

Welcome



Guide to the Esports Educator Framework

This Educator Esports Framework has been produced as part of a wider **Minecraft: Education Edition Scholastic Esports learning resource** that includes:

- 11 x [Minecraft Make & Model worlds](#) – Competitive Build Battles that can be exported to 3D printers
- 11 x [Minecraft Code 2 Create worlds](#) – Code-based competitive Build Battles that can be exported to 3D printers
- 3 x [Minecraft Creative Clash worlds](#) – Competitive strategic and exploratory games
- [A Step-by-Step Minecraft Playbook](#) – instructions for set up and game-play of each world.

This guide is designed to provide educators with an in-depth insight into esports and its place in education. It has been compiled from a variety of research on game-based learning and esports, as well as from discussion and interviews with esports educators and researchers.

Esports competitions have increased in popularity over the last two decades and have become an integral part of youth culture, with tournaments that attract interest from millions of people from around the world. In addition to the professional players who compete against each other, a fundamental component of esports culture is the huge number of spectators, who attend tournaments in person or who access the competitions by streaming them online. In 2018 The League of Legends esports World Championships had audience viewing figures comparable with the 2018 Superbowl, and it is projected that by 2021, esports audiences will have more viewers than all other professional sports leagues, except perhaps the NFL.

This growing industry has a great many connections to both technology and STEM sectors, with roles such as game design, coding, data analytics, technical set up and management, streaming, event organization, marketing, social media and brand management, and more. These employment opportunities offered by the growing esports industry are in addition to those directly associated with the game-play itself, such as coaching, team management and esports athlete.

Esports have now begun to find their place in educational settings, with many colleges having varsity esports teams, and a growing number offering esports scholarships. It's no surprise that educators in schools are exploring the ways in which esports may offer students learning opportunities, access to college, and pathways into industry.

Contents



Chapter 1 - An Introduction to Esports

In chapter one we explore the *What*, *Who* and *How* of esports, from its humble beginnings in internet cafes some twenty years ago, to its explosion into an activity that is now firmly embedded into our culture, through global tournaments and events such as The Olympic Games. We define what esports means in professional sporting contexts and ask questions about if, and how, we should redefine esports for scholastic settings.



Chapter 2 – Esports as Game-Based Learning

Chapter 2 positions Game-Based Learning (GBL) as a key foundational approach to introducing esports to your school setting. Associated with the pedagogy of play, situated learning and mastery learning, Chapter 2 presents the research evidence for the benefits and limitations of using video-games for learning, and addresses issues such as assessment of GBL through formative and summative approaches.



Chapter 3 – Esports in the Curriculum

Many schools introduce esports into their school setting as a club or extracurricular activity. However there is growing evidence that there are large, significant learning gains to be made from esports, if embedded in the curriculum and supported by effective teaching and pedagogy. Chapter 3 identifies the key learning opportunities and provides insights into how these can be utilized to take advantage of the learning potential of esports.



Chapter 4 – Esports Case Studies

Building upon the learning opportunities outlined in Chapter 3, in Chapter 4 we identify 3 case studies of curricular esports programs from around the world. Each case study presents a different approach to embedding esports into the curriculum, providing educators with an insight to the diverse possibilities for designing an esports program of their own.



Chapter 5 -Minecraft as Esports

The esports learning resources that accompany this framework have been built in Minecraft: Education Edition. In Chapter 5, we outline the rationale for using Minecraft as a scholastic esports resource, and provide step-by-step instructions on how to set up and play our Minecraft: Education Edition Esports Worlds.



Chapter 6 - Building your Esports Team

The final chapter of the Framework focuses on the practicalities of setting up a Minecraft Esports program, club or team. It identifies a pathway for success that supports educators in building an inclusive, sustainable and people-centered initiative, that will allow effective evaluation and accountability. We interview leading esports educators, who provide their top-tips on starting an esports team, and sustaining one.



Playbooks

The final section in the Esports Educator Framework is a set of Playbooks for each Minecraft: Education Edition Esports World. There is one Playbook per world, providing step-by-step instructions on how to play the game with students, with insights into the game objectives, victory conditions (how to win), and student skills and capacities to evaluate.

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1.1 What is Esports?

Introduction

There are many different perspectives on what constitutes electronic sports, or esports, but put simply, esports is competitive video-gaming at a professional or semi-professional level. It has a variety of different definitions including "an umbrella term used to describe organized, sanctioned video game competitions, most often in the context of video game tournaments"¹, and 'Organized, computer-mediated and competitive gaming'².

While many of the definitions relate to competitive, organized or professional play, few give consideration to one of the most important dimensions of esports – the community of spectators who watch live tournaments in arenas, or who live stream competitions from all over the world. This community aspect of esports is a vibrant, interactive and participative space, which is driving the growth of esports as an industry, as entertainment, and even as a route to a college education, and a potential career pathway.



The writing convention for esports varies across different disciplines and sectors from e-Sports to eSports, and e-sports. However, an announcement by the Associated Press Stylebook states that it should be written as 'esports', unless at the beginning of a sentence, in which case the correct convention is 'Esports'.



What do esports look like in practice?

Esports competitions have increased in popularity over the last two decades and are now an integral part of youth culture, with tournaments that attract interest from millions of people around the world³. In addition to the professional players who compete against each other, a fundamental component of esports culture is the huge number of spectators, who attend tournaments in person, who access the competitions by streaming them online through platforms such as Mixer, Twitch and YouTube. In 2018 The League of Legends esports World Championships had audience viewing figures comparable with the 2018 Superbowl^{4,5}. It is projected that by 2021, esports audiences will reach 300 million worldwide, and in the United States, it will have more viewers than all other professional sports leagues, except perhaps the NFL⁶, as shown in Figure 1.



The 2017 League of Legends world championship drew 106 million viewers, which is roughly on par with the 2018 Super Bowl Audience. 4 The 2018 DOTA 3 championship audience was larger than the Tour De France, peak Wimbledon, Daytona 500, and the U.S. Open (25)

Projected Esports Viewers in the United States in 2021



Figure 1 Projected esports viewers in the USA by 2021⁶

As such, esports has now become a global industry estimated to grow to \$1.5 billion by 2020 with international competitions, generous monetary prizes, and the potential for sponsorship, as well as being viewed as a valid career pathway with opportunities for university scholarships and a range of career options within the growing esports entertainment industry itself⁷.



Where did it all begin?

Esports have been well-established in Asia for over twenty years, thought to have been sparked by the widespread use of internet cafes by young people in South Korea. In the year 2000, South Korea became one of the first countries to license pro-gamers, and established the Korean Esports Association (KESA). Since then, online gaming has become an integral and accepted part of everyday culture in Korea with esports athletes often given celebrity status. Esports is now embedded within mainstream culture across much of Asia with organized leagues for games such as StarCraft and Lineage, typically broadcast on prime time television in much the same way traditional sports matches are in other countries². At the same time in the US, convention centers were becoming a meeting place for young people, competing in video-gaming tournaments with games such as Space Invaders on the Atari. While some of these competitions attracted as many as 10,000 players, the gaming community showed some signs of establishing a legitimate gaming competitions, but largely remained a fringe, or niche group and didn't receive the same acceptance into mainstream society as in other countries².

The growth of esports in the US and Europe is now beginning to excel, with competitive gaming becoming a mainstream activity, attracting millions of spectators to regional and international events organized by large professional organizations like the World Cyber Games (WCG), Electronic Sports World Cup (ESWC) and Cyberathlete Professional League (CPL)³. In this professional arena, pro-gamers, sometimes referred to as esports athletes, receive salaries and in 2017 the highest scoring player won a staggering \$2,436,772.40³. Therefore, this aspect of gaming culture has moved away from being merely an adolescent passtime for a niche group into an organized, professional domain with international leagues and tournaments, salaried athletes and teams with professional coaches, as well as the potential for large sponsorship deals from companies such as Audi, Redbull, Amazon, Nike and BMW.

Furthermore, this explosion in the esports industry has resulted in some [50 colleges](#) and universities offering varsity esports courses and scholarships, recognized by a governing body, the National Association of Collegiate Esports^{10,22}.



Where is Esports going?

The growth of esports into an industry supported by global brands and sponsors, as well as the media is enabling reach from what was once a niche audience into mainstream entertainment and leisure across the world. In addition, the move by colleges and universities to not only offer scholarships, but to begin to offer esports courses is beginning to change mindsets about the viability of esports as an industry that offers a wealth of career opportunities – not just as players or athletes, but across the whole sector. In turn, educators in high schools are considering whether there is a place for esports in schools, either as part of college preparatory classes, or whether there may be other educational benefits from this growing field. Much of the discussion about esports legitimacy as a leisure and entertainment activity, and even as a school subject, revolve around disagreements about whether it should actually be considered a *sport*. Since traditional sports have a well-respected place as part of cultural activities (such as the Olympics), leisure and entertainment (such as the Super Bowl, Wimbledon, Ryder Cup, etc.), and schooling (Physical Education and Sports Science), many argue that if esports can officially become recognized as a sport, then its growth in these sectors will be driven and supported by its wider cultural acceptance as a legitimate, productive and valuable activity. This is explored further in Section [1.2](#).

1.2 Esports – Game or Sport?



What is Sport?

According to the [Entertainment Software Association \(2017\)](#) video-games have become one of the most popular recreational activities, with as many adults as children playing for entertainment. This growth in video-game popularity has seen esports become an accepted form of sporting entertainment across the world, yet there is strong debate in the sports industry about its legitimacy as a sport – and coincidentally, some questions from educators about where it might fit in school curricula.

There are differing opinions on what exactly constitutes a sport. Research exploring the connection between esports and Sport presents a set of criteria outlining what constitutes a sport, based on a review of work undertaken by a number of different researchers¹¹. The five criteria identified are:



Physical activity



Recreation



Competitive elements



Organizational structure



Social acceptance of sports (e.g. by the media or sports agencies)

Many of the official definitions of a sport require 'Physical Activity' as a central tenet. This appears to be one of the greatest sources of disparity in opinion about the legitimacy of esports as a sport. Yet games such as darts, chess and snooker are considered sport by some organizations, even though there is little in the way of physical exertion. Some researchers propose that esports players, commonly referred to as 'esports athletes', perform at peak level, collaborating as part of a team, analyzing and responding to large amounts of information with precision timing and motor skills. These similarities, they argue, have led to the US authorities granting P-1A athletic visas to esports competitors¹². Some studies indicate that esports players can undergo physical, physiological and psychological strains similar to athletes from more traditional sports, with cortisol levels comparable to those experienced in, for example, motor racing¹³.

Other work in this field suggests that the similarities do not stop there^{14,15,16}, considering factors such as:

- the use of rules in gameplay
- competitions are presided over by governing bodies
- there is competition that results in winners and losers

In addition to this, and in accordance with the criteria set out by Hallman and Giel (2018), esports also have media and sponsorship support, with large audiences streaming competitions through platforms such as Mixer, Twitch and YouTube¹⁷. With esports developing (i) a professional structure for esports similar to traditional sports (including tournaments, leagues, fans, teams, team owners, player contracts, sponsors), and (ii) an emerging prize and pay structure, scholars argue that there are 'undoubted parallels' between traditional sporting competitions and esports¹⁸.

From an educational point of view, considering esports only from the perspective of sports may be far too narrow in terms of its inherent value as a tool for teaching and learning. Educators may be interested in explorations of esports that consider the underlying role of play in all games. Work undertaken in by researchers in 2010¹⁹, presents a model based on earlier work by Allen Guttmann²⁰ that defines sport as (i) physical (ii) competitive and (iii) organized play. For educators, this foundational element of play in sport, may provide a pedagogical cornerstone for considering whether esports has a place in formal education, and if so, how it may be threaded through other curricular or extra-curricular activities.

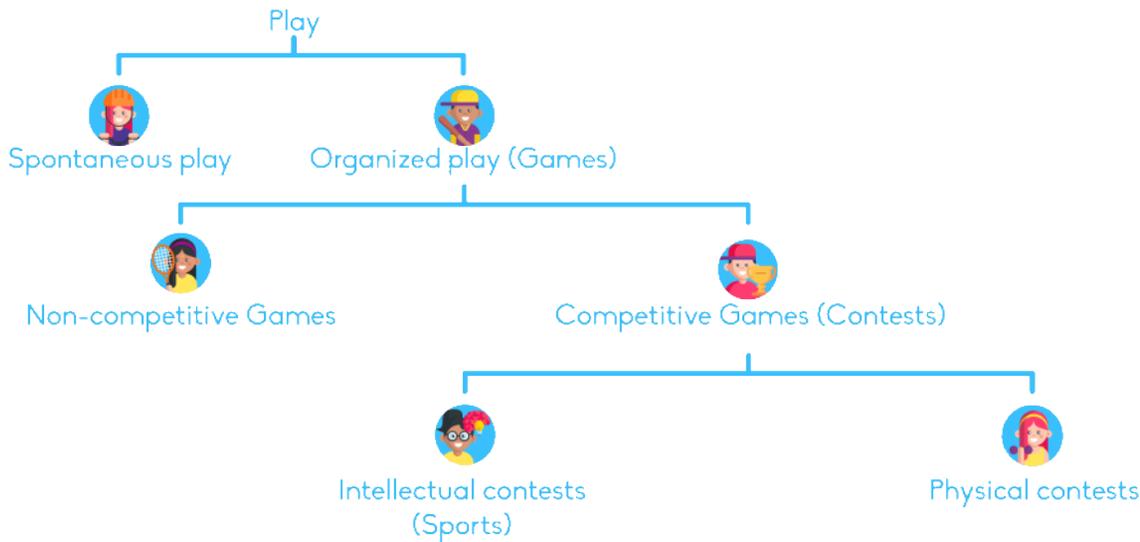


Figure 2 Guttman's Model of Sport as physical, competitive and organized play¹²

Physical Education teachers with experience working with students on esports programs also suggest that there are close parallels between esports and traditional sports.

There are so many similarities between traditional sports and esports - and this fact has been both a surprise, and hugely motivating for me. The purely physical part may be different, but things such as mental coaching, teambuilding, communication, nutrition, concentration etc. are found both traditional sports and esports. I think it is important that children get help and guidance in the beginning of their esports career in things "outside the game". Not all gaming children will become involved directly in esports, but there are so many who like to play, that through the games schools have an opportunity to teach the other "important stuff". Björn Nylund
Sports Coordinator, Prakticum Vocational School.

Is Esport a Legitimate Sport?

Currently, esports is officially accepted as a sport in more than 60 countries (including Russia, Italy, Denmark, Nepal, China, Korea, South Africa, and Finland) and is under consideration in another 40 countries^{21,22}. The United States began recognizing esports as a sport in 2013 when it categorized esports players as professional athletes, and since then the legitimacy of esports has continued to be strengthened²³. An announcement that the Olympic Council of Asia is to include esports in the official program at the 2022 Asian Games in China may be an indication that esports may officially gain world-wide recognition among traditional sports in the not-so-distant future.

It would seem, that to some degree esports may be battling the same 'image' problems that video-games have, with gaming culture being characterized as isolating, anti-social and a lazy pastime in the mass media. Whether esports gain world-wide recognition as a sport may determine the extent to which it becomes accepted as a legitimate activity for players, or indeed students, to participate in. However, the question of whether esports is a legitimate classroom activity, with solid educational foundations is a different matter, explored in depth in Section 2.

1.3 Esports as Culture



The Esports Revolution

Over the last two decades, esports has seen its worldwide audience explode, and with it, interest from the sports and entertainment industry. Estimates²⁴ suggest that esports will reach a worldwide audience of over 300 million people and revenues are estimated to rise to \$1,23 billion by 2022.

This growing industry is populated by competitors or esports athletes, esports teams competing in leagues, and professional level competitive events are supported by coaches, managers and sponsors. Its rapid growth has attracted attention from global brands, such as Amazon who own the most popular esports streaming platform, Twitch, and now there is a growing interest from colleges and schools, with more than 1200 schools in the US taking part in esports league competitions²⁵.



Who is involved in Esports?

Many refer to this complex network of players, community, and commercial aspects as the *Esports Ecosystem*. It's a highly interconnected system where individuals can engage with the game in multiple ways – via playing, watching, and organizing informal events, as well as consuming merchandise and becoming part of an esports community. Researchers exploring the link between esports and Science, Technology, Engineering and Math (STEM) have identified five categories of participation for members of the esports community within the esports ecosystem (Figure 3), including content creators, strategists, organizers, and entrepreneurs²⁶. While players and teams are found at the very center of this ecosystem, the authors argue that it is actually the wider community, their practices, engagement and even their products that create and drive the entire esports *engine*. The researchers go on to make the case that the knowledge and skills learned as part of an esports curriculum connect with STEM, college preparatory skills and Career Technical Education standards in US schools²⁷.



Figure 3 The Esports Ecosystem illustrating five routes to participation for players and the community²⁷

In addition to the player and community dimension, the ecosystem also contains professional and commercial components, including publishers, business managers, marketing experts, physical therapists and professionals representing brands and platforms. Figure 4 explores this in further detail²⁸. As the industry continues to grow, it is this professional aspect that is becoming increasingly recognized, attracting investors, media attention – and with it reaching audiences that may be considered mainstream by the public.

Participants	Description	Examples	Notes
Publishers	Companies who design and publish video-games. Publishers may also have a role in organising tournaments, or may licence out their products (titles) to external league organisers or broadcasters.	<ul style="list-style-type: none"> Riot Games Blizzard Valve 	The games used in esports are often referred to as Titles e.g. League of Legends is published by Riot Games, DOTA is published by Valve
Teams	Professional or semi-professional players are selected to play as part of a team (sometimes known as a squad). Teams compete against each other in organised tournaments for cash prizes. Typically an esports club might run several different squads specializing in different games.	<ul style="list-style-type: none"> Cloud 9 Unicorns of Love Astralis FeZe Clan Team Liquid 	
Organizers	A range of third party organisations (such as Major League Gaming) are responsible for organising	<ul style="list-style-type: none"> ESL Gaming DreamHack 	Esports Leagues: <ul style="list-style-type: none"> • Rocket League Championship Series

 <p>League Organizers</p>	<p>A range of third party organisations (such as Major League Gaming) are responsible for organisation leagues and tournaments, as well as managing the coverage and media at the events. Broadcasting rights are then sold to platforms such as Twitch and YouTube.</p>	<ul style="list-style-type: none"> • ESL Gaming • DreamHack • Major League Gaming 	<p>Esports Leagues:</p> <ul style="list-style-type: none"> • Rocket League Championship Series • Overwatch League • League of Legends Championship series <p>Esports tournaments:</p> <ul style="list-style-type: none"> • The International • Intel Extreme Masters • Overwatch World Cup
 <p>Platforms</p>	<p>Platforms such as Twitch and YouTube offer live and on-demand streaming of esports to the huge community of esports fans.</p>	<ul style="list-style-type: none"> • Twitch • YouTube • Mixer • Smashcast 	
 <p>Brands and Investors</p>	<p>Sponsorship and investment in the industry has supported the growth of esports in recent years. Teams wear brand logos on their shirts, use products and produce social media content around their sponsors.</p>	<ul style="list-style-type: none"> • Intel • Logitech • HTC • Redbull • Nissan • Volkswagen 	<p>Some brands sponsor their own teams within the scene, including the Red Bulls, Roccat and Team Kinguin.</p>

Figure 4 The commercial dimension of the Esports Ecosystem²⁸

Types of Games

There are a number of different games that are used to practice and play esports. In 2019, the most popular titles were Fortnite, Defense of the Ancients 2 (DOTA 2) and Counter Strike, with between 200 and almost 700 tournaments hosted for these games (Figure 5). However, there are also different types of games, and this is particularly interesting from an educational perspective, because different types of games illicit different forms of game-play, and require players to develop different skill sets. Additionally, it is important to understand the differences between these games, because some will be more appropriate for a school esports team than others.

Rank	Game	Prize money	Players	Tournaments
1.	Fortnite	\$64,422,992.50	2273 Players	350 Tournaments
2.	Dota 2	\$46,963,099.34	1286 Players	205 Tournaments
3.	Counter Strike: Global Offensive	\$21,716,225.02	3823 Players	776 Tournaments
4.	PlayerUnknown's Battlegrounds	\$12,890,294.86	1358 Players	103 Tournaments
5.	Overwatch	\$9,587,036.77	1226 Players	58 Tournaments
6.	League of Legends	\$9,149,465.80	1747 Players	162 Tournaments
7.	Call of Duty: Black Ops 4	\$6,517,557.00	384 Players	38 Tournaments
8.	Arena of Valor	\$5,801,003.19	242 Players	16 Tournaments
9.	Rainbow Six Siege	\$4,669,338.74	756 Players	70 Tournaments
10.	Hearthstone	\$4,567,263.29	401 Players	37 Tournaments

Figure 5 The top ten games played in 2019 by prize earnings, players and number of tournaments²²

Generally, with respect to esports, there are 4 main types of games; Player Vs Player (PVP), Real Time Strategy (RTS), Multi player On-Line Battle Arena (MOBA), and First Person Shooter (FPS). A fifth type of game is Role-Playing Games (RPG), and while these have been studied a lot in Game-Based Learning research because of the ways in which they create community, discussion, critical thinking and decision-making, they are not as popular in the esports domain as the other types. However, as the esports industry continues to explore, the emergence of new titles sees games that blend action with strategy and role-playing, making it increasingly difficult for educators to classify these games by type alone. For example in League of Legends, which is typified as a Real Time Strategy game, players assume the role of a character, or avatar with unique strengths and abilities. Here, some of the strategy in the game occurs when teams have to co-ordinate different character's strengths as part of their plan, merging the strategy and role-playing genres.

For simplicity, in the section below, we review the characteristics of each of the four main types of video-games.

Player vs Player (PVP)

Player versus Player, also known as PvP, are games where one player competes against another (or several others). A distinction is made here, that this kind of face-off is between one or more human players, as opposed to a human player battling against the computer. In days gone by, you may have expected to see this kind of action on a console game such as Mario kart, where one player races against another around a race track, or in Street Fighter where one player participates in open combat against another opponent. However, the genre has moved with the times and PVP is found in both fighting games and sports games. Figure 6, below shows popular PVP Titles used in esports.

Title	Publisher	Objective	PEGI Rating
Super Smash Bro's (or Smash)	Nintendo	In this fighting video-game involving characters from different franchises (Mario, Zelda, Pokemon...) players seek to launch their opponents off the stage and out of bounds.	12
Rocket League	Psyonix	A team game, much like soccer, where the objective is to score by knocking a ball into the opponents net. Unlike soccer individuals play in cars!	3+
Street Fighter	Capcom	In this fighting video-game, the player engages opponents in 1-on-1 martial combat. The objective is to decrease the other player's vitality before the timer runs out and to win 2 matches	12

FIFA	EA Sports	out of 3. In this football simulation, the 2 players take control of 2 football teams to compete against each other like in a real match.	3+
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Figure 6 Examples of Player versus Player (PvP) video-game titles, publishers and their PEGI age-rating

Real-time strategy (RTS)

In a Real-Time Strategy game, players do not take turns to play. Instead, play occurs continuously as players compete against each other to achieve the game's objective. In RTS games, generally, each player is positioned on a map, with limited resources and the objective is to strategize the best way to secure their resources, build their forces and defend their territory. As players begin to use up the world's resources, the game requires them to take over their opponent's bases to secure enough resources for their own growing empire.

Resource gathering is a main feature here, but so is resource use (including economic expansion and large-scale strategic maneuvering), and players must think tactically to overcome their opponents and win the game. Figure 7 lists popular RTS titles used in esports.

 Title	 Publisher	 Objective	 PEGI Rating
Starcraft	Blizzard	A Real-Time Strategy game where up to 8 players choose to become one of 3 races (Protoss, Terran or Zerg), each with different play styles and strengths, to create and control an army. Set in the future in a distant part of the Milky Way, the objective is to defeat the opponents by gathering resources, building bases and units, conquering territories to, finally, annihilate the opponent's structures. Some modes allow other victory conditions as: <ul style="list-style-type: none"> • Conquering and defending territories during a certain lapse of time (Capture The Flag), • Being the first player to reach a set number of minerals (Greed), • Being the first player to reach a set number of kills (Slaughter) etc. 	16
Starcraft 2	Blizzard	The objective is the same as in Starcraft (see above) with updated armies, and a better graphic engine.	16
Warcraft	Blizzard	A Real-Time Strategy game where up to 12 players can take on the role of an Orc or a Human. The objective is to find, build and manage to lead a small army to victory by destroying the other players' forces/bases.	12

Figure 7 Examples of popular Real-Time Strategy (RTS) video-game titles, publishers and their PEGI age-rating

Multiplayer online battle arena (MOBA)

In recent years, interest in RTS games has waned, partly because for spectators these games are not as fast-paced as other types of games. The Multiplayer Online Battle Arena (MOBA) genre is offering both players and spectators the tactical challenge of RTS, but with the pace and excitement of an action video-game. In MOBA, individual players must work as a team to gather resources and successfully destroy the opposing team's base or structure. Typically a player will assume the identity of an avatar (or character) with specific abilities in-game, and therefore a huge part of tactical play in this kind of game depends on the team deciding when, where and how to use different player's strengths to help their quest. Clever game-play can result in avatars gaining experience, skills or 'levelling up', making them even stronger opponents as the game proceeds, but there may be a cost to this, which teams will have to weigh up as part of their battle plan. Figure 8 lists popular MOBA titles used in esports.

 Title	 Publisher	 Objective	 PEGI Rating
League of Legends	Riot Games	Players assume the role of a Champion with unique abilities and battle as part of a team with the goal of destroying the opposing team's "Nexus" (or base). All Champions initially start off with basic skills but can level up through game-play.	12
Defense of the Ancients (DOTA)	Valve	This game is actually a 'mod' for the video-game Warcraft. The objective is to destroy the opponents' Ancient (a guarded structure at the opposite end of the map). <i>Players use powerful units known as heroes, and are assisted by teammates and AI-controlled fighters. As in role-playing games, players level up their heroes and use gold to buy equipment during the mission.</i>	12
Heroes of the Storm	Blizzard	Players work in teams of 5 to destroy the opposing team's main structure, called the "Core". To reach the Core, at least one line of defensive structures, known as "forts" and "keeps", needs to be destroyed.	12

Figure 8 Popular Multiplayer Online Battle Arena (MOBA) video-game titles, publishers and their PEGI age-rating

First-person shooter (FPS)

In a First Person Shooter, the player views the world through the eyes of their character. In this sense, often the player won't see their character's body, but they can usually see objects they are carrying (weapons, maps etc.) and an indication of their status in the form of health points, lives, armor, ammunition etc. This status enables the player to make strategic decisions in-game about which actions to take, or which avenues to pursue in meeting the overall objective of the game.

As the name suggests FPS, these games are typically set in battlefields or battle arenas with the objective of killing the other team. Figure 9 shows popular FPS titles used in esports.

 Title	 Publisher	 Objective	 PEGI Rating
Overwatch	Blizzard	<i>Overwatch</i> assigns players into two teams of six, with each player selecting from over 30 characters, known as heroes, with unique characteristics. Players work together to secure and defend control points on a map, or go on missions to escort a payload across a map. Players can earn rewards that are cosmetic (better skins etc.) and do not affect game-play.	Pegi 12
Counter-Strike	Turtle Rock Studios	Two opposing teams—the Terrorists and the Counter Terrorists—compete to complete objectives, such as securing a location, defusing a bomb, or rescuing hostages. Scoring is based on individual performance, enabling players to upgrade weapons, armor and so on.	Pegi 18
Call of Duty	Activision	The series originally focused on the World War II setting but subsequent releases are set in the cold war, and in modern war zones. A range of game-play options allow players to engage in Special Operations mode (where teams play against AI to complete a high stakes mission), play in multi-player format in Deathmatch mode (human teams play each other), Dominion (teams have to seek and secure 3 points across the map – and stay alive) and Search. There are a variety of other modes, but scoring is based on individual performance.	Pegi 18

Figure 9 Popular First Person Shooter (FPS) video-game titles, publishers and their PEGI age-rating



Which of these titles might be applicable in the classroom?

Game-based learning proponents often argue that not all games will be equally effective at all levels of learning, and different types of games are effective depending on the learning objectives. While fast-paced action games will be better for promoting speed of response, decision-making, and visual processing, narrative-driven adventure games are likely to be best for promoting problem solving skills²².

As you'll see from the Tables above, all of these games come with an *age rating*, and this is a good place to start in determining whether a game is suitable for your classroom setting. Pan European Game Information (PEGI) is the video games age ratings system that is in force across Europe. This means it is illegal for a retailer to sell a video game to someone who is below the game's official PEGI age rating.

There are five age ratings: 3, 7, 12, 16 and 18. It is worth noting that many online games (including PEGI 3+ titles) enable voice or text chat in their online multiplayer modes, and as such, adult discussion, swearwords and insults can be common, and therefore educators should use the ratings as a guide only. The British Esports Association have published an [Esports Age Guide](#) and recommend that it's good practice for teachers and parents to research the video game before purchasing³¹.

Consideration of game ratings and researching the games before purchasing them is an essential first step for educators. This combined with a thorough consideration of your curriculum learning objectives, and your school's ethos and values will set a clear benchmark for games that are suitable for your educational setting.

These issues are explored in greater depth in later sections, with section 6, providing a step-by-step guide for educators wishing to start their own esports team, and section 4 detailing case studies where by esports have been successfully introduced into the school curriculum in a variety of settings. We also ask experienced educators how they choose their esports games in our 'Top Tips' interviews in Section 6.2.



Types of Players

Some of esports' finest players have reached celebrity status in the gaming community, and beyond. Often known first and foremost by their *gamer tag*, these professional level players are generally (but not always) skilled at playing one particular type of game and are often scouted by the top teams. For example, **Faker** (birth name [Lee, Sang Hyeok](#)) is said to be the world's finest League of Legends player, having won the world championship 3 times. Beginning his career at the age of 17, he is believed to have won more than over \$1.2 million in prize money and has a place on the Korean National Team. This story is not unusual in esports, and as the industry begins to establish itself firmly with sponsorship and media support, schools, colleges and the wider esports industry are seeing valid career pathways emerge. Figure 10 gives a brief overview of some of the world's biggest esports stars.

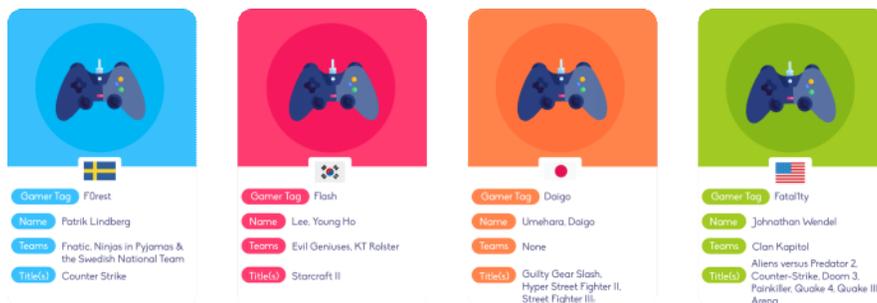


Figure 10 Overview of some of the world's biggest Esports stars²²



Who are Esports Players?

A lot of research has been conducted on the players themselves. It is important for game designers to understand what makes players *want* to play, and from this single consideration has come the realization that not all players are alike. Early research on the theory of games suggested that this '*want*' was tied to a player's strategic consideration of cost-benefit or 'how can I maximize my minimal payoff, while minimizing the maximal payoff of the other players?'²³ The data gathered was based on a specific game genre, MMORPG, and while this early game-theory was groundbreaking, it failed to take into account what is known as the 'fuzzy' human dimension that arises from understanding how games influence emotion and cognition, particularly factors such as motivation, satisfaction and pleasure²⁴.

The Bartle Model explores different player motivations for game-play, expressing them as four discrete player 'types' (Figure 11); The Explorer, The Achiever, The Killer and The Socializer²⁵. It

categorizes players based on the ways in which they are motivated by two aspects of a game; (i) Game Content (x axis) and (ii) Control (y axis).

- **Game Content** is shown on the vertical axis and refers to the ways in which players are motivated to interact with the game world (or content), either having a preference to interact with objects and environments in the game, or whether they prefer to interact and experience the game through other players.
- **Control**, shown on the horizontal axis, refers to the preferences players show for either taking unilateral, autonomous action (having full control to exercise their decisions etc.), or at the other end of the spectrum, a preference for interacting with the overarching game system to deeply understand its processes and mechanics³⁵. This combination of preferences for content and control, enables a player to be categorized in one of the four quadrants. Alternative models have been proposed, but the Bartle Model has been widely used by both players, and researchers in trying to understand player psychology and motivation. It is worth noting that while the original model suggests these player types are discrete, more recent work suggests that players may exhibit a combination of different motivations, rather than belonging to a single quadrant. It is thought that Socializers make up 80% of the average game community, and the rest is comprised of 10% each for Achievers and Explorers, and a minority of Killers³⁵.

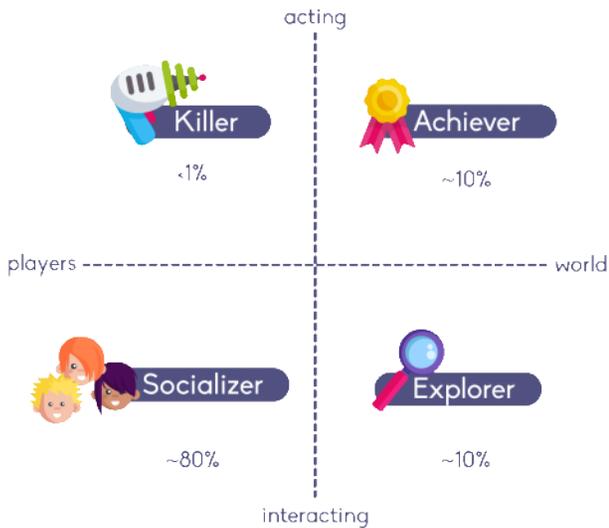


Figure 11 The Bartle Model, showing four player types based on game-play preference; Killer, Achiever, Socializer and Explorer³⁵

What might these player types tell us about our students? Like any model, The Bartle Model makes generalizations based on observations of a sample of players, and using a specific game genre, and we must bear this in mind when considering our own students. However, Figure 12 identifies some of the factors that may motivate each of the player 'types' to engage with either (i) specific games or (ii) specific types of game-play – or both.

Player Type	Characteristics
Achiever	Competitive and enjoy winning difficult challenges - whether they are set by the game, or by themselves. The more challenging the goal, the most rewarded they tend to feel. Motivated by reward, scoring points and winning.
Explorer	Interested in understanding the world. They like to explore the environment, and the finer details of the game mechanics. These players may end up knowing how the game works and behave better than the game creators themselves. They are motivated by discovering short-cuts, tricks, and glitches and solving puzzles.
Killer	Provocative and are motivated by defeating other people. Trolls, hackers, cheaters, are found in this category, along with the most ferocious and skillful PvP opponents.
Socializer	Sociable and enjoy the community aspect of gaming. They help to spread knowledge and empathy, and are often found to take on roles in the game community. Motivated by connection and by seeing their team/ guild/ community succeed.

Figure 12 Characteristics of The Bartle Model's player types

Understanding the psychology and motivations of players is not only essential for game designers, but is incredibly useful for educators too. It reminds us that different players come to games with different motivations, and different preferences – there is no one 'perfect game' for all of our students. Additionally, it's worth considering the concept of 'shifting' preferences, or the ways in which different games (with different objectives and types of challenges) may be able to illicit different motivations, emotions, approaches – and in essence develop different kinds of competencies in our students³⁶.

In a study examining the neurobiology of play, the Bartle Model's four types of player were mapped on to neuro-biological functions, enabling researchers to make indirect connections between player motivations and cognitive and emotional processes occurring in specific parts of the brain during play. The research also proposed that regular game play may stimulate, and develop the function, size, and shape of a subject's brain³⁴. The research identifies four main areas of the brain, and within the context of play relates them to Fear, Pleasure, Socializing and Memory/Association. From a teaching perspective, these insights may be useful in informing us of what it is about game mechanics and game design that is capturing the imagination of our students and motivating them to play. It helps us frame the idea that there is no 'one size fits all' game within the context of understanding our student's preferences. Finally, the research's findings that, regular game play may alter the function, size, and shape of a subject's brain means that we can help students set goals and target areas for development, whether this is problem solving, social skills or motor skills, the good news is we can use game-play to help our students improve and develop with practice.

1.4 Esports as Organized Play



Leagues & Tournaments

Over the past decade, the number of esports leagues and tournaments has grown exponentially, reflecting its growing acceptance in mainstream culture. This growth in esports events has been supported by the establishment of professional esports bodies, such as the International Esports Federation (South Korea) representing over 50 member nations including the United States, Sweden, China, Russia and Germany. In 2017, almost 4000 esports tournaments took place, with total prize money reaching \$110.6 million dollars²⁹.

Figure 13 presents information on professional tournaments that took place in 2019. Not listed here, but of particular significance is the World Cyber Games, comparable to the Olympic Games in that it attracts competitors from over 70 countries, and more than a million participants for entry into the national preliminary rounds³⁷.

 Top Esport Tournaments	 Top Esport Leagues
1. The International	1. Evolution Championship series
2. Intel Extreme Masters	2. League of Legends Championship Series
3. CS:GO Majors	3. Call of Duty World League
4. Overwatch World Cup	4. Rocket League Championship Series
5. Fortnite World Cup Finals	5. PUBG Global Championship
6. Evolution Championship series	

Figure 13 Top esports tournaments and leagues in 2019³⁸



Who organizes esports events?

Leagues typically develop around the most popular games, with publishers such as Riot, Blizzard and Valve hosting competitions for their games (League of Legends, Overwatch and DOTA 2, respectively). However, large organizations such as the Electronic Sports League (ESL) and Major League Gaming (MLG) also run events. Rather than showcasing games, these organizations give their star esports teams time in the limelight, selling out arenas, and granting broadcasting rights to particular streaming platforms. There are a number of smaller events such as regional qualifiers and so on that are organized by smaller groups with official sponsorship.

International events such as the World Cyber Games (WCG) attract such huge numbers of participants and spectators, that corporate sponsorship, media naturally follows, generating even larger audiences and larger prizes, helping to further embed esports as an increasingly accepted cultural activity³⁹.

It is this foundation as a cultural activity, supported by mainstream media and sponsored by global brands that has laid the groundwork for the establishment of institutionalized governance of esports, giving rise to an increase in the number of professional leagues, as well as the number of regulatory organizations representing esports throughout the world including The Cyberathlete Professional League (US), Korean Esports Association (South Korea), and the Electronic Sports League (Europe)^{39,40}.



Governance of esports

At the time of writing, there is no single international governing body for esports. Currently, each sport is individually governed by a game publisher (for example, League of Legends by Riot Games, Rocket League by Psyonix). Because of the fast-paced growth of the industry, and also because the participants are most likely to be young, adolescents from around the world, there is a great need for international regulation, rule-setting, ethical guidance and governance.

In practice, the rules of an sport are generally dictated by the game mechanics created by the developer. Typically, all behavior that is allowed by the game mechanics is generally allowed in an esports competition. In effect, this means that the only regulations that can be 'set' are for out-of-game expectations such as rules about competitive integrity, behavior, and equipment. Currently, these rules are either set by the developer or by the tournament organizers but with internationalization, there are calls for better regulation. A consortium of 12 Swedish esports organizations have collaborated to produce the [Esports Code of Conduct](#) for tournament players, organizers and parents.

Globally, there are two main organizations beginning to establish governance, the International Esports Federation (ISf) and the World Esports Association (WESA)⁴¹.



International Esports Federation

Founded in 2008, the International Esports Federation aims to promote standardization in esports, to provide esports oriented human resource training, and to continually promote esports and its values⁴². Based in South Korea, its members come from national esports federations in countries such as the United States, Germany, Denmark, Russia and China. Competitions associated with ISf's World Championships are organized in such a way that teams

need to consist of players with the same nationality, and they aim to separate tournaments into men's and women's tournaments. Recently, the Federation entered into a partnership with the Chinese corporation Alibaba, a collaboration that has enabled them to bring esports to the 2022 Asian Games⁴¹.



World Esports Association (WESA)

The World Esports Association was founded in 2016 by ESL (the world's largest esports company) and 8 multi-gaming organizations. It was founded to both professionalize esports, to establish players' rights and influence in esports policies, and to introduce a revenue share between all parties involved with the project⁴³. It's executive board has two members chosen by ESL and two by the teams. The fifth member is the chair and is selected by the other board members. This gives ESL a lot more influence than any other individual organization within WESA⁴¹. WESA created a Player Council to be elected by players to represent them in a wide range of areas, including players transfers, policy and rules.



A Global Sports Organisation for All?

While these organizations give some regulatory structure to the esports industry, some criticize the lack of independence and objectivity created by having publishers, and other 'insiders' in positions of authority, with a sense that these organizations may make decisions best-suited to their business, rather than for the profession, players or the industry at large. Furthermore, none of these organizations have yet established any real enforcement mechanisms necessary to enforce rules and regulations in the esports industry^{41,44}.

Recommendations are for a global governing body to unify governance and regulation of esports across all games and publishers, with independent rule setting, metrics and reporting⁴⁵.



