculum for Early Childhood Education and Care. 2016 p. 24)

Table of Transversal Competences:

Transversal Competences	
Thinking and learning	These are competences that are developed by creating communication with other people and their neighbouring. This is a foundation based on observation which allow children to develop attitudes for a life-long learning.
Cultural competence, interaction and self-expression	This alludes to the diversity observed in our society making emphasis on the capability of listening, identifying and understanding various outlooks and significance, as well communication skills.
Taking care of one self and managing daily life	These is related to those skills that aid us to take care of oneself, one's health and own safety as well allowing children to learn how to make their own choices based on a confident outlook for the yet to come.
Multi literacy and competence in information and communication technology	This is related to the everyday ICT skills and also new ways for children to express them-

	selves and get involved with adults. This includes familiarisation with ICT manoeuvres, amenities and *games*.
Participation and involvement	This makes reference on how children's participation is a key element of ECEC and how this mature their democratic values.

Table 6: Transversal competences (National Core Curriculum for Early Childhood Education and Care. 2016 p. 25-28)

The Finnish National Core Curriculum for Early Childhood Education and Care also describes a set of key objectives for Early Childhood Education and Care which are part of the core aspect of pedagogical doings within the nurseries in order to gather multipurpose know-hows in these learning areas (table 7) which are a wide and complex spectrum of different learning themes with very inherent purposes in between these activities we can mention:

- ❖ Theme weeks like Halloween, Christmas, etc.
- ❖ Excursions to museums, zoos, etc.
- ❖ Handcrafts, dancing, yoga lessons, etc.

(National Core Curriculum for Early Childhood Education and Care. 2016 p. 44)

"Learning areas of pedagogical activity"

Learning areas	
Rich world of languages	This area has as major purpose to moderate and strengthen children's linguistic skills and capacity as well as awakening interests on languages, writings and cultures. Language is a vehicle of development from which children learn how to interact with others and explore their own linguistic identity. In between the main objectives of this area we have: ✓ Interaction skills

	✓ Language comprehension skills ✓ Speech production skills ✓ Language use competences ✓ Linguistic memory and vocabulary ✓ Language awareness Examples of activities: tongue twisters, nursery rhymes, fairy tales, visual messages, audio messages, audio-visual messages.
Diverse forms of expressions	This area is based on the development of diverse ways of communication and how to get to know assorted cultural heritage by various means such as: ✓ Musical expression ✓ Visual expression ✓ verbal and bodily expression Having as core target the strengthening of multi literacy, contribution and immersion in ECEC. Example of activities: sing-alongs, finger painting, dancing, etc.
Me and our community	This area concentrates on children exploring and getting to know their surroundings as well understanding the mixture of the local community. In between the main topics to deal with we have: ✓ Ethical thinking ✓ Worldview education

	✓ The past, the present, the future of the local community. ✓ Media education These support the cultural competence, interaction and thinking ability of children and allow them to solidify their personas. Example of activities: drawing, puppet drama, fables with morals, etc.
Exploring and interacting with my environment	This area makes reference to the capacity to perceive, scrutinise and appreciate their contiguous space always with the guidance of an adult. In between the attitudes that we might find in this area we have: ✓ Mathematical thinking ✓ Environmental education ✓ Technological education Example of activities: building geometrical shapes, observing the seasons, find explanations to how many smart devices are made or work, etc.
I grow, move and develop	The purpose of this area is to provide children with the grounds for promoting health, living values and wellbeing also taking care of themselves in the future. This inspires children to be physically active and understand the opportunities they are presented for their own development. In between the fundamentals of this area we can mention:

	✓ Physical activity ✓ Food Education ✓ Health ✓ Safety Example of activities: learning different taste and textures in food, talking about the food pyramid, learning about diverse sports, understand the safety equipment used to ride a bike, etc.

Table 7: Learning areas of pedagogical activity (National Core Curriculum for Early Childhood Education and Care. 2016 p. 44-52)

Gaming applied to Finland's core curriculum for Early Childhood Education

According to the National Core Curriculum for Early Childhood Education and Care (2016) in the learning area of "me and my community", we are presented with the point of "media education" (table 4) which has as prime objective to activate children and their forms of expression within their community. Also in the learning area of "exploring and interacting with my environment" in the section of "technology education" (table 4) where kids are encourage to make acquainted with experimental and inquiry-based methods; we can, undoubtedly, find that the activity of digital gaming is more than suitable for the ECEC environment as long as it is regulated and monitored by educators. A gaming console, can be considered as a tool of child learning and development. Taking into consideration that such digital learning ecosystems are meant to improve and create platforms of learning. Therefor gaming and Finnish Early Childhood Education have many things in common in which we can bring up a few of these similarities by exemplifying them through child appropriate games that make emphasis on different areas of learning and possess some of the ECEC criteria.

a) Minecraft (Figure 23)

Minecraft is a so-called “sandbox” videogame by the Swedish developer Markus Persson and the game’s finality is to activate children’s imagination and curiosity to explore, gather resources and craft wonderful creations (IGN, 2018). In between the transversal competences we can bring up from the National Core Curriculum for Early Childhood Education and Care is “Thinking and Learning” since children have to use their intelligence in order to create the things they would like to build. Also we can mention the learning areas of “linguistic skills”, “linguistic memory and vocabulary” and language awareness since the game is in English language, this means, this is a digital learning ecosystem that promotes bilingualism from a very young age. Another ones included are “visual expression”, “”ethical thinking”, “media education” and “technology education” (National Core Curriculum for Early Childhood Education and Care 2016)

Figure 23: Minecraft gameplay during exploration (In game screenshot).

