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Article *in* European Conference on Games Based Learning · October 2024

DOI: 10.34190/ecgbl.18.1.2705

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Design of a Serious Game to Teach Esports Concepts and Career Pathways

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Abstract: The popularity of esports has gained public interest over the past decade, leading to the industries evolution, providing further avenues for career prospects and educational outreach. Esports, abbreviated from electronic sports, is the nature of playing video games casually or professionally at a competitive capacity, either as an individual, or as a team. Previous research areas in esports have focused on education, psychological factors, health and nutrition, business management, performance review, and commercialisation, factoring in the relevance of esports in sports and supporting terms. The industry has different avenues and perspectives that are advantageous to develop innovative approaches, providing information about the industry, and improving the understanding for the wider general audience. Serious games and games-based learning provides the opportunity to educate and inform about the phenomenon of esports and the potential career industry pathways. This paper presents a conceptual design for an esports serious game to educate players about esports in relation to career pathways and genres. Investigation and adaption of serious game frameworks (e.g. Learning Mechanics-Game Mechanics, Activity Theory Model of Serious Games) will be adhered to through the research. This will lead to the development of a serious game for potential stakeholders to assist in their interests in studying or learning about esports and its multi-faceted career opportunities through simulated scenarios. A mixed methods approach will support the increased frequency of new esports programmes in secondary, further, and higher education, using a serious game to inform prospective students in relation to potential career avenues. The conceptual design idea presented in this paper will support the initial research steps of a serious game to teach about esports.

Keywords: Esports, Serious Games, Competitive Gaming, Career Pathways, Game Genres, Serious Game Frameworks.

This paper provides a conceptual design of a serious game to teach about esports and career pathway opportunities, leading to informing and educating prospective students of potential opportunities available in the industry.

1. Introduction

The gaming industry and the activity of playing video games has permeated into society as a mainstream activity. By 2024, the games industry is projected to reach $455.60 billion in the market revenue with a trajectory continuing to soar (Statista, 2024). The surge in video games coupled with content creation (i.e. streaming) has influenced the popularity of esports. Esports, shortened from electronic sports, is the competitive playing of video games (Werder, 2022; Rogers, 2019) and as of 2019, has become a successful billion-dollar industry (Newzoo, 2019). Competitive games have been around for centuries, originating with the ancient Greek Olympics in 776 BC (Zhou, 2023). Video games, and competitive playing originated in the early 1970s at Stanford University, with the first recorded official esports tournament of "Spacewar!" (Scholz, 2019). Over 50 years later and the industry is soaring as a mainstream activity, breaking off into various levels in education, ranging from high school education to higher education either as a "*social space in which gamers can build community*" (Byrne, 2020, p. 25) or as a taught subject, e.g. business and events management, content creation (Scott *et al.*, 2021).

Serious games present a potential approach to teach about the domain of esports, the history of esports, the genres and career pathways. The serious games industry as of 2024, holds a market size value of $11.67 billion, with figures expecting to increase over double by the next ten years (The Business Research Company, 2024). The purpose of a serious game is to educate and train whilst fulfilling a sense of achievement for the player at the same time (Silva, 2020). Serious games research exists in multiple areas such as health, military, and education and games that are customised implementations (e.g. Baxter *et al.*, 2023; Hainey, Baxter and Holder, 2023). There is also the use of commercial games such as Doom II (e.g. Loh, Sheng and Ifenthaler, 2015) and Minecraft Education Edition (e.g. AlJanah *et al.*, 2023). AlJanah *et al.* (2023) used Minecraft Educational Edition as a tool to enhance engagement in higher education and to demonstrate the effectiveness of modified gameplay to teach programming concepts. Baxter *et al.* (2023) designed and developed a serious game to focus educating stakeholders about career pathways in the games industry.

2. Research Design

2.1 Methodology

The investigation and selection of research methodologies in the research will be mixed methods, starting with an initial phase of conceptualisation, leading to future phases of design, development, and evaluation. There will be a continued systematic literature review approach in academic literature highlighting important approaches to serious game design principles, leading to an effective use of game genres in certain scenarios (e.g. puzzles in problem solving scenarios). Interviews and surveys will gather further insight, combined with a user requirements analysis to identify commonalities in esports titles and genres. These findings will allow identification of effective strategies and approaches, with a high-quality output on teaching stakeholders about the esports industry and connecting career pathways.