National and Regional Esports Federations

A number of esports organisations exist at national and regional scales. At a regional scale, organizations like the Asian Electronic Sports Federation (AESF) are the governing body for 45 member countries including South Korea, China and Singapore. At a national level, organizations like the United States Esports Federation and others are the official governing bodies for professional esports in the USA and are members of International esports bodies such as the International Esports Federation. Figure 14 provides an insight to some of the other national and regional governing organizations around the world.

Organization	Mission
Asian Electronic Sports Federation (AESF)	Governing body of esports in Asia and recognized by Olympic Council of Asia with 45 member countries including (China, Singapore, South Korea)
United States Esports Federation	Official governing body for esports in the USA and a member of the International eSports Federation (IeSF) with the responsibility to promote, grow and develop the quality, diversity and beauty of esports
The British Esports Association (BEA)	Represent player interests at all levels of esports.
France Esports Federation	Regulate esports and advise the French government
Russian Esports Federation	National sport federation
Arab Esports Federation & the Global eSports Resources	Partnership representing 11 member countries in the Middle East
The Korea Esports Association (KeSPA)	Established to manage esports in South Korea. It is a member of the Korean Olympic Committee and the International Esports Federation, managing 25 esports in the country and <i>also hosts the annual KeSPA Cup</i> ,
National Association of Collegiate Esports (NACE)	American collegiate esports association, mentioned here because of its 42 members colleges across the US
Tespa (formerly Texas Esports Association)	North American collegiate esports
Thailand Esports Federation	It is recognised by the Sports Authority of Thailand and is a member of the International Esports Federation.
Finnish Esports Federation (SEUL)	Umbrella organization for Finnish competitive electronic gaming
Professional Esports Association (PEA)	US based professional video gaming and esports league. Created with the aim of having a "stable, healthy, long-term environment for the players. Its founding members include some of the US's best esports teams including Team Liquid, Cloud 9 and Team Solomid

Figure 14 National and regional esports governing organizations around the world.



Collegiate and High School Leagues

A number of college and high school leagues have now been established. Those presented here are not an exhaustive list, but rather an indication of the growth of this activity within the education sector. In addition to the growth of leagues and tournaments, a number of schools and colleges are beginning to create esports courses and curricula. In Norway, the Garnes Vidaregaande Skule was the first high school to add esports to the school's core curriculum. The Arlanda Gymnasiet School in Sweden introduced an esports curriculum in 2015 with the goal of equipping students to work in the growing esports industry, as players and in a range of

technical jobs across the sector. A new esports program has also been launched in schools in Finland with the support of the [Finnish Esport Federation](#). We take a more in-depth look at some of these courses in our Case Studies in Section 4.

Figure 15 provides an insight into College and High School esports leagues.

-  **United States**
[High School Esports League](#) (HSEL), [North America Scholastic Esports Federation](#) (NASEF) and [PlayVS, Electronic Gaming Federation](#) (EGF)
-  **Scandinavia**
[League of Schools](#) (Scandinavia) - A league for high schools competing in League of Legends or Counter Strike in Nordic countries. Prize pool 40,000 Euro. Sweden's new esports curriculum enrolled at Arlanda Gymnasiet school in Mrsta.
-  **European Union**
[British Esports Championships](#) open to schools and colleges with participants over the age of 12 years old.
-  **Asia**
[Garena Premier League](#) – formerly for collegiate esports now runs a competition for high schools in Singapore, Taiwan, Malaysia, China and Hong Kong.
-  **New Zealand**
[New Zealand High School League](#) with over 50 participating schools.

Figure 15 College and High School esports leagues around the world.

1.5 References



References

1. Whalen, S. J. (2013). Cyberathletes' lived experience of video game tournaments. Doctoral dissertation, University of Tennessee, <https://pdfs.semanticscholar.org/fd03/a2dab885124c8b567fde936b737cfd09980b.pdf>
2. Hamari, J., & Sjöblom, M. (2017). What is eSports and why do people watch it? *Internet Research*, 27(2), 211-232.
3. Freeman, Guo & Wohn, Donghee. (2017). Understanding eSports Team Formation and Coordination. *Computer Supported Cooperative Work (CSCW)*. 10.1007/s10606-017-9299-4.
4. Faust, K., Meyer, J., & Griffiths, M. D. (2013). Competitive and professional gaming: Discussing potential benefits of scientific study. *International Journal of Cyber Behavior, Psychology and Learning*, 3(1), 67-77.
5. Griffiths, M. (2017). The psychosocial impact of professional gambling, professional video gaming & eSports. *Casino & Gaming International*, 28, 59-63.
6. Whitman Syracuse University School of Management Blog <https://onlinebusiness.syr.edu/blog/esports-to-compete-with-traditional-sports/#viewers>
7. Borowy, M. & Jin, D. Y. (2013) Pioneering E-Sport: The Experience Economy and the Marketing of Early 1980s Arcade Gaming Contests. *International Journal of Communication*, 7, 2254- 2274
<https://pdfs.semanticscholar.org/bb28/3a5bf54153a150fb5e477f8056c451ee2b94.pdf>
8. Jonasson, K., & Thiborg, J. (2010). Electronic sport and its impact on future sport. *Sport in Society*, 13(2), 287-299.
9. JKCP, (2018) <https://info.jkcp.com/blog/professional-gamer-salary-esports/>
10. National Association of College Esport <https://nacesports.org/about/>
11. Hallmann, Kirstin & Giel, Thomas, 2018. "**eSports – Competitive sports or recreational activity?**," *Sport Management Review*, Elsevier, vol. 21(1), pages 14-20.
12. Kozachuk, J., Foroughi, C. K., & Freeman, G. (2016). Exploring Electronic Sports: An Interdisciplinary Approach. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 60(1), 2118–2122. <https://doi.org/10.1177/1541931213601479>
13. Rudolf, K., Grieben, C., Achtzehn, S., and Froböse, I. (2016). "Stress im eSport–Ein Einblick in Training und Wettkampf," in *Paper Presented at the eSport Conference Professionalisierung einer Subkultur?*, Bayreuth.
14. Adamus, Tanja & Tanja,. (2012). Playing Computer Games as Electronic Sport - in Search of a Theoretical Framing for a New Research Field.
15. Taylor, T.L. (2012). *Raising the Stakes: E-Sports and the Professionalization of Computer Gaming*. Cambridge, MA: The MIT Press.
16. Wagner, M. (2006). On the Scientific Relevance of eSport. In *Proceedings of the 2006 International Conference on Internet Computing and Conference on Computer Game Development*. Electronic version (pp. 1-4). Athens, GA: CSREA Press
17. Banyai, F., Griffiths, M.D., Demetrovics, Z., and Kiraly, O., (2019), The mediating effect of motivations between psychiatric distress and gaming disorder among esport gamers and recreational gamers, *Comprehensive Psychiatry*
18. Reitman, J. G., Anderson-Coto, M. J., Wu, M., Lee, J. S., & Steinkuehler, C. (2020). eSports Research: A Literature Review. *Games and Culture*, 15(1), 32–50. <https://doi.org/10.1177/1555412019840892>
19. Kalle Jonasson & Jesper Thiborg (2010) Electronic sport and its impact on future sport, *Sport in Society*, 13:2, 287-299, DOI: [10.1080/17430430903522996](https://doi.org/10.1080/17430430903522996)
20. Guttmann, A. 2004. *Sports: The First Five Millennia*, Amherst and Boston, MA: University of Massachusetts Press.
21. Witkowski, Emma. (2012). On the Digital Playing Field How We "Do Sport" With Networked Computer Games. *Games and Culture*. 7. 349-374. 10.1177/1555412012454222.
22. International e-Sports Federation, (2017) <https://www.ie-sf.org/iesf/>
23. Kane, D. and Spradley B.D. 2017. Recognizing Esports as a Sport. *The Sport Journal*, 2017 <https://thesportjournal.org/article/recognizing-esports-as-a-sport/>
24. Statista <https://www.statista.com/statistics/490480/global-esports-audience-size-viewer-type/>
25. Rothwell, Gregory & Shaffer, Michael. (2019). education sciences Review eSports in K-12 and Post-Secondary Schools. *Education Sciences*. 9. 10.3390/educsci9020105. <https://pdfs.semanticscholar.org/a458/845076be086da81e2a98f4eac63ce1a2ea13.pdf>
26. Connected Learning Lab <https://connectedlearning.uci.edu/enriching-esports/>
27. Anderson, Craig & Tsaasan, A.M. & Reitman, Jason & Lee, Je Seok & Wu, Minnie & Steel, Holly & Turner, Tom & Steinkuehler, Constance. (2018). Understanding Esports as a STEM Career Ready Curriculum in the Wild. 1-6. 10.1109/VS-Games.2018.8493445.
28. Critical Hit Gaming <https://www.criticalhit.net/gaming/esports-attracts-134-million-viewers-and-generates-612-million-in-revenue/>
29. Esports earnings <https://www.esportsearnings.com/history/2019/games>
30. Van Eck, Richard. (2006). Digital Game Based LEARNING It's Not Just the Digital Natives Who Are Restless. *EDUCAUSE* https://www.researchgate.net/profile/Richard_Van_Eck/publication/242513283_Digital_Game_Based_LEARNING_It's_Not_Just_the_Digital_Natives_Who_Are_Restless/links/0a85e53cd61cf43e29000000.pdf
31. British Esport Association <https://britishesports.org/news/which-esports-games-are-suitable-for-children/>
32. Ranker <https://www.ranker.com/list/best-esports-gamers-in-history/ranker-games>
33. Turocy, T.L., and Von Stengel, B. (2001) Game Theory, CDAM Research Report LSE-CDAM-2001-09 London School of Economics <http://www.cdam.lse.ac.uk/Reports/Files/cdam-2001-09.pdf>
34. Bateman, Chris & Nacke, Lennart. (2010). The Neurobiology of Play. *Future Play 2010: Research, Play, Share - International Academic Conference on the Future of Game Design and Technology*. 10.1145/1920778.1920780.

35. Gamasutra, The art and science of making games https://www.gamasutra.com/view/feature/134842/personality_and_play_styles_a_.php
36. Yee, Nick. (2007). Motivations for Play in Online Games. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society*. 9. 772-5. 10.1089/cpb.2006.9.772.
37. Wimmer, J. 2012. Digital game culture(s) as prototype(s) of mediatization and commercialization of society: The World Cyber Games 2008 in Cologne as an example. In *Computer games and new media cultures: A handbook of digital games studies*, edited by J. Fromme and A. Unger, 525–540. Dordrecht: Springer Science & Business Media B.V
38. Android Authority Esport Tournaments <https://www.androidauthority.com/esports-tournaments-leagues-963799/>
39. Taylor, T.L. and Witkowski, E. (2010). This is how we play it: what a mega-LAN can teach us about games. *Proceedings of the Fifth International Conference on the Foundations of Digital Games*. New York: ACM, pp. 195-202.
40. Seo, Y. (2013). Electronic sports: A New Marketing Landscape of the Experience Economy. *Journal of Marketing Management*, 29(13–14), 1542–1560.
41. Thiborg, J (2009) Esport and Governing Bodies – An outline for a research project and preliminary results <https://muep.mau.se/bitstream/handle/2043/10746/esport.pdf>
42. Martinelli, J., (2019) The Challenges of Implementing a Governing Body for Regulating ESports 26 U. Miami Int'l & Comp. L. Rev. 499 () Available at: <https://repository.law.miami.edu/umiclr/vol26/iss2/8>
43. International Esport Federation <https://www.ie-sf.org/iesf/>
44. World Esport Association <http://www.wesa.gg/>
45. Esport Governance and its failures <https://medium.com/@heyimJoost/esports-governance-and-its-failures-9ac7b3ec37ea>

*Björn Nylund, Sports Coordinator and author of Esport Educator Handbook, from a personal communication.

2.1 An introduction to Game-Based Learning



Videogames are a powerful medium that curriculum designers can use to create narratively rich worlds for achieving educational goals. In these worlds, youth can become scientists, doctors, writers, and mathematicians who critically engage complex disciplinary content to transform a virtual world..... if properly designed, they can provide the problems, tools, people, experiences, perspectives, and consequences to ensure that learners develop rich content understanding. Barab et al (2007)

As explored in the introduction, there is yet to be consensus on whether esports should be considered as a sport, in the traditional sense. From an educational perspective, however, sport isn't the only discipline we can consider drawing from in the curriculum. Because of the intrinsic nature of esports as being facilitated through playing video-games¹, its wider foundations are based in both Game-Based Learning (GBL) and Sport Education. In this section, we explore Game-Based Learning in some depth, as one of the foundational element of esports. Figure 15 illustrates the skills and competencies that can be delivered through esports, when the theoretical and pedagogical foundations are rooted largely, but not exclusively, in Digital Game Based Learning. Being able to conceive esports as having wider curricular foundations than just sport education, opens up a wide range of teaching possibilities including Social and Emotional Learning, 21st Century Skills and Digital Citizenship which are broadly applicable across a range of curricular areas.

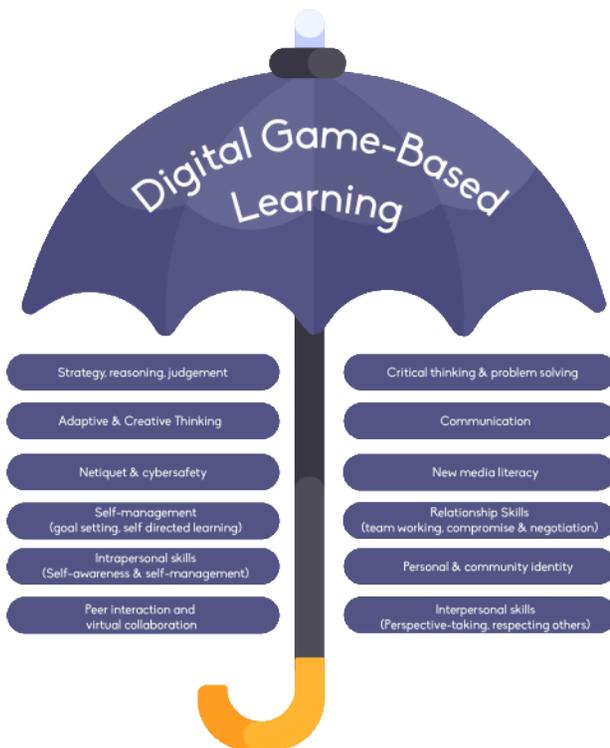


Figure 15 Esports skills and competencies from a Digital Game-Based Learning (GBL) perspective

Throughout the literature, and in some existing esports courses, there are references to even wider curricular links for esports including, for example, tapping into subjects such as Enterprise, Business Studies and Media Studies. However, these disciplines are firmly embedded in many curricula, and generally well-understood. For the purposes of this esports educator framework, we take a deeper dive into the pedagogical and curricular foundations of a newer and evolving approach, Game-Based Learning.



What is Game-Based Learning?

Game-based learning is a relatively new field in education. It can be described as using games in educational contexts to reach educational objectives². All forms of games can be used for GBL including traditional board games, however the term most commonly refers to the use of digital or video-games as a tool for classroom learning, and in this context it is referred to as Digital Game-Based Learning (DGBL).

Since this field is still developing, and the terminology is fairly new, GBL is often confused with the term Gamification. However, they are two distinct and very different approaches. According to Shapiro³, educators are already very well acquainted with gamification – the use of game elements (such as points, badges, prizes, progression to more challenging 'levels' etc.) to motivate and engage students. This happens in a normal classroom setting without the need to use technology, or even the need to play games.



They "gamify" learning by replacing grades with levels and merit badges; or, rather than delivering lectures and then testing for retention, teachers create project-based units where completion, or the demonstration of mastery, is what allows the student to move on.

Game-based learning, however, is associated with constructivist theories of learning, where knowledge is actively learned through participation, is socially constructed through interacting and learning with others, and is influenced by personal experience⁴. The educational foundation for GBL draws from concepts such as the pedagogy of play, situated learning, self-directed learning and mastery learning. We explore these in more depth here, and examine how coupling digital games and play with effective pedagogy can positively shape attitudes to failure, support the development of crucial 'learning to learn' skills, as well as provide a safe environment for learners to develop complex cognitive, social and emotional skills that support academic achievement.



The Pedagogy of Play

The value of play in children's learning has long been established in developmental education^{5,6,7}. Play is an innately intuitive medium for children's learning and can enhance childhood development from 33%-67%, supporting the growth of a wide range of skills including intellectual (problem solving, logic, IQ), social, emotional, and physical development^{8,9}. Experts on the importance of play in early childhood development suggest that it is through play that children develop important 'learning to learn' skills, problem solving skills and create important neurochemical pathways that govern skill sets such as organizing, monitoring, and planning for the future. In fact, this body of work suggests that children who are not stimulated by play or being played with may not be able to develop the neural pathways fundamental for learning⁸. While play is viewed differently by educators as children become older, often being considered 'distracting' or diverting from more serious learning and assessment activities, children do not stop playing. Instead, the nature of their play changes with games that become gradually more complex or challenging¹⁰. This evolution of play is accompanied with an increase in complexity, including rules, ethics, morality, judgement, decision-making, and social engagement providing young people with opportunities to practice and refine the growing skill sets they will need in later life. An important development is research by the American Psychology Association, that video-games provide the same opportunities to develop emotional mastery and social competence as those provided by and explored through children's play, including opportunities to explore and resolve issues of dominance, anxiety, growth and so on¹¹. The playful learning associated with game-based learning and digital game-based learning, and their links with developing complex cognitive, social and emotional skills can offer many opportunities for classroom learning.



Situated learning

Situated learning is an instructional approach based on the theoretical foundations proposed by constructivists Dewey and Vygotsky that suggests students learn by actively participating in the learning experience, and by learning theories that criticize the abstract and 'unrealistic' nature of classroom learning¹². In practice it requires the educator to create a situational context for learning outcomes that enable students to develop skills and knowledge that can be transferred and applied to other problems or challenges. When students immerse themselves in virtual worlds and actively solve problems, puzzles and challenges to achieve a pre-defined goal, it can be considered situated learning. There is evidence to suggest that situated learning is related to high student motivation, engagement and to the development of skills to support complex problem solving, and its transfer to other contexts^{13,14}. It is argued that DGBL actively develops cognitive skills because of in-game features that provide instant and continuous feedback. Video-games are designed to encourage players to undertake specific cognitive activities in-game: use feedback to (i) interpret their experiences and (ii) reflect upon their failures in order to improve. However, situated learning is often socially mediated, and while interpretation and reflection are an integral part of a game's design, research shows that meaning and sense-making is also constructed through the communities that game players create.



Gamers often organize themselves into communities of practice that create social identities with distinctive ways of talking, interacting, interpreting experiences, and applying values, knowledge, and skill to achieve goals and solve problems. Gee 2008

This kind of community demonstrates the highly connected, collaborative and social aspects of situated learning occurring through digital game-based learning, that can give rise to what is known as an *affinity space*; often virtual (but not exclusively) community spaces organized around a common passion or interest. These affinity spaces are of interest to educators, because of their potential to drive learning through collaboration, co-creation and tacit knowledge.



Self-Directed Learning

Contrary to popular belief that self-directed learning is about independent, isolating and solitary ways of learning, the concept stems from the idea that students should become independent thinkers through a combination of approaches that involve giving the learner more choice in how and what they learn, and empowering them to make more decisions about their own learning¹⁵. As self-directed learning increasingly becomes recognized as a 21st Century Skill, schools are beginning to tap into a wide range of technologies to support learners in developing skills in independent learning¹⁶. Digital game-based learning can be described as self-directed to some extent, being driven by a combination of learner-initiated activities and game mechanics. Learners work towards specific goals, using continual feedback to appraise their own performance, and reflect upon their actions, strategies and game-play to set their own goals for future success. This use of self-assessment, reflection and setting self-determined goals are all part of the 'learning to learn' process, and what is known by educators as incidental learning¹⁷.



Mastery Learning

Digital Game-Based Learning also lends itself to Mastery Learning approaches, where students are given time and repeated opportunities to improve their skills until they reach a desired level of expertise. Because game mechanics allow for tracking, scoring and progress monitoring, and that often players have many 'lives', they reinforce the concept that failure is nothing to be ashamed of, in fact, it is a useful signpost indicating where further practice is needed¹⁸. According to Anderson et al (2019), mastery oriented individuals exhibit quite marked differences in their attitudes towards failure, demonstrating positive reactions such as renewed effort, heightened affect, and positive language¹⁹. This aspect of DGBL has also been associated with shifts in learner identity, whereby learners with low ability have fresh opportunities to leave behind their classroom 'tag' as a low achiever and instead forge a new identity for themselves as they work towards mastery²⁰.



Games that reward teamwork and require close cooperation may create contexts where Master-Apprentice relationships are more likely to develop. In our esports research, it was the team leader and highest-ranking team member who invited the apprentice to join with the promise of helping and coaching him. For the novices to become competent players they need the support of experts and mentors, who engage in learning conversations, and use dialogic strategies to both teach the novices and position themselves as important contributors. Frederik Rusk and Matilda Ståhl



Game-based Learning in practice

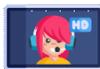
Game-based learning has been fairly well-established in schools across the world for a number of years. In 2013, 74% of K8 educators across the US said they use video-games in class, and in 2015, 64% of K-12 educators used video games for the purpose of teaching²¹, and in a 2018 survey, 74% of parents agreed that video games have educational benefits²². A number of DGBL proponents suggest that one reason games provide such rich learning environments is because they embody all of the principles of a good lesson, but in a beautifully realized, graphically-rich immersive environment. Games, they suggest, provide similar scaffolds for learning as are found in high quality learning environments including: clear goals, motivation, opportunities for practice, reinforcing expertise, feedback, progress monitoring, engagement, planning, fun failure, choice, agency and problem-based learning²³. Much of the early work of [James Paul Gee](#), aimed at trying to better understand the ways in which games are so effective at creating excellent learning environments in order to influence real-world instructional and educational design in classrooms.



Why do Video-Games Engage?

There are many perspectives on what exactly makes Digital Game-Based Learning so successful in developing a whole range of skills and competencies. One of the many arguments is that game-based learning isn't something that is only happening in schools. It is something that is so deeply embedded in youth culture that critical 21st Century skills and competencies are being developed through children and adolescents' play, leisure and social activities – and participation is completely voluntary; children *want* to take part. Researchers suggest that games are engaging because people (of all ages) like to be in control of what's on the screen, and games offer this control on a continuing basis. In addition, games can give children and adolescents a strong sense of mastery and competence, and these can make an individual feel empowered²⁴. Small, continual doses of confidence-boosting feelings of mastery are, of course, somewhat addictive. In addition to fostering feelings of control and mastery, other reasons that games are believed to be so engaging are because players are motivated to by a range of factors seamlessly offered by games and their environments, including social interaction, competition, and escapism.

Despite the DGBL becoming a widely established practice in classrooms, fears about the impact of screen time, addictive or violent behavior are still pervasive. McGonigal (2011), an advocate of play and GBL argues that it is time for us to reconsider the negative connotations that we associate with video games—that they are “escapist” or “time wasters” and instead begin to harness their incredible power. Research in this field has increased over the last 10 years, with numerous advances from the field of neurology, medicine, psychology and education illustrating the positive impacts (explored more fully in the following sections). In Figure 16, we address the primary concerns of educators when it comes to using video-games in the classroom, and explore the ways in which educators themselves can play a primary role in transforming the culture of gaming.



Too much screen time

The concern: The Health Organisation (WHO) recommend that children under the age of two have zero screen time, and advise that children 2 -5 years have no more than 1 hour of sedentary screen time in 24 hours.

In balance: WHO themselves report that most of the evidence used to come to these conclusions was of very low quality. The UK's Royal College of Pediatrics does not set time limits because there is a lack of evidence, and instead suggests parents make judgements on a case by case basis.

The Role of the Educator: There is an opportunity for educators in helping students come to understand what reasonable and safe use of technology looks like, as well as helping to equip students with tools and strategies for managing screen time, recognizing the feelings, symptoms and signs of overuse.



Violent or addictive behavior

The concern: There is some research to suggest that violent video games, can affect the emotions of players. A report published by the American Psychological Association stated that there was a relationship between violent video game use and increases in aggressive behavior.

In balance: The study came under fire from over 200 researchers from around the world. In their open letter, they cite statistics that youth violence is at a 40 year low, while video-game use continues to soar, and criticized the study as being 'deeply flawed'.

The Role of the Educator: Just like with books or movies, digital games can be designed for a range of purposes, from entertainment to brain training. There is a teachable moment here, and educators will play an important role in shaping open, frank discussions about the kinds of games that are suitable for classroom learning, and the reasons why some games will fail to meet the school's criteria. An examination of age ratings, and of some of the potential negative consequences of gaming with students may help them develop their own classroom criteria for selecting appropriate games.



Games are isolating and promote laziness and introversion



Games are isolating and promote laziness and introversion

The concern: Many parents and teachers are concerned that video-gaming encourages adolescents, particularly adolescent boys, to be lazy, sedentary and to become isolated from general society.

In balance: Reports indicate digital game players are not only growing in number but diversifying. The average digital game consumer is 35 years old, and there are more women over the age of 18 who play video games than there are young male players under 18. Many esports programmes in schools report student gaming time decreases, physical activity increases and students report gains in physical, mental, and emotional well-being as well as developing a range of technical and career-ready skills that are highly desired by colleges and employers. From a social perspective, research has also indicated that playing digital games may have a positive correlation to political and civic engagement.

The Role of the Educator: Stigmas such as 'lazy teenage boys waste their time gaming' are hard to change, but this range in age and gender, not to mention the international nature of multiplayer gaming creates opportunities for learning from diverse communities of players, as well as tapping into the power of gaming for critical thinking and ethical reasoning to promote social and civic engagement.



Toxic culture

The concern: On-line community forums in the gaming community are widely accepted as places where bullying and harassment occurs frequently, and with no consequences. It is a commonly-held belief that this hostility disproportionately affects the marginalized - women, people of colour and LGBT people, creating an unwelcoming space.

In balance: In response to this, some publishers have introduced anti-toxicity measures, such as community moderation, banning and suspending perpetrators but there is still work to be done.

The Role of the Educator: Our students are the next generation of gaming community members. In the classroom we have an opportunity to talk to students about boundaries, appropriate language netiquette, cyber safety and the way we all feel when we are disrespected. Addressing these issues through the lens of SEL and digital citizenship, enables us to explore compassion, empathy, dignity and respect with our students, and working together with them to create safe spaces for learning and playing will positively shape gaming communities of the future.

Figure 16 Infographic addressing common concerns about the impact of video-games on adolescents, and the role educators can play in transforming culture

In addition to these societal concerns about the use of video-games by adolescents and young people, educators have classroom specific concerns that relate to (i) policy and curriculum, (ii) assessment (iv) time pressures and (iv) their own proficiency with technology. We address these issues in section 2.3, Overcoming Barriers.

2.2 Benefits of Digital Game-Based Learning



Video-games and the 21st Century Classroom

Video-games are an accepted part of almost all children's lives, with 97% playing for at least one hour per day in the US¹¹. However, there is now a growing interest in the use of digital tools in the classroom, and with this comes the exploration of video-games for learning and assessment. This movement, is in part, driven by a recognition of an emerging digital economy, the digital skills gap (a shortfall between the number of digital jobs and the number of employees with appropriate skills to fill them), and the demand for 21st Century skills in places of employment, and within a technologically advancing society²⁶.

The use of video-games for teaching in the classroom has received mixed appraisal. There is a wealth of literature exploring the impacts of playing video-games. Much of the early research was conducted in response to concerns and fears about the potentially negative consequences of video-game play for adolescents^{11,27}. In 2005 a consortium of organizations including The Federation of American Scientists, and the National Science Foundation brought together a wide array of experts to explore the learning potential of video-games. They found that many of the skills required for success in games such as thinking, planning, learning, and technical skills are highly regarded by employers²³.

In addition to the development of cognitive skills and academic achievement, there is a plethora of research that identifies benefits across a range of domains including pro-social skills, social and emotional skills, self-determination and self-efficacy, decision-making and risk taking, and physical, emotional and mental health and well-being^{28,29,30,31,32,33}. A report for the American Psychological Association¹¹, found positive impacts relating to four broad areas:

i. Cognitive function

Video-games have been shown to improve attention, focus, and reaction time

ii. Motivation

Video-games inspire intrinsic, rather than extrinsic motivation

iii. Social

Gamers are able to transfer the prosocial skills that they learn from multi-player gameplay to peer and family relations

iv. Social and emotional skills

Games induce positive mood states, and help players develop effective responses to failure, manage complex emotions and relate to others

From our review, we have identified a fifth impact relating to Inclusion in the classroom. In this section, we use the categories outlined above to present evidence on the benefits of Digital Game Based Learning gathered across multiple research disciplines.



Benefits of Digital Game Based Learning

Before we explore the range of cognitive benefits identified in the research, it is worth pointing out that since the research disciplines span cognitive and behavioral science, neurology, psychology and education, there may be some differences in terminology. In education, we might expect cognitive benefits to relate to problem solving, critical thinking, reasoning and so on, referred to as Cognitive Skills. However in neurology, these relate to a range of other benefits, referred to as Cognitive Functions. We explore all of these cognitive benefits and their relationship to learning below.

i. Cognitive benefits

A number of studies from the field of medicine and neuroscience suggest that people who regularly play action video-games develop superior Cognitive Functions^{34,35,36,37}. These include faster and more efficient; attention, memory, and executive control, sensory processing, and spatial and visual performance.

From an educational point of view these cognitive skills can have a significant influence on learning, since they are related to Working Memory, which influences the ways in which students store, access and use information, prioritize information and tasks, regulate emotions and behavior, and focus on goals³⁸.

Notably, evidence suggests these highly influential functions are not fixed, and in fact can be developed and improved using video-games. Some studies suggest that these benefits can be gained in a very short period of time – perhaps as little as 10 hours of game-play, and may be transferable to activities outside the game environment^{11,39}. Research exploring the impact of activities specifically designed to target working memory showed correlations with improvements in reading ability, reading comprehension and mathematics performance^{40,41,42} and that working memory is highly predictive of scholastic achievement⁴³.

The research field of cognitive science has produced a large amount of research exploring the impacts of video-game-play on the brain. Here, we provide a snapshot into the main findings.



Playing video-games improves:

- The ability to process information very quickly, in parallel, at the same time, and from a range of different sources, and without being distracted (resisting perceptual interference).

A research study showed that doctors who spent at least three hours a week playing video games made about 37 % fewer mistakes in surgery and performed the task 27% faster than non-gaming surgeons^{44,45}.

- **The brain's ability to change - and improve over time (or neuroplasticity).**

Ordinarily, cognitive functions decline with age. Because video-gaming places complex motor and cognitive demands on specific parts of the brain, gamers have shown increases in grey matter in parts of the brain crucial for *spatial navigation, strategic planning, working memory and motor performance* ^{11,46}

- **Multi-tasking, prioritization and the ability to determine what is and is not of relevance for a given task.**

Recent neurology studies suggest that associated with increases in attentional behavior, are some complex changes in the brain that enable video-game players to filter out irrelevant tasks, whilst multi-tasking^{47,48}

- **Decision-making and reaction time.**

Video-gamers, or people who play action-based video games, make decisions faster than others, and importantly they do this without sacrificing accuracy, according to a study from the University of Rochester⁴⁹. The studies have shown that non-gamers can improve their decision-making after 10-50 hours of video-game play.

- **Visual learning and visualization**

Playing fast-paced, unpredictable action video-games helps tune players' visual skills. These are related more generally to spatial cognition, and are essential for successful problem solving in science, technology, engineering, and mathematics (STEM) education and occupations. Visualization is an advanced cognitive strategy, and can play a powerful role in problem-solving strategies particularly in STEM disciplines⁵⁰.

- **Spatial abilities**

Playing action video-games Improves the ability to track objects moving at greater speeds, detecting changes to objects stored in visual short-term memory, switching quickly from one task to another, and mentally rotating objects^{51,52}. These abilities have been found to correlate with success in STEM subjects such as math, science and engineering, and they are associated with improved performance on standardized tests, and in the choice of mathematics and science as majors in college^{53,54,55}

- **Students' ability to develop important 'Learning to Learn' skills.**

Researchers propose that these learning to learn skills developed through playing action video-games, could provide templates for high impact learning, and that in the longer term video game-play may delay or even reverse the decline in perceptual, cognitive, and motor function that occurs as part of the aging process⁵¹.

It is important to stress that these cognitive gains are evidenced from playing *action* video games, and may not arise from other kinds of games (such as puzzle or role-playing games⁵²). A [TED Talk](#) by Cognitive Scientist Daphne Bavelier entitled 'Faster, Better, Smarter, Stronger' explores some of benefits of playing action video games in more depth.



Cognitive Skills - Problem Solving, Critical Thinking, Creativity and Adaptability

Beyond the field of neurology and cognitive science and their work on action video-games, a number of studies have explored the wider cognitive benefits of playing a range of video-games, including action, role play, puzzle games and serious games. Across the literature authors cite improvements in problem solving, creative thinking, adaptability, critical thinking and decision-making, systems thinking, reasoning and judgement, to name a few^{56,57,58}, as well as skills in communication and collaboration^{59,60,61,62}. Many of these skills can be mapped on to the 21st Century skills framework used in many schools to support the development of a range of transferable and career-ready skills.

One of the reasons that video-games might be so successful in developing this array of cognitive capacities is because of the way in which problems, obstacles and challenges are situated in an immersive, contextualized setting. It is widely accepted that games provide 'situated problem-solving environments, in which players are immersed in a culture, and a way of thinking'⁶³. Here we provide a summary of the research findings in this area.



Videogames are filled with problem-solving opportunities for players, where they find environments that engage them in immersive worlds and stimulate their thinking. Gee (2007)



Digital Game Based Learning (DGBL) can help

- **Improve problem solving by developing visualization skills in graphically-rich virtual worlds.**

DGBL researchers suggest that the immersive worlds designed by game developers provide important visual scaffolds, or visual structure for learners⁶⁴, and this is important for educators, because visualization is thought to play an important role in a multitude of cognitive functions such as finding patterns, problem solving, reasoning, and memory as well as playing a central role in sense-making and efficient knowledge transfer⁶⁵. A group of researchers from MIT investigated the impact of supporting learning in middle school physics using a 3D computer simulation game, Supercharged. The study had mixed success but showed that the game had the potential to support students in using visual representations to understand complex scientific concepts, and remarkably, some students were able to use the concepts learned in-game to solve complex physics problems out of game⁶⁶.

- **Improve students' collaborative problem solving skills.**

Massively Multiplayer Online Roleplay Games (MMORPG) have been demonstrated to be conducive environments for developing problem solving skills because they

'Include all the characteristics of problem solving e.g. problem representation, conditions, goals, procedures, strategies, and metastrategies—as well as shared practices typically found in problem-solving contexts within formal and informal instructional contexts—debriefings, theorizing about the problem space, apprenticeship, and the valuing of seeking out challenges just beyond the current level of one's ability'⁶⁷.

A longitudinal study of 1429 high school students showed that the more adolescents reported playing strategic video games (such as roleplaying games), the more improvements were evident in self-reported problem-solving skills the next year, as well as indicating an indirect link with improved academic grades⁶⁸.

- **Promote high-level critical thinking and reflection**

A DGBL study conducted with 8th grade social studies classes showed that DGBL, and particular cycles of gameplay were effective in promoting higher levels of critical thinking, including the development of independent beliefs, and providing opportunities for guided reflection⁶⁹.

- **Foster the development of a suite of critical thinking skills (including reasoning, judgement and decision-making).**

One study used community forums to track player discussions. Findings showed that 86% of the conversation taking place between community members was productive discussion critical analysis and problem-solving including, argument, counterargument and use of evidence. Participants were shown to engage in high-level literacy, math, and science reasoning practices⁷⁰.

- **Develop 21st Century skills such as adaptability, persistence and resourcefulness.**

A study that investigated the impacts of adult learners using commercial games such as Minecraft and Portal 2 showed significant gains in adaptability and resourcefulness after only a short period of practice (14 hours of gameplay), when compared to a control group playing 2D puzzle games⁷¹. Another recent study⁷² showed that practice with Portal 2 led to substantial improvements in problem solving, spatial skills, and persistence (more so than training with popular brain training games).

- **Enhance creativity and creative thinking.**

In one study, among a sample of almost 500 twelve year old students, video game playing was positively associated with creativity⁷². A multidimensional measure of creativity was used to test creative thinking. Results indicate that greater videogame playing was associated with greater creativity, regardless of gender or race. Another study of students explored Minecraft and modding (making modifications to the game's functionality through commands or code). It illustrated how the game narrative of Robinson Crusso created the context for a rich learning experience, where students become inventors and creators rather than mere players, by devising code in a process referred to as *modding* to reshape the game to their own specifications⁷³.

ii. Motivation

Video-games are designed to make people *want* to play them, and with the growing realization that this aspect of popular culture is consumed across our whole society, cognitive scientists have become increasingly interested in how we might be able to leverage the huge motivational power of video-games, and the potential of the large communities of players.

When an individual's motivation to play a video-game is purely for enjoyment, without any external pressure it is described as intrinsic motivation⁷⁴. Game designers have to obtain a very careful balance by creating environments that encourage players to 'work toward meaningful goals, persevere in the face of multiple failures, and celebrate the rare moments of triumph after successfully completing challenging tasks'^{11,75}. To do this, game designers use a number of tools to encourage engagement with the game.



Tools to encourage engagement with the game:

- **Continual feedback (in the form of points, coins, lives etc).**

This is said to have a large influence over motivation because it serves to balance challenges and frustration, with experiences of success and competency¹¹, it is in essence a form of self-assessment in practice. The feedback provided in games enables players to perform at a level above their previous attempt, or skill level is associated with positive mood states, *flow* states and intrinsic motivation⁷⁶.

- **Failure** – used to motivate players, and help them value the goal or prize. '[Games] teach players that persistence in the face of failure reaps valued rewards'. A great deal of research shows the ways in which video-game players react differently to failure, using it as a steppingstone to improvement, honing skills, and eventually, success¹¹. A study of gamers playing *Monkey Bowling 2* showed indications of positive affect, rather than negative affect, following errors in game play⁷⁷.



When players orient towards working as a team, and learning as a team, they seem to use death-events as learning opportunities to develop their understanding of game skills and the opponent's tactics. The players in our study were looking for explanations of how the "failure" came into being. Therefore, these events appear to be treated as pivotal events, which can help in becoming a better player through understanding what happened. The esports context appears to support such an approach, as success in the game is dependent on teamwork and cooperation, not on individual performance. Frederik Rusk and Matilda Ståhl

- **Flow experience**

Flow is a state that results from a phase of game-play that is neither overly challenging, or overly uninteresting. This phase of play enables the player to become fully immersed and inhabit a *mental zone* associated with creativity, discovery, or a feeling of being transported to a new reality⁶⁴. Flow is of significant interest to researchers since it is associated with deep engagement, motivation and enhanced learning⁶⁵.



In one model describing motivation, it is suggested that motivation in video-games is not a singular, isolated entity, but is a function a number of factors which include:

- Interest – also described as intrinsic motivation
- Autonomy – being able to regulate one's own behavior and direct one's actions
- Competence – a sense of accomplishment and effectiveness
- Relatedness – the quality of the relationships between students, teachers and players
- Self-efficacy – one's belief in her ability to achieve a desired outcome

Persistence, and the effort that a student (or player) puts into achieving a goal is influenced by these motivational factors⁷⁹. Of particular significance for educators is the factor, *Relatedness*, largely because it is one of the only factors in the list that the educator has any influence over. The research on relatedness points to the quality of relationships between students as indicated by a sense of belonging and acceptance. While this sense is developed by activities in-game, there may well be a role for educators in encouraging peer interaction, and indeed elucidating the positive behaviors that lead to good peer relationships, to help make this often 'hidden' learning visible for all students.

However there is some research to suggest that student engagement, and subsequent motivation can be limited when game-play is mandatory (for example, as part of a class), where game mechanics do not align well with the learning content, or when player choice in-game is limited²⁹, affirming the recommendations of other work that suggests educators must familiarize themselves with game content and choose games carefully to ensure their align with learning goals⁸⁰.

iii.



Social

Collaboration and cooperation are highly desirable 21st Century skills, and they appear to be a nascent part of youth gaming culture, particularly in the case of multi-player games. Data from the Entertainment Software Association suggests that over 70% of gamers play games with a friend – either in a collaborative format, or as opponents in a competitive format. In addition to game-play between friends, some types of games (typically MMORPG) can bring together people from all over the world, who formerly were strangers, for the purpose of playing together.

Research has tried to understand how online games that bring strangers together to play, foster almost immediate, effortless cooperation^{81,82,83}.



Playing multi-player video-games can:

- **Help develop 21st Century skills communication and collaboration skills**

A large body of research has demonstrated that digital gameplay provides optimal opportunities for individuals to develop collaboration, communication, and negotiation skills^{11,27,84}, as well as a suite of literacies related to interacting with different *texts* and forms of communication in a digital environment. It has been argued that video game play itself is a form of digital literacy practice, and the on-line communities that support gaming collectively read and write huge collections of multimodal text as part of their play, online discussion threads, fan fiction, and digital fan art⁸⁵. Evidence suggests that video game texts enable struggling readers to perform on par with their more successful peers despite the fact that game related texts typically read at the high school level (11.8 grade level text)⁸⁶. These arguments position gamers as more than mere end-consumers, but as creators of content. Furthermore, this ability to co-create content and knowledge in distributed, yet interconnected communities is fast becoming a feature of 21st Century workplaces, and a skill that is highly desirable.