b) Mario Kart 8 (Figure 24)

This all-ages racing game takes us on an adventure go-kart-style adventure by the beloved plumber Mario and friends; created by Shigeru Miyamoto this game has met great commercial success due to its intrinsic gameplay and loony physics that have brought friends and families together since 1992 (IGN, 2018). In between the learning areas it’s possible to talk about “rich world of languages” since the game is English this develop language comprehension skills, language awareness, linguistic memory and vocabulary. “Me and my community” and media education, since children use this media for communicating with others and build new

ideas from scratch. “Exploring and interacting with my environment” brings up technology education; since the child uses a smart device to accomplish his/her objectives. Also “I grow, move and develop” alludes to safety, since children must understand that the physics of Mario Kart do not apply to our world. (National Core Curriculum for Early Childhood Education and Care 2016)

Figure 24: Mario Kart gameplay during a Multiplayer race (IGN).

c) Super Mario Odyssey (Figure 25)

This platform game is one of the newest addition to the extensive library of Mario Games. It follows the adventures of Mario and his friend Cappy in the search of Princess Peach who has been kidnaped by Bowser. The theme song “Jump up, Super Start!” became a big hit in the United States on release. (IGN, 2018) Between the learning areas that this game covers there is “rich world of languages” since the gameplay and storytelling is developed in English this present players with the possibility of developing language comprehension skills, language awareness, linguistic memory and vocabulary. “Diverse forms of expression” are present by music and visual expressions that can be found through Mario’s adventure since some challenges consist on memorizing and identifying songs or in taking pictures of different landscapes. “Me and my community” brings up media education, since children use this media for communicating with others via photos as well as ethical thinking subsequently, sometimes Mario finds himself in certain dilemmas in which he must make decisions and players must analyse what’s right or what’s wrong. Also, “world view” since Mario visits and observes a miscellaneous ways of living by different communities and interacts with its inhabitants.

“Exploring and interacting with my environment” alludes technology education and also environmental education since Mario visits many places with their own indigenous people, flora and fauna and learns how that ecosystem works. Also mathematical thinking could be included since many puzzles use mathematical logic in order to be solved. “I grow, move and develop” brings up physical activity and safety. (National Core Curriculum for Early Childhood Education and Care 2016)

Figure 25: Mario and Cappy exploring Cascade Kindom (In game screenshot).

d) The legend of Zelda: Breath of the wild (Figure 26)

This action-adventure game is one of the most complex digital learning ecosystem we can find. It narrates the story one Link, who wakes up after 100 years slumber and must help his friend Princess Zelda to rescue the land of Hyrule. It has been described as one of the best games of all the time since it possesses a non-linear storytelling, a transcendent physics engine and the exquisite art style Studio Ghibli-like (IGN, 2018). In between the many aspects related to the learning areas of ECEC, there is “rich world of languages” since this game can be played in many languages including Japanese, English, French, Spanish, Italian and Russian and it can be used for those multicultural/multilingual families who would like to develop the linguistic skills and capacity of their children. “Diverse forms of expression” Link possesses a camera from which kids can create incredible photographs and use develop their visual expression e.g. as a wallpaper or even print them and use them as a reference.

"Me and my community" exercises ethical thinking that can be shown throughout the whole game as well as worldviews, the past, the present and the future of the local community in Hyrule including also media education, since children can save their pictures and share it with other friends via a safe social media channel. "Exploring and interacting with my environment" allows mathematical thinking which is developed through many puzzles; environmental education as well, since Link visits many places with a great variety of flora, fauna and understand how to save natural resources such as wood and food. "I grow, move and develop" alludes to physical activity, food education health and safety can be observed all the time since Link must adapt to different situations e.g. put on warm gear when going to the low temperatures, cooking meals in order to win status boots, how to tame and ride a horse, etc. (National Core Curriculum for Early Childhood Education and Care 2016).

Figure 26: Link and his horse helping Hestu to get back his maracas that got stolen (In game screenshot).

Gaming as a tool of Children's participation

Children's contribution has been proofed to be a very particular practice that has increased nowadays gradually. Long are gone the days in which Rousseau quoted: "Hold childhood in reverence, and do not be in a hurry to judge it for good or ill…" (Émile, ou de L'éducation, 1979) in which children should only obey and grow via a moralist method of adult's arbitrariness and authorities which evolved subsequently into a more dynamic and appreciative system that allows us to listen to children's queries in order to treat them as unique individuals and safeguard their physical, emotional and psychological wellbeing.

We all do know by fact that since the unquestionable growth of children's rights; many have theorized that children's participation starts from the moment he or she enters the world and explores the possibilities of having influence over events by crying or just movements. Many others theorized that once a child develops cognitively he or she find his or her voice upon impacting actions on his or her life and the degree in which his or her participation might vary depending on cultural and communal standards e.g. a child in Papua New Guinea might not have the same level of participation as a child living in Denmark or a child living in Amazons. (UN, 1989; Hart, 1992)

Children are for sure recognized as a spokesmen of our society, sort of a beacon towards our future but the nature way we address them is one of the greatest issue we might face. Children's participation is one of the core aspects which asserts that children and youths have the right to freely convey their points of view and within it the inherent commitment of their facilitators, meaning their parents and professionals involved in their lives. They must have a meaningful, safe, and appropriate participation which is a premeditated key priority to ensure and safeguard their own wellbeing and creating democratic societies with informed and engaged citizens. Otherwise trying to create a fake way of children's participation would result in a way shallow and advance euphemism for tokenism? (UN, 1989; Hart, 1992).