2.2 Data Collection Methods

Due to the contrast in subject areas, there will be a separation in the method of collecting empirical data for esports and serious games. With the lack of common literature between the topics, the projected outcome should be positive, ensuring the creation of a supporting, high standard, serious game reflecting these outcomes. The initial selection for academic literature in esports and serious games will lead to results from different databases, due to the popularity and difference in research accomplished in these areas. The data collection of empirical data will be subject to a Boolean logic search (Aliyu, 2017) outlining the keywords to align the best databases for empirical gathering (e.g. esports, serious games, competitive video games).

Furthermore, mixed methods data collection would be effective in the research, addressing the serious game purpose. These methods would include interviews and surveys, as well as focus groups and observations to gain concrete solutions in addressing effective approaches to effectively teach about esports to stakeholders and to ensure support of the research hypothesis. These conclusions will come from industry experts, both esports and serious games, with a focus from beginners to professionals.

3. Evolution of Esports

In recent decades, the surge and demand for esports has transformed, turning the industry into a global phenomenon, capturing the attention of countries across the globe. Starting as a side spectator sport to accompanying the ever-growing video games industry, esports has taken a monumental step to becoming its own standalone industry, reshaping entertainment. The industry evolution has called for a diverse advancement in areas such as career opportunities and potential growth for educational outreach joining in with content creation (Johnson and Woodcock, 2021). Esports, stemmed from electronic sports, is the competitive playing of video games, professionally or casually, competing individually or most commonly, as a team. Academic research in esports has explored dimensions ranging from education to psychology, and health and nutrition to business management. Researchers have saw these opportunities, gaining a broader understanding of esports, deriving from traditional sports providing a connection to relative terms and industries, and developing innovative approaches to disseminate information and provide a deeper understanding of the domain.

3.1 What is eSports?

Esports revolves around the competitive playing of video games with competitors partaking in organised tournaments across video game titles and game genres. The art of traditional sports relies heavily on the physical attributes of an individual, while esports relies on physical attributes, and a focus on the strength of meta skills (e.g. strategic thinking and teamwork) in a virtual environment. Early academic research found a focus on, and comparison, to the definition of traditional sports, extending the definition through the art of digitalised sports (e.g. Wagner, 2006). Wagner (2006) defined esports with the proposition of rewriting a definition by Tiedemann (2004) on traditional sports. This definition, although dated, still gives a broad and comprehensive definition dating back to early academic research.

"*'eSports' is an area of sport activities in which people develop and train mental or physical abilities in use of information and communication technologies.*" – Wagner (2006, p. 4).

3.2 Popular Esports Games And Genres

Within the games industry, game genres vary, with one or multiple per game. These genres all adapt different game mechanics and features, prevailing as being common occurrences in that genre. Examples include the skill-tree system, a common approach to support player advancement in role-playing games. A weapon management system, an approach in shooter genre games. Academic research to date presents studies focusing on a game specifically and not the genre. Mora-Cantallops and Sicilia (2018), as an example, focused on esports studies within the popular multiplayer online battle arena game, League of Legends. They investigated ranked (competitive) play, as opposed to casual, indicating the importance of the player experience to support the competency levels through 547 participants in the completion of an online survey. This research found that team collaboration was key to winning any game, no matter the skill level or role played in the game, revealing teamwork at the heart of esports. You have better chances of working as a team than on your own.

The popularity of game genres in the industry, will not always resonate with the popular game genres for esports, within reason. Due to the nature of competitive gaming, not all genres are applicable or popular by the wider population. As we saw in the previous example, Cantallops and Sicilia (2018) showed us the multiplayer online battle arena genre through the game, League of Legends. This is one popular genre within the industry, see Table 1 for an overview of leading genres within esports with examples of games from the esports industry. These games highlight an example of the top four genres in esports with a sample of popular, corresponding titles.

Table 1: Esports genres and games. Results and games adapted from Esports Charts (2024) data. Results extracted May 2024.