- **Help groups bond through the creation of shared intentions and goals.**

A 2017 study showed that multi-player games are designed to increase shared group norms, social identity and joint commitment between individuals in-game. One of the most important research findings illustrated how these apparent strangers developed shared intentions and goals. The work showed that the shared goals, referred to as '*We Intentions*' were crucial in helping to bond and unite individuals⁸².

- **Enhance learning by fostering a culture of participation, interaction, cooperation and experimentation**

According to Squire (2011) social interactions and gaming culture are two of the most critical aspects of learning through games, alongside content, goals and continuous problem solving. He suggests that it may not be the game that is the driver of the learning, rather, the game merely fosters a 'participatory environment for experimentation, systemic thinking, and authentic participation'^{29,63}.

- **Act as a *test-bed* for developing adolescents' pro-social skills**

Much of the research across very diverse fields continues to point to social engagement and interactivity between peers, friends, and even strangers as one of the most crucial aspects of game-based learning. It is from these rich social contexts that social knowledge is being actively constructed, and where opportunities for learning pro-social skills in a safe 'test-bed' environment are presented. According to Gentile et al 2009¹¹, it is highly likely that these social skills spill over into real-world situations having a positive effect on peer and family relationships.

iv.



Social and emotional skills

Social and emotional learning (sometimes referred to as social and emotional literacy) in young people has been shown to be related to a wide range of well-being outcomes (including reducing stress and anxiety, improving coping abilities, reducing aggression, and reducing probability of drug and alcohol addiction, to name a few), as well as increasing the capacity of students to learn and to relate and connect to each other, which consequently has a positive impact on performance in tests and attainment in school grades⁸⁷.

Game-based learning has the potential to foster the growth of both intrapersonal (skills relating to self) and interpersonal skills (skills relating to others). Players begin to

establish a sense of individual identity, through growing self-esteem, competence and self-efficacy, while peer relationships and collaborative game-play help shape collective identity and the formation of 'we intentions' - developing shared goals, a common language, and a context for relating to each other. These aspects of co-operative gameplay can have influences outside the game environment and may help foster a sense of belonging and acceptance between individuals in the classroom. These important shared, social perceptions (referred to as *Relatedness* in motivation theory) are important in motivating students to persist and continue to try again after failure, and may even play a role in students' ability to solve complex problems⁷⁸.



Research in the field of game-based learning indicates that:

- **Highly social and interactive nature games help children develop social and emotional competencies.** Games that require strategic thinking, role-play, discussion, problem-solving and collaboration encourage players to balance personal goals with the needs of their peers while managing a range of complex emotions such as frustration, in order to play co-operatively⁸².
- **Games provoke a range of emotions in players.**
While gaming has been cited as one of the most common, and effective ways that young people use to generate positive feelings, leading to an improvement in mood, feelings of relaxation, feeling of being 'in-flow', and reductions in anxiety, in actual fact playing video games elicits a range of both positive and negative emotions. Negative emotions may include, frustration, anger, disappointment and sadness. Here, educators are presented with an opportunity to explore emotions and emotional regulation through SEL teaching strategies¹¹.
- **Flow (or transportation) in games is linked to positive outcomes for students**
Flow experiences occur when players are deeply immersed in game-play. This state of immersion has been linked to high levels of creativity, commitment and motivation, as well as high achievement in high school. It is also thought to lead to increased self-esteem and reduced anxiety^{11,75,76}.
- **The *pretend* element of games makes them a safe space for experimentation and failure**
Much like traditional forms of play, the 'pretend' element of games provide enough of a real challenge to make 'winning' or achievement meaningful, but safe enough to offer practice in failure, loss, error. This safe environment creates opportunities for children to play out both positive and negative emotions, developing strategies and tools that will enable them to recognize, regulate and control their emotions¹¹.
- **Playing pro-social video games led to pro-social behaviors out of game**
In a study of 252 students who self-identified as video game players, participants who reported playing cooperatively and/or competitively with other players were more likely to report engaging in helping behaviors during game play, and were more likely to report engaging in helping behaviors during throughout the school year⁸⁸.
- **Games provide a context for individuals to engage in ethical reasoning.**
Research investigated the kinds of choices and decisions players make when adopting different 'characters' as part of a MRPG. The role playing games, are open-ended enabling individuals to play any number of diverse characters and engage in a range of pro and anti-social behaviour. This particular study showed that these games provide a context for individuals to engage in ethical reasoning, that may lead to individuals developing empathy, tolerance and understanding for others – attributes required for 21st Century Global Citizenry⁸⁸.
- **Games provide opportunities for students to develop self-confidence and self-efficacy**
Players' self-confidence and self-esteem increase as they begin to masters games. In many games, the levels of difficulty are adjustable, beginning at the easy level and slowly building skills, responding to feedback and failure, they become confident in handling more difficult challenges⁷⁸.



Inclusion

Throughout the review of literature for this section, there have been numerous examples of cases where the impact of video-game play serves to include those that may, to some extent, be marginalized from classroom learning. There are many instances when children with physical disabilities cannot take part in sport or school games activities. However, video-games that require strategy, problem-solving and collaboration, offer new ways for all students to participate in games-education⁸⁹.

- **Video-game play may enhance learning in students who are non-neurotypical**
A number of studies have explored the effects of using DGBL and video-games with children and adolescents who have autism. Research suggests that autistic children can excel in DGBL environments which has the impact of boosting confidence, and can have self-calming effects for the individual^{90,91}.

Video-games that are linked to biofeedback (brain waves) may be able to help children with attention deficit disorders. Research showed that over time, some patients can learn to modulate brain waves associated with focusing. In the longer term this may lead to improvements in grades, social ability, and organizational skills among others. Furthermore, some research exists that suggests dyslexic children improved reading speed and attentional abilities after playing an action video-game⁹².
- **Video-game play may help children who are labelled as 'disenfranchised' participate.**
A pilot study using esports in a school in Kansas, saw student attendance improved to 94% (the goal was 85%), as well as improvements in grades which were boosted to 1.5 GPA above the school average. Teachers at the school commented that the children who were attending, were those who normally feel like they do not fit in to social groups and extra-curricular clubs⁹³. A survey involving almost 700 K-8 teachers across the US identified games as having beneficial impacts for all learners, but groups of students who benefited most were low-performing students, students with emotional and/or behavioral issues, and students with cognitive or developmental issues⁹⁴. Others suggest that the accessibility offered by games and DGBL can create positive shifts in learner identity, whereby learners with low ability have fresh opportunities to leave behind their classroom 'tag' as a low achiever and instead forge a new identity for themselves as they work towards mastery of a game⁹⁰.



It is worth noting that a number of authors discuss the difficulty in drawing direct correlations between video-game play and specific learning skills, and difficulties in comparing studies. Authors cite issues relating to (i) the games themselves (games have a huge number of complex variables operating at any one time, and different studies explore different types of games), (ii) skills (learning skills such as critical thinking and problem solving have numerous definitions, making it difficult to come up with one specific, and transferable way to measure these. This means that often the methodologies used differ from one research study to another) (iii) students (we must always remember that any study conducted with students is only pertinent to those individuals, within that context at that time, and may not be transferable to other learning contexts). While we present the research here as an insight into the potential benefits of Game-Based Learning, we recommend caution in generalizing the results to other educational contexts and settings.



Summary

What are the simple take-aways as educators? The research tells us that playing games to learn is an ancient, innate and effective form of human development across a range of capacities, skills and even behaviors. Video-games are particularly effective at this because of the immersive worlds, their ability to provide contextualized problem scenarios, and induce flow states – and all within highly connected, interactive communities of practice. Research conducted across the fields of medicine, neuroscience, psychology and education indicate that video-games have the potential to motivate players, promote behavioral persistence, extend time on task and promote mastery learning approaches.

The pedagogies associated with DGBL have the potential to draw from 21st Century learning approaches, situated, self-directed and participatory learning, meanwhile the games themselves provide similar scaffolds for learning as are found in high quality learning environments including; clear goals, motivation, opportunities for practice, reinforcing expertise, feedback, progress monitoring, engagement, planning, fun failure, choice, agency and problem-based learning. In addition to this, video-games can encourage inquiry and high-level discussion, provide a contextual bridge between complex concepts and their applications, and for learners who require more time to develop, they provide “infinite” opportunities to enable for students to successfully achieve a goal.

The difficulty in relating educational gains and benefits to DGBL is recognized because the games themselves have a huge number of complex variables operating at any one time. In addition, the wide variety of games that exist, develop different competencies – and this is before we take into considerations differences in the way that individuals learn. Therefore, the review presented here, uses peer-reviewed research across a wide spectrum of disciplines, and across an array of game types to present an insight into what we believe is the educational case for DGBL. This field is diverse, and rapidly advancing and with it attitudes to technology in the classroom and DGBL are changing too.

Returning to the theme of esports, we make the case here that if we are willing to diverge from the purist definition of esports as video-game play at professional levels, and consider it as rooted in Digital Game-Based Learning, then what this chapter illustrates is the incredible potential for learning across and beyond the curriculum.

In the next section, Esports and the Curriculum, we explore this idea further and identify modalities of teaching and learning esports in schools.

2.3 Overcoming Barriers

Digital Game-Based Learning has been fairly well-established in classrooms in Europe and the United States for over a decade. A number of teacher surveys have been conducted to determine the extent to which DGBL is occurring in classrooms. A [study](#) by Futurelab in the UK in 2009 took place with 1600 teachers across primary and secondary school. In 2013, the Joan Ganz Cooney Centre conducted a [survey](#) with 700 K8 teachers from across the United States, and an international [survey](#) collected responses from almost 700 primary and secondary teachers across 34 countries in 2016. While the surveys took place at different times and in different countries, many of these teachers cite similar barriers to DGBL including lack of computers, lack of time, and time needed for preparation for school and national testing, and in the international survey, a significant number of teachers felt that educational games are poorly designed, do not capture the imagination or interest of children, and are thus not fit for purpose⁹⁵.

In this section we review findings one of the most in-depth reports, *Level Up Learning* by The Joan Ganz Cooney Center⁹⁴.



What do we mean by DGBL?

The Level Up Learning survey showed that 74% of K-8 teachers report using digital games for instruction, with more than half of these teachers reporting they do so at least weekly. While encouraging, the survey digs deep into the classroom activities, the profile of teachers themselves and they ways in which teachers measure and perceive impacts. The report raises concern over the narrow range of game genres used by these teachers, with few using immersive or adventure games that 'lend themselves to deep exploration and participation in the types of activities that set digital games apart from more didactic forms of instruction'. While educational games have their place in the classroom, findings in the report question whether teachers who say they undertake DGBL are missing out on the huge opportunities for cognitive and 21st century skill development that video-games are innately good at eliciting, over preferences for teaching content knowledge via math or science games. Figure 17 illustrates the game genres used by teachers participating in the survey.

The report states in no uncertain terms the genre of games chosen for classroom learning matters. In particular they point to the vast opportunities offered by entertainment (commercial off-the-shelf) evidenced by the body of research that shows how they develop skills and knowledge that transfer to real-world situations. The authors of Level Up Learning suggest that consideration should be given to why there is an almost complete absence of role-playing games from K-8 classrooms, given the benefits these games have demonstrated in players' problem solving skills and critical thinking. It is clear, that among the sample of teachers surveyed in this report, DGBL means using educational games, not the action adventure videogames, or strategic, multi-player roleplay games that have been associated with 21st century skill and cognitive development reviewed in other sections of this document.

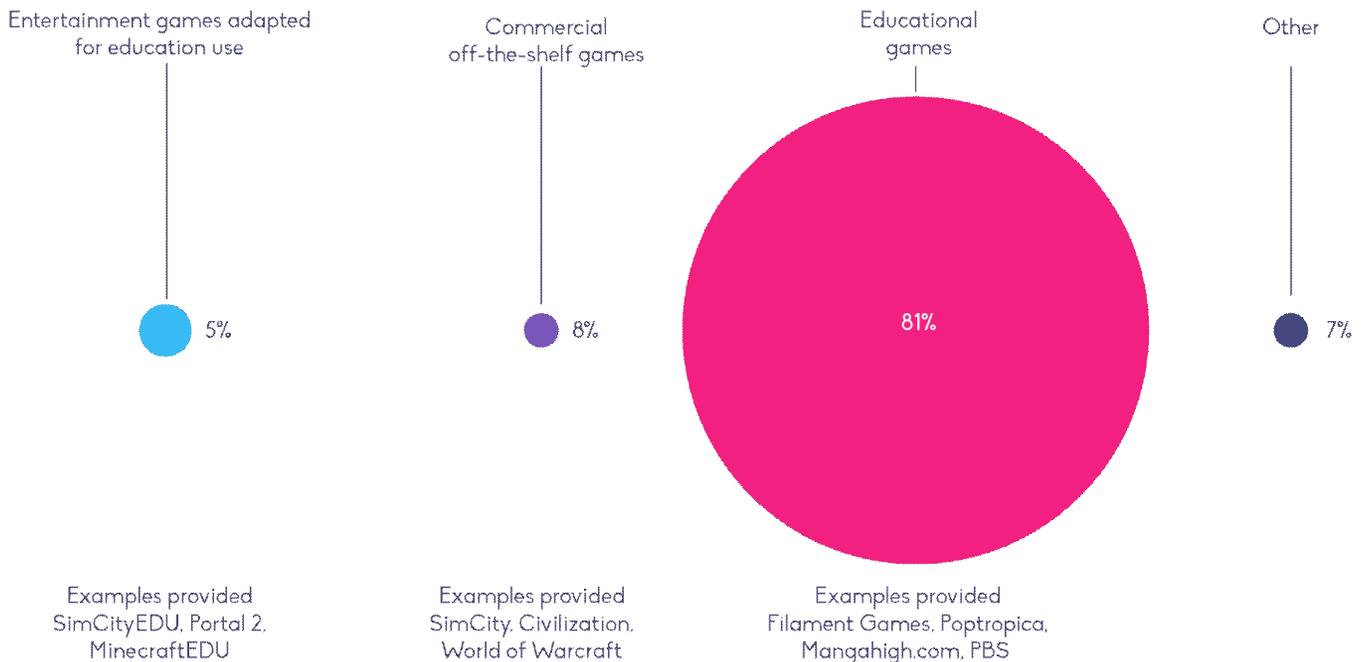


Figure 17 Game genres used by teachers in DGBL, illustrating a preference for educational games over other types⁹⁴



Barriers to DGBL

The Level Up Learning Survey conducted in the US, investigated the barriers that teachers face to using video-games as part of their curriculum teaching practices. The survey asked both teachers who use video-games in the classroom (Game-Using Teachers), as well teachers who do not use video-games as part of their own classroom practice (Non-Game Using Teachers). Figure 18 identifies twelve barriers reported by the teachers. Interestingly both sets of teachers identified the same barriers.

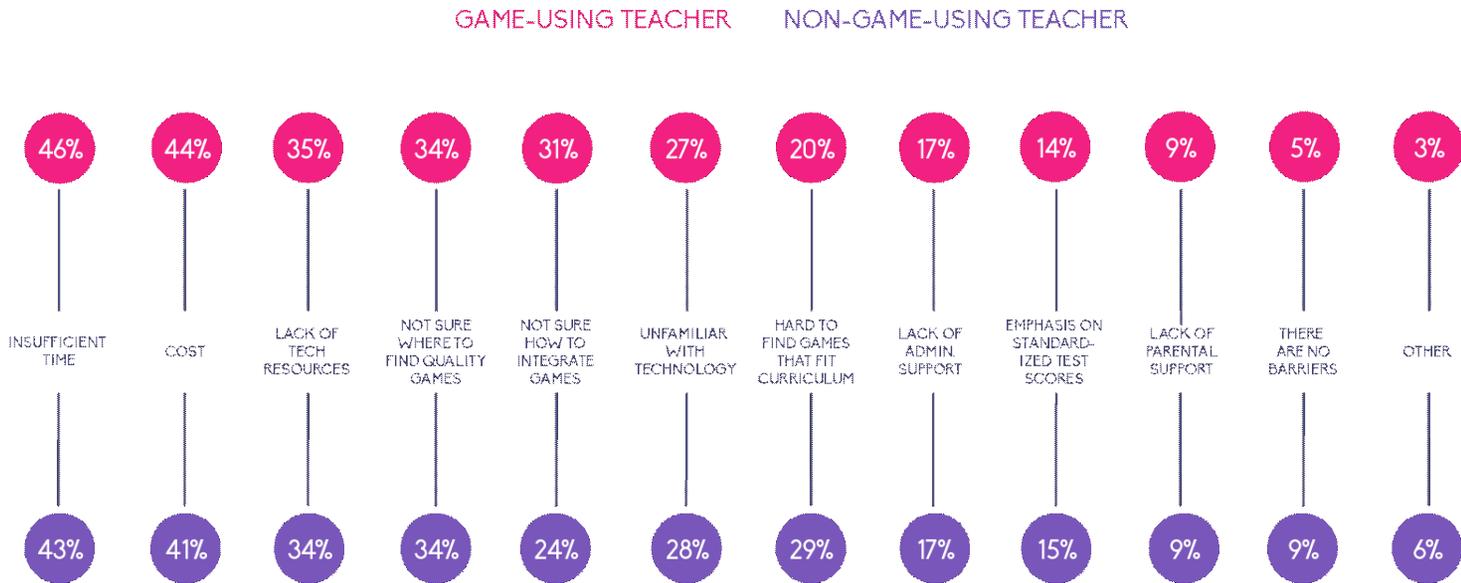


Figure 18 Barriers faced by Game-Using and Non-Game-Using teachers to implementing digital games in the classroom⁹⁴.

The Level Up Learning Survey found 12 different barriers that teachers face when implementing DGBL in the classroom with time pressure, cost, technical resources and uncertainties ranking the highest. We've categorized the common barriers and obstacles to DGBL as follows:

- i.  Curriculum
- ii.  Time Pressure
- iii.  Costs
- iv.  Teacher proficiency with technology

i. Time Pressure

Alongside costs, time constraints was one of the biggest concerns for educators. Timetabling issues often mean that teachers have class times of 40-55 minutes, which can be restrictive in enabling the kind of gameplay that enables deep exploration and learning in DGBL. However, the report's authors suggest that teachers don't need to devote full class periods to gameplay; with the right games, shorter play sessions can be effectively employed to inspire and/ or prime students for non-digital instruction post gameplay discussion and analysis. However, a whole-school approach to DGBL may require consideration for building in some flexibility into school timetables.

The time pressures cited in the report also refer to teachers' concerns over assessments and testing. 14% of teachers cite standardized tests as significant barriers, leaving them little time to include any 'non-assessed' content into the already busy curriculum. This kind of feedback might

suggest that teachers don't place the same value on the kind of learning elicited by video-games as other forms of learning. While critical and creative thinking and problem solving can be difficult to assess, these skills can feed into the holistic development of a student's learning skills, and if scaffolded effectively, can lead to gains in grade points and improved performance in standardized tests.

ii. Costs

Almost half the teachers surveyed said that cost was a big concern when it comes to DGBL. This may relate to devices and the software required to run a DGBL curriculum. With respect to devices, over a third of teachers state that lack of access to technology (firewall issues, broken devices, low-spec devices and low numbers of devices) present obstacles to DGBL.

The report supports the idea that classroom teachers themselves have little influence over school budget decisions, and that one of the root issues may be that the decision-makers are at school and district level, where DGBL may be less acceptable or well-understood.

Once again, school ethos and values and policy will shape the ways in which budget is allocated to these kinds of courses. The report recommends greater alignment on a shared Digital Game Based Teaching vision across all levels of the school system. While investing in a computer suite, or a set of laptops and software needn't cost the earth, consensus from the school is required to make a substantial investment into suitable technology that has the capacity to run the games that Digital Game Based Educators have opted to use. Poor decisions and short-term investments in technology can lead to slow-performing games, poor graphics, freezing screens, and ultimately lead to frustration among students, negating the motivational and engagement impacts commonly seen in DGBL courses.

iii. Curriculum

Teachers in all surveys cite concerns about being able to match game content to curriculum content and standards. In the Level Up Learning survey K-8 teachers aim to use games to cover the Common Core State Standards. However four out of five teachers say it's hard to find curriculum-aligned games, and just two out of five believe that a sufficient variety of such games even exist.

The report's authors suggest the problems teachers face relate to

- *Integration* - how do I integrate curricular concepts with DGBL? and
- *Discovery* - how do I access the games that are pedagogically appropriate for my goals and the needs of my learners?

They make several recommendations in this area, suggesting that better pre-service training with formal DGBL to expose educators to the broader range of pedagogical strategies that can enhance and facilitate digital game integration. Pre-service and Professional Development should help teachers reframe the ways in which they use video-games in class, explore new pedagogies and approaches that help capitalize on what games are innately good at, rather than trying to use games like other classroom tools.

Wider curricular and school policy issues (such as timetabling, scheduling, and ethos) also have a role to play in the overall implementation of DGBL, as explored below.

iv. Teacher proficiency with technology

The report identified that only 8% of the educators surveyed had received any formal exposure to DGBL at pre-service education. This means that over 90% of teachers have had no pedagogical training or development in implementing DGBL. This affects teachers' ability to

- (a) analyze the educational potentials of digital games for inclusion in the classroom,
- (b) to integrate video games into the existing curriculum, and
- (c) to account for conditions impacting the use of games in school contexts⁹⁶

As a result, almost half go by what other teachers say when choosing an appropriate game for their learners, as well as how they learn to use games in instruction. Collegiate sharing of expertise is highly commendable, but the report makes strong recommendations about the need for formal training programs as well as access to on-line course in DGBL for teachers.

Summary

A number of reports exploring the use of digital games for learning in the classroom have identified a suite of similar challenges that educators face, including curricular, time pressures, costs, and teacher proficiency (in selecting, integrating and using games in pedagogically sound ways). In addition, these factors all appear to be related to wider institution and system level issues. Regardless of which of the barriers we choose to consider, there is a clear need to address the policy and curriculum constraints created by education systems if they are to be afforded the opportunity to realize the true potential of DGBL. As Young et al (2012) states unless the system is prepared to change, the real benefits of DGBL will be traded-off for short-term goals:



Games are often multiplayer, cooperative and competitive; they engage players in several hours of extended play, allow rich "hint and cheat" websites to develop around player affinity groups, and are played from weeks to years. However, most schools trade off extended immersion for curriculum coverage, individual play, and short exposures, goals that are not well aligned with engaging video game play.

2.4 Assessment

Many teachers suggest that time pressures, especially concerns over having enough time to prepare students for standardized tests are barriers to adopting DGBL. In addition, the literature suggests that many teachers struggle to see how the supposed learning taking place during DGBL can be assessed. Here, we briefly review the discussion on DGBL and assessment.

Genre Matters

Before beginning to explore the idea of assessment in DGBL it is worth making a distinction between serious or educational games and commercial 'off the shelf' games. Because educational games have been designed with teachers and students in mind, often they come with built-in assessment tools that aid teachers in monitoring and tracking students' performance, and come with some assessment features to help students monitor their own progress, for example, dashboards that show points, health, lives or other elements that indicate the status of the player. These types of games have a definite edge when it comes to enabling teachers to easily identify the educational purpose, and track student progress.

While these games have been designed to help teachers deliver specific content (math, language arts or science) it is well-documented they may be limited in the ways in which they can be employed for competency and skill development as commercial games, or illicit the same intrinsic motivation and engagement. In this section we focus largely on a less-well understood area, assessment and commercial games. Since these games have been designed for a broad audience, with attention in mind, they do not typically contain assessment features designed for teachers or students. How then, can we determine if students are learning?

Games as Assessment

Many proponents of DGBL make the case that there are clear parallels between video game mechanics and formative assessment practices used by teachers. They suggest that well-designed videogames *are* assessment²⁸. Formative assessment is one of the most effective approaches to improving student learning in the classroom²⁷. Like good lessons, games are built with explicit, clear goals, and provide immediate feedback, enabling players to alter their strategies or change their game-play in order to succeed²³. This concept of supported improvement through continuous feedback is a central tenant of Formative Assessment²⁸. Figure 19 illustrates the ways in which formative assessment and video games have similar design characteristics. Column 3 makes suggestions for how these elements can be connected as part of the wider learning design in a DGBL course²⁸.

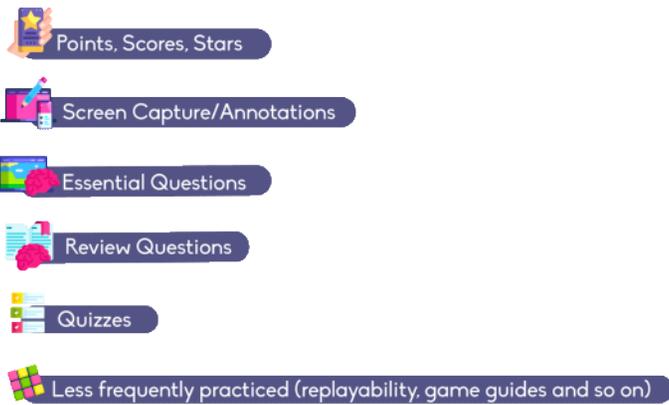
 Formative Assessment Practice	 Video Game Analog	 Connecting the Game to the Broader Learning Context
Teachers identify and share learning expectations with the students (learning goals and progressions)	Games provide explicit challenges and goals	Game goals and challenges are connected to larger unit learning goals
Teachers elicit relevant and quality evidence of student learning on an ongoing basis to inform instruction	Games collect telemetry and use analytics to understand player behavior and structure the game experience	Evidence collected and identified in game informs instruction outside the game, and is integrated with other evidence about student learning
Teachers structure opportunities for students to take ownership of their own learning	Games create a sense of agency by providing choice and flexible pacing	Students have opportunities to reflect on their own learning both within the game and as part of the larger instructional unit
Teachers structure opportunities to activate students as instructional resources for one another	Games provide structured contexts for collaboration and sharing– multiplayer platforms	Students have opportunities to reflect with peers about their learning within the game, and to provide feedback to peers on their learning
Teachers provide feedback to move learning forward and create a structure for students to act on it	Games provide just in time feedback linked to rewards that guide players' actions	The teacher is able to provide feedback that helps students connect learning within the game to the broader instructional unit

Figure 19 Formative Assessment Practices and Their Game Analogs ²⁸

In terms of assessing a student's performance in a DGBL classroom, as educators we can:

- i. Use *progress indicators* within the game itself (points, lives, resources) to determine a student's performance or progress
- ii. Develop out-of-game activities to help students make connections made between the game and a lesson's learning objectives
- iii. Develop both in-game and out-of-game learning activities that connect (i) and (ii) as suggested in column 3 of Figure 19, as part of a DGBL course or unit.

A nationwide survey of K-12 teachers in the US was undertaken to investigate common formative assessment practices, common video-game use practices, and their relationship to each other²⁹. It was followed up with interviews with 30 middle grade teachers (grades 5-8) teachers in the New York City. The report from the survey showed a number of formative assessment techniques teachers were using to assess educational games in their classrooms, including:



The survey was undertaken with a focus on educational games only, but its reporting on formative assessment practices for DGBL broadly apply to both educational and commercial games. Figure 20 shows how each of these Formative Assessment practices were used by teachers, along with barriers they present. For example, by keeping track of the stars/points on-screen students were able to:

- monitor their own progress or performance;
- increase their persistence to complete the task or level
- determine whether or not a level should be replayed for greater proficiency

Importantly, some teachers felt that it was hard to relate these stars or points to their learning objectives, or to relate them to specific learning being undertaken or achieved by students. Aligning DGBL activities with unit and lesson objectives is of crucial importance for both students and teachers when using video-games in class.

FEATURE	HOW FEATURE "PLAYED OUT"	BARRIERS
 Points, Scores, Stars "Quantified" outcome marking overall progress or proficiency within a level	<ul style="list-style-type: none"> • students monitored own progress or performance • increased motivation or persistence • determined whether or not a level should be replayed for greater proficiency 	<ul style="list-style-type: none"> • lack of clarity about what these indicators mean with respect to student learning • may not be related to content learning objectives • often displayed only at the end of a level (not displayed persistently)
 Other Forms of Player Feedback Game responses to player actions to encourage or discourage future action	<ul style="list-style-type: none"> • asked students to pay attention to the in-game feedback they were receiving • allowed over-the-shoulder observations • focused each student's attention on areas of weakness before they replayed the game 	<ul style="list-style-type: none"> • students might not perceive or understand the information they were being given • difficult for teachers to assess students' learning and in-game interactions in larger classes
 Dashboards Information display that allows one to quickly scan a range of information pertaining to a task	<ul style="list-style-type: none"> • focused students in their further play and learning • reviewed the report with the student • helped guide post-game discussion with the entire class 	<ul style="list-style-type: none"> • technical complications involving student logins • may be better with longer-form games or when displaying progress across games
 Essential Question Help teachers focus students' gameplay on key concepts and ideas; could be used at the beginning or end of game play	<ul style="list-style-type: none"> • used essential questions at various times during a lesson • focused students on what they learned from game play 	<ul style="list-style-type: none"> • teachers often create their own assessment questions
 Review Questions Review questions or objectives at the end of a level	<ul style="list-style-type: none"> • students received feedback about their answer or were shown the correct answer • students were asked to check off a list of objectives met by their writing before moving on to the next task in the game • kept track of what students learned 	<ul style="list-style-type: none"> • no direct way for teachers to see students' progress (without dashboard) • students were sometimes not motivated to spend enough time on them
 Quizzes Quiz features provided by the game designers, including videos with accompanying quizzes and/or a tool for generating quizzes provided by portal	<ul style="list-style-type: none"> • provided informal checks on learning • set 'cut scores' for whether students should replay a level or move on • offered a "quick read" on how students were doing • offered assessment data that could be used immediately to inform instruction 	<ul style="list-style-type: none"> • not aware of the available quiz features • usefulness of a quiz depended on the purpose of game use • the extent to which quiz content was aligned to the important game content
 Replayability	<ul style="list-style-type: none"> • games where there was no "right" answer had higher re-playability 	<ul style="list-style-type: none"> • games with one "right" or "best" answer have no or limited replayability

Game can be played multiple times for practice; new experience each time



Ability to Unlock Levels

A code that unlocks all levels of the game at once; allows teacher to tailor difficulty for students

- the majority of a class played and was assessed on content at an entry level, an advanced student could play and be assessed on more advanced content
- generally associated with replayability



Graphic Organizers

Supplemental worksheets and documents that accompany game experiences

- generated traces of student work that the teacher could review
 - elicited student reflection in advance of the group discussion
 - reduced cognitive load for students as they played the game
- teachers sometimes preferred their own materials concerns about printing students work at different paces



Game Guides

Supplements to lesson plans that help teachers integrate games into their curricula; include guidance on how to assess student learning with the game

- provided overviews of game
 - prompted small-group discussion activities
 - provided support for peer feedback
- because game designers cannot always anticipate context, the extent of guidance for how to gather and interpret information about student learning is limited

Figure 20 Formative Assessment practices used by teachers in Digital Game-Based Learning lessons⁹²



What are we teaching?

How and what we measure in terms of assessing student performance, depends very much on our learning objectives. Common goals for video-games are to teach:

- i. Content provision (by both educational and commercial games)
- ii. 21st Century Skill development, career-ready or college prep skills (mainly by commercial games)
- iii. Digital Literacy (potentially both, but more evidence exists for commercial games)

i.



Content provision

As we have seen previously, often in classroom Serious Games are used to teach math or science content. However, there are a whole range of commercial games that have been used to teach core content subject matter to students, and with great success. The games used are often powerful simulation games, capable of simulating large-scale systems, such as environmental, economic, social, political systems in a realistic manner. The learning from these games can be assessed formatively and summatively. The case study presented here used summative assessment to determine if the game Civilization can support learning in social studies with disengaged groups.



Case Study – using Civilization to teach Social Studies Content

The video-game Civilization is used to help students learn concepts and terminology from history.



Objective:

Students play as particular a country or civilization and make strategic decisions based on resources to try to win (and hold on to) territories.



Developer Summary:

Civilization is a turn-based strategy game in which you attempt to build an empire to stand the test of time. Become Ruler of the World by establishing and leading a civilization from the Stone Age to the Information Age. Wage war, conduct diplomacy, advance your culture, and go head-to-head with history's greatest leaders as you attempt to build the greatest civilization the world has ever known.



Mechanics:

Gameplay can include 'global play' development of stable cities, allocation of resources, or negotiations with competing civilizations, or 'local play' role-play as a historical figure, navigation of historical villages and terrain, and re-enactment of key battles or negotiations with other historical figures



Teaching & Learning:

Numerous research studies have shown that when the video-game experience is coupled with effective teacher strategies and scaffolding in lessons (discussions on strategy, reflection on game-play, decision making and outcomes and comparisons between game-play and actual historical accounts) the game is highly effective in developing students' content knowledge and retention, and has the capacity to engage students beyond traditional methods^{59,101,102}, particularly in combination with skilled teaching and implementation^{59,103,104}.



Impact & Assessment:

In a study with school children of grade, 4, 5 and 6 as part of an after school program, The after school program children used the game to explore a range of historical game scenarios, including ancient Mesopotamian civilizations (4000 BC) The iron age (100 AD), and The industrial age of Europe (1800 AD). After only a few weeks of play, the researchers observed that all of the participants showed dramatic improvements in their geography and history skills (locating major ancient civilizations on a map, naming key historical military units, as well as making arguments about the growth of cities in particular geographic areas, demonstrating skilled world history terminology, using words and terms such as monotheism, cathedral, hoplite etc.). Children were tested on their content knowledge. Test scores showed that students were proficient in accurately identifying 90% of historical facts.

ii.



21st Century Skills

While educators are very familiar with assessing content, it is much more difficult to assess 21st Century Skill acquisition. Indeed some reports suggest that teachers may be less willing to spend time on activities that actively develop these skills when they are not actively measured in standardized tests. However many proponents of DGBL suggest that the games themselves assess these competencies¹⁰⁵:



Games require the kind of thinking that we need in the 21st Century because they use actual learning as the basis for assessment. They test not only current knowledge and skills, but also preparation for future learning. They measure 21st Century skills like collaboration, innovation, production, and design by tracking many different kinds of information about a student, over time. Gee and Shaffer (2010)

Can the tracking within commercial games be used to help assess 21st Century skills? A branch of research is exploring what is known as Evidence Centred Design (ECD)¹⁰⁶. Analytical tools use data generated by the player's in-game performance, as well as products created by the player during the course of game-play. ECD has been shown to be able to relate both lower order processing skills (comprehension and application), as well as higher order thinking skills (analysis, innovation, creativity). ECD has been used by some researchers as part of a wider concept referred to as *Stealth Assessment*. Here, the overarching idea is very simple – stopping students continually during DGBL to ask them to take a test, give a hands-up response, have a discussion and so on actually interrupts 'flow' – one of the characteristics of game-play that aids creativity and higher order thinking. In stealth assessment, the in-game data logs (records of decisions) are used by powerful analytics software to provide information on, for example, creative problem solving, strategic decision making and so on. The scores can be used by teachers, parents and students to shape personalized learning plans, instruction and practice sessions that target key areas.

The fundamental principles of ECD are based on gathering evidence that can illustrate competency. Like any good assessment, it begins by clearly identifying what knowledge, skills or attributes should be assessed, and these are outlined in what is referred to as The Competency Model. Because 21st Century skills are difficult to directly observe, other behaviors, performances or activities that infer or demonstrate these competencies need to be identified, these are outlined in The Evidence Model. Finally, the types of tasks and situations that will evoke these behaviors from players are identified in The Task Model. All of the data gathered by the game is used together in these three models to score a player on a particular skill or set of skills.



Case Study – Oblivion

Oblivion (The Elder Scrolls IV: by Bethesda Softworks) is a role-playing game set in a medieval world. Players choose to be one of many characters (e.g., knight, mage, elf), each of whom has (or can obtain) various weapons, spells, and tools.



Objective:

To gain rank, improve your avatar's skills and complete quests.



Mechanics:

There are multiple mini-quests to complete (locating a person to obtain information, figuring out a clue for future quests, and so on), and a major quest that results in winning the game. Players have the freedom to complete quests in any order they choose, and this can entail hundreds of hours of game play to complete the game.



Teaching & Learning:

Research on multiplayer roleplay games has shown that they can elicit a wide range of 21st Century skills including creative and critical thinking, collaborative problem solving, ethical reasoning and communication and literacy skills. These higher order skills are difficult to measure and assess in practice.



Assessment:

In this case study example, the player's creative problem solving skills were being assessed. A simplified version of the models is provided as an example. The scenario is as follows:

The player is faced with crossing a river full of dangerous fish. There is a mage in a cave on the other side who has some information they need. Figure 21 contains a list of possible actions the player could take to solve this problem. For example, swimming across the river is a high-frequency, common solution (a simplistic option taken by a large number of players) and is therefore associated with a low “novelty weight.”

Action	Novelty	Efficiency
Swim across the river	$n=0.12$	$e=0.22$
Levitate over the river	$n=0.33$	$e=0.70$
Freeze the river with a spell and slide across	$n=0.76$	$e=0.80$
Find a bridge over the river	$n=0.66$	$e=0.24$
Dig a tunnel under the river	$n=0.78$	$e=0.22$

Figure 21 Example of Action Model with indicators for Novelty and Efficiency

In this example the EDC uses the three models as follows:

- a. In this Competency Model the cognitive and non-cognitive Creative Problem Competencies are identified as attention, working memory and reading comprehension; and persistence, exploration and exploratory, respectively (Figure 22). However in this example, we follow the shaded boxes for simplicity where the competencies we will use to assess creative problem solving relate to efficiency and novelty.

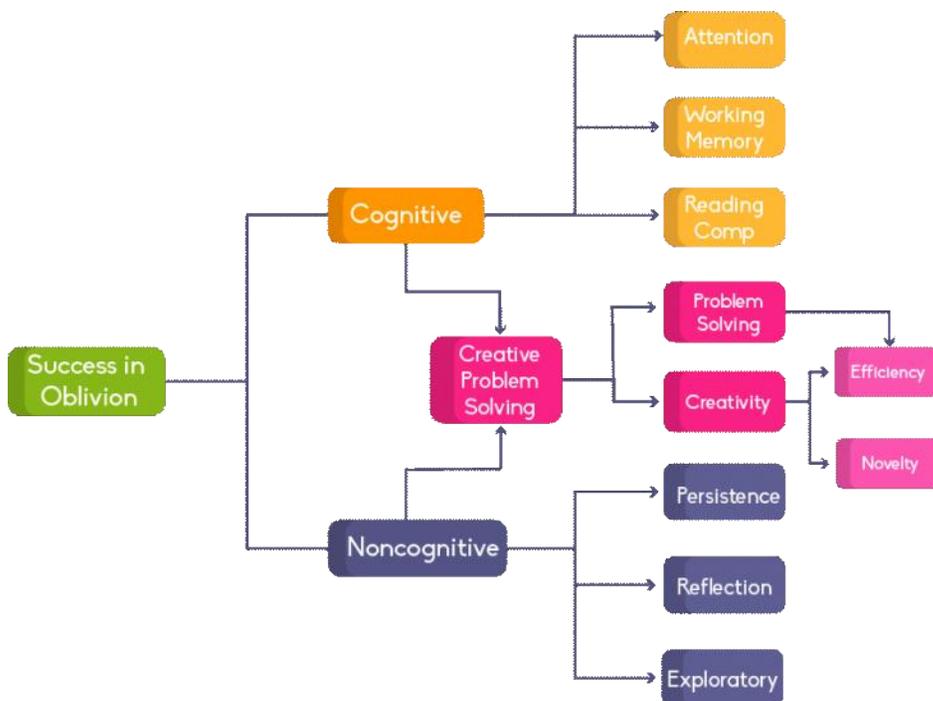


Figure 22 Example of a decision pathway in a Competency Model in the video-game Oblivion

- b. Next we ask how can we use the evidence (data) from student game play to infer competency in efficiency and novelty in student's choices and actions? The Evidence Model contains the rules, weightings and so on for scoring actions and behaviors and maps out the 'argument' for how the student's behavior in a given task relates to a competency, and to what extent. In this example the Evidence Model will provide the numerical framework for scoring how efficient and novel a student's gameplay is.
- c. The Action Model works with the evidence model so that possible tasks, behaviors or actions relating to novelty and efficiency (in this example) are scored. Referring to the values in Figure 21, the action of swimming across the river would have a low efficiency value because of the extra time needed to evade the piranha-like fish that live there. Digging a tunnel under the river, to get to the other side, however, is judged as highly novel, but less efficient than, freezing the water and sliding across— this action being both highly novel and highly efficient.

This Evidenced Centred Design approach would use automated data collection and analysis tools in-game to assess student performance on a range of hard-to-observe skills and competencies, and in doing so prevent the interruption of flow-states that can occur from other types of classroom-based assessment practices.