By realizing on how vital children's input is we transform them into noteworthy mediators of conversion with the capability to occupy in decision-making developments, in accordance with their capacities and gradually cumulative self-sufficiency. Children learn to communicate opinions, take accountabilities and develop a sense of being appropriate, impartiality, responsibility and camaraderie. As Mahatma Gandhi said: "If we are to reach real peace in this world… we shall have to begin with children"

Participation in Finland:

Finnish kindergarten system follows up the track from the core curriculum for pre-school education meaning that children's participation is a fundamental aspect of consideration mandated by law. Children are considered dynamic topics, who interrelate with both society and their milieu. However the mail of these laws it's to facilitate a platform of dialogue between children and their respective educators.

Participation is an active notion, particularly in the field of education when making emphasis on the children's outlook. Participation is a companion of democratic values and adults raising empowerment based on their rights. (UN, 1989; Hart, 1992)

Sociologically talking many have reflected that children's participation is the reflection from the point of view if the decisions and main events of a child's life (Woodhead, 2006) meaning that children are the subjects of their own lives and their participation is connected to the contextual concept of interaction with others.

The archaic and narrow view of "listening to children voices" is ruled out of early childhood education since a child is not seen isolated from his or her social and cultural environment (Clark, 2005) and this develops a sociological paradigm about how much competency can be brought up from children instead of seeing them as helpless and needy beings (Rogoff, 2008; Pramling-Samuelson & Sheridan, 2008) This is a multidimensional issue which ensures a more receptive attitude towards understanding the wellbeing of children.

Many early educators consider participation as a developing skill which cultivates throughout experiences, observations, perspectives and impressions making independent initiatives and learning to bear responsibilities (Duncan, 2009; Venninen & Leinonen, 2013) where all of the previous mentioned are significant features to master as well as settings for sharing with peers and teachers.

Participation may similarly befall within the collaboration between a child and his or her learning environment (Sheridan & Pramling-Samuelson, 2001; Woodhead, 2006) which according to law should foment his or her improvement in many aspects of his or her life e.g. socio-emotional development which consists in how he or she interprets and express feelings in an inter- and inner-social manner and how he or she creates or addresses dialogue with others.

Children's lack on interactive moments in their everyday life, could've threatened their involvement; maybe due to the rigorously organized daily routines, following schedules and timetables stipulated by their teachers, this might not leave any mean for self-expression (Nyland, 2009; Smith, 2002). In the other hand we can denote elements of democracy in the

preschool everyday life such as negotiations, compromises, shared planning and above all the capacity of learning to listen and respect each other points of view (Brostöm, 2012).

Many writers such as Hart (1992) & Shier have stated that us as mentors and overseers bear the duty to upkeep children's involvement and we are hold accountable to circumvent fabricated participation, such as tokenism. We must let children express themselves and be in contact with the reality whatsoever surrounded their developing environment. As well of designate, scrutinize and assess their sense of belonging.

Kindergarten teachers and children's caretakers accompany children in their transition from home settings to a more established and systematic way of developing onto school which is backed up by the core curriculum hence the need of documenting their participation in order to examine their growth. Finally this data could be passed onto the teacher-to-be in order for him or her to have a ploy to work on the child's intellectual advance in school. Knowing that the more a children join in activities that derive in changes for their own life or others; the more he or she will behave as in responsible member of the social order.

Participation via gaming:

Forbes (2018) published recently a very thought-provoking article that brings up the importance of videogames and their role in children's participation in our society. Children spent an average of three to four hours a week playing videogames. Many researchers speculate that videogames is a new way of children's participation; a safe place where they can explore, chat with friends and interact with artificial intelligence. Their creations and talents can be turn into unique expressions, where within videogames children are provided with a platform to make changes in society. The most impressive fact about gaming and children's participation can be that this audience can be indoctrinated into entrepreneurship, where developers give free online coding lessons in order to make children understand videogames from a developer's point of view and why not make a living out of it in the future. (Forbes, "How Roblox is training the next generation of Gaming Entrepreneurs", 2018).

4 Methods

"A sword wields no strength unless the hand that holds it has courage" -The Hero's Shade, Legend of Zelda: Twilight Princess

This chapter of the thesis focuses on the preferred methods applied for studying the subject of gaming as a digital learning ecosystem for early childhood education. Each method was selected with the objective of further investigate the phenomena in the thesis and to establish how the legislature summarize and schedule this phenomena and how it's seen by early childhood educators and children. The main method used for this revision is one of the most used methods in social sciences: the case study. However, the methods used for this investigation include as well literature review and non-structured interviews. These methods encompass immediate, comprehensively and circumstantial analysis of certain pedagogical activities that incorporate the use the previously given hypothesis on how smart devices and their applications can become a tool of e-learning (also known as a digital learning ecosystem) for children who attend Early Childhood Education and Care. Case study will cover the qualitative part as well as small interviews, e-focus groups and e-group interviews with parents, ECE educators, caretakers and children's guardians who will let us explore a more in-depth outlook of theme.

On the quantitative research part, an electronic survey will take place via the social media channel of Facebook throughout its group services; it's important to mention that no screenshots can be taken since the administrators of such group asked for confidentiality. It's estimated that around five thousand to six thousand people between the ages of 13 (which is the age limit within the Facebook user's guidelines) to 60. In order to gather data from this Facebook groups many things have been considered such as: collecting data from groups that belong to Finland's metropolitan area (Helsinki, Espoo, Vantaa and vicinity).

This methodological work has been designed to use as much technology and electronic services as possible in order to remark the use and prominence of high-tech ontology and epistemological expertise in order to find patterns and apply this theory to future works (Yin, R 2013). Making this thesis and its subject a beacon for future students, researchers and such to further investigate and invest time on doing a high scrutiny on how gaming is changing our society and the way our brain learns, adapts and crafts new ways to explore our own metacognition, psyche, social interaction, behaviour, and perception of ourselves, however, we should underline that regardless our pedagogical layout evaluates in principle, how a digital learning ecosystem is sufficient evidence to support the adherence to our new educational needs; human beings still have the prerequisite to discover the equilibrium on how we coexist in a world alongside digitalization, artificial intelligence and algorithmically stipulated networks our road to a better future.

5 Case Study: "Pokémon Go: An e-learning tool for Early Childhood Education"

"No matter how dark the night, morning always comes, and our journey begins anew." -Lulu, Final Fantasy X

Introduction to Digital Learning Ecosystem of "Pokémon Go"

Pokémon Go (see figure 27) is a mobile game developed and published by Niantic for iOS and Android smart devices that has its foundation on the utilization of augmented reality (AR) and the device's global position system (GPS) to interact with virtual creatures, known as Pokémon (from the portmanteau Pocket and Monsters), which are located in real world locations powered by the accuracy of Google maps. The app uses the "freemium" business model and as well it stands in-app purchases or micro transactions. On its release in 2016 the game was constituted of 150 variety of Pokémon which now adds up over 400 by late 2018. This game has been gotten over 800 million downloads globally and it possesses around 147 million active users as of May 2018 (IGN, 2018).

One of the most provocative aspects of Pokémon Go is the in-game mechanic of promoting physical activity since players are encourage to explore their surroundings in order to encounter different types of Pokémon e.g. Grass-type Pokémon are easier found in forest or green areas. In the United States alone the levels of activity went up by 144 million steps during the first 30 days of launching. Adults and children met the recommended quota of activity level, which consists of 150 minutes a week (MIT Technology Review, 2016).

This opened up the eyes of many researchers and scientists who wonder how a smart device game could have such a deep influence in the activity levels of many adults, children and senior citizen; being the last one, one of the hardest to motivate by many global initiatives. This only showed researchers and computer science experts that gaming is also a tool to persuade physical wellbeing via the use of technology. It's considered that many Pokémon Go active users have increased their physical levels by 25 percent over 30 days (MIT Technology Review, 2016).

Figure 27: Pokémon Go promotional banner (Pokémon Go's webpage).

Children's e-Learning and development via Pokémon Go

After creating an account in Pokémon Go, the next step is to customize the trainer's avatar (figure 28) which is a graphic representation of the user. This avatar is displayed on the map (figure 29) each time the player opens up the application and it follows and mimics the movement of the player thanks to the GPS technology. Also part of the process, after capturing some Pokémons, to choose a Poké-buddy (figure 30) who is the equivalent of a companion who helps the player to accumulate more experience points (usually abbreviated as XP) while walking with it. There's also the possibility of creating a "trainer code" (figure 31) which helps to add trainer friends in order to battle and send power-ups.

At first glance this might appear trivial but this is a very thought-provoking opportunity to observe how children tailor their avatars since this could be a way of designing a learning experience with children (Leinonen & Venninen, 2012) in which they see the outcomes of their own decisions making them feel heard and taken into account during a decision-making process.

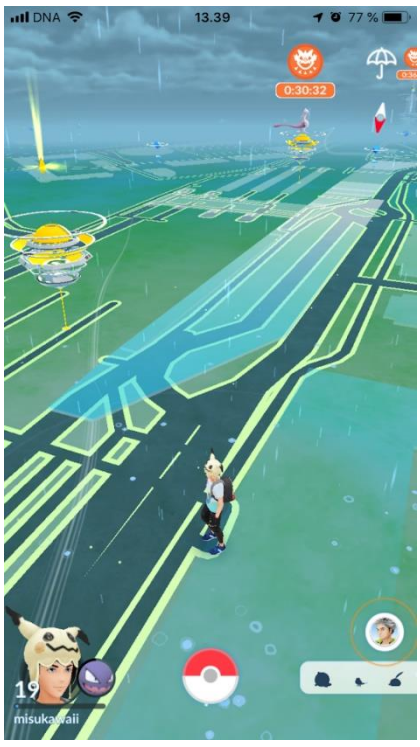


Figure 28 & Figure 29: Pokémon trainer's avatar customization process (right) and avatar in map (left) (Pokémon Go Application in-game screenshot from personal archive).

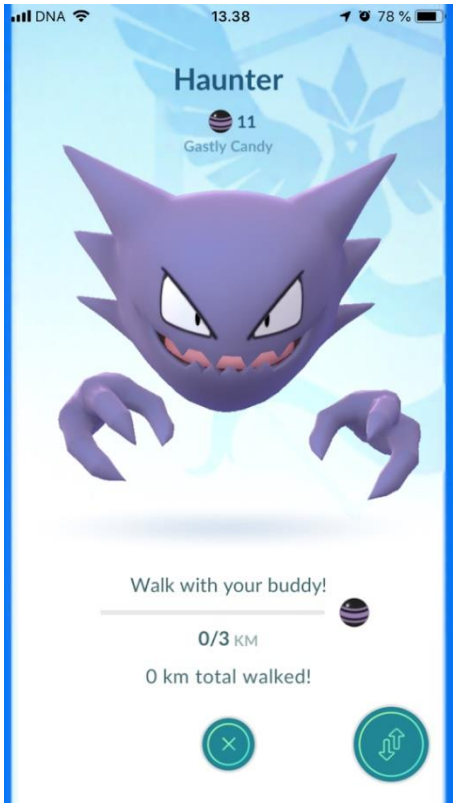


Figure 30 (right) and Figure 31 (left): Poké-buddy and Trainer Code (Pokémon Go Application in-game screenshot from personal archive).