However, it is not clear to what extent such models are available as 'add-ons' to games, say, for regular classroom teachers. These may begin to become more available as the field of DGBL grows. What has been clearly demonstrated is that if computer-based models can *infer* that a student has achieved a particular skill or proficiency based on *performance* in a game, then educators can too. This concept of performance based inference and task-based assessments for competencies is a central feature of the well-established approach Authentic Assessment. Perhaps authentic assessment principles may offer another viable way for educators to approach the challenging issue of assessing 21st Century skills in DGBL classrooms.

In almost all of the DGBL studies, researchers stress the importance of gaming communities in the process of learning. These communities, often referred to as *affinity groups* (or affinity spaces), develop over time and are built on players' shared experiences and shared objectives in -game¹⁰⁷. They are most commonly associated with, but are in no way exclusive to, Massive Multiplayer Online Roleplay Games (MMORG). These diverse communities of players produce blogs, wikis, and discussion forums that provide hints, cheats and mods and support other players in playing the game. According to Young et al (2012) it is this 'metagame' community and its products that are a rich source of learning¹⁰⁸:



Much of the 'learning' of video game play may come from affinity groups that emerge from game play, consisting of metagame sources such as blogs, wikis, and discussion pages that support hints, cheats, and modding. Young et al (2012)

For example, in a study of World of Warcraft community forums researchers showed that almost 90% of the conversation taking place between community members was productive discussion, critical analysis and problem-solving including, argument, counterargument and use of evidence. Participants were shown to engage in high-level literacy, math, and science reasoning practices⁵⁸. Such student co-created texts can be used for both formative and summative assessment purposes, to identify, as in the example above, argument and counter argument, reasoning and use of evidence, and even critical thinking and problem solving. These texts will be generated in a community forum or collaborative space in a cyclical way (as a by-product of, and as an input to game-play) and be a rich source of assessment material, with both co-created ideas and individual comments and contributions clearly visible.

In addition, educators can capitalize on this aspect of gaming culture and invite students to replicate the high quality collaborative production seen in:

- Written game reviews
- Video reviews
- Feature articles
- Pre-release marketing videos
- Social media
- Fan fiction
- Hints and Tips wikis
- Strategy discussion boards

Framing these tasks appropriately as marketing pieces, community development pieces, or game-play strategy pieces can help students engage critically with ideas such as target audience, communication style, language, length and so on. Alternatively, using real in-game scenarios (should player X accept a stolen gift from this stranger) can help engage students in ethical reasoning and wider discussions that can be shaped using Social and Emotional Learning frameworks for scaffolding and assessment.



The Role of the Teacher

Many of us have heard the term 'digital natives', in reference to the almost innate way that children pick up and use technology. The phrase has given some educators cause to believe that students don't need adults to support their learning when it comes to technology. However the deep learning experiences students gain from DGBL work most effectively when coupled with effective pedagogy^{108,109}. DGBL studies continue to show that learning from video-games takes place not only within the game, but when the activities performed in-game are connected to activities, tasks and materials out-of-game. In essence we, as educators have a crucial role to play by making explicit connections between students' game-play and teaching objectives, curricular resources and activities – and real-world events, situations and experiences¹¹⁰. This can be done in many ways, although pre and post-game briefing activities, discursive reflection and self-reflection practices that support metacognition, and peer support and discussion are thought to be highly important in facilitating the transfer of skills to other learning contexts¹⁰⁸.



Summary

Assessment in DGBL is still an emerging practice. While educational games have a definite edge when it comes to assessment, coming equipped with in-game assessment components, these games are unlikely to generate the kinds of affordances in critical skills seen in commercial games. There have been incredible developments in the field that may yet enable teachers to 'bolt-on' software that enables automated data collection and analysis of commercial video-games, but as yet it is up to teachers to decide how best to assess students' learning in DGBL. The unequivocal parallels between formative assessment and video-game mechanics, should make it possible for teachers to infer learning from actions, behaviors and performances when assessing hard-to-observe skills. Authentic Assessment approaches that utilize such methods may offer teachers some well-established practices for this purpose. However there are clear cut lessons from the research on DGBL and assessment;

1. Teachers can and should draw from their formative assessment practices when designing and facilitating DGBL
2. Aligning learning objectives with activities and tasks in-game is essential if students are to be able to make connections between knowledge and skills developed during game-play and the real-world, and
3. The teacher plays a crucial role in scaffolding the learning process in DGBL, facilitating reflection, metacognition, and importantly modelling behaviors and expectations for multi-player, community learning environments.

Having made the case for considering DGBL as one of the curricular building blocks of any esports school program, in the following section, Section 3, we take a more focused look at esports in the curriculum, particularly as foundation for learning 21st Century Skills, Social and Emotional Learning and Digital Literacies. We present different models for delivering esports in your school and present international case studies illustrating different course models and approaches to esports in education.

2.5 References



What should I read if I want to know more about DGBL?

- Jordan Shapiro has written an excellent quick-start guide to GBL. We've referenced some of his work here (3), and we suggest it as an accessible and comprehensive overview of DGBL.
- We also recommend two videos, [A TED Talk](#) by Cognitive Scientist Daphne Bavelier entitled 'Faster, Better, Smarter, Stronger' explores some of benefits of playing action video games and a video on the work of scholar [James Paul Gee](#) on the ways in which games can lead to learning and educational design in classrooms



1. Hamari, Juho & Sj blom, Max. (2017). What is eSports and why do people watch it?. Internet Research. 27. 10.1108/IntR-04-2016-0085.
2. Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T. and Boyle, J. (2012). A systematic literature review of empirical evidence on computer games and serious games. *Computers & Education*, Vol. 59 No. 1, pp. 661 – 686.
3. Shapiro, J., (2014) The MindShift Guide to Games and Learning <https://a.s.kqed.net/pdf/news/MindShift-GuidetoDigitalGamesandLearning.pdf>
4. (Deubel, P. (2006). Game On!. *T.H.E. Journal*, 33(6),. Retrieved February 11, 2020 from <https://www.learntechlib.org/p/77186/>
5. Dewey, J. (1944). *Democracy and education*. New York: The Free Press.
6. Piaget, J. and Inhelder, B. 1971. *Mental imagery in the child.*, New York: Basic Books.
7. Vygotsky, L. (1978). *Mind and society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
8. Sutton-Smith (1997) in Goldstein 2012, *Play in Children's Development, Health and Well-Being*, Toy Industries of Europe
9. Fisher 1992 in Goldstein (2012) [https://www.persil.com/content/dam/unilever/persil/global/english/online_comms/persil - play in children s development health and well-being-1816599.pdf](https://www.persil.com/content/dam/unilever/persil/global/english/online_comms/persil_-_play_in_children_s_development_health_and_well-being-1816599.pdf)
10. Joe L. Frost, Sue C. Wortham, Stuart Reifel. *Play and child development* — 4th ed <http://docshare03.docshare.tips/files/27020/270200789.pdf>
11. Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The benefits of playing video games. *American Psychologist*, 69(1), 66–78. <https://doi.org/10.1037/a0034857> <https://www.apa.org/pubs/journals/releases/amp-a0034857.pdf>
12. Brown, J.S., Collins, A. & Duguid, S. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42
13. Gee, James Paul. "Learning and Games." *The Ecology of Games: Connecting Youth, Games, and Learning*. Edited by Katie Salen. The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press, 2008. 21–40. doi: 10.1162/dmal.9780262693646.021 <https://www.issuelab.org/resources/861/861.pdf>
14. Subrahmanyam K, Greenfield P, Kraut R, Gross E (2001). The impact of computer use on children's and adolescents' development. *Journal of Applied Developmental Psychology*, 22(1), 7–30.
15. Hiemstra R. Self-directed learning. In: Husen T, Postlethwaite TN, editors. *The International Encyclopedia of Education*. 2nd ed. Oxford: Pergamon Press, 1994
16. Fahnoe, C. & Mishra, P. (2013). Do 21st Century Learning Environments Support Self-Directed Learning? Middle School Students' Response to an Intentionally Designed Learning Environment. In R. McBride & M. Searson (Eds.), *Proceedings of SITE 2013--Society for Information Technology & Teacher Education International Conference* (pp. 3131-3139). New Orleans, Louisiana, United States: Association for the Advancement of Computing in Education (AACE).
17. Marsick, V. and Watkins, K. (2001) 'Informal and incidental learning', *New Directions for Adult and Continuing Education*, Vol. 2001, No. 89, pp.25–34.
18. Educause (2014) 7 Things you should know about games and learning <https://library.educause.edu/-/media/files/library/2014/3/eli7106-pdf.pdf>
19. Anderson, Craig & Campbell, Kathryn & Steinkuehler, Constance. (2019). Building persistence through failure: the role of challenge in video games. 1-6. 10.1145/3337722.3337741.
20. Barab, S., & Dede, C. (2007). Games and immersive participatory simulations for science education: An emerging type of curricula. *Journal of Science Education and Technology*, 16(1), 1-3. http://www.fisme.science.uu.nl/publicaties/literatuur/2007_barab.pdf
21. From Pixel to Print, The Role of Videos, Games, Simulations and Animations within K-12 Education Project Tomorrow <https://tomorrow.org/speakup/pdfs/SU15AnnualReport.pdf>
22. Entertainment Software Association 2019 Essential Facts About the Computer and Video Game Industry <https://www.theesa.com/esa-research/2019-essential-facts-about-the-computer-and-video-game-industry/>
23. Federation of American Scientists. (2006). *Summit on Educational Games*. Washington, DC: Federation of American Scientists
24. Shute, V.J. (2011) *Computer Games and Instruction*
25. McGonigal, J. (2011). *Reality is Broken: Why Games Make Us Better and How They Can Change the World*. New York, NY: Penguin.
26. Barr, M. (2019) *Graduate Skills and Game-Based Learning: Using Video Games for Employability in Higher Education*. Series: Digital education and learning. Palgrave Macmillan. ISBN 9783030277857 (doi:10.1007/978-3-030-27786-4)
27. Squire, Kurt. (2003). Video Games in Education. *International Journal of Intelligent Simulations and Gaming*. 2. 49-62. 10.1145/950566.950583.
28. McClarty, K. L., Orr, A., Frey, P. M., Dolan, R. P., Vassilev, V., and McVay, A. (2012). *A Literature Review of Gaming in Education*. Pearson. Available online at: http://formative.pearsonassessments.com/hai/Images/tmrs/Lit_Review_of_Gaming_in_Education.pdf
29. Squire, Kurt (2011) *Video Games and Learning: Teaching and Participatory Culture in the Digital Age* Teachers College Press ISBN: 978-0807-751-98-5
30. Ryan, Richard & Rigby, C. & Przybylski, Andrew. (2006). The Motivational Pull of Video Games: A Self-Determination Theory Approach. *Motivation and Emotion*. 30. 344-360. 10.1007/s11031-006-9051-8.
31. Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Ming, L. K., . . . Sakamoto, A. (2009). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies. *Personality and Social Psychology Bulletin*, 35, 752–763. doi:10.1177/0146167209333045
32. Lenhart, A., Kahne, J., Middaugh, E., Macgill, A. R., Evans, C., & Vitak, J. (2008). *Teens, video games, and civics: Teens' gaming experiences are diverse and include significant social interaction and civic engagement*. Pew Internet & American Life Project. Retrieved from the Pew Internet & American Life Project website:

- <http://www.pewinternet.org/Reports/2008/Teens-Video-Games-and-Civics.aspx>
33. Ventura, M., Shute, V., & Zhao, W. (2013). The relationship between video game use and a performance-based measure of persistence. *Computers & Education*, 60, 52–58. doi:10.1016/j.compedu.2012.07.003
 34. Green, C. S., & Bavelier, D. (2012). Learning, attentional control, and action video games. *Current Biology*, 22, 197–206. doi:10.1016/j.cub.2012.02.012
 35. Bavelier, D., & Davidson, R. J. (2013). Brain training: Games to do you good. *Nature*, 494, 425–426. doi:10.1038/494425a Bavelier, D., Green, C. S., Han, D. H., Renshaw, P. F., Merzenich, M. M., &
 36. Gentile, D. A. (2011). Brains on video games. *Nature Reviews Neuroscience*, 12, 763–768. doi:10.1038/nrn3135
 37. Walter R. Boot, Daniel P. Blakely, and Daniel J. Simons (2011) Do Video Games Improve Perception and Cognition *Front. Psychol.*, 13 September 2011 <https://doi.org/10.3389/fpsyg.2011.00226>
 38. Shah, P., and Miyake, A. (1999). "Models of working memory: an introduction," in *Models of Working Memory: Mechanism of Active Maintenance and Executive Control*, eds P. Shah and A. Miyake (New York: Cambridge University Press), 1–26.
 39. Anaya and Bavelier D (2013) Ever Wondered What Playing Video Games Does to Your Brain?. *Front. Young Minds*. 1:15. doi: 10.3389/frym.2013.00015
 40. Chein & Morrison 2010 <https://www.apa.org/pubs/journals/features/xhp-a0037556.pdf>
 41. Loosli et al Loosli, S. V., Buschkuhl, M., Perrig, W. J., and Jaeggi, S. M. (2012). Working memory training improves reading processes in typically developing children. *Child Neuropsychol.* 18, 62–78. <https://www.frontiersin.org/articles/10.3389/fnsys.2014.00243/full#B76>
 42. Jaeggi, S. M., Buschkuhl, M., Jonides, J., and Perrig, W. J. (2008). Improving fluid intelligence with training on working memory. *Proc. Natl. Acad. Sci. U S A* 105, 6829–6833. doi: 10.1073/pnas.0801268105
 43. Gathercole, S. E., Brown, L., and Pickering, S. J. (2003). Working memory assessments at school entry as longitudinal predictors of national curriculum attainment levels. *Educ. Child Psychol.* 20, 109–122.
 44. Hubert-Wallander, Bjorn & Green, C. & Bavelier, Daphne. (2011). Stretching the limits of visual attention: The case of action video games. *Wiley Interdisciplinary Reviews: Cognitive Science*. 2. 222 - 230. 10.1002/wcs.116.
 45. Rosser, J. C., Lynch, P. J. Haskamp, L., Gentile, D. A., & Yalif, A. (2007). The impact of video games in surgical training. *Archives of Surgery*, 142, 181-186.
 46. Kühn, S & Gleich, Tobias & Lorenz, Robert & Lindenberger, Ulman & Gallinat, J. (2013). Playing Super Mario induces structural brain plasticity: Gray matter changes resulting from training with a commercial video game. *Molecular Psychiatry*. Advance online publication. 10.1038/mp.2013.120. <https://doi.org/10.1002/wcs.116>
 47. Chiappe, D., Conger, M., Liao, J., Caldwell, J. L., & Vu, K.-P. L. (2013). Improving multitasking ability through action videogames. *Applied Ergonomics*, 44(2), 278–284. doi:10.1016/j.apergo.2012.08.002
 48. Green, C. S., Sugarman, M. A., Medford, K., Klobusicky, E., & Bavelier, D. (2012). The effect of action video game experience on task-switching. *Computers in Human Behavior*, 28(3), 984–994. doi:10.1016/j.chb.2011.12.020
 49. Green, C. S., & Bavelier, D. (2003). Action video game modifies visual selective attention. *Nature*, 423(6939), 534–537. doi:10.1038/nature01647
 50. Subrahmanyam, Kaveri & Greenfield, Patricia. (1994). Effect of video game practice on spatial skills in girls and boys. *Journal of Applied Developmental Psychology*. 15. 13-32. 10.1016/0193-3973(94)90004-3.
 51. Green, C. S., & Bavelier, D. (2015). Action video game training for cognitive enhancement. *Current Opinion in Behavioral Sciences*. doi:10.1016/j.cobeha.2015.04.012
 52. Green, C. S., & Bavelier, D. (2012). Learning, Attentional Control, and Action Video Games. *Current biology*, 22(6), R197–R206.
 53. Casey M. B., Nuttall, R., Pezaris, E., & Benbow, C. P. (1995). The influence of spatial ability on gender differences in mathematics college entrance test scores across diverse samples. *Developmental Psychology*, 31(4), 697–705. doi: 10.1037/0012-1649.31.4.697
 54. Casey M. B., Nuttall, R. L., & Pezaris, E. (1997). Mediators of gender differences in mathematics college entrance test scores: A comparison of spatial skills with internalized beliefs and anxieties. *Developmental Psychology*, 33(4), 669–680. doi: 10.1037/0012-1649.33.4.66
 55. Reilly, David & Neumann, David & Andrews, Glenda. (2016). Gender Differences in Spatial Ability: Implications for STEM Education and Approaches to Reducing the Gender Gap for Parents and Educators. 10.1007/978-3-319-44385-0_10.
 56. Goldin, A. P., Hermida, M. J., Shalom, D. E., Elias Costa, M., Lopez-Rosenfeld, M., Segretin, M. S., et al. (2014). Far transfer to language and math of a short software-based gaming intervention. *Proc. Natl. Acad. Sci. U S A* 111, 6443–6448. doi: 10.1073/pnas.1320217111
 57. Shute, V. J., Ventura, M., and Ke, F. (2015). The power of play: the effects of portal 2 and lumosity on cognitive and noncognitive skills. *Comput. Educ.* 80, 58–67. doi: 10.1016/j.compedu.2014.08.013
 58. Gee, James & Gee, Elisabeth & Torres, Robert & Games, Ivan & Squire, Kurt & Salen, Katie. (2008). Playing to learn game design skills in a game context.. 368-374.
 59. Squire, Kurt (2005) Changing the Game: What Happens When Video Games Enter the Classroom? <https://nsuworks.nova.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1168&context=innovate>
 60. Steinkuehler, C.A. (2006a) Massively Multiplayer Online Videogaming as Participation in a Discourse, *Mind, Culture, & Activity*, 13(1), 38-52
 61. Steinkuehler, Constance. (2007). Massively Multiplayer Online Gaming as a Constellation of Literacy Practices. *E-learning*. 4. 10.2304/elea.2007.4.3.297.
 62. Pratama, L & Setyaningrum, Wahyu. (2018). Game-Based Learning: The effects on student cognitive and affective aspects. *Journal of Physics: Conference Series*. 1097. 012123. 10.1088/1742-6596/1097/1/012123.
 63. Gee, J. P. (2007). *What video games have to teach us about learning and literacy*, New York: Palgrave Macmillan
 64. Annetta, Leonard. (2010) The "I's" Have It: A Framework for Serious Educational Game Design. *Review of General Psychology*. 14. 105-112. 10.1037/a0018985.
 65. Greenfield PM, Camaioni L, Ercolani P, Weiss L, Lauber BA, Perucchini P (1994). Cognitive socialization by computer games in two cultures: inductive discovery or mastery of an iconic code? *Journal of Applied Developmental Psychology*, 15(1), 59–85.
 66. Squire, K. (2006). From Content to Context: Videogames as Designed Experience. *Educational Researcher*, 35(8), 19–29. <https://doi.org/10.3102/0013189X035008019>
 67. Steinkuehler, C. A. (2006). Why Game (Culture) Studies Now? *Games and Culture*, 1(1), 97–102. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.624.5368&rep=rep1&type=pdf>
 68. Adachi, Paul & Willoughby, Teena. (2013). More Than Just Fun and Games: The Longitudinal Relationships Between Strategic Video Games, Self-Reported Problem Solving Skills, and Academic Grades. *Journal of youth and adolescence*. 42. 10.1007/s10964-013-9913-9.
 69. Cicchino, M. I. (2015). Using Game-Based Learning to Foster Critical Thinking in Student Discourse. *Interdisciplinary Journal of Problem-Based Learning*, 9(2). Available at:<https://doi.org/10.7771/1541-5015.1481>
 70. Simkins, David & Steinkuehler, Constance. (2008). Critical Ethical Reasoning and Role-Play. *Games and Culture - Game Cult.* 3. 333-355. 10.1177/1555412008317313.
 71. Barr, Matthew. (2017). Video games can develop graduate skills in higher education students: A randomised trial. *Computers & Education*. 113. 10.1016/j.compedu.2017.05.016.

72. Jackson, L. A., Witt, E. A., Games, A., Fitzgerald, H. E., von Eye, A., Zhao, Y. (2012). Information technology use and creativity: Findings from the Children and Technology Project. *Computers in Human Behavior*, 28, 370–376. doi:[10.1016/j.chb.2011.10.006](https://doi.org/10.1016/j.chb.2011.10.006)
73. Nguyen, Josef. (2016). Minecraft and the Building Blocks of Creative Individuality. *Configurations*. 24. 471-500. 10.1353/con.2016.0030.
74. Vansteenkiste, Maarten & Lens, Willy & Deci, Edward. (2006). Intrinsic Versus Extrinsic Goal Contents in Self-Determination Theory: Another Look at the Quality of Academic Motivation. *Educational Psychologist - EDUC PSYCHOL*. 41. 19-31. 10.1207/s15326985Sep4101_4.
75. Csikszentmihalyi, M. (1990). The domain of creativity. *Theor. Creat.* 4, 61–91.
76. Nakamura, J., and Csikszentmihalyi, M. (2002). "The concept of flow," in *Handbook of Positive Psychology*, eds C. R. Snyder and S. J. Lopez (Oxford: Oxford University Press), 89–105.
77. Ravaja, N., Saari, T., Laarni, J., Kallinen, K., Salminen, M., Holopainen, J., and Järvinen, A. (2005). "The psychophysiology of video gaming: phasic emotional responses to game events," in *online Proceedings of DiGRA 2005*.
78. Eseryel, D., Law, V., Ifenthaler, D., Ge, X., & Miller, R. (2014). An investigation of the interrelationships between motivation, engagement, and complex problem solving in game-based learning. *Educational Technology & Society*, 17 (1), 42–53.
79. Steinkuehler, Constance & Squire, Kurt. (2014). Videogames and learning. 10.1017/CBO9781139519526.023.
80. Van Eck, Richard. (2006). Digital Game Based LEARNING It's Not Just the Digital Natives Who Are Restless. *EDUCAUSE*. 41.
81. Nick Yee, *CyberPsychology & Behavior*, Dec 2006.772-775. <http://doi.org/10.1089/cpb.2006.9.772>
82. Morschheuser, Benedikt & Riar, Marc & Hamari, Juho & Maedche, Alexander. (2017). How games induce cooperation? A study on the relationship between game features and we-intentions in an augmented reality game. *Computers in Human Behavior*. 77. 169-183. 10.1016/j.chb.2017.08.026.
83. Dickey, Michele. (2005). Engaging by design: How engagement strategies in popular computer and video games can inform instructional design. *Educational Technology Research and Development*. 53. 67-83. 10.1007/BF02504866.
84. Kirriemuir, John & McFarlane, Angela. (2003). Use of Computer and Video Games in the Classroom.
85. Black, Rebecca & Steinkuehler, Constance. (2007). Literacy in Virtual Worlds https://www.researchgate.net/publication/327228146_Literacy_in_Virtual_Worlds
86. Steinkuehler, C. (2012). The mismeasure of boys: Reading and online videogames. In W. Kaminski & M. Lorber (Eds.), *Proceedings of Game-based Learning: Clash of Realities Conference* (pp. 33-50). Munich: Kopaed Publishers.
87. Hromek, R., & Roffey, S. (2009). Promoting Social and Emotional Learning With Games: "It's Fun and We Learn Things." *Simulation & Gaming*, 40(5), 626–644. <https://doi.org/10.1177/1046878109333793>
88. Velez, John & Ewoldsen, David. (2013). Helping Behaviors During Video Game Play. *Journal of Media Psychology Theories Methods and Applications*. 25. 190-200. 10.1027/1864-1105/a000102.
89. Feng, J., Spence, I., and Pratt, J. (2007). Playing an action videogame reduces gender differences in spatial cognition. *Psychol. Sci.* 18, 850–855. doi: 10.1111/j.1467-9280.2007.01990.x
90. Gaylord-Ross, R.J., Haring, T.G., Breen, C. & Pitts-Conway, V. (1984). The training and generalization of social interaction skills with autistic youth. *Journal of Applied Behaviour Analysis*, 17, 229.
91. Demarest, K. (2000). Video games – What are they good for? Located at:<http://www.lesstutor.com/kd3.html>
92. Franceschini, S., Gori, S., Ruffino, M., Viola, S., Molteni, M., and Facoetti, A. (2013). Action video games make dyslexic children read better. *Curr. Biol.* 23, 462–466. doi: 10.1016/j.cub.2013.01.044
93. District Administration (2019) <https://districtadministration.com/esports-students-develop-healthier-tech-habits/>
94. Takeuchi, L. M., & Vaala, S. (2014). Level up learning: A national survey on teaching with digital games. New York: The Joan Ganz Cooney Center at Sesame Workshop.
95. Rocha, Mariana & Tangney, Brendan & Dondio, Pierpaolo. (2018). Play and Learn: Teachers' Perceptions About Classroom Video Games.
96. Shah, Mamta & Foster, Aroutis. (2015). Developing and assessing teachers' knowledge of game-based learning. *Journal of Technology and Teacher Education*. 23. 241-267.
97. Black, P. J., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in education: principles. Policy and Practice*, 5, 7-74.
98. Bauer, Malcolm & Wylie, E. & Jackson, Tanner & Misdley, Robert & John, M & Hoffman-John, E. (2017). Why video games can be a good fit to formative assessment. *Journal of Applied Testing Technology*. 18. 19-31.
99. Fishman, B., Riconscente, M., Snider, R., Tsai, T., & Plass, J. (2014). Empowering Educators: Supporting Student Progress in the Classroom with Digital Games. Ann Arbor: University of Michigan. gamesandlearning.umich.edu/agames
100. Squire, Kurt. (2003). Video Games and Education: Designing learning systems for an interactive age. *Int. J. Intell. Games & Simulation*.
101. Sardone, Nancy & Devlin-Scherer, Roberta. (2011). DIGITAL GAMES FOR ENGLISH CLASSROOMS.
102. Barab, Sasha & Squire, Kurt. (2004). Design-Based Research: Putting a Stake in the Ground. *Journal of the Learning Sciences*. 13. 1-14. 10.1207/s15327809jls1301_1.
103. Squire, Kurt & Giovanetto, Levi & Devane, Benjamin & Subramanian, Shree. (2005). From users to designers: Building a self-organizing game-based learning environment. *TechTrends*. 49. 34-42. 10.1007/BF02763688.
104. Squire, KD Cultural framing of computer/video games *Game Studies: The International Journal of Computer Game Research* 200212
105. Gee, J. P., & Shaffer, D. W. (2010). Looking where the light is bad: Video games and the future of assessment. (Epistemic Games Group Working Paper No. 2010–02). Madison: University of Wisconsin-Madison.
106. Shute, V. J. (2011). Stealth assessment in computer-based games to support learning. In S. Tobias & Fletcher, J.D. (Eds.) *Computer games and instruction* (pp. 503–524). Charlotte, NC: Information Age Publishing.
107. Gee, J.P. & Hayes, Elizabeth. (2012). Nurturing affinity spaces and game-based learning. *Games, Learning, and Society: Learning and Meaning in the Digital Age*. 129-153. 10.1017/CBO9781139031127.015.
108. Young, M. F., Slota, S., Cutter, A. R., Jalette, G., Mullin, G., Lai, B., ... Yukhymenko, M. (2012). Our princess is another castle: A review of trends in serious gaming for education. *Review of Educational Research*, 82, 61–89.
109. Squire, KD Cultural framing of computer/video games, *Game Studies: The International Journal of Computer Game Research* 200212
110. Kirriemuir J (2002). The relevance of video games and gaming consoles to the higher and further education learning experience. April 2002. Techwatch Report TSW 02.01.

*[Frederik Rusk](#) and [Matilda Ståhl](#) personal communication based on research study conducted by Rusk, Ståhl & Silseth, submitted for review.

3.1 Esports' Place in Education

An Inclusive Approach

In the previous section, we made the case that when esports is viewed through the lens of both Digital Game-Based Learning and Sport Education, it provides a breadth of opportunities for teaching students. While common definitions of esports place great emphasis on playing at a professional or semi-professional level, reframing the scope for the educational setting to include Game-Based Learning, positions esports as a highly desirable addition to a curriculum or extra-curriculum offering. In addition the range of learning benefits associated with DGBL, this placement of esports grants greater inclusivity to a broad range of students by shifting the focus away from developing professional athletic skills, towards offering transferrable 21st Century learning opportunities to all students.

Regardless of how we choose to frame esports, there is general consensus that in Digital Game-Based Learning programs, it is the role of the teacher in managing learning activities, promoting discussion, and inviting reflection that enables students to make connections between game-play and other curricular areas, skills and learning objectives^{1,2}. To be effective in education, the learning and skill development of the game mechanics must align with desired learning outcomes. For educators to be able to do this, they have to have a firm grasp of how esports relate to their curriculum, and their learning goals for their students.

In this section we work with the proposition that esports largely draws concepts from both DGBL and Sports Education (sometimes known as physical education or sports science in different curricula), and as such, has the potential to provide a range of learning and skill development across the curriculum.

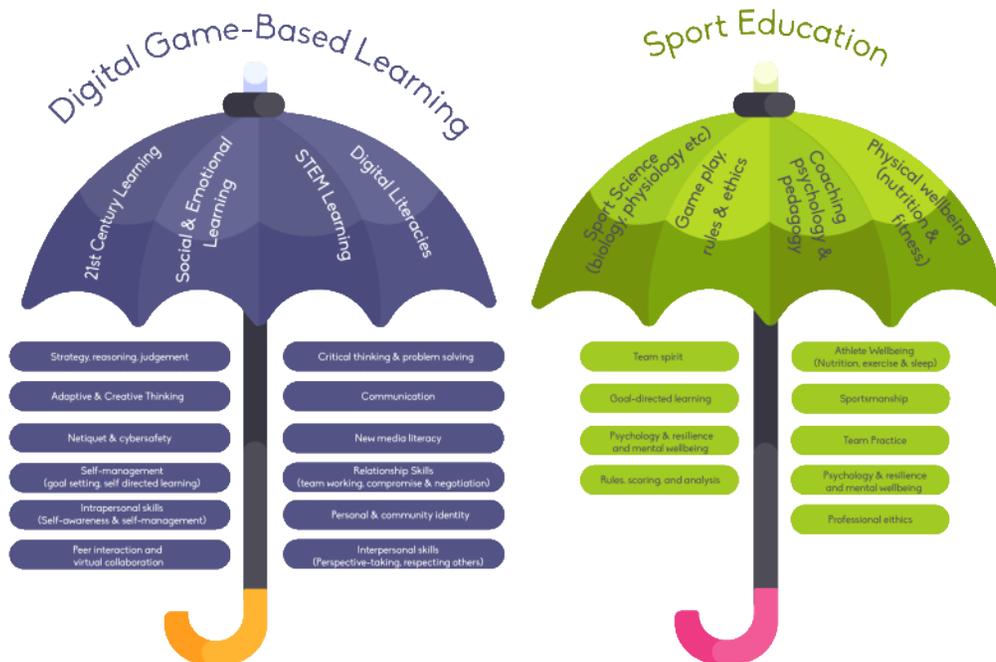


Figure 23 Competencies and skills that can be taught by esports programs informed by Game-Based Learning and Physical Education principles

Figure 23 illustrates our conceptual model of the content, competencies and skills that can be taught as part of an esports program. We begin by identifying esports' theoretical foundations, as being rooted in both Game-Based Learning and Sport or Physical Education. While framing esports in this way is entirely novel, there has been thorough consideration regarding the extent to which esports might purely belong within the Physical Education and Sport Science domain, in terms of its place within the school curriculum. However some research suggests that issues around movement behavior in PE may prevent it from being aligned fully with PE pedagogy³. A study conducted in Finland has indicated that there are a great many benefits to including physical training into an esports program:

Results from our study showed that teams who train physically together, perform better as a team in-game. In addition, while it wasn't a primary focus of our work, individualized interviews clearly indicated that our [esports and physical training] program had helped them in various ways, including motivation, mental health, daily routine etc. Zacharius Planting

Other researchers claim that if the difference between sport and esports is really only about *where* the competitive activity takes place (i.e. in a virtual arena or on a real field), then the huge benefits associated with youth sporting activity in education should be transferable from esports activities too, with the right coaching and support⁴. These benefits are well-documented and include, for example, improved self-esteem and self-confidence, self-efficacy, lower levels of depression, and the development of pro-social skills⁵.

Opportunities for Cross-Disciplinary Program Design

In this type of model, where educators design esports programs drawing pedagogical theory and practice from both DGBL, and sport science there are incredible opportunities for cross-curricular projects and co-teaching – and in fact the opportunities are much wider than those two key disciplines. The expertise of several teachers, with backgrounds in coaching and games (PE teachers), group dynamics (PE, Psychology, Biology teachers), Gaming and DGBL (teachers from multiple disciplines) technical support (ICT, Technology,

Engineering) and health and well-being (PE, Biology, Psychology teachers, social workers) would be invaluable at the design phase of any esports program, though not essential.

While we believe that the main principles of esports education can be easily aligned with DGBL and Sport Education, esports also draws upon concepts from the field of Enterprise⁶, given its links to business - and specifically STEM tech industries, creating opportunities for drawing from educators with expertise across other fields including Business, Media and Marketing (Enterprise, Business Studies, Media Studies, English Language Arts teachers) and Design (Technical design, art and design teachers). The vast opportunities for cross-curricular teaching and learning is something that educators may wish to consider when creating an esports program.



Frameworks for Developing an Esport Program

From Figure 23, it is possible to identify a range of skills that map directly into 21st Century Skills frameworks including inter and intra personal skills, and a suite of higher order cognitive skills elicited in game-based learning including; critical thinking & problem solving; strategic thinking, reasoning and judgement, and adaptive, creative thinking. What is interesting, is the way in which esports offers novel opportunities to pair this thinking with health and well-being competencies, for example through coaching and an understanding of sport psychology, P.E. teachers can support the development of a number of complementary skills such as coaching (strategy, player roles, data analysis), team spirit and team practice, game-play, rules and ethics, as well as helping students developing an understanding of the importance of sleep, exercise and nutrition.

The role of a team coach in helping students analyze game-play, develop strategy and understand team roles will be a crucial part in forming a cohesive, effective team. An esports program presents unique opportunities for colleagues to work together across the curriculum bringing their professional expertise together.

In the following sections of Chapter 3 we present five frameworks that educators may wish to consult, reference or embed when designing their own esports program. Four of these appear in Figure 23, as they are foundational components in Digital Game-Based Learning, however, the esports literature suggests a fifth component, Connected Learning, be considered:

- i.  21st Century Skills
- ii.  STEM Skills
- iii.  Connected Learning
- iv.  Social & Emotional Learning
- v.  Digital Literacies

Some schools will wish to develop a program that has a focus on Social and Emotional Learning, while others may look to use esports as a way to attend to their digital learning strategy, and therefore will prefer to work with Digital Literacy frameworks. In many cases, educators may prefer to work with multiple frameworks, drawing elements of best practice from each to suit their own School's ethos and goals. This approach in addition to reviewing how other educators have developed their programs ([Chapter 4](#)) should provide a sound pedagogical basis for developing an esports program to suit your school's ethos and your students' needs.

3.2 Future Ready Skills

There are a variety of organizations and frameworks that describe Future Ready skills, including The 21st Century Skills Partnership in the United States and the Lisbon Council of the European Union. Naturally, there are some differences in terminology, as well as some overlap in the way these skills are presented by different groups. A recent stride forward in this area has been made by the *Assessment and Teaching of 21st Century Skills* (ATC21S), a cross-sectoral consortium which has worked to align the principles from eleven different 21st Century skills frameworks⁷. The ATC21S researchers concluded that 21st Century skills can be grouped into four broad categories:

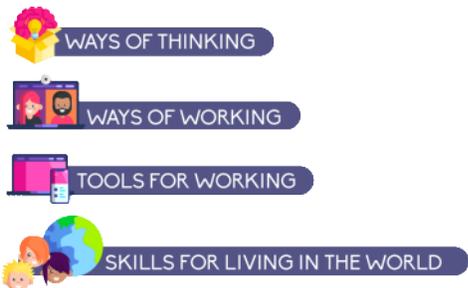


Figure 24 illustrates the ways in which the four categories described by ATC21S report includes skills across the cognitive, affective and behavioral domains such as creative and critical thinking, personal and social responsibility and communication and collaboration. In particular, this way of presenting these skills makes reference to the *tools* that learners need to successfully operate in a 21st Century world including a suite of digital and information literacies. However, many educators state that while they know these skills will be useful to their students, since they are not currently assessed, it's hard to know exactly what purpose these skills have in the future lives of our students, and to what extent educators should be devoting time to teaching them.



Figure 24 21st Century Skills categories according to the Assessment and Teaching of 21st Century Skills (ATC21S) consortium

Leveraging 21st Century Skills through Esports

The Institute for the Future 2020 Future Skills Report⁸ tackles some of these issues head on. By addressing how these skills might be utilized by students in a workplace of the future, the 21st Century Skills become a little less abstract. In Figure 25, we see the most in demand skill sets of 2020 such as *Novel and Adaptive Thinking* and *Cognitive Load Management* depicted in the smaller circles, with innovative 'disrupters' such as the *rise of smart systems* driving skill demand.

The skills identified here in both the 21st Century Skills frameworks and the Future Skills Report can be directly mapped onto those reported in the literature as associated with playing commercial video games as part of a DGBL or esports program. In fact, skills such as novel and adaptive thinking, social intelligence and virtual collaboration have been demonstrated to be key skills associated with esports game-play^{9,10,11}. Given that game design is included in a number of existing esports programs⁶, skills such as 'design mindset' will become increasingly of interest. In addition, design, particularly multi-media design, also features in aspects of digital literacies competencies, and across a number of roles in the esports ecosystem (such as branding, marketing etc) and therefore this skill may be much more relevant in a 21st Century esports program than it first appears.

Future Work Skills 2020

While a few drivers are important in shaping the landscape in which work skills emerge, the accelerating and plate-tectonic have indicate which drivers have particular relevance to the development of each of the skills



Figure 25 Future Work Skills 2020, illustrating the skills needed in 21st Century workplaces, and the 'disruptors' that will drive the demand for skills²

Much of the esports literature makes reference to complex skill sets used by both players, and the wider community¹². These skills are involved in every aspect of esports from game-play, to analysis and strategy development, to brand creation and management and collaborative community production, creating real-world learning environments and conditions, similar to those experienced in dynamic 21st Century workplaces:

With its emphasis on intense teamwork, its high communicative demands, on-the-spot informed decision making, and collaborative postmortem analytics could carry similar potential for learning 21st-century learning. (Lee and Steinkuehler 2019)

As educators, having opportunities to develop these critical skills in a way that will be useful in our students' future can be challenging given that it is difficult to predict what situations our students may find themselves in, or indeed which kind of employment, challenges or changes may yet emerge over the coming years. However, Figure 26, below, has been synthesized using the information from Institute for the Future and the 21st Century skills partnership, as well as earlier research conducted on esports (Section 2.2) to present a snapshot of the opportunities that esports provide, not only for teaching 21st Century skills, but for practicing these within the context of the *applied* skills that are likely to be demanded in a future society.

Institute for the Future Skill	Definition	Esports Context?
Sense-Making	Ability to determine the deeper meaning or significance of what is being expressed	Sense-making demands critical thinking, and the ability to make judgements and decisions. Research indicates that cognitive development and decision-making are improved using action video-games. The 'real-world' contexts provided by the graphically-rich environments, and the 'just-in-time feedback' supports students in problem solving, and making sense of their in-game failures, and critically, sign-posting them to better decision-making in future attempts. Sense-making aligns with ATC21s <i>Ways of Thinking</i>
Social interaction	Ability to connect to others in a deep and direct way, to sense and stimulate reactions and desired interactions	Socially intelligent employees are able to quickly assess the emotions of those around them and adapt their words, tone and gestures accordingly. esports are highly social environments with communities of players and spectators from all over the world who interact with each other via the medium of social media and entertainment platforms. Social Interaction aligns with ATC21s <i>Ways of Working and Living in the World</i>
Novel & Adaptive	Proficiency at thinking and coming up with solutions and responses beyond that which is rote or rule-based	This is "situational adaptability"—the ability to respond to unique unexpected circumstances of the moment. This requires creative thinking and rapid decision-making. Research indicates that cognitive development, decision-making and problem-solving can be greatly improved using action video-games

	Novel & Adaptive thinking	solutions and responses beyond that which is rote or rule-based	circumstances of the moment. This requires creative thinking and rapid decision-making. Research indicates that cognitive development, decision-making and problem solving can be greatly improved using action video-games, and over relatively short time periods, given consistent practice.
Novel & adaptive thinking aligns with ATC21s <i>Ways of Thinking and Living in the World</i>			
	Cross-cultural competency	Ability to operate in different cultural settings	Esports communities are formed from multi-player teams and international spectators, globally connected via the internet. These diverse communities are the perfect 'training ground' for learning about cultural norms, respect, diversity and responsibility.
Cross-cultural competency aligns with ATC21s <i>Living in the World</i>			
	Computational Thinking	Ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning	Research indicates esports players have to process large amounts of data in-game to dictate game-play, as well as being able to analyze scores, point systems and other players' strategy to improve their own skills. Making sense of game data, can help students improve statistical analysis and quantitative reasoning skills – and these can help them develop strategic decision-making capacities.
Computational Thinking aligns with ATC21s <i>Ways of Thinking</i>			
	New media literacy	Ability to critically assess and develop content that uses new media forms, and to leverage these media for persuasive communication	The next generation of workers will need to become fluent in texts and tools such as video, social media, e-publishing and so on. They will also need to be comfortable creating and presenting their own visual information. Whether spectating an international tournament, or reading, listening to or watching the media associated with them, esports provides opportunities for learning about interacting with and creating new forms of media.
New media literacy aligns with ATC21s <i>Ways of Working and Tools for Working</i>			
	Transdisciplinary	Literacy in and ability to understand concepts across multiple disciplines	The ideal worker of the next decade is "T-shaped"—they bring deep understanding of at least one field, but have the capacity to converse in the language of a broader range of disciplines. This requires a sense of curiosity and a willingness to go on learning far beyond the years of formal education. Cultivating curiosity through game-play, and offering opportunities to participate in the full 'ecology' of esports, as it permeates a range of disciplines and industries, is innately transdisciplinary. These vital experiences help prepare students for workplaces and careers in the 21 st Century.
Transdisciplinary aligns with ATC21s <i>Ways of Thinking and Living in the World</i>			
	Design Mindset	Ability to represent and develop tasks and work processes for desired outcomes	Workers of the future will need to become adept at recognizing the kind of thinking that different tasks require. Design thinking requires students to empathize with the 'user' or the person experiencing the problem. Techniques for empathizing involve skills in social research as well as interpersonal skills such as perspective taking and empathy – and can be explored as part of SEL in Esports. The Design Mindset can be applied to any design challenge within your esports ecology including website design, branding and media, event and competition design and so on.
Design Mindset aligns with ATC21s <i>Ways of Thinking</i>			
	Cognitive Load Management	Ability to discriminate and filter information for importance, and to understand how to maximize cognitive functioning using a variety of tools and techniques	Much of the DGBL literature discusses cognitive skills and the importance of focus, multi-tasking and prioritization. Action video-games such as those used in esports have been shown to significantly enhance and develop cognitive functions.
Cognitive Load Management aligns with ATC21s <i>Ways of Thinking</i>			
	Virtual Collaboration	Ability to work productively, drive engagement, and demonstrate presence as a member of a virtual team.	Work places of the future will need individuals to develop strategies for engaging and motivating a dispersed group. Techniques borrowed from gaming are extremely effective in engaging large virtual communities. These skills can be fostered through building communication and communicators that provide immediate feedback, clear objectives and a staged series of challenges. Esports' need for collaboration and team-play in a virtual environment offers unprecedented opportunities for students to practice these skills in a safe environment.
Virtual Collaboration aligns with ATC21s <i>Ways of Working</i>			

Figure 26 Opportunities for *future-ready* and *work-place appropriate* skill development provided by scholastic esports

3.3 STEM Skills



STEM and Esport – What's the Connection?

Esports have been shown to have strong links to science, technology, engineering, and mathematics curriculum and career pathways. According to the [North American Scholastic e-Sports Federation](#) esports have the potential to “change the game in how we integrate STEM education with workforce sectors and industries”. In some schools, esports programs are taught as part of STEM and Career Technical Education (CTE) education, as well as in programs such as English and Language Arts^{9,13}.

There is a strong body of evidence to suggest that esports participants are not just developing skills for the esports industry itself, but that they are learning skills and competencies that are desirable across a wide spectrum of employers in Science, Technology, Engineering and Math fields. The variety of roles and responsibilities presented by the esports ecosystem (playing, event organizing, strategy development, game analysis, media production and so on) lead to a variety of opportunities for STEM learning that have intrinsic links to STEM careers^{9,12,13}.



These roles have strong ties to science, technology, engineering, and mathematics related content and careers that are rarely made explicit, even though they develop skills valued in high tech careers at the intersection of STEM and Entrepreneurship. Anderson et al (2018)

This intersection of learning in technology-rich environments, with collaborative, peer-driven approaches that demand problem solving and critical thinking, may give esports students an edge over others in 21st Century STEM workplaces¹³.

As detailed in Section 2.2, higher order cognition, and the development of cognitive skills and abilities are associated with game-based learning, particularly when using action video games. Studies indicate that gamers develop a wide variety of superior skills through game-play including tracking objects, detecting changes to objects stored in visual short-term memory, switching quickly from one task to another, and mentally rotating objects more efficiently than non-gamers¹⁴. These **spatial abilities** are associated with success in STEM subjects such as math, science and engineering, as well as influencing the choice of mathematics and science as majors in college¹⁵. Esports participation, regardless of level, nurtures mastery of skills and knowledge associated with diverse careers that span the whole technology sector - across data science, software and web development, social media marketing, and event organizing¹³. These associations between esports and STEM learning and STEM careers are being recognized in high school and college education. Massachusetts Institute of Technology (MIT) renowned for its innovations in the technology sector has hosted an [esports panel](#) since 2007 to explore the innovations and trends in the industry. Meanwhile the United States High School Esports League now offers a STEM accredited programme.



How can we leverage STEM Learning through Esports?

Game-based learning activities are believed to be suited to STEM learning because they are well-aligned with inquiry-based learning approaches used by science educators, and foster the development of hypotheses, experimentation, and discovering the consequences of actions¹⁶. A large number of studies have explored the ways in which video-games may contribute to developing scientific literacy and the critical skills required for engaging in scientific discourse, reasoning and inquiry^{17,18,19}.

An evaluation of naturalistic game-play (not structured by adults/educators) in six school esports clubs in Orange County identified 5 key areas of student talk including in Science and Mathematics, as well as in English Language Arts, SEL and Relationships. Figure 27 identifies the core areas of STEM discourse.

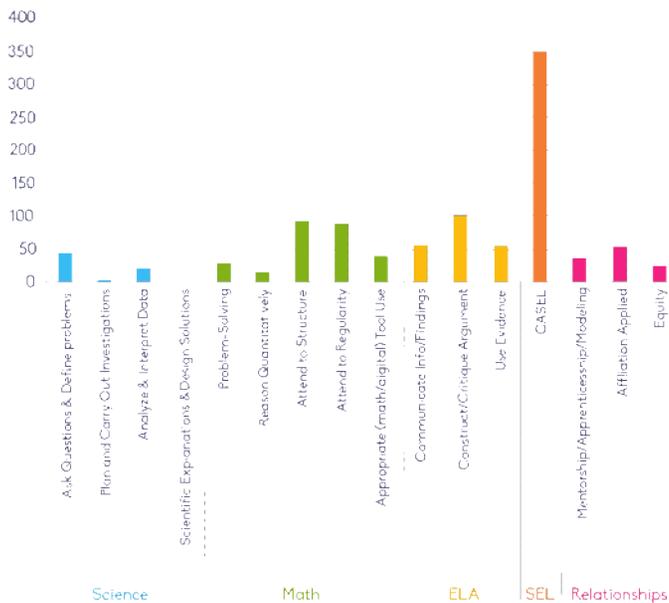


Figure 27 Key topic areas of student talk, by curricular subject in Orange County high school esports clubs¹²

Much of the literature expresses the need for educators to scaffold the learning experiences during game-based learning activities. By supporting students in identifying aspects of the scientific method, inquiry-based learning, or mathematical tool selection in their gameplay (What did I think was going to happen? How can I test this idea?), by using discussion and metacognitive strategies to help students see cause and effect relationships (when I did *this* in-game, *that* happened), and drawing comparisons between similarities between the game-world and the real world (in the game when you drop an item it floats, why wouldn't that happen in our world?), educators can help shape scientific, systemic, analytic and relational thinking as well as problem solving and creative thinking - important skills across many aspects of STEM learning.

Using metacognitive approaches to help students make connections between scientific inquiry approaches, or mathematical tool selection and the outcome of their game-play is an important part of supporting students in developing strategies for success. However, these reflective tools alongside collaborative learning approaches also provide opportunities for students to relate their game-play sessions to learning outcomes, and importantly, to their real world experiences.

Note: Figure 27 shows by far that the greatest area of student talk observed fell into the social and emotional learning category. We explore this further in section 3.5.



Widening Access to STEM through Esport

Early research indicates that scholastic esports programs may improve STEM outcomes for students. In particular, research by UC Irvine¹ has shown that students who participate in esports as opposed to other after-school activities have better STEM participation, career knowledge, and engagement²⁰.

Additionally, research shows that playing action video games, such as those commonly played in esports can enhance performance on spatial tasks. As there is a strong connection between spatial cognition and performance in STEM disciplines, video games that strengthen spatial abilities may enhance student performance in STEM learning.

For other underrepresented groups, such as minority groups and students with disabilities, reports from scholastic esports programs show a trend of these students participating in greater numbers as compared with other extracurricular activities. Therefore, esports may offer a unique opportunity for engaging these students in STEM learning leading to STEM career pathways^{21, 22}.

3.4 Connected Learning

Connected Learning is an approach that recognizes that today's students live, socialize and learn in ways that are quite different from those growing up in the industrial era. Young people operate in highly connected, often international social networks, they have instant access to information and news from around the world, and many of them take part in leisure activities that involve the kinds of technologies and on-line communities that require interaction with, and production of, a variety of complex materials (Gee).²²



Young people are using the Internet, communication media, digital tools, and membership in virtual communities of practice to develop technical expertise in such areas as digital video, digital storytelling, machinima, fan fiction, history and civilization simulations, music, graphic art, political commentary, robotics, anime, fashion design, and nearly every other endeavor the human mind can think of. Gee and Levine (2009)

While students engage in these complex digital, social activities at home, at school they are often presented with more traditional forms of learning. This disconnect between what Gee and Levine (2009) refer to as *'the real world outside their classrooms and the contrived, dated world that exists within'* has been highlighted as one potential reason for high disengagement and falling standards as well as a widening digital skills gap²³.

Connected Learning seeks to readdress this balance by tapping into student passions and interests, leveraging digital technologies and empowering students to shape their learning to develop skills suitable in a 21st century world. The Connected Learning Association define it as:



Socially embedded, interest-driven, and oriented toward educational, economic, or political opportunity. Connected learning is realized when a young person pursues a personal interest or passion with the support of friends and caring adults, and is in turn able to link this learning and interest to academic achievement, career possibilities, or civic engagement.

Educational research agrees that learners' satisfaction and interest are related to academic achievement²⁵. In one study conducted in Orange County schools, student interest in esports was such that an esports program was used as a *'trojan horse'* for Connected Learning. In this case, students' passion for esports participation was connected with curriculum, career and civic achievement²². This research, and therefore the Connected Learning approach, underpins the NASEF esports programs.

The short video below introduces the Connected Learning Approach and highlights its six design principles.

[Connected Learning: The urgency and the promise](#)



How can we leverage Connected Learning through Esports?

Video-games, and in particular esports, tap into students' innate passions and interests, and connects them to meaningful learning, not just in school across home, peer and community networks. Studies conducted on school esports programs concluded that esports is perfectly positioned to support Connected Learning Approaches to teaching and learning, offering a nexus of interest-driven, socially interactive and digitally mediated content²⁶. Furthermore, well-designed esports programs can transcend the divide between school, home and community. Figure 28 presents the six Design Principles of Connected Learning and we illustrate how these can align with your esports program design.



Design Principles of Connected Learning



Esports



Interest-Powered

Interests foster the drive to gain knowledge and expertise. Research has repeatedly shown that when the topic is personally interesting and relevant, learners achieve much higher-order learning outcomes. Connected learning views interests and passions that are developed in a social context as essential elements.

Game-based learning, and esports are both well-associated with intrinsic motivation and interest-driven play, and both are socially-mediated. It is important not to assume that all games will interest all students in your class, so providing choice, or opportunities for the students to suggest titles that can be tried and tested and voted on will be an important part of ensuring your esports program is interest powered.



Production-Centered

Connected learning prizes the learning that comes from actively producing, creating, experimenting and designing because it promotes skills and dispositions for lifelong learning and for making meaningful contributions to today's rapidly changing work and social conditions.

The communities that develop around the esports meta-game are well-known for the production of websites, forums, mods, Let's Plays, reviews and so on using a variety of media from social media to streaming platforms and discussion tools such as Discord. Tapping in to these authentic esports practices in your program will provide a simple way to production-centered learning that reflects real-world youth culture and develops 21st century skills.



Peer-Supported

Connected learning thrives in a socially meaningful and knowledge-rich ecology of ongoing participation, self-expression and recognition. In their everyday exchanges with peers and friends, young people fluidly contribute, share and give feedback. Powered with possibilities made available by today's social media, this peer culture can produce learning that's engaging and powerful.

Esports is widely acknowledged for its global, participative, connected communities. Using your esports program to explore safe, respectful and ethical online practices with students alongside enabling them to develop SEL skills in relating to others and understanding different cultures and perspectives will promote peer-supported learning practices.



Shared Purpose

Today's social media and web-based communities provide unprecedented opportunities for caring adults, teachers, parents, learners and their peers to share interests and contribute to a common purpose. The potential of cross-generational learning and connection unfolds when centered on common goals.

Esports can simply be dismissed as kids playing video-games, or it can be embraced as part of a wider school culture that invites teachers, parents and others in the community to participate. Whether this is in shirt-design for the team, raising funds for events, or family play-along sessions to help parents see the learning potential of esports, it's worth considering how your esports program will help develop shared-interests across the wider school community



Academically Oriented

Connected learning recognizes the importance of academic success for intellectual growth and as an avenue towards economic and political opportunity. When academic studies and institutions draw from and connect to young people's peer culture, communities and interest-driven pursuits, learners flourish and realize their true potential

Esports can be provided as an extra-curricular club, but we also know there is an opportunity to connect it to curricular subjects such as Career Technical Education, ELA, Media Studies, 21st Century Skills, STEM learning and so on. Regardless of how you choose to deliver the program, the evidence shows us that connecting it to learning content can help students develop a range of skills that will empower them to be successful in a 21st Century world.



Openly-Networked

Connected learning environments link learning in school, home and community because learners achieve best when their learning is reinforced and supported in multiple settings. Online platforms can make learning resources abundant, accessible and visible across all learner settings.

This principle links well with Shared-Purpose, inviting you to consider the ways in which learning can be supported in contexts outside of school. We know that esports is already being played by millions of students outside of school, so there is potential for educators to extend the learning aspects of their program into other contexts too. How does your school make learning materials accessible to students when they are at home? How are family members encouraged to access those resources? Are there tools you can use to encourage this kind of engagement with your program?

Figure 28 The six Design Principles of Connected Learning

3.5 Social & Emotional Learning

There is a wealth of research that supports the concept that video games, their environments, and their resultant communities give young adults the opportunity to practice and perfect social and emotional skills^{27,28}. In an evaluation of school esports clubs in Orange County, observations of student talk under naturalistic play conditions (student-led/largely unstructured by adults), led researchers to conclude that 'Social and Emotional Learning is by far the greatest educational potential of the [esports] program'¹².

Educators are particularly interested in evidence that suggests esports participation can have long-term impacts on relational competences and personal choices for well-being²⁹. These behaviors, value-based judgements and attitudes can be explored in class through the lens of social and emotional learning (SEL).

 Social and emotional learning (SEL) is the capacity to recognize and manage emotions, solve problems effectively, and establish positive relationships with others, competencies that clearly are essential for all students. The Collaborative for Academic, Social and Emotional Learning

As with 21st Century skills there are a number of definitions and frameworks available for working with students' Social and Emotional Skills. The Collaborative for Academic, Social, and Emotional Learning (CASEL) describe SEL as the process of effectively applying the knowledge, attitudes, and skills necessary to recognize and manage emotions; developing caring and concern for others; making responsible decisions; establishing positive relationships; and handling challenging situations capably³⁰.



Figure 29 Social and Emotional Learning Framework from the Collaborative for Academic, Social and Emotional Learning (CASEL)³⁰

The CASEL framework (Figure 29) identifies 5 important areas in Social and Emotional Learning including:



Self-awareness

- Identifying emotions
- Accurate self-perception
- Recognizing strengths
- Self-confidence
- Self-efficacy



Self-management

- Emotion-control
- Stress-management
- Self-discipline
- Self-motivation
- Goal-setting
- Organizational skills



Social awareness

- Respect-taking
- Empathy
- Appreciating diversity
- Respect for others



Relationship skills

- Communication
- Social engagement
- Relationship-building
- Teamwork



Responsible decision-making

- Identifying problems
- Analyzing situations
- Solving problems
- Evaluating
- Reflecting
- Ethical responsibility

These five broad areas can be generalized into two categories, Interpersonal Skills (refers to the knowledge, skills, and attitudes directed toward other people, institutions, or social structures) and Intrapersonal skills (ways of dealing with oneself, including ones' thoughts and emotions. These are the awareness, beliefs, and skills directed and applied inwardly)³¹.



Interpersonal Skills and Esport

One phenomenon associated with esports gaming is that it produces a hotbed of social interaction, providing many opportunities for connecting with a wide variety of people. Moreover, this highly social aspect occurs throughout the whole esports ecosystem, between players on a team, between teams, and within the international spectator community. These interactions, the co-operation and collaboration, as well as the communication that takes place within the wider community create a case for students' developing some of the relationship skills associated with SEL competencies including **Social Awareness**, particularly the benchmark 'appreciating diversity and respect for others' given the highly international and inclusive aspects of competitive global esports. The team-play dimension of an esports program also provides fertile ground for developing **Relationship Skills** relating to benchmarks for *communication, teamwork and social engagement*, as well as other SEL skills such as perspective-taking and empathy that go hand-in-hand with the compromise and negotiation that result from any team activity.



Intrapersonal Skills and Esport

In addition to these explicit SEL competencies, numerous studies cite 'self-confidence' and improvements in 'self-esteem' as major impacts for esports players³². These benefits relate to competencies such as **Self-Awareness**, and signpost possible crossovers between SEL and health & well-being within the curriculum. Health, nutrition, and exercise appear in some of the existing high school esports programs (detailed in Chapter 4), but this overlap with self-esteem may provide opportunities for developing practices for mental health and well-being too enabling educators to provide scaffolding or students to develop practices and tools required in the **Self-Management** domain of the CASEL framework.

Further studies indicate that the highly social aspect of esports may also create an environment for developing the SEL skills relating to self-management, self-awareness and goal orientation. Studies show that competitive gaming can:



Stimulate significant changes in the players including their leadership skills, role-management skills, as well as their capacity to be part of a group and interact for the achievement of a common goal. Masala & Iona (2018)

Esports programs can provide safe environments for young people to play out and practice relationship skills, and may contribute to the development of a growth mindset. Masala and Iona(2018) suggest that video-games provide adolescents with a safe space to practice and develop self-esteem, cognitive skills, autonomy and peer relations, while offering a much lower rate of failure than in the a real world setting. This idea of providing safe spaces for students to fail, sometimes referred to as *Failing Forward*, is a recurring theme in Game-based Learning. In this regard, games create a non-threatening environment, where players are rewarded for taking risks, for effort and for persisting (or trying again, and again until they succeed). It is from this failure that players use feedback to improve their game-play. In essence they use failure to learn how to succeed. This persistence, and ability to fail forward are components of a growth mindset³³, and are in keeping with *mastery learning* associated with DGBL.



How can we leverage Social and Emotional Learning through Esport?

According to the SEL Assessment Working Group (AWG), social and emotional learning competencies are developed through:

- A supportive learning environment
- Positive interactions with adults and peers
- Explicit SEL instruction
- The integration of SEL into academic instruction

This emphasizes the need for educators to consider the ways in which they can explicitly teach SEL skills and competencies, while weaving it through curricular instruction. Since much of the Game-Based Learning research suggests that a large part of the learning takes place in the meta-game – the communities that develop around the game including forums, fan sites and discussion groups, there are opportunities here for educators to:

I. Identify the kinds of social interaction taking place during esports game-play, specifically, the positive interactions that occur between peers (noted by the AWG above)

Some researchers have used the discussions in the chat forums to identify key areas of student talk, revealing high-level student discourse around scientific thinking, critical thinking and ethical reasoning. In the aforementioned study that took place in Orange County schools, researchers observed scholastic esports clubs during unstructured game-play and found that the majority of the discussions taking place related to social and emotional learning competencies identified by the CASEL framework¹². This approach can be used by educators to identify SEL taking place.

Listening to student discussion during gameplay, observing and recording interaction during game-play and by reviewing student discourse in forums, educators can get an initial, or baseline, indication of the kinds of talk and learning occurring as an innate part of their esports program.

II. Select an SEL Framework to work with to develop explicit SEL learning activities

With this baseline identified, educators can select an SEL Framework to support the development of SEL learning objectives and design instructional activities (in-game and out-of-game) to target the development particular SEL competencies. Continuing to review forums and discussions as a source of evidence will help educators track changes in student talk and learning.

The AWG suggests that taking time to select an appropriate, high quality SEL framework is essential because it provides practitioners with:

- A set of competencies to consider
- Consistent language that ties to theories and empirical studies and helps communicate with stakeholders
- Clarity about how its SEL competencies develop over time in children (i.e., [developmental sequence](#)).
- Guidance, tools, and resources to support implementation in practice (e.g., theories of action, implementation rubrics, other tools to foster implementation).
- Available curriculum/programming and assessment tools.

III. Explicitly involve students in SEL practices (goal setting, observation, critical analysis, reflection and reporting)

One of the most powerful methods of making Social and Emotional Learning visible, or explicit for students, is to openly involve them. Share the learning criteria from your SEL framework with them, invite them to choose areas for development, explicitly link game-play or meta-game behavior and choices to successful SEL. Challenge students to review particular segments of their own chat forums using SEL criteria, and assess to what extent the discussion might indicate successful learning against SEL criteria. Self-reflection, self-assessing and reviewing their own development will be crucial for students in an SEL capacity.



Esport SEL Example Activity

A good example of how an educator might introduce some of these ideas in an esports program is through an exploration of what some refer to as '*The Toxic Culture of Gaming*'. Since developing empathy, respect for diversity and perspective-taking are the cornerstones of any SEL framework, inviting students to collaboratively develop rules, guidelines or safe-practices for community engagement in their esports forums is a direct, and authentic way to explore SEL competencies. Challenging students to consider how it might feel if 'someone wrote this about your team', or 'someone excluded you from play', for example is a good starting place for encouraging students to consider the attitudes, beliefs, values and behaviors of a healthy, inclusive esports community. Educators can also refer to the [Swedish Esports Code of Conduct](#) as a source of inspiration for students in developing rules for ethical play and participation³⁴ or to [AnyKey.org](#) for guidance on developing inclusive, diverse and participate gaming communities.



The SEL Assessment Working Group (AWG) have developed an SEL Assessment toolbox for educators. They emphasize the importance of considering the developmental nature of SEL when considering assessment practices, especially given that generally intrapersonal skills (self-management, self-regulation) are developed in elementary school, while more complex intrapersonal skills (mindsets, beliefs, values) develop later. This is also useful for educators when designing ways for students to contribute to SEL practices (self-report, peer-rating, reflective practice), understanding that younger children are less able to self-evaluate will very much shape instructional and assessment design.

3.6 Digital Literacies

Beyond all of the other explicit skills that may be developed as part of an esports program, it is important to remember that a large part of the learning will be taking place within a digital environment, while the remainder will be making some sort of reference to it. Whether the issue is being learned in-game (for example, how to improve a particular aspect of game-play, or how to execute a strategy) or out of game (discussions on sportsmanship and values, cybersafety, cyberbullying etc.), there are great opportunities to embed Digital Literacy learning into your esports program.

Like many other educational concepts, there is no single definition for Digital Literacy. Digital Literacy is referred to as *an umbrella concept for important skill clusters* by UNESCO³⁵. The skills included are ICT literacy, Technological literacy and Information literacy. However, given the evidence for the range of learning that esports have the potential to teach, and with particular consideration of its global context, and international community, we also draw from literature that discusses Digital Citizenship.



Digital Citizenship is the quality of habits, actions, and consumption patterns that impact the ecology of digital content and communities. Heick (2018)

The Institute for Technology Education (ISTE) provide student standards for digital literacy³⁷, shown in Figure 30, that provide benchmarks for competencies such as innovative design, computational thinking and global collaboration, among others as well as referencing the competencies of the Digital Citizen, which lend themselves easily towards teaching within an esports program.

Global collaborator and Digital Citizen perhaps have the most obvious links to esports, which taps into practices of a large, socially diverse, international community. However, all of the benchmarks have some useful purpose in an innovative esports program. We explore these further here, as part of our approach to leveraging Digital Literacy via Esports.



Figure 30 The Institute for Technology Education (ISTE) Digital Literacy Framework³⁷



Digital Literacy and Games

As communication has become increasingly shaped by developments in digital and multimedia technologies, society has to accept that literacy can no longer solely be considered a linguistic practice³⁸. Educational standards are beginning to consider the ways in which their students engage with digital media as part of their everyday, out-of-school culture, as well as considering the ways in which we define a 'text'³⁹.

In Digital-game based learning, video-games are positioned as *multimodal texts* that combine written and spoken language, images, graphics, and symbols with sound⁴⁰. Players must engage with these *texts* to decode the meaning of specific signs, symbols and images. On this basis Gee (2003) argues that learning to play a videogame requires sense-making on the part of the student, and leads to players gaining a new form of literacy⁴¹.



Over the past decade educators have begun to rethink the ways in which we define a 'text', moving towards an understanding that meaning is communicated through combinations of two or more modes. Modes include 'written language, spoken language, and patterns of meaning that are visual, audio, gestural, tactile and spatial'. This interpretation of text as multimodal includes picture books, text books, and posters, film, animation and web pages, but can also include dance, performance, and oral storytelling to convey meaning. Victoria State Government, Education & Training

However learning using video-games isn't just about reading and interpreting multimodal texts, it's about producing them too. In this context, students become content creators within a community, co-creating knowledge and learning experiences for others. For example, many gamers and esports community members will be familiar with the format of 'Let's Plays' which are generally found on Twitch or YouTube channels. Researchers suggest that the complex skills required to create this content are pedagogically similar to the 'see one, do one, teach one' methodology⁴², since the author must grapple with digital literacy skills to:



Record and edit video, capture and stream gameplay and other on screen actions, high levels of technical communication, and the ability to inform and educate others while accomplishing complex tasks. At the same time the participants feel like they are playing and being part of a community, not learning or teaching. Smith and Sanchez (2015).

Let's Plays are just one aspect of content creation in the esports ecosystem, that representing three core strands within digital literacies; curation, creation, and participation. However the myriad roles and responsibilities associated with participation in the esports community present many opportunities for developing wider digital literacies. In particular Steinkuehler and King (2009) refers to a 'constellation of digital and print textual practices entailed in online gaming' and their research, with adolescent boys identified as "at risk" and failing in literacy-related classes shows that student practices and products (such as researching, assembling, and synthesizing information) from these gaming activities often exceed state and national standards in reading, writing and technology⁴¹.

Another aspect of esports, and gaming communities more generally, is the culture and practice of *modding* – or making modifications to the game. This can be a complex practice undertaken by whole communities (in for example the case of World of Warcraft fan communities who may create new 'hot key' functions at the game interface, or enhance other in-game features), but the same skill sets can be observed in younger students undertaking modifications in, for example, Minecraft. Minecraft allows for the modification of both the look and feel through resource pack development, and the mechanics through behavior pack development. Players of all ages are able to modify almost every aspect of Minecraft to suit their vision. A community of young players have recreated Hogwarts School of Witchcraft and Wizardry to capture the authentic look and feel of the castle, as well as the people and creatures that inhabit the world. This requires competency in a wide range of coding and software packages as well as the inner workings of the Minecraft file system. Furthermore, the community release [YouTube videos](#) to share their expertise in modding, for example how to make your own magic wand. Some research suggests that these highly skilled practices represent a form of Digital Literacy and computational fluency by demonstrating an ability to understand and use computational models and processes to conceptualize and solve problems^{42,43}.

These innate gaming practices are stimulated both by the game (as a text), and the community surrounding it, requiring 'complex and nuanced' skills that are a function, and a product of the metagame community (Gee, 1999). Esports, and their community activities, offer educators powerful, evidence-based approaches to teach literacies, and importantly to engage those who are most often most disenfranchised and at risk.



How can we leverage Digital Literacy through Esport?

There appear to be great opportunities for developing esports programs that help students practice and refine their skills in a whole 'constellation' of literacy skills. Figure 31 identifies the seven Digital Literacy Competencies as outlined by ISTE, and maps the ways in which these can be introduced as part of an esports program.

 ISTE Competency	 ISTE Definition	 Esport Opportunity	 Esport Example
 Empowered Learner	Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences. <i>Benchmark 1a</i> Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.	Self-directed learning and Self-efficacy are strongly associated with game-based learning and esports, partly as a consequence of the 'fail forward' environments created by games that help students to persevere and learn to overcome obstacles to succeed. By developing esports programs that empower learners to make choices, set goals for their own learning and reflect on the choices that led to success, educators can work towards this capacity.	In esports, many team games provide students with the opportunity to choose a character (with particular skills), or to choose a role (e.g. a captain, an explorer, a protector, a healer etc. see our Busy Bees and Pirate Cove Esports Minecraft Worlds). Providing students with choice over the role they will play in a team, and enabling them to develop the skills required to be successful in that role, alongside reflecting on the decisions and behaviors that led to both success and failure in their role empowers learners to set targets, practice, and understand their own strengths and development needs.
	Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they	Esports, are by their nature highly collaborative, being comprised of diverse community members. Yet, they can be associated with online 'toxic'	In general, young people who participate in esports for leisure are spectators, and while they can be part of an active community, their role can be somewhat



Digital Citizen

interconnected digital world, and they act and model in ways that are safe, legal and ethical

Benchmark 2b Students engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.

can be associated with online culture. By modelling respectful, safe and ethical on-line participation within esports programs, educators can support students in embodying principles of respecting diversity, perspective taking and empathy, required in a connected, collaborative learning environment. Many esports programs actively include cybersafety and netiquette courses which help support the development of these competencies.

community) that you can be somewhat passive. As part of a esports community at school, students have the opportunity to be in charge. An activity that can greatly develop a 'digital citizen mindset' involves asking students to develop the rules and ethics for their school team (considering events that they may play at a regional, national and international scale). Can they investigate their legal rights to broadcast? What are the ethical and legal responsibilities of moderating, coaching, playing, broadcasting and hosting an esports event?



Knowledge Constructor

Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

Benchmark 3c Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

Esports is famed for is active communities who create discussion forums, websites, Let's Plays, Wikis and so on to support the construction and sharing of expertise. Tapping into the practices of this vibrant community for the purposes of classroom learning will offer students a real-world experience of co-creating digital knowledge as part of an esports program, in a safe, educational space.

Whether constructing websites, marketing materials, narratives for games, character studies, or developing guidance materials (such as Let's Plays) for other players, there are a wealth of opportunities for students to be active constructors of knowledge and content in an esports program. Esports communities use many different places to co-create content (e.g. fan websites and forums). An authentic way to begin to build such a community is by challenging students to design their own esports website with community forum, or alternatively, exploit software (either a school intranet, or software such as Discord) to encourage students to provide help and support to each other via audio and text chat functions.



Innovative Designer

Students use a variety of technologies within a *design process* to identify and solve problems by creating new, useful or imaginative solutions.

Benchmark 4a Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.

Innovative Design relates to the 'Design Mindset' referred to in Figure 25 Section 3.2 Many existing esports programs provide students with opportunities to use inquiry-based approaches to solving problems, both in-game and out-of-game. The Orange County ELA esports program offer courses such as hospitality and game-design that mirror real careers in the esports industry. Here students must propose innovative solutions to real-world problems using technology in order to deliver their esports event, or game product. Introducing a design process (such as a Design Thinking framework) into a new esports program would be one way of supporting students develop the 'processes' that match a design mindset in this competency.

The opportunities for innovative design depend on the learning objectives of your esports program. However, there are design aspects involved in many parts of the esports ecosystem including the commercial aspects (branding, marketing, merchandise), game design (animations, characters), and ergonomics (comfortable mouse, efficient keyboards, well-designed gaming chairs etc.)

A simple way of getting students started with considering human-centered design is in considering their own school Team brand, challenging them to design their own logo, merchandise and streaming channel to reach a specific audience. How will they use particular aspects of design to reach their desired target group? Introducing a design process such as Design Thinking here, would support them in identifying ways in which to connect with, and empathize with their target audience.



Computational Thinker

Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.

Benchmark 5b Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.

Computational Thinking competencies include the processing, analysis and use of large data sets, which are also associated with tactical and strategic game-play in esports, particularly post-game. It may also be associated with the kind of problem solving that occurs through *modding*, or creating 'add ons' to an existing game. In addition some esports programs involve teaching aspects of game design (such as coding) which can help develop the logic required for solving computational thinking problems.

Esports game-play and analysis provide many opportunities to engage students in computational approaches to working with data – including abstraction, algorithmic thinking, pattern recognition and so on.

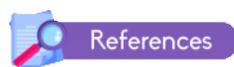
A simple way to get started with using esports in this way is to record your student's gameplay (using screen recording, Win10's built-in WinG, OBS etc.). After the match, invite them to reflect collectively on their play. Which decisions led to success? It's hard to remember individual decisions when you are involved in a bigger game.

			<p>Replay the screen recording, and pause it after each significant move/decision. You can use colored pens, and introduce language to help students frame and categorize the kinds of decisions/play.</p> <p>After some practice, students will be able to do this with significantly less scaffolding, and they will be able to use their game play analysis – this algorithmic approach, to build strategies for individual team member development and team gameplay.</p>
 <p>Creative Communicator</p>	<p>Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.</p> <p><i>Benchmark 6a</i> Students publish or present content that customizes the message and medium for their intended audiences.</p>	<p>The esports ecosystem, comprised of players, teams, spectators and a range of organizers and professionals. This ecosystem thrives on active, vibrant, participative communities who create a range of communication pieces (discussion forums, websites, Let's Plays, reviews etc.) across a range of media (text, e-publishing, video streaming and podcasting). Developing these collaborative, participative and creative communication skills should be a key aim of your esports program.</p>	<p>As with other aspects of digital literacy, there are many opportunities for an esports program to promote creative communication.</p> <p>A good example of this is the role of the <i>Shoutcaster</i> – a person who provides commentary on the game-play for the audience. Here students have to both customize the key messages to the esports audience, and use the correct medium to do so. Inviting your students to practice 'shoutcasting' to recorded portions of game-play, as well as reviewing language, tone and terminology of professional shoutcasters will be a useful exercise in developing creative communication</p>
 <p>Global Collaborator</p>	<p>Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.</p> <p><i>7c Students</i> contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.</p>	<p>Much of the Game-based learning research points to affinity spaces - communities that are organized around passion and interest, and not determined by gender, race, age or socio-economics. These communities provide incredible opportunities for collaboration with diverse community members, and most often lead to co-creation, knowledge construction and problem solving (discussion forums, websites, Let's Plays, reviews etc.), all focused around in-game challenges.</p>	<p>The co-creation and production of texts that occurs as a result of esports' international communities can be used as a model for similar collaboration in a school esports program.</p> <p>By providing support for students to learn how to build respectful, welcoming and diverse collaborative spaces in class, and by enabling them to practice using digital tools to develop products, you can model how these spaces can and should operate outside of school. With these best practices in place, can your students collaborate with other local schools to co-create together? Example products might be a regional esports website or brand identity. Perhaps they collaborate to set up a local esports event, or might their collaboration be about providing mentoring via a top tips wiki, forum or play throughs to help other students learn to play?</p>

Figure 31 Illustrating the potential for ISTE's Digital Literacy Competencies to align with esports program objectives

On-going research suggests that educators are under increasing pressure to include Digital Literacy as part of their classroom teaching³. However, teachers cite a number of obstacles from lack of confidence in using technology, and time pressures from examination schedules to concerns relating to e-safety and technology use. Moreover, a recent study suggested that the myriad definitions and terminology related to the concept of Digital Literacy has made it difficult for teachers to determine exactly what and how they should be addressing this concept⁴⁴. Esports can be used as a context for embedding digital literacy teaching and learning into a school curriculum. Using frameworks such as the ISTE Digital Literacy Student Standards, and others can help scaffold and elucidate the learning objectives of digital literacies and digital citizenship as part of an esports curriculum, leveraging the potential of video-games to tap into the interests and passions of the students, as well as providing a rich multimodal stimulus for their own text production.

3.7 References



1. Young, M. F., Slota, S., Cutter, A. R., Jalette, G., Mullin, G., Lai, B., Yukhymenko, M. (2012). Our princess is another castle: A review of trends in serious gaming for education. *Review of Educational Research*, 82, 61–89.
2. Squire, KD Cultural framing of computer/video games, *Game Studies: The International Journal of Computer Game Research* 200212
3. Hilvoorde, Ivo & Pot, Niek. (2016). Embodiment and fundamental motor skills in eSports. *Sport, Ethics and Philosophy*. 1-14. 10.1080/17511321.2016.1159246.
4. Hamari, J. and Sjöblom, M. (2017), "What is eSports and why do people watch it?", *Internet Research*, Vol. 27 No. 2, pp. 211-232. <https://doi.org/10.1108/IntR-04-2016-0085>
5. Taylor, P., Davies, L., Wells, P., Gilbertson, J., & Tayleur, W. (2015). *A review of the social impacts of culture and sport*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416279/A_review_of_the_Social_Impacts_of_Culture_and_Sport.pdf
6. Anderson, Craig & Tsaasan, A.M. & Reitman, Jason & Lee, Je Seok & Wu, Minnie & Steel, Holly & Turner, Tom & Steinkuehler, Constance. (2018). Understanding Esports as a STEM Career Ready Curriculum in the Wild. 1-6. 10.1109/VS-Games.2018.8493445.
7. Binkley, M., Erstad, O., Hermna, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. (2012). *Defining Twenty-First Century Skills*. In Griffin, P., Care, E., & McGaw, B. *Assessment and Teaching of 21st Century Skills*, Dordrecht, Springer.
8. Future Work Skills 2020 (2011) Institute for the Future Institute for the Future for the University of Phoenix Research Institute, http://www.iff.org/uploads/media/SR-1382A_UPRI_future_work_skills_sm.pdf
9. Squire (2002), Cultural Framing of Computer/Video Games, *Game Studies*, the international journal of computer game research Volume 2, Issue 1
10. Wagner, Michael. (2006). On the Scientific Relevance of eSports. 437-442.
11. Steinkuehler, Constance & King, Elizabeth. (2009). Digital literacies for the disengaged: Creating after school contexts to support boys' game-based literacy skills. *On the Horizon*. 17. 10.1108/10748120910936144.
12. Je Seok Lee and Constance Steinkuehler. 2019. Esports as a catalyst for connected learning: the North America Scholastics Esports Federation. *XRDS* 25, 4 (July 2019), 54–59. DOI:<https://doi.org/10.1145/3331075>
13. Rothwell, Gregory & Shaffer, Michael. (2019). education sciences Review eSports in K-12 and Post-Secondary Schools. *Education Sciences*. 9. 10.3390/educsci9020105. <https://pdfs.semanticscholar.org/a458/845076be086da81e2a98f4eac63ce1a2ea13.pdf>
14. Green, C. S., & Bavelier, D. (2012). Learning, Attentional Control, and Action Video Games. *Current biology*, 22(6), R197–R206.
15. Casey M. B., Nuttall, R., Pezaris, E., & Benbow, C. P. (1995). The influence of spatial ability on gender differences in mathematics college entrance test scores across diverse samples. *Developmental Psychology*, 31(4), 697-705. doi: 10.1037/0012-1649.31.4.697
16. Mayo, Merilea. (2009). Video games: A route to large-scale STEM education? *Science* (New York, N.Y.). 323. 79-82. 10.1126/science.1166900.
17. Barab, S., & Dede, C. (2007). Games and immersive participatory simulations for science education: An emerging type of curricula. *Journal of Science Education and Technology*, 16(1), 1-3. http://www.fisme.science.uu.nl/publicaties/literatuur/2007_barab.pdf
18. Squire, Kurt. (2003). Video Games in Education. *International Journal of Intelligent Simulations and Gaming*. 2. 49-62. 10.1145/950566.950583.
19. Steinkuehler, Constance & Duncan, Sean. (2008). Scientific Habits of Mind in Virtual Worlds. *Journal of Science Education and Technology*. 17. 530-543. 10.1007/s10956-008-9120-8.
20. Positive Learning Outcomes in NASEF High School Esports Clubs <https://www.nasef.org/news/press-room/uc-irvine-research-on-nasef/>
21. Marino, Matthew & Israel, Maya & Beecher, Constance & Basham, James. (2012). Students' and Teachers' Perceptions of Using Video Games to Enhance Science Instruction. *Journal of Science Education and Technology*. 22. 10.1007/s10956-012-9421-9.
22. The Journal <https://thejournal.com/articles/2019/09/13/free-esports-curriculum-contains-full-lesson-plans.aspx>
23. **Gee, J.P., and Levine, M.H., (2009) Welcome to Our Virtual Worlds, Educational Leadership** Volume 66, Number 6
24. Cantrill, Christina & Filipiak, Danielle & Garcia, Antero & Hunt, Bud & Lee, Clifford & Mirra, Nicole & donnell-Allen, Cindy & Peppler, Kylie. (2014). Teaching in the Connected Learning Classroom. http://www.kyliepeppler.com/Docs/2014_Peppler_Teaching-in-the-CL-classroom.pdf
25. Melton, B.; Graf, H.; Chopak-Foss, J. Achievement and satisfaction in blended learning versus traditional general health course designs. *Int. J. Scholarsh. Teach. Learn.* **2009**, 3, 1–13.
26. Alexander Cho, A. M. Tsaasan, and Constance Steinkuehler. 2019. The building blocks of an educational esports league: lessons from year one in orange county high schools. In Proceedings of the 14th International Conference on the Foundations of Digital Games (FDG '19). Association for Computing Machinery, New York, NY, USA, Article 30, 1–11. DOI:<https://doi.org/10.1145/3337722.3337738>
27. Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Kam, L., ... Sakamoto, A. (2009). The Effects of Prosocial Video Games on Prosocial Behaviors: International Evidence From Correlational, Longitudinal, and Experimental Studies. *Personality and Social Psychology Bulletin*, 35(6), 752–763. <https://doi.org/10.1177/0146167209333045>
28. Masala, D., and Iona, T., (2018), The Psycho-pedagogic Value of Video Games and E-sports *Senses Sci* 2018: 5 (4)676-683 doi: 10.14616/sands- 2018-5-676683
29. Johnson, Daniel & Jones, Christian & Scholes, Laura & Colder Carras, Michelle. (2013). Videogames and Wellbeing: A Comprehensive Review.
30. CASEL, What is SEL? <https://casel.org/what-is-sel/>
31. Assessment Working Group <https://measuringcel.casel.org/our-initiative/>
32. Guo Freeman and Donghee Yvette Wohn. 2017. Social Support in eSports: Building Emotional and Esteem Support from Instrumental Support Interactions in a Highly Competitive Environment. In Proceedings of the Annual Symposium on Computer-Human Interaction in Play (CHI PLAY '17). Association for Computing Machinery, New York, NY, USA, 435–447. DOI:<https://doi.org/10.1145/3116595.3116635>

33. Klopfer, E., Osterweil, S., Salen, K. (2009). *Moving learning games forward*. Cambridge, MA: Education Arcade.
34. Swedish Esport Code of Conduct <http://esportcodeofconduct.com/>
35. UNESCO Institute for Information Technology in Education Policy Brief (2011) <https://unesdoc.unesco.org/ark:/48223/pf0000214485>
36. Heick, T (2018) The Definition of Digital Citizenship, Teach Thought <https://www.teachthought.com/the-future-of-learning/the-definition-of-digital-citizenship/>
37. The Institute for Technology Education (ISTE) <https://www.iste.org/standards/for-students>
38. Jewitt, Carey. (2008). Multimodality and Literacy in School Classrooms. *Review of Research in Education*. 32. 10.3102/0091732X07310586.
39. Victoria Government <https://www.education.vic.gov.au/school/teachers/teachingresources/discipline/english/literacy/readingviewing/Pages/litfocusmultimodal.aspx>
40. Cheng, C., and McFarlane, A. (2006) Gaming Culture and Digital Literacy: Inspiration and Audience, *Nordic Journal of Digital Literacy* 02 Volume https://www.idunn.no/dk/2006/02/gaming_culture_and_digital_literacy_-_inspiration_and_audience
41. Gee, James Paul. 2003. *What Video Games Have to Teach Us about Learning and Literacy*. New York: Palgrave Macmillan, pp.2, 14, 203-210.
42. Smith, Peter A., and Alicia D. Sanchez. 2015. "Let's Play, Video Streams, and the Evolution of New Digital Literacy." In *Learning and Collaboration Technologies*, edited by Panayiotis Zaphiris and Andri Ioannou, 520–27. Dordrecht, Netherlands: Springer. http://dx.doi.org/10.1007/978-3-319-20609-7_49.
44. Steinkuehler, Constance & Johnson, Barbara. (2011). Computational Literacy in Online Games. *International Journal of Gaming and Computer-Mediated Simulations*. 1. 53-65. 10.4018/jgcms.2009010104.
45. Wiliamson, B., (2009) Computer games, schools, and young people: A report for educators on using games for learning, FutureLab

*Zacharius Planting – personal communication based on research study conducted in Finland, printed in Finnish, available here: <http://practicum.fi/esport/research/>

**Feng, J., Spence, I., and Pratt, J. (2007). Playing an action videogame reduces gender differences in spatial cognition. *Psychol. Sci.* 18, 850–855. doi: 10.1111/j.1467-9280.2007.01990.