According with the e-learning theory proposed by Mayer & Moreno (1998), Pokémon Go covers certain doctrines of operative multimedia and the use of electronic educational technology that can be "field tested" in everyday learning environments e.g. a nursery or kindergarten. Meaning that the mixture of images, audiovisual information, text and AR supports effective learning in kids by giving cognitive stimulation by empirically established principles such as the multimedia Principle, coherence principle, contiguity principle, signaling principle, personalization principle and redundancy principle. These principles are strategies of e-learning that can be easily found in the Pokémon Go app and go hand-in-hand with the framework given by the National Core Curriculum for Early Childhood Education and Care.

Pokémon Go can be analysed in comparison to the National Core Curriculum for Early Childhood Education and Care (2016) and the "Transversal Competences" (Table 8) as well on the

"Learning areas" (table 8) that all children must cultivate during their Early Childhood Education in Finland.

Table of Transversal Competences Applied to Pokémon Go:

Transversal Competences	**Applied to Pokémon Go:**
Thinking and learning	Children learn and think in many different ways. The competences developed by playing this app can be endless as long as the child has the adequate guidance and he/she has a guardian present at the moment of playing who can initiate dialogue and activate the thinking and learning process e.g. creating a plan or route of pokéstops that can be doable.
Cultural competence, interaction and self-expression	Pokémon Go pinpoints the landmarks of each city and this is very central in the development of cultural competence since many of these landmarks are monuments or building that are rich in history and this can be a perfect way to bring up fun trivia about different pokéstops e.g. The guardian guiding the child can talk about fun facts about a monument or a building and by passing by the same pokéstop the child can memorize it and initiate dialogue and express his ideas about certain landmark. (Figure 32)
Taking care of one self and managing daily life	Pokémon Go always gives useful recommendations such as: being aware of our surroundings, do not trespass private property and be attentive of the weather. This can be very useful for kids e.g. the adult guiding while playing Pokémon can ask the child what's the correct way to cross the street, what can we do to keep our safety, what

	kind of clothes do we need to go outside depending on the weather. (Figure 33 & 34)
Multi literacy and competence in information and communication technology	Just by the simple fact of letting the child use and explore a smart device, we contribute to the development of his/hers ICT skills. Pokémon Go help children to get familiar with Google Maps, Weather Forecast, etc. Making their relationship with technology more fluid.
Participation and involvement	Via Pokémon children can participate and settle their democratic values e.g. when a child partake in a raid; he/she can choose which raid or which gym he supports or interacts. This is a very fascinating way to understand democratic values, since it's the player who chooses who continue to represent his/her team in the gym.(Figure 35)

Table 8: Transversal competences (National Core Curriculum for Early Childhood Education and Care. 2016 p. 25-28).

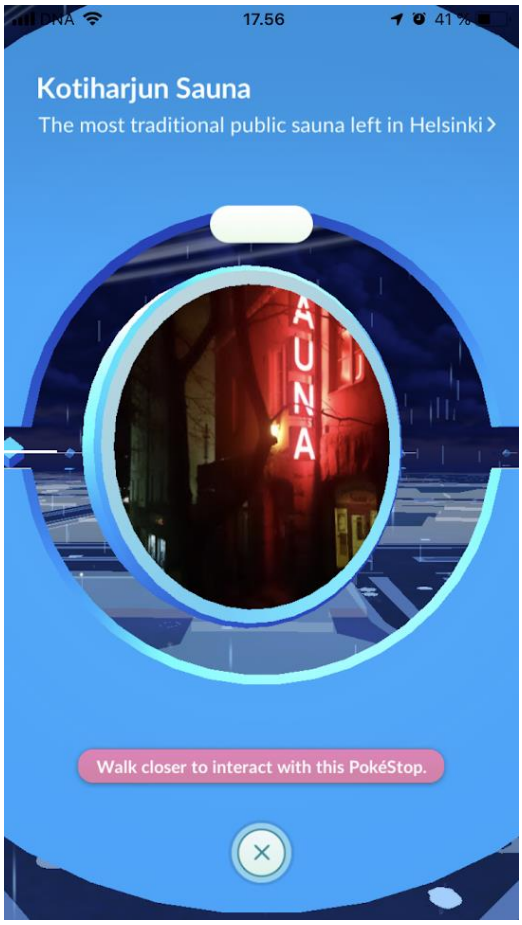


Figure 32: Kotiharjun Sauna, a pokéstop that shows the oldest public sauna in Helsinki established in 1928 (Pokémon Go Application in-game screenshot from personal archive).

Figure 33: Pokémon Go advising the user to be aware of what's going on around (Pokémon Go Application in-game screenshot from personal archive).

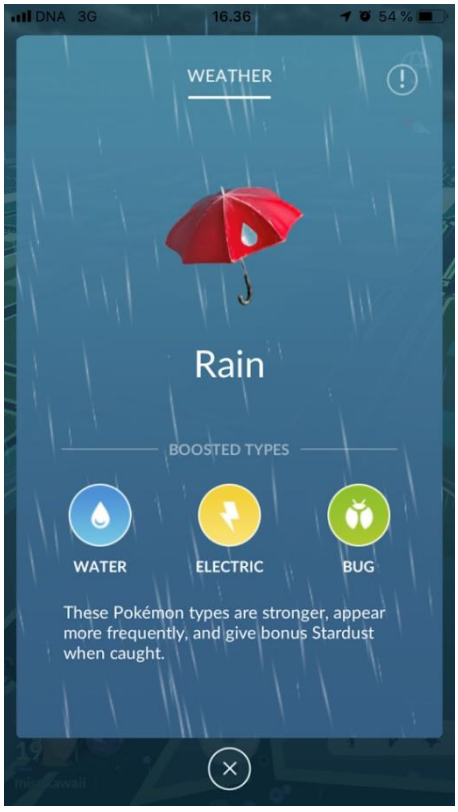


Figure 34: Pokémon Go weather forecast (Pokémon Go Application in-game screenshot from personal archive).