4.1 Esport Education in Practice

As a growing number of schools around the world become early adopters of esports, we are seeing examples of innovative practice and a variety of models for embedding esports activities into different educational settings. In 2019, the High School Esports League (HSEL) suggested there are 1500 high schools participating in their esports leagues and NASEF reported there are 260 clubs across 27 US states and three Canadian provinces, with more than 3,000 students participating^{1,2}

This early adoption of esports in education is reflected worldwide with schools in Europe, Asia and the Middle East also offering similar opportunities for students in middle and high school. From the information published and openly accessible, we have been able to categorize the ways in which schools are weaving esports into their program offerings as:

- Co-curricular (Curriculum Programs and Elective Courses)
- Extra-curricular (After school clubs)
- Community Education (clubs in libraries, community centers and so on)

i. Co-Curricular

There are some examples of practices from around the world, where schools have opted to design completely new programs, or use a pre-designed program within their curriculum.



In Finland, The Practicum Vocational School pioneered the country's first esports program in 2015, led by Karl Ogland³. The work undertaken developed a school esports curriculum, identifying the core competencies and foundational elements for esports education. These included aspects of physical education, nutrition and sleep science as well as coaching, ergonomics and netiquette. A study conducted on the program with students in 2016 found that the majority of students felt their physical fitness had improved, their gaming time had decreased and their overall health and (physical, emotional and mental) well-being had increased. Furthermore, many of the students discussed the impact of learning to use their gaming time more effectively, increasing their understanding of the importance of taking breaks and recognizing that their previous gaming habits were unhealthy, with *too much* play. The results of this research support the assertions of esports educators who suggest that esports can help students develop both intra and inter personal skills in the SEL competencies.



In the United States, Fair Haven Middle School, New Jersey have developed a program called Fair Haven Innovates⁴. The program design, led by educator Chris Aviles, blends 21st century skills, innovation, and technology, with the aim of preparing young people for the world they will be expected to work, live and succeed in when they graduate school. The program focuses on the development of 5 key skills:



Creative problem-solving in complex challenges.



Goal setting for oneself and team.



Persistence in problem solving (making effective use of available resources, taking the initiative to do appropriate research, testing, and troubleshooting).



Feedback communication skills (give, find, and use feedback to improve oneself, team to persevere through failure and find success)



Contribution to collaborative discussions and tasks with diverse teammates.

In his blog, Chris Aviles, outlines his thinking in the design of the program and identifies the key elements for teaching:



Students are exposed to computer science, engineering, and the digital arts through entrepreneurship. Not only is entrepreneurship safe from automation, it is the best vehicle for delivering the problem-solving opportunities that our students need to hone their skills. Developing these [five] skills requires authentic, hands on experiences in a low risk environment. Students can't develop a skill if they don't apply it and students won't try to apply a skill if they think they will be punished for failure. That is why I've built the Fair Haven Innovates program to be a safe place for students to apply these skills.

In Orange County, California, an innovative partnership approach has been taken by NASEF, the University of California Irvine and schools in the county¹. Professor Constance Steinkuehler is leading the design and development of the school esports curriculum based on on-going research. Several courses have been developed for different age groups as part of the English Language Arts curriculum, but within the context of esports skills and competencies, for example Game Design, Hospitality and Marketing.



The League has been carefully constructed with an academic framework incorporating STEM, ELA, and social emotional learning, as well as Career Technical Education. It's relevant, forward leaning, and tied to future careers both inside and outside the tech industry.

In 2018, a partnership between the High School esports league and Microsoft led to the publication of a free esports curriculum developed by educators in Kansas⁵. The Gaming Concepts curriculum teaches college-and-career skills and social-emotional learning. The curriculum covers self-advocacy, personal and social behaviors, interpersonal communication, fluency in technology, and strategy development. Students who took the esports class at Complete High School Maize near Wichita, Kansas, reported that they spent less time playing video games at home. Student attendance also improved and saw improvements in their grades above the school average.

ii. Extra-Curricular

Many schools currently deliver esports in schools as an extra-curricular club or activity. Students can practice against club members, but real team game-play is tested out by competing against other teams. In the United States, some schools join an established league such as High School Esports League (HSEL), the High School Starleague (HSL). However some districts have now created their own leagues, including Orange County, CA, Connecticut, Ohio, Michigan, with other school districts beginning to follow suit.

In 2019, ten school districts in Oklahoma created an esports league to enable students to participate in esports as an extra-curricular activity⁶. In the league, students will compete using titles such as Clash Royale, Madden NFL, Overwatch, Rocket League and Super Smash Bros. Students must participate in try-outs each season, and must adhere to strict academic eligibility rules, like in other extra-curricular activities at the participating schools.

In Alaska, more than 60 high schools are now on a waitlist to compete in a varsity esports league delivered by the Alaska Schools Activities Association and PlayVS. The cost for students to participate is \$64 and each school is required to have an esports coach on site for all official matches⁷.

In North Dakota, 14 high school esports teams across the state are competing in the first season of a new esports league, and in Virginia, a one year pilot program has been approved⁸. In the Virginia High School League, teams compete in League of Legends, Rocket League and SMITE, and schools are able to enter multiple teams for each game.

In France, the government has launched plans to introduce esports in schools, aiming to promote the development of a responsible and socially valued sport practice⁹. Over the period 2020- 2025, they will support the implementation of educational tools for educators and parents, and support school and extra-curricular esports activities.

This trend is seen in countries around the world with a recent report suggesting that 20% of leaders across K-12 and higher education in North America, Latin America, Asia Pacific, Europe, and Middle East have already set up an esports program, and a further 71% are considering offering one in the future¹⁰.

iii. Community

There are some schools that are concerned that any initiative that requires a lot of technology will be too costly to run. However, there are some case studies of esports leagues being run by community facilities such as libraries. In this case, technical resources or budgets can be pooled across a community, enabling a wide range of people to take part, and/or bring their own device.



France

In 2014 a large-scale League of Legends tournament was organised between French libraries, known as *LoL en Bib*¹¹. Participation in the tournament is free, and matches are organised with 3 different levels to enable inclusive participation:

- "Baby LoL" league: level 0-19
- Junior league: 20-30 unranked

- Ranked league: 30 ranked



United Kingdom

In 2017, a pilot project was undertaken with Westminster Libraries, UK and the British Esports Association to deliver esports training in for children at Maida Vale Library, London¹². The aim was to determine if libraries could play a role in helping to foster future British esports talent, as well as increasing awareness of esports with parents, children, teachers, the media and government. The training club featured games of Rocket League, as well as sessions on esports coaching, commentating and journalism, followed by a Q&A.

The report identifies several benefits and skills that the esports pilot promoted, including strategic thinking, teamwork, communication, leadership, performance skills and confidence, and suggests that the skills learned are transferable and can benefit children in other areas, such as schoolwork, physical sports and general wellbeing. Following the success of the pilot, Westminster libraries are hoping to extend the pilot to a more regular club in the area, and the British esports Association are considering the viability of scaling this up to offer similar activities at libraries nationwide.

In the following section, we will take a deeper dive into some of the existing esports curricula, exploring the different approaches adopted by educators in the learning design.

4.2 Prakticum Vocational School, Finland

As outlined in Section 4.1 The Prakticum Vocational School pioneered the country's first esports program in 2015, led by Karl Ogland². The work undertaken developed a school esports curriculum, identifying the core competencies and foundational elements for esports education. The authors suggest that there are four key components in all of their esports courses:



They suggest that all of these are supported by good management, in the form of a national federation, a gaming organization or a school. They identify a number of key competencies that students develop as part of an esports course, illustrated in figure 22. Here, educators illustrate the ways in which balance is important in an esports curriculum. Their rationale is that students already know how to play games, what they need is not more time gaming, but rather support from educators in understanding that to be successful in esports they need to balance learning new skills and knowledge (team work, goal awareness, health and fitness, communication etc.) with school and life commitments. By learning to manage themselves, to operate as part of a team, and to strive for balance students learn to be successful esports athletes.



Figure 32 Key competencies developed by students in the Prakticum Vocational School esports courses

We provide an outline of one of the basic courses, worth 10 credits, available to students at the Prakticum Vocational School, however, some additional lectures and classes are conducted across all of the courses. Briefly these include:

Insight into Game-Based Learning

a lecture from a games professional covering aspects such as the benefits of digital games, health risks of digital gaming, performance optimization, role of sleep and exercise in gaming, advice for game educators

Sport & Health Education

the Finnish team suggest teaming up with your Physical Education or Sports Science colleagues to deliver this. Specifically, the PE educator should cover issues such as team spirit, teamwork, sportsmanship, planning, communication and goal orientation as well as helping students understand the importance of balancing physical fitness, nutrition, and rest. The philosophy used is: 'One day consists of 8+8+8=24 hours, where you need

8 hours of sleep, 8 hours of work (or school) and 8 hours of something else.

Therefore players have 8 hours to balance fitness, nutrition, and game-play.



Physical Exercise

contrary to popular belief, esports players need to be physically fit*. Students were given different fitness options (team sports, swimming, gym passes etc), and were asked to develop a team activity schedule. Among the benefits of exercise for esports players are better circulation and oxygen uptake and stress relief. It can also help in preventing sports injuries, such as carpal tunnel syndrome and neck and back pains.



Ergonomics

As a part of the students' esports education, professionals such as physiotherapists and other specialists check students' sitting posture and give them the knowledge and the tools to self-assess, fix and prevent problems.



Mental Coaching

A sports teacher or coach provides students with an important source of support in developing the esports mindset i.e. this is not just gaming, they are learning the skills required to become an athlete. A range of tools and exercises can help students learn to focus and to be present, not only physically but also mentally. There is also an opportunity to help students develop social and emotional skills here, and it is especially important for them to learn how to deal with both success and disappointment.



Building Team Spirit

Having a team with a vision and a goal is important, it gives students a common issue to work on together. Here students practice team building exercises in a non-gaming setting, and develop an ethos of sportsmanship and friendship. The school also have found that something that is crucial in building team spirit is having the students dress in team clothes where possible, for example, when going to the gym.



Responsibility

Based on the "Swedish Esports Code of Conduct" students are taught the rules and ethics for esports events at all levels, for both players and organizers. The Code of Conduct is also used to help create a better environment in esports – where players are not judged for how they look in a game but how you behave, how you play.



Basic Course

These are the overarching teaching elements that are taught across all of the courses. We outline the Basic Course content below .



Physical exercise

Students participate in mandatory morning workout at the gym or another place of exercise designated by the teacher. The content consists of

- Fitness and strength training in different forms
- Exercise routine - warm up - workout - stretching
- Relaxation



Basics in exercise

Breakfast (provided by the school for all esports students) during which the following themes are discussed

- Development principles
 - exercise
 - periodization of the training
 - the importance of the right diet
 - the importance of sleep and rest
- Weight training
- Skill training
- Speed training
- Cardio
- Endurance training
- Mental training
- Maintenance of diary
 - exercise diary
 - diet diary
 - sleep diary



Lectures

Lecture series in which invited experts lecture on their field of specialization. Based on the lectures, teachers continue to work on different themes, such as

- Game education
- Media education
- Mental training
- Stress
- Doping

- Special areas of sport
- Teamwork and communication



Personal development

Time students spend on their game from home, at leisure. It counts as school time when playing with the school team, during which time the student represents the school and is expected to behave accordingly.

- Evaluation at least once a year by a specialist from their sport for each individual athlete, alone and / or in their team
- Mental training
- Exercise and exercise time in their sport / game
- Critical reflection and self-evaluation



Events

Time students spend on their game from home, at leisure, competing in an event. As above, it counts as school time when playing with the school team, during which time the student represents the school and is expected to behave accordingly.

- Code of Conduct
- Competition, representation or participation in events in their sport / game
- Critical reflection and self-evaluation

The advanced course is aimed at developing semi-professional and professional esports athletes, streamers, vloggers and so on. It includes additional elements relating to finance and legal responsibilities (sponsors, contracts, accounting and so on) as well as a detailed module on personal branding focusing on learning how to market yourself, including:

- Creating a personal brand
- Analysis of the market and key competitors
- Social media strategy (presence and reach, choice of platforms etc)

4.3 English Language Arts - Orange County

Developed as a partnership between the University of California Irvine developed, high schools in Orange County California and the North American Scholastic Esports Federation (NASEF), English Language Arts Integrated Courses for grades 9-12th grade were designed to connect esports and content standards (Next Generation Science Standards, English Language Arts, International Society for Technology in Education, and Social Emotional Learning).

"Connecting esports, content standards, English Language Arts and the field of esports matters because it could literally change the game in how we integrate STEM education with workforce sectors and industries in order to attract more students".

The courses have been based on extensive research conducted by the Connected Learning Lab at the University of California, Irvine to understand the relationship between esports, STEM, and social emotional learning for high school players.

There are 4 courses, each set at a different grade/age level, covering Game Design (grade 9+), Entrepreneurship (grade 10+), Marketing (Grade 11+) and Organizers (Grade 12+). Below we provide a simplified course outline for the Game Design course. Full details for [all courses](#) are available on the HSEL website¹.



Game Design 9th grade +



Course Descriptor

The esports industry holds unrealized potential for a 9th grade English Language Arts classroom; the stories told within games, the mythology of characters, literacy required to achieve mastery, and opportunities to integrate the intersections between technology, culture, and play all parallel English Language Arts skills and concepts



Unit 1 – Game On! What is Competitive Gaming?

Students write an expository essay that explains what esports are, making connections with the "story" of a video game by reading short story texts to understand elements of plot.



Unit 2 – Evolution of Esports

Students will conduct research on the past, present, and future of the esports industry. As researchers, they will learn the basics of evaluating sources for credibility, continue to apply annotation strategies, and cite sources.



Unit 3- Esports Ecosystem

Students are immersed into the various roles available in the community or ecosystem of esports. They will explore careers in the areas of content creation, entrepreneurship, strategy, and organization, as well as how fandom and journalism contribute to the industry.



Unit 4 - Head to Head : Esports and Ethics

Students will engage with real world examples of challenging ethical esports dilemmas and discuss how actions within esports affect the people in and around the environment. Students will study ways others have expressed their experiences and use writing to express their own thoughts and feelings.



Unit 5 – Legends and Lore

Students will study archetypes in literature and game lore and examine the purpose of storytelling and the purpose of game play, to analyze both mediums as texts worth studying. In doing so, they will learn about the elements of stories and of esports games, and the archetypes that influence many genres of text.



Unit 6 - Creators Journey

Students will take their knowledge of how esports games operate, as well as their understanding of story, setting, and character, to create a unique game concept. Going through the iterative process of game design, they will craft ideas, receive and implement feedback, and make an effort at publication.

4.4 Microsoft Esports Course: More than just a game

Esports: More than just a game

This [course](#) highlights the growing, exciting, and curricular value of esports in education. In a structured, competitive setting that esports provides, students around the world are strengthening 21st century skills to be successful in future-ready STEM careers. Integrating esports within the curricular setting with Minecraft: Education Edition, players and coaches can be part of an inclusive setting that supports and enriches social and emotional wellbeing while also allowing educators to support and assess students in a fun and formative manner. Minecraft: Education Edition.

Learn how to leverage your students' passion for esports to help improve their social-emotional well-being, develop 21st century learning skills, and learn how to be responsible digital citizens. Additionally, participating in esports prepares students for a variety of careers, including: information & technology, marketing, event planning, game design, communications, graphic arts, and many more. Learn the steps to establish a inclusive team culture, to gather the necessary resources to start and grow your scholastic esports program, and to unleash students' creativity in ready-made, immersive, Minecraft worlds designed specifically for competitive gaming. Through the principles of game-based learning, including communication, problem-solving, collaboration, and persistence, you will set you and your students on the path to success in the exciting world of scholastic esports.

Learning objectives

By the end of this course, you'll be able to

- Explain why esports belongs in education
- Identify elements of an esports program
- Describe how to get an esports program started

Additional Resources for your Esports Program

- [Minecraft: Education Edition product page](#)
- [Minecraft: Education Edition support site](#)
- [Recommended Minecraft: Education Edition course in Microsoft Educator Center](#)
- [Minecraft: Education Edition YouTube playlist](#)
- [Microsoft Education webinars](#)
- [Sign up for training](#)

From <https://education.microsoft.com/en-us/course/1a787891/8>

Recognition



Esports: More than just a game

4.5 References



References

1. North American Scholastic Esports Federation ELA <https://www.esportsfed.org/learning/curriculum/ela/>
2. High School Esports League <https://www.highschoolesportsleague.com/high-school-partnership/#our-schools>
3. Esport Educator's Handbook, Practikum, Finland https://practicum.fi/dokument/esport_book_pages_lowres.pdf
4. Fair Haven Innovates <https://www.techlearning.com/tl-advisor-blog/welcome-to-fair-haven-innovates>
5. Microsoft Educator Community Esports Gaming Concepts Curriculum <https://www.education.microsoft.com/en-us/course/d40087b3/overview>
6. https://www.unionps.org/240942_2
7. Varsity Esports Foundation <https://www.varsityesportsfoundation.org/curriculum>
8. <https://www.washingtontimes.com/news/2019/jul/8/14-north-dakota-high-schools-to-create-an-esports-/>
9. <https://www.economie.gouv.fr/strategie-e-sport>
10. <https://www.fenews.co.uk/press-releases/79-sp-821/34085-70-of-schools-are-considering-introducing-an-esports-curriculum>
11. <https://archipel.ville-fouesnant.fr/agenda/lol-en-bib-3/>
12. https://issuu.com/british_esports/docs/british_esports_library_pilot_findi

*A summary of research findings from a 2016 study conducted on the impacts of esports at Practikum Vocational Institute in Finland are summarized the Esport Educator's Handbook (article 3 above). The full thesis can be found here: [Electronic Sports in education. Students' experiences of the eSports –course's impacts on lifestyle and wellbeing](#), by Mirka Tukka

5.1 Introduction to Minecraft: Education Edition



What is Minecraft?

Minecraft is a digital game, with no given set of rules or endgame, that promotes creativity, collaboration, and problem-solving in an immersive environment where the only limit is your imagination.

Minecraft puts players in a world modelled on our own. A 360 degrees, experiential environment with forests, rivers, mountains, and deep oceans, biomes, weather conditions and animals.



Why Minecraft: Education Edition?

Minecraft: Education Edition is a game-based learning platform, derived from Minecraft and designed to facilitate the environmental, mechanical and narrative elements of the game in a learning capacity. It assists educators in building STEM skills, unleashing creativity and engaging students in collaboration and problem-solving. Minecraft helps educators meet students where they are and inspires deep, meaningful learning across subjects. Educators around the world use Minecraft: Education Edition to teach lessons, build STEM and social-emotional skills and inspire project-based learning.

Minecraft: Education Edition offers special features designed for educational use, including assessment tools and classroom multiplayer to allow learners to work together in the immersive game environment.

Features like classroom [multiplayer](#) allow students to collaborate on projects in their Minecraft worlds, building, planning, learning and even chatting as they work together. (Download this [how-to guide](#) for using Multiplayer Mode.) When they are ready to document their work and submit their projects, students can use tools like the [Camera and Book & Quill](#) to take screenshots, write about their work and export their in-game portfolios as PDFs.

When students collaborate remotely in Minecraft: Education Edition, it presents new opportunities for them to build communication and problem-solving skills together.

Minecraft: Education Edition includes several features that support collaboration and help educators create more inclusive classrooms, whether students are learning in person or remotely. These include multiplayer mode, formative assessment tools like the Camera and Book & Quill, export options to help students share their work outside the game, and Immersive Reader to support reading and translating.

Students can learn and play in a collaborative environment simultaneously by using multiplayer mode. To play together in multiplayer, each individual's home network must satisfy the requirements outlined in our article on how to set up a multiplayer game. This resource also includes a helpful video and instructions for educators to get started with setting up a multiplayer experience.

5.2 Esports and Minecraft: Education Edition

Educators who are familiar with esports, won't be surprised to learn that Minecraft isn't a typical esports title. In fact, if you ask students if they've ever used Minecraft to play esports they are likely to tell you that's not what Minecraft is for! Why then, are we introducing Minecraft: Education Edition for Esports?

There are three very compelling arguments for using Minecraft: Education Edition for Esports:

1. **Minecraft is a familiar digital environment for students**

Minecraft is a well-established game and students are familiar with playing it. They understand the in-game mechanics and have mastered basics of moving around and navigating. This familiarity creates a safe space for learning new skills and a great a practice ground to *fail forward*.

2. **Minecraft: Education Edition has been especially designed for learning**

Minecraft: Education Edition has been designed with special teacher and student features to enable educators to get the most out of learning. It is purposefully non-violent, and doesn't support the gory elements that you may find in other games. This makes Minecraft: Education Edition an excellent introductory tool for students' first steps into esports.

3. **Minecraft is the ultimate tool for developing creativity and creative thinking.**

In this sense it is unique with reference to other esports titles, since it invites players to design, create, build, and code their own game experiences. It is our aspiration for these resources, that once students have become familiar with the game-play (rules and roles), and the game mechanics (scoring, timers, etc), they will begin to create their own esports gaming experiences in Minecraft. This move from *students as consumers of games* to *students as creators of games* signifies a transformative shift evident of the high-level creative, critical and computational thinking demanded in 21st century workplaces.

To support this, we have developed 13 different Minecraft Worlds that enable organized, competitive and collaborative play in your classroom. The worlds are categorized under three genres:

- Make & Model – competitive, collaborative *Build Battles* that can be exported to 3D printers
- Make & Code - competitive, collaborative *Build Battles* where teams compete by coding their builds
- Creative Clash – competitive, collaborative and strategic exploratory games



Make and Model

These are competitive build battles that take place inside a range of immersive Minecraft environments called *Arenas*. Teams of two battle it out against the clock to design and build a themed object, chosen by the class, or the teacher. A special feature of these maps is the way in which they invite spectating students to participate in the game by voting for their favorite build. A bonus feature of these worlds is that students are able to 3D print their designs at the end of the battle, if the school has access to a 3D printer. There are six worlds in this genre:

Arena	Screenshot	Description
 <p>Pirate Cove</p>		Set on huge galleon ships, docked by a forgotten island in the Caribbean Sea and featuring cannons, skulls and treasure chests.
 <p>Busy Bees</p>		Set in a gigantic garden, where the players are the size of bees, surrounded by huge trees, flowers, a garden gnome and a lawnmower.
		Set in an old west town during the California gold rush.

 <p>Gold Rush</p>		
 <p>3D Print</p>		<p>Set in a giant maker space with 3D printers and 3D printed objects.</p>
 <p>Space Race</p>		<p>Set on a barren moon in a glass dome, surrounded by floating spacecraft, meteors and planets.</p>
 <p>Splat Racers</p>		<p>Set on a fantasy race track on a colorful island of giant plants, mushrooms, gliding goldfish and butterflies, and a rainbow volcano.</p>

You can download the esports [Make and Model](#) content [here](#).

Jump to the [Make and Model Playbooks](#) [here](#).

The Make and Model series will be the first in the Minecraft: Education Edition Esports package to be released. Make & Code, and Creative Clash coming soon.

5.3 Getting Started with Minecraft: Education Edition

In this section, we provide step-by-step guidance on Minecraft Education Edition technical set-up¹ for esports.



What software do I need?

Depending on your **Operating System**, the requirements are:

Operating System	Software
Windows	Windows 10* Windows 8 Windows 7
MAC	MacOS High Sierra 10.13 and up
iOs	iOS 10 or higher

*Recommended version



Minecraft: Education Edition

You can use, depending on your school configuration, two different Minecraft: Education Edition installations:

- Minecraft: Education Edition for *Windows 10* is an **application** managed by the [Microsoft Store](#)
- Minecraft: Education Edition for *Windows Desktop* is a **software** you can download and install from the official website education.minecraft.net

Operating System	One-to-one devices	Shared PCs
Windows 10S	Minecraft: Education Edition for <i>Windows 10</i>	Minecraft: Education Edition for <i>Windows 10</i>
Windows 10 (1709 and later)	Minecraft: Education Edition for <i>Windows 10</i>	Minecraft: Education Edition for <i>Windows Desktop</i>
Windows 7, Windows 8.1, Windows 10 (1703 and earlier)	Minecraft: Education Edition for <i>Windows Desktop</i>	Minecraft: Education Edition for <i>Windows Desktop</i>

From <<https://minecrafteducation.zendesk.com/hc/en-us/articles/360025605672-Supported-platforms-for-Minecraft-Education-Edition>>



Classroom mode

The Classroom Mode is currently available for users running the Minecraft: Education Edition app and isn't compatible with Windows 7.

Classroom Mode needs to be installed only on the teacher's device as it provides a central interface allowing management of several multiplayer games. Educators can use Minecraft: Education Edition and Classroom at the same time (but not Code builder if Classroom Mode is running).

- **Windows** users can install Classroom Mode from [here](#).
- **Mac** users can install Classroom Mode from [here](#).



Minecraft: Education accounts

To connect to Minecraft: Education Edition both teachers and students need Office 365 Education accounts. You can check your organization eligibility [here](#).

Each Office 365 Education user has a free trial access:

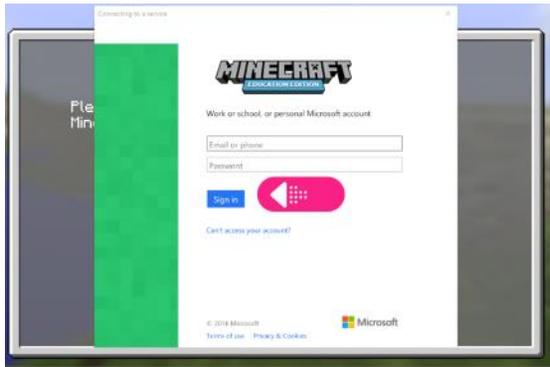
- Students: 10 logins
- Teachers: 25 logins

Once you've used your free trial logins, you'll have to purchase Minecraft: Education Edition via an [Authorized Education Partner](#) or the [Microsoft Education Store](#).



Minecraft: Education login

Once you've launched Minecraft: Education Edition, you'll need to login using your Office 365 credentials.



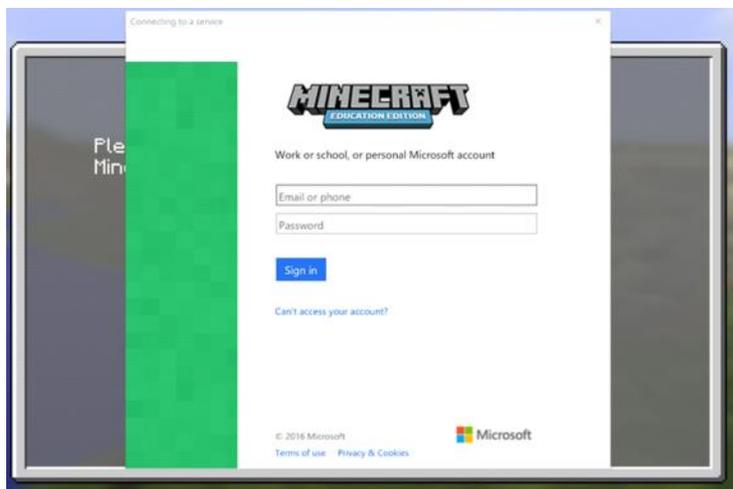
Download Minecraft: Education Edition

Download and install Minecraft: Education Edition for Windows, Mac, or iPad from [this page](#).



Log in to Minecraft: Education Edition

Once you've launched Minecraft: Education Edition, you'll need to login using your Office 365 credentials.



Get Started with Minecraft: Education Edition

Before you dive into esports with Minecraft: Education Edition, you may wish to become more familiar with the game or see it in action in an education context. An understanding of what the game does and how it can impact your students and their education is key to using it successfully in the esports arena. [Visit this link](#) for free online courses for educators on the Microsoft Education Community to learn the basics of Minecraft: Education Edition.

Download this [Starter Guide](#) for tips on getting started with Minecraft in your school, including classroom management.

5.4 Minecraft Esports – Set Up Guide

In order for you to play the Minecraft: Education Edition esports content, you must first download it to your device.

Minecraft worlds are stored locally on your device and so whichever device has the worlds installed can either play or host that content.

Let's make sure you have all the esports content on your Host device(s).

- 1 Download the Minecraft: Education Edition content here: <https://click.immersiveminds.com/minecraftduesports>

Note where you save the Minecraft worlds to on your device.

- 2 Open Minecraft: Education Edition.
- 3 Click on the 'Play' button center screen on the main menu.



- 4 Click on the 'Import' button at the bottom right of the screen.



- 5 Locate and open the MinecraftEdu Esports world you wish to play and load it.

This will automatically open the game world on your device in Minecraft: Education Edition.

To get all the worlds you want, we recommend you press 'Esc' and return to the main menu and begin the process again for each world. When finished, you may choose which game world to play. They will show as follows in your Worlds menu:



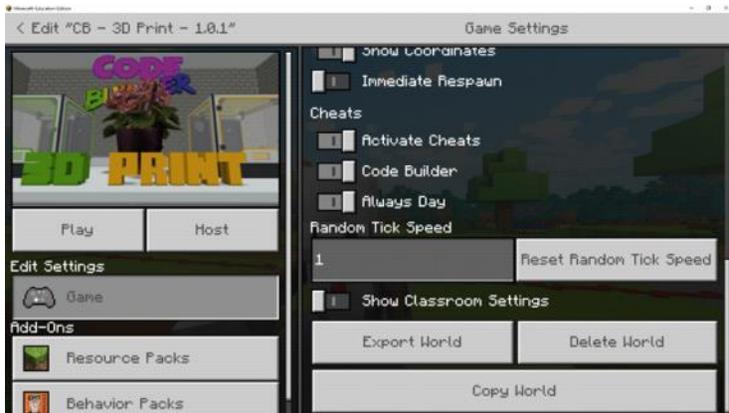
We recommend you make a copy of the original world before you begin. To do this, do the following:

- 6 Click on the world you wish to copy.



7 Click 'Settings'.

8 Scroll to the bottom of the right column of the settings page until you see this:



9 Click 'Copy World'.

This will create a copy of the game world in your game library. Use this one to game with, keeping the original in your library to copy each time you wish to play.



All of the Game Settings for each world are set specifically for each game. DO NOT change any of the game settings. Particularly 'Allow Cheats', 'Allow Destructive Items' and 'Allow Mobs'.

5.5 Multi-player Set Up



The very point of esports is to have players compete together in the same gaming environment, just as traditional sports are played in the same arena, be that a tennis court, football pitch or ice rink.

To do this, you need either all player devices attached to a Local Access Network (LAN) (usually in one location like a school or library), or each player must be on the internet on their own devices in separate locations. While the former makes multiplayer and esports teamwork easier, you may not have that option and so below you will find connection instructions for both.

The 'Make and Model' and 'Code Clash' tenant (the address after the @ of your Office365 email address) can host or join a multiplayer game.



In order for players to enter an esports gaming arena, it must first be hosted somewhere. This means one device is used as a master device, with the game loaded onto it and hosted online for others to join. In most cases in esports in education, this will be the teacher's or esports facilitator's device, though you may have several host devices if you are running smaller group sessions across many players.

Once you have chosen your host device, it is time to set up the game for others to join.



Step 1

Open Minecraft: Education Edition and log in.



Step 2

Click 'Play'



Step 3

Select the world you wish to play from your game library, and click on it

Step 4

Click on 'Host' to host a game with the selected world



Note: If your game is already in progress you can host by pausing the game (ESC key), click the 'Friend' tab, then click 'Start Hosting' and 'Confirm'.

Give players the 'Join Code' to allow them to join your game. To access this code at any time during the game, pause the game (ESC key), then click the Friends tab.

To access this code at any time during the game, pause the game (ESC key), then click the Friends tab.

The Join Code is made up of image icons. Players wishing to join the game will have a set of these icons they must choose from. If they choose the icons matching your own, they will have access to your world.



You can click the refresh button at the end of Join Code images to select another code. This can also be used to lock the game once all players are in. Anyone who has the original code will no longer be able to join once the code has been refreshed.

If a player leaves the world for any reason, they must rejoin using the latest code.

You may end the game at any time by clicking the 'Stop Hosting' button under the Join Code icons.

If the Host exits the game, all players will be automatically disconnected!
A Host device must always be active in order for the game to be played from start to finish.

Limiting Player Numbers

You can set up a maximum number of players in the chat function

Step 3 - Step 1

Press 'T' while in game to open the chat function.

Step 2

Type the command '/setmaxplayers' then add a number to the end, up to a maximum of 30

Setting Player Permissions

You can set up different permissions for your players by clicking on the 'Crown' icon. Select the level of permissions you wish your students to have. Set this to Member'.



Joining a game

To compete in a multiplayer game, you need players to join the Host game.

Step 1

Each player should launch Minecraft: Education Edition and click 'Play' on the main menu.

Step 2

Click 'Join World' at the bottom center of the screen



Step 3

Enter the 'Join Code' by clicking on the different pictures in the correct order given by the host.



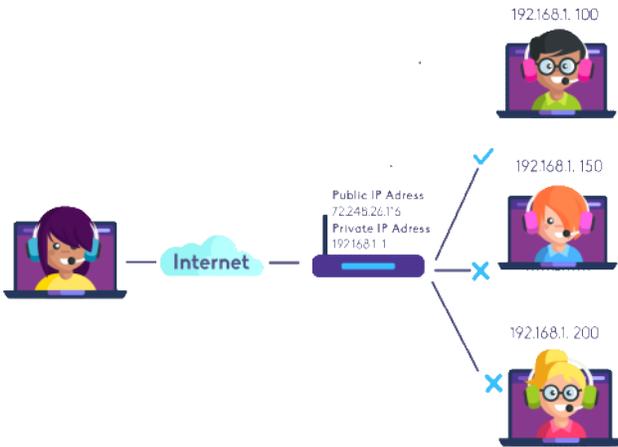
Step 4

Click 'Confirm' to join the game and begin playing with others.

Multiplayer across internet between different locations

It is possible to host a game and to invite players from outside, on separate internet connections to join you. To do this, they must meet the following conditions:

- a. Players must be logged in on the same Office 365 Tenant.
- b. They must run the same Minecraft: Education Edition version as all other devices, including the Host.
 You can check this on the main menu of the game, looking for the number in the bottom right corner of the screen. For example - 'v1.12.60'.
 If your game versions do not match, update those devices that do not. We recommend all devices match the Host device and that the Host device is running the very latest version.



Setting up your network

- **Whitelist** the website <https://meeservices.azurewebsites.net/> in your router, Firewall and Antivirus. For some guidance on how to do it, you can consult this [website](#).
- Forward the **port 19132** on your router to make your connection more stable and faster. You must forward port 19132 both UDP and TCP. You'll find more information about port forwarding [here](#).

In order that players on a separate internet connection can join your game, you (the Host) must open a port on your network. A port is like a door that lets internet traffic flow in and out. Games like Minecraft are assigned these ports to channel traffic to and from them in multiplayer scenarios. You must open a specific "door" in your network settings to let them pass through your Firewall or Antivirus, and forward them to your device.

The first step is to identify the host device IP address. While this is NOT the address you need to give to players joining the game later, this IS the address that you need to Port Forward to.

Step 1

Open Minecraft: Education Edition and log in.



Step 2

Click 'Play'



Step 3

Select the world you wish to play from your game library, and click on it. Any world will work for this.

Step 4

Click on 'Host' to host a game with the selected world



Step 5

Once the world opens, press 'Esc' and note the IP address on the left of the screen



This is the address of your device. If you have multiple devices on one network they will all have a similar but ultimately different IP addresses.

For example:

- Device a – 192.168.1.16
- Device b – 192.168.1.20
- Device c – 192.168.1.24

Note your local IP address, you will need this for Port Forwarding. This is the address that your router will open port 19132 to so players can access your game.

This is often the step missed when trying to Port Forward for Minecraft: Education Edition.

Now you must forward port 19132 both UDP and TCP. Each make and model of router is different and so this cannot be explained here. You'll find more information about port forwarding [here](#) and [here](#). The main thing to note is that when asked which IP address you wish to port forward to, you use the host device IP address from step 5.

Step 6

Now find your router's Public IP. You can find this on the internet by visiting <https://www.myip.com>.

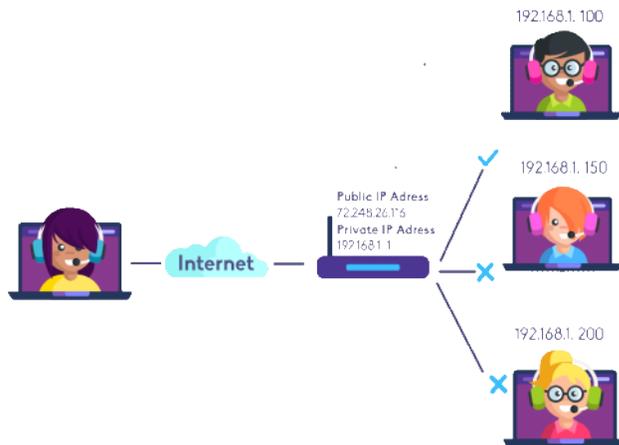
On the page that opens, you are looking for the address under 'Your IP address is:'.



Note this IP address.

Step 7

Now you must whitelist the website <https://meeservices.azurewebsites.net/> on your router, Firewall and Antivirus. For some guidance on how to do it, you can consult this [website](#).



Once you have completed these steps on the Host network, players can join your hosted game:

Step 8

Give the Public IP address you got from 'myipaddress.com' to the players that wish to join your game from outside your network.

Step 9

To join the Host game, players must click on the icon of three dots in the bottom corner of the screen; ignoring the join code option



Step 10

Ask players to enter the public IP address of the Host device, found in **Step 7**, then click the Join button.



You will note the port field contains the same port number you allowed access to during port forwarding in your router.

<https://minecrafteducation.zendesk.com/hc/en-us/articles/360001429368-Get-Started-with-Classroom-Mode->



Performance issues:

If the performance decreases with new players joining:

- Check your connection bandwidth (should be 1.5Mbps at least)
- Check your network speed
- Decrease the video rendering in your parameters

Connection issues

- Check the settings above (Setting up your network)
- Check all players run the same M:EE version
- Check the host didn't exit the game

6.1 How To Build Your Esports Team

In this Chapter we explore pathways to starting your school Minecraft esports team (Section 6.1), identifying the key steps in the process of introducing esports to your school. We invite experienced esports educators to share their expertise, lessons learned and top tips with us (Section 6.2), as well as outlining some of the basic considerations in setting up an inclusive esports space in your school or community (Section 6.3)



A Pathway to Esports in Your School Setting

There are many different ways to begin building an Esports team, club or program at your school. How you choose to do this will depend on your school's ethos and context. Below we outline 8 key steps that we believe are important when starting out, as illustrated in Figure 32. We've gathered this information from some of our research as well as from talking to educators who have successfully built their own team.

The 8 steps don't necessarily have to be taken in the order outlined below, but we believe any good, sustainable and impactful practice begins with people – so steps 1, 2 and 3 focus on building relationships and shared understandings with key stakeholders. Steps 4 and 5 encourage strategic growth and development of your esports vision by using sound planning and data to build a persuasive case for esports, and Steps 6, 7 and 8 focus on the practicalities of establishing and managing an esports team and running a pilot esports program or club. We explore these steps in greater depth below.



Figure 32 An 8-step pathway to building a Minecraft Esports team

1. Start with students

Survey student interest and participation in esports

We know it's very likely that many of your students know what esports is, and a high number may already be playing or watching esports, but this may not be the case for every child, or every school across the country. Connect with your students to find out what they already know about esports.

- Are they interested?
- Which titles do they enjoy/play/watch?
- Are there students who don't play? Why?
- Are there students who would play but don't have access to equipment at home or experience other barriers?
- Where are the outliers, gaps, surprises? Are there differences in responses between boys and girls, for example?

Design a survey that lets you really come to understand how your students feel about it, who would participate and who might find it difficult to join in. Evaluations conducted in schools suggests that esports programs can help include those children who are sometimes disenfranchised, improve attendance and motivation, and can positively affect academic learning and GPA. Begin to gather data from your students and use this as a basis for determining the kinds of impacts you might be able to see from an esports program or club in your school.



Data drives design: According to the ESA, 45% of video-gamers in the United States are female, a figure widely reflected in developed countries around the world. Despite this, the number of girls participating in esports is much lower than males. There are many reasons for this, including the masculine culture of gaming. Some colleges and high schools are now creating all-female teams to combat this, and as step toward creating teams where females are not dissuaded from participating. While, there are some educators who argue that separating out boys and girls may only serve to perpetuate the gender divide, this is a good example of how understanding the needs and concerns of your students can help you in your planning. Be sure to use the student survey data you collect to inform the design of your program or club



The role of Minecraft

Minecraft is often referred to as the *great equalizer*. It's easily accessible, open gameplay makes it inclusive and collaborative, attracting players across wide demographic and age ranges. If your survey data suggests there may be some students who don't have experience playing typical esports titles, Minecraft may offer these students a safe and welcoming first step into the esports domain.



2. Connect with Colleagues

Identify colleagues with experience, passion, interest or expertise

In scholastic esports, often the challenge comes from gaining support from other adults, who may perceive video gaming as a poor use of school time. The research evidence for game-based learning is strong and sound, however by scoping out interest for esports among your colleagues you will be able to identify adults who have experience in playing video games (and potentially in playing esports), have a passion for game-based learning, or who have coached or delivered health and wellbeing activities. It may also enable you to identify any resistance or concerns within the school community early on, which can be addressed through your preparations. Note these concerns, or ask about them specifically in a whole-school survey (including staff, PTA, librarians, IT support and so on) , it will be important to tackle fears and misconceptions head on.



The role of Minecraft

Minecraft Education Edition has been specifically designed for use in schools. It has several education features built in, and purposefully does not support the gory elements of some other games. You may find that starting out with Minecraft as esports helps address some of the worries and concerns of your community.



3. Get Focused

Create a focus group to develop vision and goals

From your survey of students and staff, you should be able to identify colleagues who have some expertise in this area, as well as students and parents who can be a representative sample of the larger school community. Work with this focus group, using tools such as surveys, focus group discussions, polls, etc to collect, record and analyze data to:

- create a working, shared definition of what esports means for your school
- identify how best esports may be incorporated in your school setting (a club, a program, an elective course etc.), and
- begin to refine some of the details of your plan (such as relevant stakeholders, potential sponsors etc.).

The involvement of staff, parents and students helps ensure that this preparatory work is inclusive, innovative and student-centered. All of the initial groundwork in steps 1-3 enable you to use a strong evidence-base before addressing your school leadership team (as in step 4 below). A student centered approach in some existing programs has enabled educators to identify areas of tension or challenge, and address them head on:



In my experience the label 'esports athlete' doesn't always sit well with people, particularly students. I decided to refer to them as Scholar Gamers, which is a much better reflection of who they are and what they do in our school community. James O'Hagan, Academy of Esports



4. Be Strategic

Develop a Vision and Values framework for your school stakeholders

Use the work undertaken in your focus group to develop a strategy document that you can present to key stakeholders (school leaders, managers, parents and so on), ensure you outline the benefits as well as addressing any concerns the school may have. Set out the *What*, *Why* and *How* of esports for them and don't be afraid to set targets for your esports pilot. For example if you know your school has a STEM agenda, or a digital literacy drive, use the data collected in the surveys to demonstrate how this initiative can support these aims. At this stage, there is an opportunity to scope out your operational plan. This might include:



Identifying the roles each member of your team will play

It's important that your team has a coach, this needn't necessarily be someone who has coaching experience, but it should be someone who is willing to play the game, learn the strategies, and help students develop skills to improve their collaborative game-play. It's also important that this person can help students review their play, look at analytics and use those to develop strategy and plans for future play. You may also wish to assign a role of General Manager. This person would be a first point of contact, deal with administrative issues such as booking rooms, setting up events, organizing practice etc. Finally, it can be helpful to have a Technical Advisor. This role (and indeed all three roles) may well be fulfilled by one person who is able to do all of the above, but if your coach does have a background in sport education, for example, they may not feel overly comfortable with being in charge of the technical set up for competitions etc. Consider all of your needs, and the roles that you require to be filled. If this sounds daunting, it may be helpful to connect with other educators who have been in your shoes. Check out the #EsportEdu community on twitter – a friendly, helpful and welcoming community of esports educators who will be more than happy to help.



Identifying a suitable space for your esports activities

Depending on whether you have opted to run a club or a program, you may be happy to begin in a school IT lab. It may be that your school operates a 'digital classroom in a box' (a class set of lap tops that can be booked out for particular sessions), or maybe your school has a flexible learning space that can be tailored to the needs of different educators/students. However your school operates, it's important to identify a space that will fulfil your needs such as team practice, debriefings (analytics and strategy meetings) and potentially competitions. The wonderful thing about esports is that, as you first begin, students can practice and play with each other from home, assuming all students have access to the technology, however as you begin to grow your team properly, it will be important to establish regular practice, and develop team spirit etc. through collegial, face-to-face meetings. If you decide to deliver esports as part of an elective or school program, you may want to consider options such as a 'digital classroom in a box' that enable to you to flexibly introduce devices into your learning space, as well as considering the use of the gym and other sport-related facilities - many existing curricular esports programs establish strong, positive nutrition and exercise plans as part of a student's esports wellbeing mindset. Some esports educators have tapped into resources in their wider community in order to access the kinds of facilities they need for their esports clubs:



Your school may not have all the resources you need, but your community may. If you're starting a bowling club at school, you don't build a bowling alley in your school if you have one in town! We were very lucky to have a gaming lounge in our town, and this is where we brought our five esports teams into a shared space. James O'Hagan. Academy of Esports



Identifying the available technology vs the technology required for esports

Technology can be a large obstacle to any digital learning program for three main reasons outlined here:

- **Access:** Draw up a list of available technology in your school. What on the list is accessible to you and your students? What is bookable for regular scheduling? It's important that you are able to book the room/technology regularly throughout the semester/season.
- **Appropriate:** Is the technology up to date? Will it run the latest versions of games, software etc? Is it suited to the needs of your students (e.g. is there a mouse and keyboard rather than trackpads or touch screens)?
- **Expertise:** In almost every survey of digital learning, fear of technology or worries about not knowing enough about hardware and software prevent teachers from getting started with digital learning. It's important to understand that your passion for game-based learning does not have to be matched with the technical know how to run an inter-state esports competition! Do you have a colleague who has expertise in IT/digital set up? Are there IT support staff who can support you in setting up the technical side of your esports activities? This is where connecting with your colleagues in step 2 above is ultra-important. Draw upon the expertise of a wide range of colleagues who can help ensure small pitfalls don't stop your pilot in its tracks. Identify an IT/technical support person who will make themselves available at your practice sessions throughout your pilot activity. In the longer term, you will be able to support students in developing the technical, strategic and organizational skills to enable them to play a key role in supporting the growth and management of esports in your school in future years.



Identifying sponsors/ developing a fundraising campaign

You may find that you have enough suitable technology to get by in your pilot, or you may find you have to do this with a combination of school tech and a Bring Your Own Device drive with students. However to fully ramp this up and roll it out wider, and to get the very best from it you will need to invest in appropriate, up-to-date equipment in the longer term. This may come from sponsors or donors in the community, so it may be worth identifying these patrons early on and inviting them to some of your matches, or to your fundraiser events.

5.



Grow, grow, grow

Generate community-wide support for your project

Once your school leadership have signed off on the plan, prepare to get the whole school community on-board (parents, teachers, administrators and so on). Hold an information evening, or prepare a letter for home, that outlines the benefits and addresses concerns. You may wish to deliver a special assembly for students or run an interactive event such as a student-teacher esports play-off to drive interest and support for the coming pilot. In terms of the sustainability of your esports initiative, invite a wide range of students to take part with the aim that in subsequent seasons, older students will be able to mentor or perhaps even coach younger teams, as part of their own contribution and learning.

6.

Establish your Esport Program

Choose players, set rules, start practice and scaffold the learning experiences

The steps you take here depend very much on how you intend to deliver your esports activities (club, program, elective etc.). In general, it's good practice to



Start with an on-boarding session

Outline what esports mean in your school (with your school definition, this may include expectations such as attendance and GPA etc.), rules of participation and practice (e.g. if you join our team you must commit to one hour of practice per week, one hour of sport with the team, and completion of a sleep and nutrition diary every week). Setting out clear expectations in this way will enable interested students to differentiate between playing video-games for leisure, and being part of a committed team. It will provide the correct springboard for inviting students to collectively draw up a charter of fair play and ethics for their own esports engagement.



Establish teams

If this is part of a wider program, you may be trying to run five or six small teams in a class of thirty students as part of embedded lessons, or if in a club format you may be running tryouts. Your team coach will lead this initial team set up, and begin to introduce some soft-launch games to get a feel for the strengths of each of your players, and the kinds of roles they naturally gravitate towards. Briefings and Debriefings should envelope digital practice to ensure students learn key skills of reflection, giving and receiving feedback, practicing communication, resolving arguments, and engaging in ethical conduct, as well as analyzing play and devising future strategy.



Develop team culture

Moving from initial play and set up to developing a team that works and plays well together is the aim. This will require the team coaches, managers, and players to work to establish clear roles (team captain and subsequent hierarchy), clear, concise communication, decisive action in-game, and reflective practice (in and out of game). Team managers will have to be consistent in how they approach the ways in which players meet expectations around attendance, academic achievement, conduct and so on.



Making Connections

All of the research on game-based learning makes a clear case for the role of the educator in helping students make connections. While we want these activities to be student-led as much as possible, it's important that the educator team provide adequate scaffolding for students to learn essential skills in communication, working with others, reflecting on action, setting goals, considering wellbeing and so on. Gradually, as students become adept, they will take on more of these roles, and may even be able to lead team briefings and debriefings, or work to become coaches for younger/newer teams in the school.



Competitions

Competitive play within the school will be wonderful for team practice, and can take the form of:

- Different teams in a class competing against each other
- Different classes in a year group competing against each other
- Different House Groups competing against each other (mixed ages across the school)

However, students will have opportunities to really try out their strategies and skills against other schools. Here the team manager may want to investigate starting a league with other schools in the district or region, or joining an existing league.



The role of Minecraft

Minecraft Education Edition is a naturally multi-player game, designed from core principles to allow players to interact within the same game world. It enables players to create, collaborate and compete with each other while communicating easily through the in-built chat function and/or a third party voice chat software. Using the Minecraft Esports games that accompany this resource, students will be able to compete with each other easily and in a safe environment that has been designed with students and teachers in mind.

7. Pilot & Review

Launch a pilot semester or season, record outcomes and evaluate successes and development needs

With your school community on-board, and your teams and expectations well-established, it's time to run your pilot esports activity with select classes or groups. Your team of colleagues should have undertaken key roles (coach, digital champion, manager etc.), and should support monitoring and evaluation activities in addition to delivering the esports program throughout the pilot. If you deliver esports as part of a program, you may choose one or two classes to work with at first, embedding game-play into wider lessons. If you decide to deliver this as a club, you may need to run try-outs, identify players, and even create a number of different teams to enable competition practice, and to satisfy demand. Make sure you and your colleagues have thoroughly thought through how you will monitor, record and evaluate the pilot activities, as everything you learn here can be used to improve and scale your esports offering.

8. Roll it out

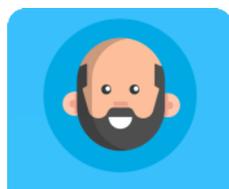
Use the evidence collected to improve and scale-up

Work with your colleagues to review the evaluation data you have collected, and present this to your school leadership. Like esports activities in other schools, you may see improvements in attendance, motivation or even in academic performance. This may enable you to make a case for widening the program, joining a scholastic esports league (to compete with other schools) or to work with teachers across the entire school community to create a truly cross-curricular learning program around esports to meet your school's wider ethos and vision.

6.2 Top Tips from Esports Experts

In this section we provide insights and perspectives from educators who are delivering esports in their schools. Together they represent a cross section of educators, having taken different approaches to esports, in order to suit their school setting and the needs of students, parents and teachers. What they share is their passion for student-centered approaches to learning with play, inclusivity and community at the heart of their classrooms. We asked them to share their insights into getting started with esports to provide their 'top tips' for other educators considering introducing esports into their school.

Educator Profiles



Name James O'Hagan

Director of Digital and Virtual Learning for Racine Unified School District, Wisconsin, USA

James is an Educator and Host of The Academy of Esports Podcast, Racine, Wisconsin, USA. He has experience of overseeing esports programming across several high schools in his district. In 2018, James founded The Academy of Esports where he presents a regular esports podcast and blog series for educators and parents.



Esports allows us to redefine athletic culture, diversify opportunities for student participation, promote good mental and physical health, increase career and collegiate scholarship pathways, and honor the importance of play. We can never forget the importance of play!



Name Steve Isaacs

Teacher of Video Game Design and Development at William Annin Middle School, New Jersey, USA

Steve is a teacher at William Annin Middle School, Bernards Township Board of Education, New Jersey, USA, where he has developed an internationally recognized middle and high school game development program. He has been actively involved in building the K12 to College Esports pipeline and co-founded the #EsportsEDU community. In 2016 Steve introduced an extra-curricular esports club at his middle school, and started an esports program at the local high school in 2017. Steve's book *Game Changer: Empowering Every Learner Through Esports* will be published in Autumn 2020.



Gaming is a common language among a diverse audience, and especially important to kids who don't have other school-to-home connections. It provides a great social outlet to bring these kids together and supports their social and emotional needs.



Name Karl Ogland

Game-Based Learning Teacher at Prakticum Vocational College, Helsinki, Finland

Karl is a Game-Based Learning and Esports Educator at Prakticum Vocational Institute, Helsinki, Finland. In addition to pioneering the introduction of esports to Prakticum in 2015, he is responsible for introducing esports in education to Finland. Karl is a member of the Education Committee of the Swedish Esports Association, Svenska Esports Förbundet, and his interests are edtech, game based learning and esports. Karl has published a book on esports education *The Educator's handbook to Esports* written in Swedish, English and Finnish.



Esports education is not about teaching students to get better at playing video-games, it's about what they are learning while they play!

Top Tips from Esports Educators



On the benefits of esports in education...



James O'Hagan

Think inclusion, accessibility and equity. Esports has incredible potential to address these issues in your school, if supported properly. It will provide you with the potential to help children really tap into what interests them through honoring a deep connection to play. The work of T.L Taylor (MIT) and her organization Any Key.org² provide guidance and resources on inclusion and diversity in esports. Something else that shouldn't be overlooked is the importance of community. Community is key, and esports will provide a focus for enabling children to develop a positive, supportive community of peers and friends. This community is something

esports has become very well known for.



Steve Isaacs

I've always been excited about the power of games in learning and the idea of competitive gaming in a school environment always intrigued me. Once articles started surfacing about scholarships being offered for esports athletes I knew people were ready to listen. The *affinity space* that is obvious among gamers is something that provides an opportunity for like-minded kids to come together. Gaming is a common language among a diverse audience, and especially important to kids who don't have other school-to-home connections. It provides a great social outlet to bring these kids together and support their social and emotional needs.



Karl Ogland

It's important to consider the benefits to three groups; students, teachers and parents. You see students don't need educators to help them to play video-games better, they need us to help them learn skills and knowledge they previously may not even have considered. Our programs help them understand the ways in which skills like team work, balance and health education are equally important to their esports performance and their school education. Our esports programs do this by focusing on sleep, nutrition, physical exercise and so on, and this results in them naturally spending *less* time on video-game play. If the students play a bit less, sleep a bit more and eat a bit better, do a bit more physical exercise – they will improve in their games. **But** – and here we have the win-win-win situation, while the students start with the esports program they will improve both in game and in their own well-being (it's a win), their parents will be very happy to see their kids not spending so much time in front of the computers (it's a win) and the school will get more alert students (it's a win).

We also have seen fewer bullying cases, because gamer kids tend to be bullied, but when you bring them together (or all the Esports interested students) and dress them in one united uniform it's not that funny to bully that single guy anymore. Suddenly that single guy is not alone, suddenly there are 50 students with a uniform and a common interest. Suddenly they are part of a community"



On getting started...



James O'Hagan

It's worth considering what strategic goals of your school district are, as well as those of your individual school, and then take some time to see how creating an esports club might help to achieve these goals. You could start casually with an after school video-game club as a way of gauging interest and later add an esports club. If you do this, my top tip would be to keep these two clubs separate. Esports isn't a bunch of kids just playing video-games. Esports is organized and competitive. It should be taken as seriously as any other school sport. You have to recruit and you have to take the time to clearly explain the difference between the two approaches to the students, since most of them will be used to playing casually. No matter what their exposure to esports has been up until this point, this is likely to be a completely new experience for them – and it's your job to prepare them for that.



Steve Isaacs

My top tips would be to engage all the stakeholders in the idea and recruit their support (other teachers, building level admin, district level admin) Share the reasons that esports belongs in schools - academic research and programs (NASEF - esportsfed.org is a great resource covering all of the academic benefits). Survey student interest regarding the club, games, ancillary positions (involve as many kids as possible - consider all of the different roles kids can play). Get a commitment from students regarding the competitive players and the fact that the expectations are to treat esports similar to traditional sports (practice, academic performance, matches). Let students know about the other possible ways to get involved (graphic design, website design, marketing, shout casting, streaming, fund raising, etc). Get IT on your side (brownies go a long way!).



Karl Ogland

My top tips would be: Involve your colleagues. Don't get tired of explaining what esports is all about to them. Especially involve the sports teachers! Gamers lack the skills that traditional sports players take for granted. Don't worry if you are not an avid gamer. A gaming interest is not vital among the staff it's way more important to show your students you want to help them to improve in a sport that is important to them. Our esports educator team has six members; social worker (female), 3 sports teachers, (1 female, 2 men), Game development teacher, GBL teacher (me). There are only two out of six teachers that are gamers, the rest are non-gamers. It's also incredibly important to involve the student's health care (sleep, nutrition, exercise etc). I would also say carefully consider the games you use when you first introduce esports to school. Be sure to follow the PEGI recommendations, and perhaps look for games that are non-violent, and age-appropriate.



On Overcoming Obstacles...



James O'Hagan

We still experience some obstacles in our esports club. Video-games in school still face negative stereotypes, despite the range of research showing the potential benefits. So having a clear message about the benefits of esports, based in our strategic goals, is important. That message helps to secure much needed funds, especially when resources can be scarce. We are also incredibly lucky to have a gaming lounge in our town, so we didn't need to think about set-up with school technology. We rent the lounge like you would rent a lane at a bowling alley. That's why it's incredibly important to tap into the wider community that surrounds your school, their support can really make a huge difference.



Steve Isaacs

Funding can be an issues for schools. My middle school stopped offering clubs for a number of years due to funding. Then they started to explore a 'pay to play' model where we offered a variety of clubs and students paid to participate. I approached our administration about esports, and due to the 'elective' nature of the pay to play club program they encouraged me to offer it and see if enrollment warranted running it. When I promoted the club I indicated that all were welcome and that we would also pursue opportunities to compete against other schools. I also had parents complete a permission slip to indicate if it was ok for their child to play teen rated shooting games (Fortnite, Overwatch primarily) so that I could honor their wishes but also offer these titles with their permission. In terms of avoiding pitfalls, it's important to be clear about what your goal is. For my middle school program, a casual game club was the initial idea which then makes it a little more challenging to get kids more serious about competitive gaming (practice, etc). I don't regret it as for the middle school level I do want to offer something for everyone. I did make a change during the second year where I broke it up into 2 clubs (casual gaming and esports - with more of a focus on competition). Our high school program started as a competitive community right from the start.



Karl Ogland

You have to have the courage to try new and different solutions - and you will learn so much from the process of doing it. We often felt like we were walking uphill in a quagmire. Everyone had arguments about the program but no one could give us advice. We had to set up our own network, this was before the Twitter community started. We asked the esports organizations what skills they wanted to see new players in the future have. No one said 'Be a 24/7 gamer!' All of the organizations gave us the feedback "We can teach them play, strategy and so on, you [educators] have to help them learn to set realistic goals, how to evaluate the goals, balance and structure of everyday life, the importance of nutrition and sleep". Our obstacle was, *How?* As no one could give us those answers we started to test, evaluate, test, evaluate....

Our obstacle was, how? As no one could give us those answers we started to test, evaluate, test, evaluate...research has become an integral part of what we do in our programs.



On Minecraft for Esports...



James O'Hagan

Minecraft already part of our students' common culture. They are already very competent in navigating this game, and because of this, using Minecraft for esports can really help to bring esports to elementary and middle school students.



Karl Ogland

The Esports world and the online gaming world can be an unfriendly place, sometimes people talk about the 'toxic culture' because it can be homophobic, racist and degrading to women. Finnish research proves kids play the same kind of video games until they are 11-13 years old and after they are 20. Many women play with male characters, male nick names and so on as they are afraid of being challenged. A female gamer often experiences double standards. They have to prove they are worthy,

they have to prove they are better than average but they can't be the best one. We have 60 esports students, 58 guys and 2 girls. But when we're in classes and talk about Esports we have at least 50-50 split between the genders. So what do the girls play? It turns out our female students play Call of Duty (with their boyfriends), Roblox and Minecraft (without boyfriends). Developing Minecraft for Esports play widens the genre to more than just 'first person shooter' options, and in doing so enables more diverse as well as younger students to play. This gives educators all the chances in the world to make Esports what it really is: there is no difference between gender. It doesn't matter what gender you are, but you have to be able to teach your students this when they are young enough to learn it. Minecraft is the key.



On Sources of inspiration and support for educators...



James O'Hagan

Educators who are interested in going a little deeper, the work of T.L Taylor (MIT) and her organization Any Key.org² are a great place to explore esports and inclusion. The work of Dr Constance Steinkuehler³ on literacy, learning and esports is very insightful, and I have a podcast series⁴ on esports in education called 'The Academy of Esports'.



Steve Isaacs

We have an EsportsEdu Discord server⁵ - it's a vibrant community of close to 1000 educators and other stakeholders. I also have a book coming out in the fall on esports in education!



Karl Ogland

I would say, involving the industry is vital to be taken seriously. Collaborate with your National Esports Federation, and set up your own network and invite the esports organizations. I have also written a book⁶ for educators about our experience of introducing Esports into our institute.

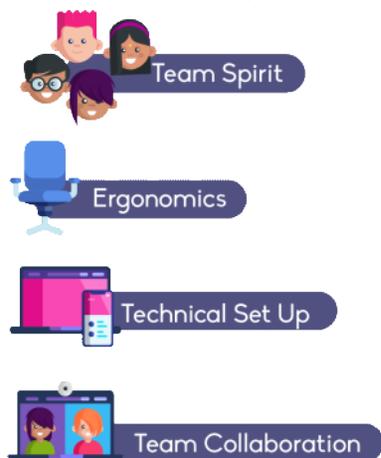
6.3 Designing Your Esports Space

In this section we focus on the design and set up of an esports space for a Minecraft esports team. The outline below makes the assumption that you are using the Minecraft esports maps and activities that accompany this resource, which are set up for two teams to compete against each other.



When schools first begin exploring esports, it can often be in an informal way – meeting in the library over lunch, or as an after school club in a classroom, where students bring their own devices, or in a school computer lab. As long as the space is accessible and can be booked for regular meetings, it will serve your purposes for getting started.

As interest grows, and teachers develop their expertise, decide to formalize their club, create a program or wish to join a league, finding a suitable space for practice, play and debriefings becomes an important consideration. Your esports space doesn't need to be a super high tech hub, but it should take into consideration the following needs:



We cover each of these in the sections below.



One way of developing a strong team spirit is through branding – team shirts, a team logo, team colors and so on. If you do have sponsorship and you can dedicate an entire room to esports, then you may wish to consider branding in your set up. Consider painting one wall of your studio or lab in team colors, or display your team logo. You may also wish to make sure that your team ethics/rules/ expectations are clearly displayed for all to see.

Research from Finland suggests that including physical training within esports can lead to a range of benefits, particularly for building team spirit:



Since we started our Esports journey back in the Fall of 2015 we have tried to connect as much research as possible to investigate how school and education can benefit from Esports in education. One of the very strong findings from the research is that physical exercise has a positive impact on the players' in-game performance, as well as contributing positively to their overall wellbeing and health. We have seen that teams that physically train together, develop a very strong team bond. Karl Oglund

Another great way to build team spirit is through community. Esports have been shown to have a highly collaborative, supportive ecosystem of participating community members. It is worth thinking about the different activities that will take place in your space, including how the space caters to the wider esports ecosystem. It's possible that not all of the students who try out for esports will be able to get a space on a team, and it's also possible that not all students wish to be players, even if they are interested in esports. How does your space create opportunities for other students to participate? Your team may need support in terms of marketing, event organization, shoutcasting, journalism, branding and merchandise, web and technical support, spectating and so on. Can you design a space that enables a supporting community to participate?

Finally, you may wish to consider the ways in which a strong team ethos can create a sense of belonging, and how this has been shown to help young people make more healthful choices. How can the setup of your space encourage healthful practices? Is there a space where players can stretch and move before and after play, to prevent repetitive strain? Are there spaces where they can fill up on water, and have healthy snacks such as fruit? Does your space have a large screen or projector to enable group discussion of game-play and strategy development, encourage open communication, and create

safe spaces for students to blow-off steam after difficult matches?



Ergonomics is about performance design. In this case, it's about choosing furniture and computer peripherals that will help encourage safe and healthy practices among students. If you are using an existing computer lab, it's likely that you won't have any say in the types of desks and chairs in the room, but there are small adjustments that students can make (including the height and distance of the screen, and their posture and seating position) to improve their comfort and their safety. If you are setting up a room from scratch, you will have options over a variety of features that can impact game-play including:

- Chairs
- Desks
- Screen size
- Keyboard and Mouse

There are many online [guides](#) to ergonomics and esports available but it's always best to check with your school district, as they may have their own set of guidelines in place.



Your esports space will need to be set up with the hardware and software to enable your team(s) to compete on the Minecraft: Education Edition Esports Maps that accompany this resource. The basic technical requirements for your esports space are as follows:

- Internet access or Local Access Network (LAN) (usually in one location like a school or library)
- One device per student/player
- Minecraft: Education Edition

Minecraft: Education Edition has been specifically designed for use in schools, and can be played across a broad range of devices including PC, iPad and Mac devices. Minecraft: Education Edition isn't currently available on Chromebooks or iPhones.

Figure 33 shows the minimum requirements across these devices. In esports clubs, many teachers opt to use a school computer suite, equipped with PCs, keyboards and mice. This set up gives you, the teacher, a more consistent procedure in terms of getting the computers set up with the correct software, etc if a suite is not available to you, the availability of Minecraft:Education Edition across these different formats gives you the option of asking students to bring their own device.

To run Minecraft:Education Edition, the computers you are using will have to meet certain technical requirements. These are listed in Figure 33, below. The minimum requirements on iPad is 1GB of memory

CPU	Intel Core i3-3210 3.2 GHz / AMD A8-7600 3.1 GHz or equivalent
RAM	2GB
GPU	<ul style="list-style-type: none">• Integrated:<ul style="list-style-type: none">• Intel HD Graphics 4000 or AMD Radeon R5 series with OpenGL 4.4• Discrete:<ul style="list-style-type: none">• Nvidia GeForce 400 Series or AMD Radeon HD 7000 series with OpenGL 4.4
HDD	1GB for game core, maps and other files

Figure 33 Minimum requirements on PCs and Mac computers

Once you have your team using devices that meet the minimum hardware requirements, you also must ensure that the devices are using an operating system that can run Minecraft: Education Edition. We cover operating systems, and provide step-by-step Minecraft set up guidance in Chapter 5.



Great esports teams consist of players who communicate and collaborate with exceptional skill. Not only do many teams participate in regular practice, deconstruct and analyze their game-play after games, and work together to develop game-play strategies before games, but teams must be responsive in-game. To enable this responsiveness, teams must:

- Develop effective communication skills – many teams develop their own 'language' - quick ways of relaying instructions to each other. Educators may need to scaffold the process of developing communication skills, and provide age/stage appropriate activities to support teams in developing communication and collaboration skills.
- Use efficient communication methods – many teams use additional software to enable them to have a formal channel for their in-game audio discussions, as well as providing a platform for text discussion, file sharing and so on to support pre and post-game team briefings. [Microsoft Teams](#), Discord and Asana are all examples of software that can be used by your esports teams to enable in-game communication, as well as wider team management.

6.4 References



References

1. The ESA (2018) https://www.theesa.com/wp-content/uploads/2019/03/ESA_EssentialFacts_2018.pdf
2. AnyKey.Org www.anykey.org
3. Interview with Dr Constance Steinkeuhler <https://www.gamecrate.com/interview-constance-steinkuehler-talks-e-sports-and-education-uci/18357>
4. The Academy of Esports <https://www.taoesports.com>
5. EsportsEdu discord server <https://discord.gg/7D9vhV>
6. The Educator's Handbook to Esports *please note this book has three chapters, one in Swedish, English and Finnish https://practicum.fi/dokument/esport_book_pages_lowres.pdf

Esports educator Steve Issacs will also be publishing a book on esports education in Autumn 2020
[Working title *Game Changer: Empowering Every Learner Through Esports*. A Ready Learner One Book]

Make and Model – How to Play



How to Play Make and Model



Minecraft Game

Make and Model is a game of creative competition. Which team can create a Minecraft build and get the vote? Who's will be the biggest, the best, the most colorful, the most accurate, or have the most moving parts?



Game Objective

This game has one objectives or 'Victory Condition':

1. Create a Minecraft build that is voted to be better than that of your competitors.



Gameplay

Two teams battle against each other in any of six beautifully crafted arenas, to test their creative skills, imagination, and Minecraft knowledge. This Build Battle-style game is designed for players to create from a given theme, with players voting, or scores given to, the best of those creations.



Coach Insights

Pirate Cove is full of strategic level gameplay, from choosing your roles and navigating the environment, to focusing on the same treasure as your opponent and stealing from them to purchasing Cannons and sinking their ship; instead. Players will have to work as a team to succeed in whatever strategy they choose. Planning, communication, teamwork and flexibility are critical skills in this game.

Because there are two win conditions, students will have to spend some time deciding on their tactics. This means they will have to:

- Familiarize themselves with the key abilities that each crew member brings. (Table 1)
- Map the relationships between each role, like who can purchase what and who they must give it to for it to be used effectively, and at what cost. (Table 2)
- Decide on the crew roster before a game starts, considering who their Captain should be and how many Pirates, Miners and Engi neers they need.
- Choose, plan and their game strategy, picking a preferred victory condition, role selection, how to accumulate Gold Coins, purchasing preferences, etc.



Student Skills

In this game students will have opportunities to develop the following skills:

- Strategic thinking
- Communication
- Collaboration
- Responsive Thinking
- Reflective thinking



Getting started with Make and Model



Accessing the Game

Download the game arena you wish to play [here](#).

The file will download a single .mcworld file.

If you choose to Open in directly, it will automatically engage Minecraft: Education Edition and load the world, ready to begin.

If you choose to Save the world first (recommended) you will need to open the file by double clicking on it.



Arenas

There are six arenas to choose from:

-  Pirate Cove
-  Busy Bees
-  Gold Rush
-  3D Print
-  Space Race
-  Splat Racers

Arena	Screenshot	Description
 <p>Pirate Cove</p>		Set on huge galleon ships, docked by a forgotten island in the Caribbean Sea and featuring cannons, skulls and treasure chests.
 <p>Busy Bees</p>		Set in a gigantic garden, where the players are the size of bees, surrounded by huge trees, flowers, a garden gnome and a lawnmower.
 <p>Gold Rush</p>		Set in an old west town during the California gold rush.
 <p>3D Print</p>		Set in a giant maker space with 3D printers and 3D printed objects.
 <p>Space Race</p>		Set on a barren moon in a glass dome, surrounded by floating spacecraft, meteors and planets.
		Set on a fantasy race track on a colorful



island of giant plants, mushrooms, gliding goldfish and butterflies, and a rainbow volcano.

Splat Racers

Figure 1

For the purposes of this Playbook, we will showcase the Pirate Cove arena. We recommend you start with this one until you are familiar with the features, which are common with the other arenas.

Every arena contains the same, common features of gameplay. Due to the different arena designs they will look a little different, but each arena will always have the following:

- Spawn Area game controls
- Team Selection Area
- Build Area
- Voting/Scoring area
- Timer
- Scoreboard

Becoming familiar with these aspects of the game design will mean that you can play in any arena with ease, knowing what to look for and how to use it.



Spawn Area

Players start in a Spawn Area, surrounded by the instruction signs and NPC's they need to learn the basics of the game. This area contains the Game Controls and Team Selection Areas.



The Yellow and Green floor areas of this ship are designed as Team Selection Areas. Players should stand on the color matching that of the team they are in. Yellow players on the Yellow area, Green Team players on the Green area. All players MUST be standing on one of these colors when the Start Button is pressed by the game leader. Any player who is not, will not be part of any team when the game begins and will not be teleported from the Spawn Ship to the game arena.



Game Controls



Team Selection

Before you begin setting the timer and starting the game, players must choose their team color and stand in the appropriately colored Team Selection Area so the game can assign them to that team.

There are always and only two team colors:

- Yellow
- Green

Players in the Yellow team must stand and remain on the yellow floor, while Green team members must stand and remain standing on the green floor.

When the Host presses the Start button, players on each color will be assigned to that team and teleported to the game arena. Any player not standing in that area, will be left, unassigned.



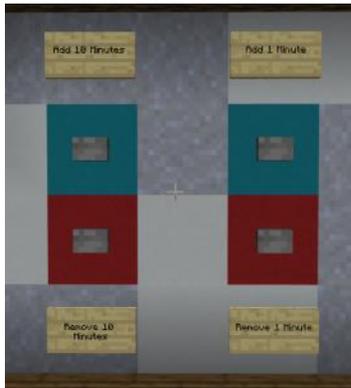
Timer

At the start, on the Spawn Ship, the Host of the game sets a timer. This time can be set to any amount of time between 1 minute and 60 minutes.

We recommend between 20 and 40 minutes per game.

The game Host must press the Buttons on the Blue Blocks to count the time up in increments of either 10 minutes or 1 minute. Should you wish to reduce the time, you may do this at any time by clicking on the Buttons on the Red blocks.

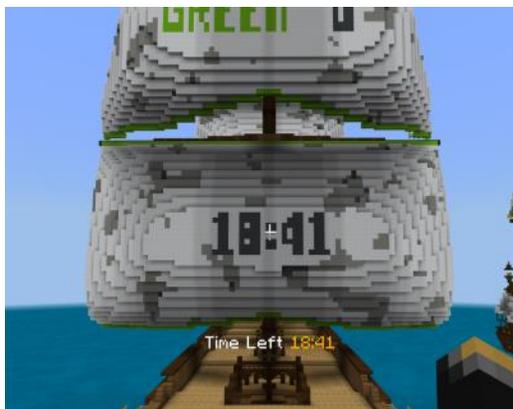




Note: If the timer shows anything below 11 minutes, you can only reduce the time by clicking the 1 minute Button.

When the game begins, the timer will countdown in two places:

1. At the bottom center of the screen.
2. On the sails of each of the Player ship (large enough to be seen from almost anywhere on the island).



Once you have set the time, click on the Button on the Green block in the Game Controls area to start the game.



Be sure you are ready to start the game. Use this checklist to get you started:

In this game students will have opportunities to develop the following skills:

- All players who should be present, are present
- There is no one in the game who shouldn't be
- Players who have been allocated a team color are standing on their respective Team Color area
- Players who are not in a given team are NOT standing on a Team Color area
- Each team knows the build theme



Once you have set the time and started the game, you can reset it at any time by clicking on the Button on the Black block in the Game Controls area.



The Make and Model content is designed to be used over and over again. The Reset function is designed to reset the game to a fresh start. It is also useful if there was an error in team selection or the incorrect time was set to begin with.

Resetting the game **does**:

- Reset the timer
- Reset the Team Selection

Resetting the game **does not**:

- Remove any builds in the Team Build areas
- Reset the scores if Armor Stands have been used to score

You must clear the builds and remove any scoring Armor stands manually before you begin a new game.

If for any reason you think the Minecraft world is not working correctly or has been damaged during play so that it does not perform as the playbook suggests, reload the game from its original file source to start again:

Download the game arena you wish to play [here](#).



Game Mechanics



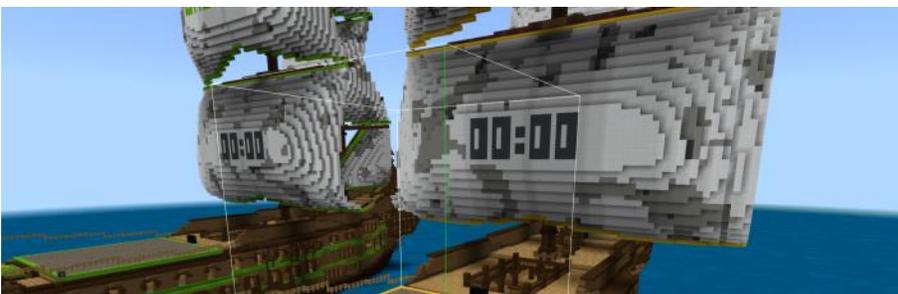
Build Area

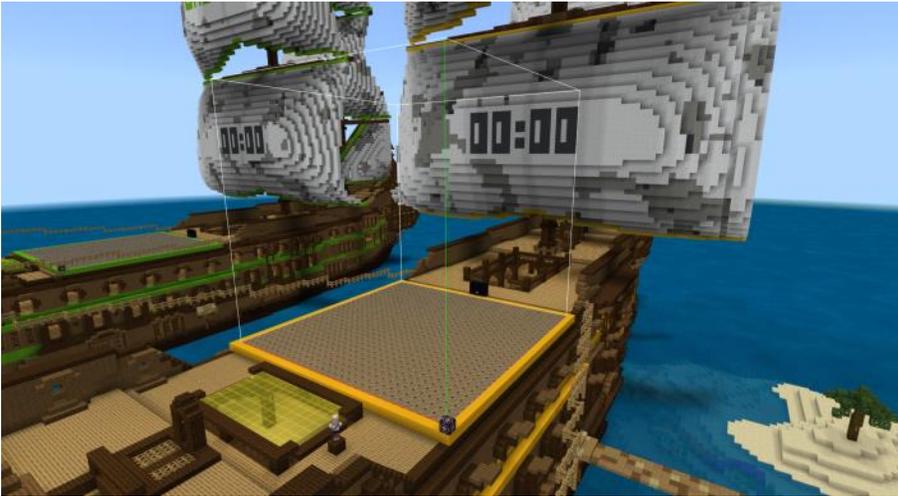
As Make and Model focuses on the creative aspects of Minecraft in a competitive game, players will build their creations in a pre-designed space called a Build Area. Each team has a Build Area in which they must create something that competes with the opposing team's ability to create.