Figure 35: By giving berries to the Pokémon stablished in the Poké-Gym we can show our support to our peers who represent us, this is a very interesting way to develop democratic values (Pokémon Go Application in-game screenshot from personal archive).

Table of learning areas:

Learning areas	**Applied to Pokémon Go:**
Rich world of languages	Pokémon Go can be played in a big numbers of languages as long as the operating system of the smart device. This could be a very motivating activity for children to get more reading fluency in a certain language they don't speak natively e.g. Pokémon Go can be used with children who speak English as their second language and enrich their vocabulary, linguistic memory and written comprehension skills as well as developing their language awareness and encouraging

	children to make use of their interaction skills. (Figure 36)
Diverse forms of expressions	Children can use Pokémon go as a tool to learn new ways of communication e.g. musical expression can be seen in many children who learn the lyrics and notes for the Pokémon theme song and poke-rap. Also visual expression can be observed in different handy crafts made by children (Figure 37)
Me and our community	Just by the fact of taking a walk and see many Pokéstops children can get to know their surroundings better and understand what's their community constitute of and what the meaning of the landmarks around them. This will help to cultivate the knowledge of the past, the present and the future of their community as well as media education.
Exploring and interacting with my environment	Within the game children realize they get more XP points by visiting new Pokéstops, this make them more curious and more aware of what their immediate environment is. Environmental education can be seen as well, since children scrutinise the diverse places where Pokémon can be found. In terms of mathematical thinking it's important to remark how children learn to identify numbers and understand distances; which is something that is always present in the app. Nonetheless, technological education can be listed due to the use of a smart device. (Figure 38)
I grow, move and develop	Pokémon Go does promote physical activity by walking and visiting Pokéstops and

	Pokégyms. It's been research that kids who are physically active in a young age, grow up to be active adults. We can say that many children and their guardians increase their activity levels just by playing Pokémon go and also understand the basic safety procedures of being outside. (Figure 39)

Table 9: Learning areas of pedagogical activity (National Core Curriculum for Early Childhood Education and Care. 2016 p. 44-52).

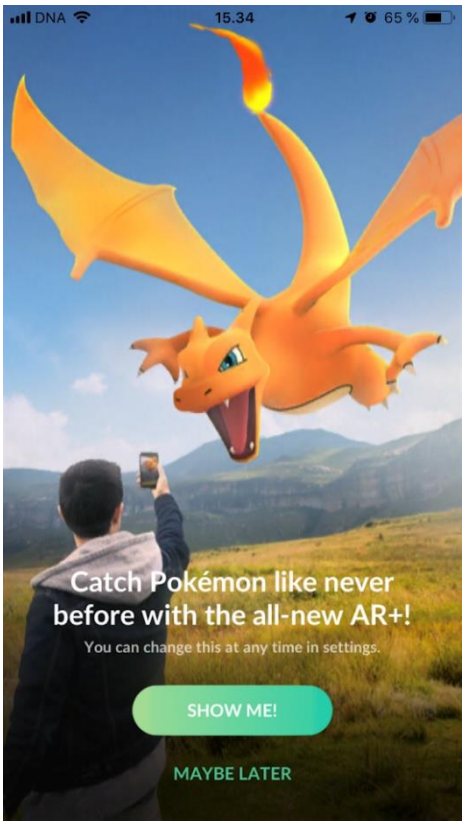


Figure 36: Pokémon tutorial for the usage of the updated altered reality (Pokémon Go Application in-game screenshot from personal archive).

Figure 37: Pokémon drawing made by Pokémon Go player who wants to capture a Squirtle in the wild (Personal archive).

Figure 38: Shows the number of XP gain by catching a Pokémon (Pokémon Go Application in-game screenshot from personal archive).

Figure 39: Pokémon Go related safety mark in Kaisaniemi Park that encourages Pokémon players to be alert while playing (Pokémon Go article from a Finnish magazine).

Comments & reactions

During the making of this thesis and investigation many comments and reactions from the Pokémon Go community were received and it's crucial to denote that around 99% of them were positive and encouraging. Specially coming from parents and early childhood education professionals who were especially interested on how to apply this app to the Early Childhood Education and Care.

Here are some comments gotten from various Pokémon Go Facebook groups (Most of the groups were located in the Helsinki Metropolitan Area and vicinities, names have been changed in order to protect the group's confidentiality.)

- "*I play Pokémon Go with my daughter and I have noticed that the more she plays and more she learns English!*" –Taru, 35 years old from Helsinki City.
- "*Using videogames in a learning context is something new and radical.*" –Kiki, 21 years old, practical nurse from Espoo City.
- "*My two sons love playing Pokémon Go and seem to know the neighbourhood better than me.*" –Jarmo, 40 years old from Vantaa City.
- "*I think that the physical activity levels of my mother have increased due to my son, he always want to go outside with his grandma and collect lots of Pokéballs, berries and items from all the stops. It's like a sacred moment for both of them. Now my*

mother has a walking companion and my son a Pokémon Go buddy; it's a win-win situation!" – Marina, 45 years old from Espoo City.

- "*The notion of increasing physical activity by the use technology is very science fiction-like but I think that's what awaits us in the future.*" -Kimmo, 15 years old, from Uusimaa vicinity.

- "*As a future Kinder Garten Teacher I've struggled trying to find adaptable ways to incorporate technology in children's everyday life. I really like this take on technology education.*" – Peppa, 29 years old, Student from Helsinki City.

- "*I was flabbergasted when I heard my child reading out loud long numbers in the Pokémon Go app; I think this is a very fun way to learn, indeed!*" – Erik, 33 years old, from the Uusimaa vicinity.

- "*I feel a very special bond with this app because it has let me spend more quality time with my child and now we have something in common.*" –Erkki, 50 years old, from Vantaa City.

- "*I never thought of Pokémon Go as a tool for learning. E-learning it's something very brand new for everyone but once I became a student myself and had to do homework and all those activities online I realized the importance of letting children explore technology and if that includes my child getting good benefits from it, it's like a match made in heaven!*" – Outi, 27 years old, from Helsinki city.

- "*Personally, I didn't like the fact that my child played Pokémon Go because many parents run rumours about smart devices making children sedentary and anti-social but after I realized my daughter was more active and had a lovely circle of friends with the ones she had her gaming session, my fear died and I'm happy with the results I see.*" –Anders, 41 years old from Espoo City.

- "*Most of the times I played Pokémon Go with my five year old brother, I never realized how much his English language developed. He learnt from listening to me and my friends talk about the game and he taught me a trick or two. Kids nowadays learn so fast with the help of technology.*" -Tommi, 15 year old from Vantaa city.

- "*I have two girls who assist Kindergarten and they love playing Pokémon Go together, I always let them do it because I like to see how they learn and talk things to each other*" –Martina, 36 years old from Helsinki City.

Educational Partnership with Parents

Pokémon Go is a tool of development in Early Childhood Education as well as a utensil for educational partnership between parents and early childhood educators meaning that through the data collected either by parents or educators is possible to observe how the child's development advances and what could be the possible areas of development that need a certain highlighting e.g. a kindergarten teacher realizes a child has problems identifying the colours of certain Pokémons and he/she communicates this to the parents so they can support the child at home while he/she comes up with a strategy to progress in the child's learning.

Parents in cooperation with early childhood educators (kindergarten teachers, child caretakers, etc.) have the duty of working together on safeguarding the wellbeing of a child of children from a certain household. However, educators and parents identically should get informed about the pros and cons of videogames in this digital era and how to utilize it for children's growth.

Screen time is a very common concept used nowadays for any activity that implies the usage of a computer, console or smart device, though, it's the responsibility of parents and early childhood educators to guardian what kind of content children get exposed to and whether or not such content is edifying or not. Parents and educators should bear in mind the age ratings of videogames, the same way it's done with films, television programmes and books meaning that games like Call of Duty, Grand Theft Auto, Gears of War, etc. might be inappropriate for children due to their extreme graphic and mature content containing gameplay adjoining reckless behaviour, illegal activities, torture, usage of fire arms, torture and sexual behaviours. It's recommended that parents and educators double check the content and rating of videogames before children interact with them. In case a child insists on playing a videogame that is not suitable for his/her age, it's necessary that parent, educator or guardian in question discuss the reasons why this videogame cannot be played by the child and as well offer alternatives for the child e.g. a child would like to play "Doom" (see figure 40) which according the Entertainment Software Rate Board (2018) is in the rating category M which means mature (17+) due to its blood & gore, intense violence and strong language; the child can be offered the alternative of "Splatoon" (see figure 41) which category rating is E which means is suitable for a child even though is listed as cartoon violence its aesthetics and children friendly digital environment would be a better option (ESRB, 2018).

Figure 40: Doom's gameplay displaying lots of gore and violence (In-game screenshot from electronic library).