By default, the arenas are 'Immutable'. This means that players cannot add to or destroy anything in the world around them. The Build Areas are the only place that players are able to manipulate the world to create, so containing their creations in a viewable and scoreable area.

The Build Areas are floored with Allow Blocks. Allow Blocks 'allow' players to build on top of them.

Each Build Area is made up of a 32x32x32 block space, with a colored frame, a Delete/Clear Build Button nearby, and a Structure Block on the corner.





The Delete/Clear Build Button clears the entire Build Area in one go. Players can use this to clear a previous build, or their own.

Once pressed, this cannot be undone!

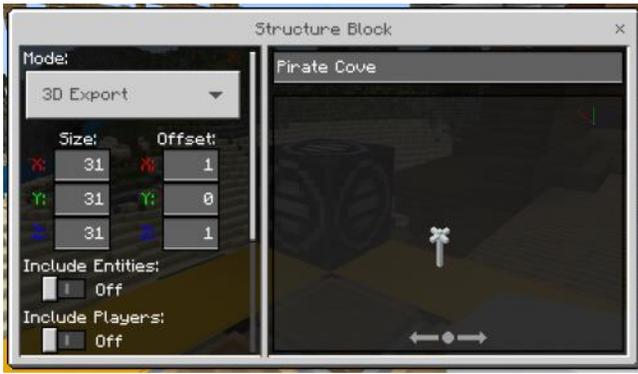


Structure Block - 3D Printing

Players can export a creation using this Structure Block located in a corner of each Build Area.



The settings inside the Structure Block have been preset to reduce player input to just one button - Export.



Click on the Structure Block then click Export in the bottom left of the window to turn your Minecraft build into a 3D Object.



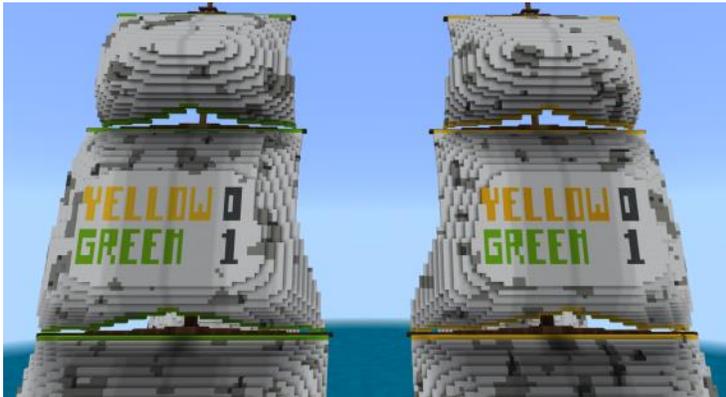
To make it available for 3D Printing, open the Minecraft Export in 3D Builder (Win10) and then save it in the format you need - .STL or .OBJ are most common.



Scoring

Scoring takes place during a two minute Voting timer at the end of each round.

When the build time runs out, players are automatically teleported outside of their build and banned from returning into the Build Area so the cannot



Build Themes

Arena	Basic Build (Block Building Only)	Advanced Build (Redstone/Mechanics/Command Blocks)
 Pirate Cove	<ul style="list-style-type: none"> • Cannon Firing a Cannon Ball • Shipwreck • Pirate's face • Pirate shack • Trap for Pirate Treasure Hunters 	<ul style="list-style-type: none"> • Cannon Ball hitting a building • The Kraken attacking a ship • Pirate's face that moves its mouth or eyes • Pirate shack with secret area for hidden treasure • Trap for Pirate Treasure Hunters
 Busy Bees	<ul style="list-style-type: none"> • Bee hive • Flower in a pot • Lawnmower • Bird's nest • Giant bee • Hedge Maze 	<ul style="list-style-type: none"> • Ant colony (section) • Flower that emits pollen • Lawnmower that cuts grass that regrows. • Bird's nest with eggs that hatch • Giant bee that stings if you get too near • Hedge Maze that changes form
 Gold Rush	<ul style="list-style-type: none"> • Wagon • Bandit • Gold mine • Gold town stables • Gold town house 	<ul style="list-style-type: none"> • Wagon camp • Bandit Camp and ambush • Gold Mine with Rails for gold collection • Gold town railway with working train system • Gold town marketplace with traders

 <p>Gold Rush</p>	<ul style="list-style-type: none"> • Gold mine • Gold town stables • Gold town house 	<ul style="list-style-type: none"> • Gold Mine with Rails for gold collection • Gold town railway with working train system • Gold town marketplace with traders
 <p>3D Print</p>	<ul style="list-style-type: none"> • 3D Printer • Toy • Minecraft Mob • New Minecraft Mob • Spray can • Maker tool • Computer 	<ul style="list-style-type: none"> • 3D Printer with Piston building mechanism • Toy with moving parts • Minecraft Mob with moving parts • New Minecraft Mob with moving parts • Spray can that sprays color blocks • Maker tools that moves • Computer with working function (
 <p>Space Race</p>	<ul style="list-style-type: none"> • Moon Base • Alien spacecraft • Space Station • Astronaut helmet • Alien colony 	<ul style="list-style-type: none"> • Moon base with meteor impact • Alien spacecraft with firing weapons • Space Station with fuel system and food • Astronaut (whole) • Alien colony with transport systems and food
 <p>Splat Race</p>	<ul style="list-style-type: none"> • Racing Car • Monster truck • Fantasy vehicle • Race track design • Rainbow volcano • Butterfly 	<ul style="list-style-type: none"> • Racing car with working lights and interior • Monster truck • Fantasy Vehicle with lights and interior • Race Track Design with Rails and Carts • Rainbow Volcano that erupts • Butterfly that lights up at night

Figure 2

Make & Model Rubric

Wednesday, July 28, 2021 11:43 PM

Make and Model Rubric 1.0.1

 Make and Model Scoring Rubric					
Map:					
Topic:					
Date:					
Time:					
Host:					
Green Team:					
Yellow Team:					
Score up to 1 point max per slot. You can award 0.X for more accurate scoring.		Judge 1	Judge 2		
Scoring Rubric		Up to 1 point per slot!	Up to 1 point per slot!		
Category 1	Topical Accuracy - Relevant, Recognisable Is recognisable within the context of the subject or theme. Is visible and does not have to be uncovered. Is fully 3D, and can be observed from multiple angles. Contains accurate detail, adding to the overall aesthetics.				
Category 2	Visual Creativity - Color, Shades, Highlights, Texture Adopted a variety of blocks to enhance the color range. Used a range of block types to create shades and highlights. Created patterns and effects for detail using a selection of blocks. Considered texture through the use of unique, textured blocks.				
Category 3	Size and Space - Area, Used scale as an intentional aspect of the build. Made use of the whole space given - width, length, and height. Matched all aspects of the build to scale (characters to buildings, etc).				
Category 4	Aesthetics and Environment Considered and created the surrounding environment of the build. Used lighting to raise the profile of the build and accentuate detail and focus. The additional aesthetics and environment enhance the look and design of the build				
Category 5	Redstone Redstone has been used successfully to create a function or aesthetic. Redstone mechanics have been hidden from view. Redstone mechanics are relevant to the topic or theme Multiple Redstone creations have been created as effective parts of the build.				
Category 6	Teamwork Team has clear and active leadership. Roles and responsibilities are allocated and clear. Effective communication displayed between team members. Active encouragement and help among team members. Organisation is apparent in active building. Pre-game planning is evidenced in the process and result of the build.				
TOTAL		0	0	0	0
		Total Score		Score out of 9	
Green Team		0		-	
Yellow Team		0		-	



Make and Model Scoring Rubric

Map:	The name of the Make and Model map used
Topic:	The theme or topic of the build to be created
Date:	The date of the competition
Time:	The time this round takes place
Length:	How long this round has been allocated using the in-game timer?
Host:	Teacher/Host name and IP address?
Green Team:	The name of the Green team
Yellow Team:	The name of the Yellow team

Scoring Rubric		Judge 1		Judge 2	
		Up to 1 point per slot!		Up to 1 point per slot!	
Category 1	Topical Accuracy - Relevant, Recognisable	Score	Score	Score	Score
	The finished build represents the topic of theme	Score	Score	Score	Score
	Is visible and does not have to be uncovered.	Score	Score	Score	Score
	Is fully 3D, and can be observed from multiple angles. Contains accurate detail, adding to the overall aesthetics.	Score	Score	Score	Score
Category 2	Visual Creativity - Color, Shades, Highlights, Texture	Score	Score	Score	Score
	Adopted a variety of blocks to enhance the color range.	Score	Score	Score	Score
	Used a range of block types to create shades and highlights.	Score	Score	Score	Score
	Created patterns and effects for detail using a selection of blocks. Considered texture through the use of unique, textured blocks.	Score	Score	Score	Score
Category 3	Size and Space - Area,	Score	Score	Score	Score
	Used scale as an intentional aspect of the build.	Score	Score	Score	Score
	Made use of the whole space given - width, length, and height. Matched all aspects of the build to scale (characters to buildings, etc).	Score	Score	Score	Score
Category 4	Aesthetics and Environment	Score	Score	Score	Score
	Considered and created the surrounding environment of the build.	Score	Score	Score	Score
	Used lighting to raise the profile of the build and accentuate detail and focus. The additional aesthetics and environment enhance the look and design of the build	Score	Score	Score	Score
Category 5	Redstone	Score	Score	Score	Score
	Redstone has been used successfully to create a function or aesthetic.	Score	Score	Score	Score
	Redstone mechanics have been hidden from view.	Score	Score	Score	Score
	Redstone mechanics are relevant to the topic or theme Multiple Redstone creations have been created as effective parts of the build.	Score	Score	Score	Score
Category 6	Teamwork	Score	Score	Score	Score
	Team has clear and active leadership.	Score	Score	Score	Score
	Roles and responsibilities are allocated and clear.	Score	Score	Score	Score
	Effective communication displayed between team members.	Score	Score	Score	Score
	Active encouragement and help among team members.	Score	Score	Score	Score
	Organisation is apparent in active building. Pre-game planning is evidenced in the process and result of the build.	Score	Score	Score	Score
TOTAL		0	0	0	0

Scoring based on three recommended metrics:	0	Did not display or complete this element of the scoring.
	0.5	Showed aspects of, or attempts at this element of the scoring.
	1	Displayed or completed this element of the scoring.

Green Team	Total Score	Game Score
	Total Score	Game Score
Yellow Team	Total Score	Game Score
	Total Score	Game Score

The **Total Score** represents the total calculation of the Score slots in the rubric.
The **Game Score** is calculated to give you the total number of points to allocate each team at the end of the build. This can be no more than 9 points.



Make and Model Scoring Rubric

Map:	The Lost Library
Topic:	Harry Potter Scene
Date:	6/10/2021
Time:	1200 PST
Host:	Teacher X
Green Team:	The Tenbury Tigers
Yellow Team:	The Fire Dragons

Scoring Rubric		Judge 1		Judge 2	
		Up to 1 point per slot!		Up to 1 point per slot!	
Category 1	Topical Accuracy - Relevant, Recognisable				
	Is recognisable within the context of the subject or theme.	1	1	1	1
	Is visible and does not have to be uncovered.	1	1	1	1
	Is fully 3D, and can be observed from multiple angles.	1	1	1	1
	Contains accurate detail, adding to the overall aesthetics.	1	1	1	1
Category 2	Visual Creativity - Color, Shades, Highlights, Texture				
	Adopted a variety of blocks to enhance the color range.	1	0.5	1	1
	Used a range of block types to create shades and highlights.	0	1	0.5	1
	Created patterns and effects for detail using a selection of blocks.	0.5	1	0.5	1
	Considered texture through the use of unique, textured blocks.	0.5	1	1	1
Category 3	Size and Space - Area,				
	Used scale as an intentional aspect of the build.	1	1	1	1
	Made use of the whole space given - width, length, and height.	1	1	1	1
	Matched all aspects of the build to scale (characters to buildings, etc).	1	1	1	1
Category 4	Aesthetics and Environment				
	Considered and created the surrounding environment of the build.	1	1	1	1
	Used lighting to raise the profile of the build and accentuate detail and focus.	1	1	1	1
	The additional aesthetics and environment enhance the look and design of the build	1	0.5	0.5	1
Category 5	Redstone				
	Redstone has been used successfully to create a function or aesthetic.	1	1	1	1
	Redstone mechanics have been hidden from view.	1	1	1	1
	Redstone mechanics are relevant to the topic or theme	1	1	1	1
	Multiple Redstone creations have been created as effective parts of the build.	1	1	1	1
Category 6	Teamwork				
	Team has clear and active leadership.	1	1	0.5	1
	Roles and responsibilities are allocated and clear.	1	1	1	1
	Effective communication displayed between team members.	1	1	1	1
	Active encouragement and help among team members.	1	1	0.5	1
	Organisation is apparent in active building.	1	1	1	1
	Pre-game planning is evidenced in the process and result of the build.	1	1	1	1
TOTAL		20	21.5	19.5	22
		Total Score	Score out of 9		
Green Team		39.5	8.08		
Yellow Team		43.5	8.90		
			Rounded up or down to the nearest point =		
			8		
			Rounded up or down to the nearest point =		
			9		

Creative Clash Esports Overview

Thursday, July 29, 2021 10:54 AM

How to play Minecraft Esports Creative Clash Adventure Maps

Minecraft Esports Creative Clash games are the second generation of Minecraft Esports challenges. These maps build upon themes introduced in the Minecraft Esports Make & Model worlds – the first-generation challenge maps, but are designed to more closely embrace the principles of typical esports titles, where fast-paced, adventurous play and collaborative competition drive much of the game play.

Here, teams must work together, utilizing each players' strengths to develop a strategy that will enable their team to meet the game objectives more quickly than competing teams.

Student Skills

Each of the Creative Clash games has different objectives and victory conditions, and therefore the skills students develop by playing them will differ. However, this series of games has been created to provide opportunities for students to develop the following skills:

- Strategic thinking
- Planning
- Communication
- Collaboration
- 3D thinking and orientation
- Responsive, Adaptive and Flexible Thinking
- Creative problem solving
- Reflective thinking
- Fair play & sportsmanship

Minecraft Esports Adventure Maps are designed to be played and revisited many times to enable students to develop skills over time. Students are encouraged to reflect upon gameplay to determine strategies that were successful and team players' strengths, as well as reviewing techniques that other teams employed to assist them in planning, strategy-development and goal-setting for future games.

Many of the skills students will develop relate to 21st Century Learning, Connected Classrooms and Social and Emotional Learning – skills that are as desirable in hybrid learning situations, as they are in 21st century workplaces.

Busy Bees Nectar Hunt - How to Play

Thursday, July 29, 2021 10:53 AM



Busy Bees Nectar Hunt – The Playbook



How to play Busy Bees Nectar Hunt



Game Objective

Set in an enormous garden, students play as 'bees' working together with their teammates to collect nectar for their hive. Two hives compete against each other as bees from each team visit flowers, collect nectar and return it to the hive. Placing nectar in the hive also fills a glass jar behind the hive with honey, for observers to see. This game has one primary objective:

To collect enough nectar to fill the glass jar with honey before the other team.

Because there is no timer in this game, this will occur in one of two ways:

- The teacher will give students an allotted time to play the game in (e.g. 15 minutes), and the team with the most honey in the jar at this time will win, or
- One team will completely fill the jar with honey and the game will stop.

To achieve the objective, students must develop skills in take-off, flight and landing, as well as in negotiating several fixed objects (flowers, garden gnomes, water features), and challenges (spiders, spider webs and wasps) in the garden. Students can practice their skills in the **Flight School** tutorial world.



Welcome to Flight School

Since learning to fly is a crucial element in this game, we have provided a tutorial area called Flight School. Students who have played Minecraft before will be very familiar with being able to 'fly' around in-game while in Creative mode. However, this is very different from the kind of flight required in this game.

Here students use Wings, usually called Elytra in Minecraft. Some of your students may already be skilled in using these. However, our recommendation is that players attend Flight School first.

Busy Bees Nectar Hunt automatically begins in the Flight School Tutorial. Students find themselves inside a bee hive, where friendly Bee NPCs (Non-Player Characters) will direct them to collect wings and nectar before practicing their flying skills. Within the tutorial area students are encouraged to practice:

- Flying different distances
- Avoiding man-made objects (such as walls)
- Landing on flowers of different heights
- Flying through high value bonus areas
- Using nectar to boost their flight

All of these skills will be important when playing in the adventure map arena.

Once students feel they have developed their flight skills enough to play, they can join the Busy Bees Nectar Hunt arena by completing the tutorial objective – which is to fly the full length of the flight school area to land on the garden gnome. Once on the gnome, they will stand on the Nectar Pod on the pink flower, which will teleport them to the main arena.



Getting Started in the Busy Bees Nectar Hunt Area

The Busy Bees arena comprises the same, common features of gameplay as all other Esports Minecraft Maps in the series:

- Spawn Area – Where students arrive in the game
- Spawn Area Game Controls – Levers, buttons and switches accessed by the teacher to begin, end and reset the game
- Team Selection Area – yellow and green platforms that students stand on to indicate which team they are joining
- Team Base – A place where players in each team congregate, in this map each team has a beehive as their base.
- Scoring – teams keep track of their score by the tracking the amount of nectar collected in their hives.
- Observation – Students not competing are permitted spectator status, by ensuring they do not stand on the yellow or green Team Selection Areas when the host starts the game.

Spawn Area

Players start in a Spawn Area, surrounded by signs and NPC's providing instruction on the basics of the game. This area also contains the Game Controls and Team Selection Areas.

A new feature in this map is the *All Area Access* given to the Game Host (normally the teacher). *Each Hive has a protective barrier that prevents players from entering the opposing team's Hive. However, to enable the teacher to enter both hives, observe play or resolve issues where necessary, the Game Host is permitted access to both Hives.*





Team Selection

Before you begin the game, players must choose their team color and stand in the appropriately colored Team Selection Area so the game can assign them to that team.

There are always only two team colors:

- Yellow
- Green

Players in the Yellow Team must stand and remain on the yellow floor, while Green Team members must stand and remain standing on the green floor.

When the Host presses the Start button, players in each Team Selection Area will be assigned to that team and teleported to the game arena.

Please Note: Any player not standing in that area, will be left, unassigned and should be considered a spectator. *Busy Bees Nectar Hunt* is not designed to enable players to join after the game has started. If players arrive late and wish to join, the Host will have to reset the game entirely.



Game Mode

Time of Day

This option allows you to choose which time of day your students will play in.

Day = Bright daylight Night = Dark nighttime.

Difficulty

This option dictates whether or not Spiders and Wasps (mobs) will spawn in the game as enemies.

Easy = No Mobs Hard = Mobs

Weather

This... option allows you to choose the weather throughout gameplay.

Clear = No Rain Rain = Rain

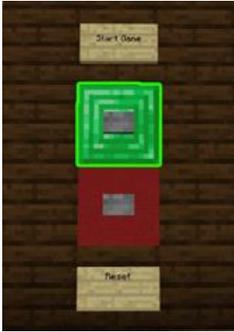


These settings do not affect gameplay directly (i.e. it is not any more difficult to fly in rainy weather than in dry conditions), however these settings can enhance the player experience, and create unique conditions for alternative gameplay and strategy. For example, playing in the rain at night with mobs enabled will require a different game style and more teamwork than playing in bright daylight, clear weather, with no mobs.



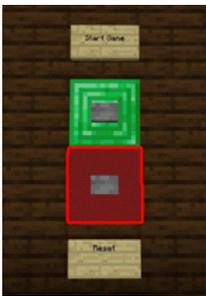
Once you have selected the game mode and all participating students are standing on their chosen Team Selection Area, click on the Button on the Green block in the Game Controls area to start the game.

Note: Items that students have brought with them from the Flight School tutorial (e.g. nectar) will be removed from them once the Start button has been pressed.



The Busy Bees Nectar Hunt map is designed to be used repeatedly. The Reset function is designed to reset the game to a fresh start after each match. It is also useful if there was an error in team selection. You can reset the game by pressing the Red button on the main game control panel.

If for any reason you think the Minecraft world is not working correctly or has been damaged during play so that it does not perform as the playbook suggests, reload the game from its original file source to start again.

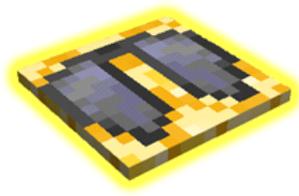


Once the Host selects **Start Game**, all players standing on the Team Selection Areas will be transported to their corresponding hive (Yellow Hive for Yellow Team, Green Hive for Green Team).



When they arrive in the hive, they will see a golden pressure plate on the floor marked with wings. Each player must stand on this plate to be given two objects:

- Wings – These are automatically applied to the players for flight.
- Bee Sting – Players must use this for defence and Player vs Player combat.
- A coloured helmet – Green or Yellow to indicate which team they are in



Each player will also be given a small amount of nectar (3 drops) to fuel their first flight. After this, they must collect nectar from flowers. Nectar serves two purposes:

1. To boost a players flight - If Nectar isn't used to create a boost, players will eventually fall to the ground. Using Nectar to boost means that players can travel further and so collect more Nectar overall. Part of the strategy is how much Nectar to spend on flight, and how much to deposit.
2. To deposit in the Hive - Deposited Nectar is transferred to the glass Jar behind the hive, which will fill up gradually with honey and lead to victory when full.



Collecting Nectar

Players must leave the Hive and take flight in order to reach the Flowers in the garden, which will both replenish their Nectar for boosting flight, and provide them with Nectar to take to the Hive.

Flowers contain Nectar Pods (a yellow block with a Pressure Plate on top). Standing on top of the Nectar Pod will reward the player with Nectar. Nectar Pods provide random amounts of Nectar. Between 1 and 15 Nectar can be delivered from each Nectar Pod. They also replenish at a random time, meaning Flowers can be revisited for more Nectar.

Some Flowers are easier to land on than others. Some Nectar Pods are easier to find in some flowers, and some Flowers contain more than one Nectar Pod.





Flight

As Bees, players must fly around the garden. While flight offers a huge range of skills to master, the basics of flight are as follows:

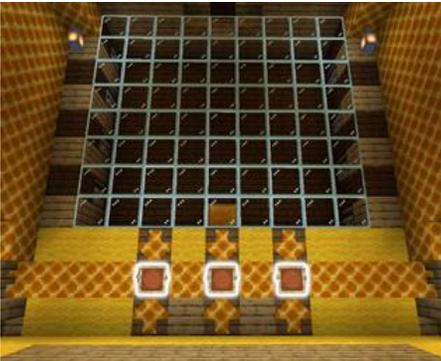
- **Take Off**– There is no vertical take-off. Taking off requires players to drop from a high object and press Jump to engage the gliding ability.
- **Gliding**– Once engaged, players will glide at speed, with a slow descending motion. True mastery of this game is in the ability to glide effectively.
- **Boosting**– Players can boost while gliding and gain both speed and altitude, allowing them to glide further.
- **Landing**– Landing is not as easy as it seems. The ability to land accurately and safely will determine how successful a player is in retrieving Nectar for the team.

Students will have to make decisions about how far they are prepared to fly to collect Nectar, and how many Flowers they visit, and how much to use for boosting before returning to the hive. This is part of the overall team strategy.



Banking Nectar

Players decide when they have collected enough Nectar to deposit in the Hive. Once inside the Hive, players must hold the Nectar in their hand and deposit it in the Frame between the arrow blocks on the back wall. Filling each row of this wall will also fill a row in a Honey Jar behind the hive. When the Honey Jar is filled, the game is ended, and that Team win the match.



When depositing Nectar, students will need to keep some in order to boost their next flight. If they forget to do this and deposit all their honey, they will be unable to fly unless one of two things happen:

1. Another player shares their Nectar – Players carrying Nectar can drop it for other players to pick up.
2. Taking a loan from the Bee Banker - Players can visit the Bee Banker (NPC) at the Jar behind the Hive and collect 3 Nectar Drops. However, this is deducted from the Jar/Hive score - with a little added interest too, so this should only be done in an emergency.

Teams can decide if it is strategically better to cooperate by sharing, or to send struggling players back to the hive to collect nectar from the Bee Banker.

Note: New players to the game may find that rather than depositing Nectar in the Frame inside the Hive, they have unintentionally deposited their Bee Sting. After some practice, this issue will drop off and players will become adept at depositing nectar. In the short term, the game Host can resolve this by deleting the Bee Sting from the Frame.

To do this the Host will need to be in World Builder mode (the Host should always be in this mode): Enter World Builder mode by:

Pressing **T** to bring up the chat window.

- Enter the command **/wb**
- Point at the item inside the Item Frame (in this game, this is likely to be a Bee Sting)
- Left Click the mouse to make the item disappear.



Bonuses

As well as the random Nectar Pods in Flowers, players can find Nectar Rings in the sky. These Nectar Rings will gift Nectar to a player. Be mindful that they only gift nectar once per game.

These rings are found in the farthest reaches of the garden, to encourage students to weigh up risk-versus-reward, as they will need extra nectar to fuel their flight there and back to the hive. They will have to decide if the reward is high enough to take the risk and if their flight skills are honed enough!



Obstacles

All around the garden, there are obstacles that will challenge students, including spider webs, water, the ground, and predators:



Predators- Mobs such as Spiders and Wasps are present in the game when Hard Mode is selected. They spawn randomly and will attack players in the sky and on the ground. Players can use their Bee Sting to defend themselves.

Webs- If a player gets stuck in a web, this will cost them time to escape in Easy Mode, and Spiders will emerge to attack in Hard Mode.

Water- Bees don't swim! Players would do well to avoid the water in the garden pond and the watering can. This will cost them time and leave them vulnerable to attack.

The Ground- If a player lands on the ground, there is no vertical take-off. Taking off requires players to drop from a high object and press Jump to engage the gliding ability. To reach a high enough place to take off, players should look for and approach the nearest human-made object. These include:

- Shovel (x 2)
- Garden Fork
- Garden Trowel
- Sun Dial
- Garden Gnome
- Lawnmower
- Black Bin
- 4 Hive Table Corner Legs



Players should look for the small **Melon Block** pillar at the base of these objects and approach it. This will teleport them to the top of that object, where they can begin their next flight.

Dying -If a player dies in-game, they will spawn back in the Team Selection area. They will lose all of the items they were carrying (Nectar, Bee Sting, and Wings), and should revisit the Hive to start afresh. They begin again by getting wings in the hive, and by visiting the Bee Banker for fuel.



Playing as a bee, students will get a sense of how enormous the garden can seem. When playing for the first few times, it can be easy to become disorientated. To assist them, they will find a Map in the central Team Selection Area, as well as a Map outside each Hive. Players can use this to guide their team mates towards areas of interest, human-made objects for new flight, or to assist them avoiding danger or making their way back to the Hive.



When one of the teams fills the Jar with Honey, the game will end. All players will be teleported back to the Team Selection Area and fireworks in the winning teams' colours will fill the screen.

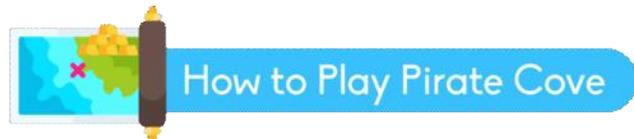
To play the next game, the Host will simply press the reset button to clear the Hives and the Jars and invite the students to choose a Team Selection Area to stand in, before pressing the Start Button.



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Pirate Cove Speed Run - How to Play

Thursday, July 29, 2021 10:54 AM



How to Play Pirate Cove, Speed Run



Pirate Cove *Speed Run* is a variation of the Make and Model Pirate Cove World. In this version, students play together as one team to find the hidden cache of treasure on the island, competing against the clock.

The game is designed for multi-player asynchronous play, so that the same Team can compete again and again to beat their own score, or try to beat the high score of other Teams who have played at other times.

One of the main features of this game is asynchronous play, and in this regard, Teams do not compete against other Teams at the same time. This enables Teams to play against themselves, to devise new strategies to try to set and beat their own personal best. This kind of play is ripe for post-game debriefings with reflection, meta-cognitive activities and goal setting. The game can also be played asynchronously against other Teams. This requires all Teams to keep a record of their time and score, enabling others to try to best the high scorers.



There are two different ways to play Pirate Cove *Speed Run*:

Students seek out Treasure on the island, by locating where 'X' marks the spot (which is in multiple fixed places on the island), and dig to find the buried Treasure. By returning this treasure to the Ship's Deck and placing it inside the gigantic Treasure Chests onboard they can meet the following objectives:

1. Pieces of 9

With this objective, students must locate enough Gold Blocks on the island to fill all 9 Treasure Chests on the Ship's Deck before the time runs out. In order to do this, the Host may wish to set a reasonable time (e.g. 30 minutes or so) for exploration of the island.

2. Fill Your Boots

With this objective, the Host can set relatively short times for gameplay (e.g. 10 minutes), and challenge the students to fill as many Treasure Chests on the Ship's Deck as possible before the time runs out. Most suitable for Teams who have played the game before and are familiar with the map.

These different objectives require very different kinds of strategy, and shorter play times may see students devise game-play tactics that divide up team roles, and take more risks.

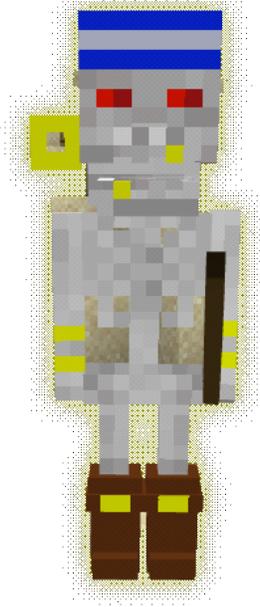
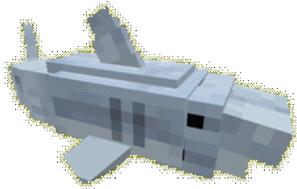


Due to the nature of this game, it is not designed to be refreshed or restarted. To play a fresh game each time, you must reload a new copy of the game to your Minecraft Education Edition world library.

Keep this bubble (or make a new one?) it is still an important point



One Team battles against shark-infested water, pirate skeletons and booby-trapped loot to locate and collect as much Treasure as possible before the timer runs out, or to fill 9 Treasure Chests on the Ship's Deck.





Teams will locate Treasure on the island by looking for sites with an 'X'. There are many of these located around the island. Some are fairly obvious, others are well-hidden, and buried very deep. Teams will also find that some of these locations are easy to access, while others are protected by enemies or are booby trapped.

These markers do not change over time, students will find them in the same location each time they play. This helps students develop strategies to improve their game-play over time, and once they are familiar with the map, undertake better risk analysis and weigh up risk versus reward.



In Pirate Cove *Speed Run*, Players assume two different roles: Captain and Pirate.

Captain - each team is led by a Captain, who will have access to tools these such as Pickaxe's, Lanterns, and Fish-Flingers - to defend themselves against enemy mobs. The Captain can visit the ship and re-stock the crew's tools whenever necessary. How often they choose to do this will be down to the strategic decision-making of the Captain.

Note: There can only be one Captain per team.

Pirate - each team can contain multiple pirates. The Captain should collect and distribute tools to the crew, based on team strategy. However, Pirates can also return to the ship at any time for a new Wooden Pickaxe and Bread.

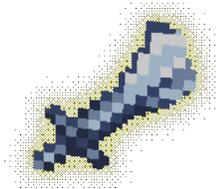
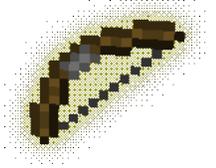
Starting Supplies

At the start of the game, the crew have an opportunity to collect the supplies they will need for digging for treasure and defending themselves against enemies. The Captain is supplied with more advanced tools than the crew, however, the Captain can choose to distribute these items to suit the Team strategy and player strengths.

Captain – starting supplies

- Sharktooth Cutlass x 1
- Diamond Pickaxe x 1
- A Fish flinger x 1 (a bow)
- Fish-flinger fish x 5 (arrows)
- Puffernades x 2 (pufferfish trap)





Pirate – starting supplies

- Wooden Pickaxe x 1



While pirates only begin with a Wooden Pickaxe, they have an opportunity to gain extra Loot in a variety of ways throughout the game:

1. The Captain may share Loot
2. Battling Skeletons may result in weapon and armour drops
3. Hidden Treasure Chests may contain bonus Loot as well as Gold Blocks



Student Skills

Teams will have to collaborate strategically to share tools, overcome shark-infested waters, locate and dig for Treasure and fend-off enemies. Some Treasure Chests are more lucrative than others, but these are often in hard-to-reach locations and guarded by enemies (such as sharks, spiders and skeletons). Once familiar with the map and the location of Treasure, Teams will make important game-play decisions by weighing up risk versus reward.

This kind of game will enable the development of the following skills:

- Communication
- Collaboration
- Strategic Thinking

- Creative Thinking
- Problem Solving
- Leadership skills
- Responsive & Adaptable Thinking
- Reflection
- Metacognition
- Goal-Setting

Scaffolding the Experience

As an educator, if you are looking for a game that will enable you to take your students on a deep dive into reflective thinking for the purposes of planning and goal-setting, this game is for you. Because the location of the buried treasure never changes, it gives students opportunities to reflect on strategy, discuss what worked and what did not, and plan to improve their game-play in successive games. By scaffolding the briefing and de-briefing sessions, educators can support their students in developing crucial learning-to-learn skills that they can apply across other areas of learning.



Getting started with Pirate Cove

The Pirate Cove *Speed Run* arena comprises many of the same features of gameplay as all other Esports Minecraft Maps in the series:

- **Spawn Area**– A small ship where students arrive in the game and can set the Game controls
- **Spawn Area Game Controls**– Levers, buttons and switches accessed by the Host (normally a teacher) to begin, end and reset the game
- **Team Selection Area**– a purple platform that students stand on to indicate they are joining the Team



- **Scoring**– A scoreboard on the Ship's sail keeps track of score and time (based on the number of Treasure Chests filled).
- **Main Ship** – This is the main arena where the players will return their found Treasure, placing it in giant Treasure Chests on deck to score



Spawn Area

Players start on a small wooden ship, surrounded by the instruction signs and NPC's to learn the basics of the game. The ship is called the Spawn Ship and is where all

players on the Team begin and end their game.



This area also contains the controls for the game including the Timer and the Start buttons. While the Spawn Ship is part of the main gaming arena, it is not needed during play and should not be visited again after the game starts. Players will be teleported back to the ship once the game ends.



The Game Controls are visible on the deck of the Spawn Ship and are controlled by the Host. These include:

- Timer
- Start Button
- Game Mode (Time of Day, Weather)
- Reset Button



The game Host has the responsibility of setting the timer on the Spawn Ship. It can be set to any amount of time between 1 minute and 90 minutes.

For a **'Pieces of 9'** game objective, we recommend 30 minutes plus for the first game, to enable students to familiarize themselves with selecting roles, collecting supplies and locating treasure. After this, games could last anywhere between 20-90 minutes, although this will depend on how many students you have in a team.

For a **'Fill your Boots'** round, students are encouraged to play a quicker game, and are forced to make decisions about risk versus reward. These games should be played from 7-20 minutes.

The game Host must press the Buttons on the Blue Blocks to count the time up in increments of either 10 minutes or 1 minute. The host can reduce the time, at any time during the game by clicking on the Buttons on the Red blocks.



When the game begins, the timer will countdown on the sails of the ship (large enough to be seen from almost anywhere on the island).

Game Mode

This game is designed to be played in Survival Mode. In addition, the game Host can also choose environmental settings that include:

Time of Day

This option allows you to choose which time of day your students will play in.

Day = Bright daylight Night = Dark nighttime.

Weather

This option allows you to choose the weather throughout gameplay.

Clear = No Rain Rain = Rain

These settings do not affect gameplay directly, however these settings can enhance the player experience, and create unique conditions for alternative gameplay and strategy.

Team Selection

The Team Selection Area is found on the deck of the Spawn Ship. All students wishing to take part must stand in the purple Team Selection Area on the deck so the game can assign them to the team.

Any player not standing in that area, will be left, unassigned and will not be able to participate.



Once the game has started, the Host should make themselves Creative Mode so they can fly, observe and control the game. They do this by pressing 'T' then typing '/gamemode creative' and pressing enter.



Once you have selected the game mode and all participating students are standing on the purple Team Selection Area, click on the Button on the Green block in the Game Controls area to start the game.

Note: Please note that once you play the game, the arena cannot be reset. To replay the map, you will have to reload from the original file. We recommend that you make a copy of the original file, and always ensure that any game is played from a copy, keeping your original file intact.



Be sure you are ready to start the game. Use this checklist to get you started:

- You have made a copy of the game to play from (i.e. you are not playing from the original file you downloaded)
- Players are standing on the Team Selection Area
- The Team has selected a Captain to lead the crew of Pirates
- The Team Captain is ready to get supplies and allocate to the crew
- There is no one standing on the Team Selection Area who isn't intending to play



Once the time is set, it can be reset it at any time by clicking on the Button on the Black block in the Game Controls area.



Due to the nature of the game, with destruction to the island environment, the Reset Timer function is not designed to reset the game to a fresh start. It is merely designed to reset the timer. It is useful if there was an error in team selection or the incorrect time was set.

Using the Reset Timer button **does**:

- Reset the timer

Using the Reset Timer button **does not**:

- Repair any damage done to the island by players
- Reset any Treasure Chests on the island
- Enable the map to be played from fresh

The only way to start a new game is to reload a fresh copy of the original game file:
[Download Pirate Cove Speed Run.](#)

Scoreboard and Timer

This game is scored and timed. These can both be seen on the Main Ship's Sails throughout the game.

IMAGE?



One of the key objectives of the game is to locate, mine, and retrieve Treasure Chests. These can be found located in several sites around the island, marked by a 'X'. When a Treasure Chest is found, players collect the Gold Blocks inside. The number of Gold Blocks in each location varies. Teams will have to decide which chests to seek out first, and

when to return to the ship with the Gold. If they don't place them inside the giant Treasure Chests on the Ship's Deck before the timer ends, the gold won't be counted towards their score.

A graphic for the 'Treasure Hunting' section. It features a small map of an island with a red 'X' marking a location. To the right of the map is a dark blue rounded rectangle containing the text 'Treasure Hunting' in white. A brown vertical bar with gold-colored ends is positioned between the map and the text box.

Treasure Hunting

Players find Treasure by exploring the island and seeking out 'X's. Once located, they will use their tools to dig for the treasure. Some chests are buried deep, and they will have to ensure they leave an exit route after their excavation.

They may also have to defend their haul from enemies, or get past booby traps.





Mobs

Pirate Cove is not only home to Pirates, but to a dark and mysterious magic that awakens the Skeletons of pirates long passed away.



These Skeletons roam the island and attack anyone hunting Treasure, for the Treasure players seek is their own, hidden on the island many moons ago.

Skeletons will attack players and players can defend themselves using tools they can purchase.



Scoring

Points are allocated to the team for each Treasure Chest on the Ship's Deck that is filled. There are 9 Chests in total on the deck, and therefore a maximum potential score of 9 points. Points are displayed on the Ship's Sail.

Victory Objective 1—Pieces of 9

Fill the 9 Treasure Chests on board the Ship's Deck before the time runs out. Teams will gain 1 point for each Chest that is filled. To fill a chest, players must place 9 blocks of Gold inside.

Victory Objective 2—Fill Your Boots!

Fill as many chests as possible before the time runs out. Teams will gain 1 point for each Chest that is filled. To fill a chest, players must place 9 blocks of Gold inside.

Pirate Cove Speed Run Champions

By keeping a record of each team's time and score, teams can compete against themselves to set and exceed their own personal best. Different teams can also play asynchronously, to best the highest scoring team.

To enable this kind of competition to take place, make sure you keep an accurate record of each team's time and score.



Download Pirate Cove Speed Run [here](#).

- The file will download a single .mcworldfile.
- If you choose to Open in directly, it will automatically engage Minecraft: Education Edition and load the world, ready to beg in.

If you choose to Save the world first (recommended) you will need to open the file by double clicking on it.

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Video Playlist

Tuesday, August 24, 2021 1:01 PM

Please find the full playlist of helpful video overviews and tops at <https://aka.ms/esportsvideos>



Esports

9 videos • 171 views • Last updated on Aug 1, 2021



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