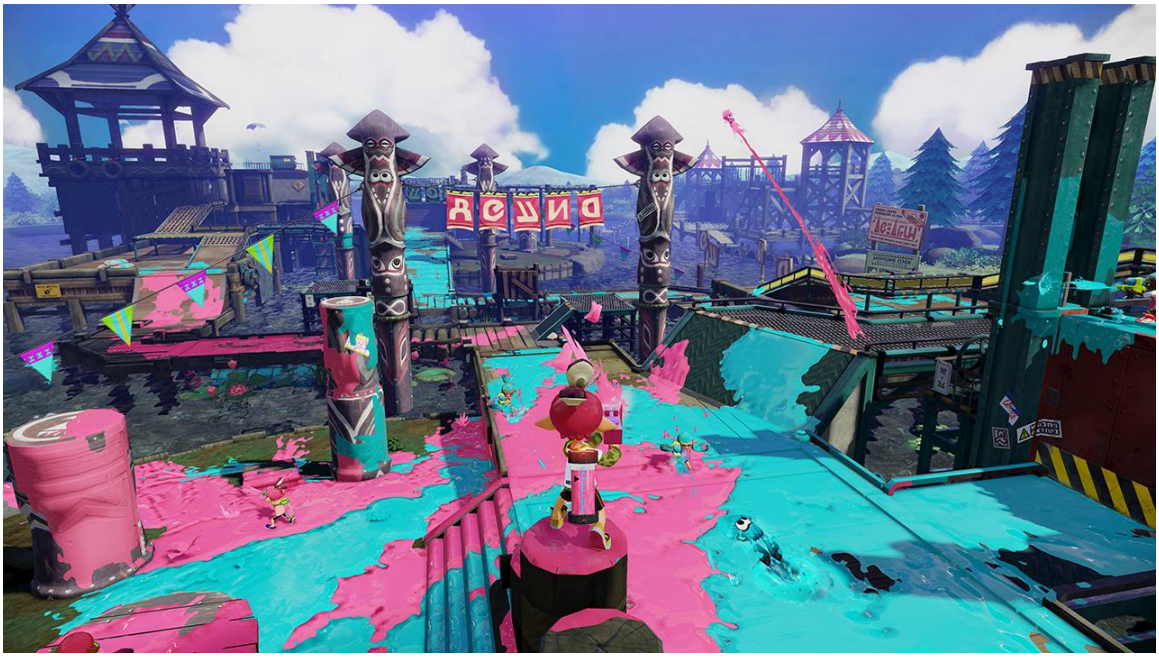
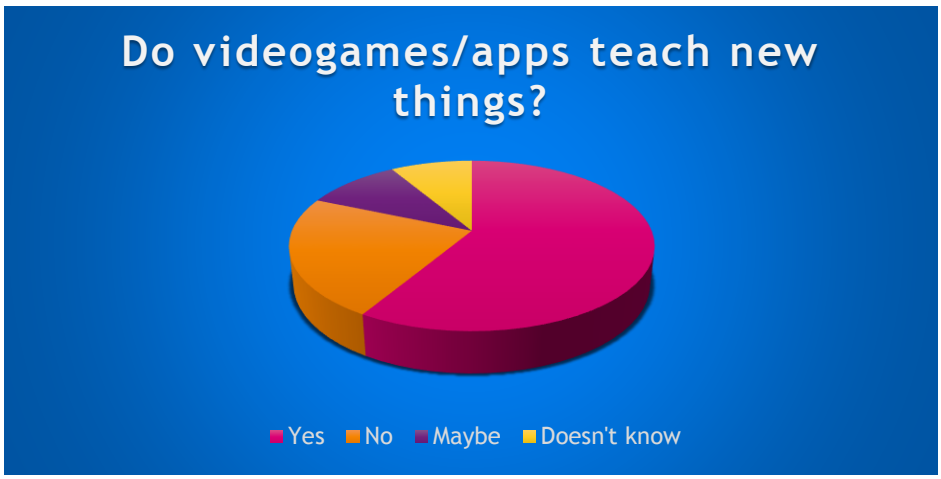


Figure 41: Splatoon 2 displaying a "paint war" with a child friendly aesthetic (Nintendo Switch in-game screenshot).

Evaluation of the study

In synthesis, studying the phenomenon of Pokémon Go as a digital learning ecosystem has been very satisfactory since 100% of their active users gave incredible feedback and show many achievements in physical activity, development new friendships, extension of their personal network, etc. Most parents agreed with the theory presented and so did Early Childhood Educators who took part during this study. In the following chart, we can observe how people answer to the question: "Do you think videogames/apps can teach new things?"



It's important to remark that more than 80% of people who answered this question concur that videogames/apps can teach new things and the rest are divided between "no", "maybe" and "doesn't" know. This shows on how much people is aware of the influence of gaming in our everyday life. Even during this research one of the members of this group denoted that even the Vatican has decided to create a "Pokémon Go clone" called "follow JC (Jesus Christ) GO" (figure 42) which is a game based on the mechanics of Pokémon Go. This is pretty monumental because if the Vatican can recognize the reach of these technologic advances, anyone else can understand the magnitude of learning via the digital learning ecosystem of gaming.

Figure 42: Follow JC Go! A clone of Pokémon Go created by the Vatican that allows players to collect Saints and biblical figures such as Virgin Mary in between others (Follow JC Go! Website).

6 Conclusions

"Life is all about resolve. Outcome is secondary." -Waka, Okamu

Gaming has been one of the most underestimated methods of e-learning since it's brand new and a pretty complex mixture of art, music and interaction that in the eyes of many is considered an art form. All terms and concepts applied to the hypothesis of "gaming as a digital learning ecosystem for Early Childhood Education" express very optimistic outcomes.

Children who do gaming are more active participants of their close social circles either physical or online and are most likely to be independent learners, tend to set realistic learning goals, achieve their full potential easily and find motivation easily, all this based on the theories of Mayer & Moreno (1998). All the theories, approaches and perspectives of this thesis meet the terms of Early Childhood Education and Care stablished by Finnish National Agency for Education. All the information applied from gaming to the digital learning ecosystem also complies with the terms of Early Childhood Education and Care.

All the learning objectives of this thesis were met during the making of this study; in between such purposes we can mention: reviewing a huge variety of information and theoretical framework that confirms that gaming is indeed a tool for e-learning that has a huge impact in our society. Plus gathering truthful facts by using quantitative and qualitative analysis.

In terms of professional development, this thesis has showed that multidisciplinarity is one of the key aspects of social health care going from multimedia, artificial intelligence, videogames, programming, digital art, online queries, etc. all these are gears that help many professionals understand social phenomena and strengthen opportunities to understand how to associate empiric knowledge in this digital era.

The questions related to future topics and further investigation could be: Could there be more measurable patterns on how gaming affect society? Could the gaming phenomena and its conceptual nature model our psyche one way or another? Could videogames become a political art form that reflect existing state of affairs of humans to an era of digitalization?

Another important point could be making a functional research in which consoles and smart devices can be taken to nurseries and document the changes in children's lives in a qualitative and quantitative way as well as documenting the children's feedback on how they perceive phenomena.

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Figures

Tables

Appendix

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