Genre	Example Games
Shooter	Counter-Strike 2 Fortnite Valorant Overwatch 2
Multiplayer Online Battle Arena (MOBA)	League of Legends Dota 2 Mobile Legends: Bang Bang
Sport	Rocket League EA Sports FC/ FIFA
Fighting	Street Fighter Tekken Mortal Kombat 1 Super Smash Bros. Ultimate

3.3 Esports Ecosystem

Since the first official recorded competitive video games tournament in the early 1970s, esports players competing against other players have evolved. This has been highlighted through online servers or connected via a local area network (LAN), individually or team-based, directing towards what the esports ecosystem is today (Scholz, 2020). The ecosystem has grown and become an intricate system, involving branches into the industry (e.g. content creation, the player, the game, tournaments) as highlighted by Johnson and Woodcock (2021). The core of the ecosystem in esports comprises of the teams, the game, the game publishers, the distribution to streaming platforms, the tournament organisers, and the biggest factor in esports, the sponsors (Reitman *et al.*, 2019).

3.4 Career Pathways in eSports

With the industry of esports taking a mass leap in the recent decade and the popularity of games continuing to be a staple in households worldwide, the appeal to younger generations wanting to achieve a dream job in the industry has increased (Salo, 2017). As suggested by Salo (2017), the younger generation are seeing these highly paid professional players achieve greatness through esports and are wanting the same for themselves. As addressed by Salo, the lifestyle surrounding a profession in esports can be difficult to control, straining your life habits or strenuous mental issues, highlighting resemblance to traditional sports. These difficulties can lead to early retirement from players, or difficulties in achieving a career beyond professional esports. With the idea of designing a serious game, this would assist in the areas of career and skill development early-on, gaining insight to stakeholders about the different career opportunities available within the esports industry. This may include going from a professional player in esports to becoming a caster. See below in Figure 1, an example of potential

career pathways in the esports industry and the retrospective career pathways beyond esports that are available to potential candidates. These are only a small example of popular areas in career pathway opportunities.

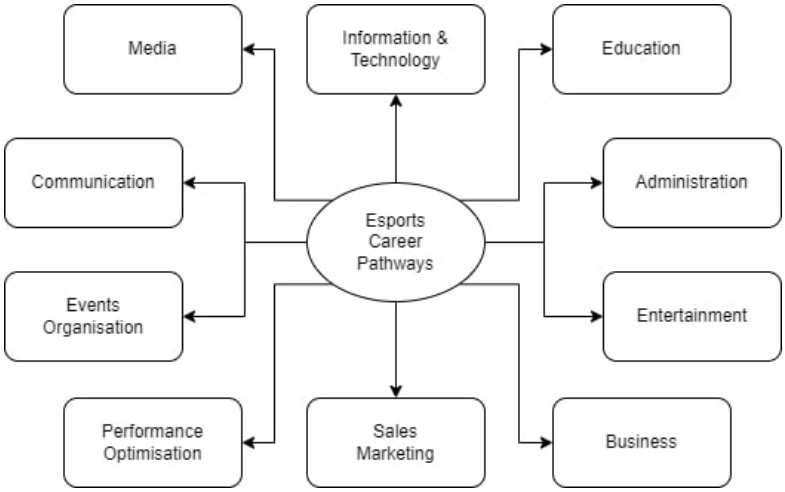

Figure 1: Esports career pathways. Adapted from Besombes (2020).

4. Serious Games

The academic research surrounding esports has explored a diverse range of disciplines, reflecting on the industries multifaceted dimensions. These areas have included the examination of psychological factors (e.g. motivation, performance, skills), health and nutrition (e.g. physical performance in players, dietary needs affecting cognitive influence (Johnson & Woodcock, 2021)), and business management (e.g. financial and legal standing (Hedlund, Fried and Smith III, 2020)), but rarely serious games. The use of a video game to teach potential stakeholders about the underlying concepts, historical events, games, genres, ecosystem, and career pathways would be important in demonstrating an innovative approach to teaching the subject area. Serious games and game-based learning provides an opportune research gap for the design, development and evaluation of a game providing a fun, yet, educating experience for players, focusing on beginner to experienced stakeholders in the industry.

4.1 Frameworks

Bellotti, Berta, and De Gloria (2010) suggest serious game frameworks and pedagogy as practical and constructive ways to learn about domains (e.g. health). The sole reason for a serious game is to create an educational experience offering information through gameplay (Silva, 2020) while conventionally using intrinsic motivations to entice the player in the game (i.e. learning). See Table 2 highlighting potential frameworks. Serious games shortened to SG and games design shortened to GD. These frameworks highlight potential frameworks that will be adhered to throughout the research and development.

Table 2: Serious game and game design frameworks examples

Framework	Type	Reference
Four-Dimensional Framework (4DF)	Development - SG	de Frietas and Oliver (2006)
Activity Theory Model of Serious Games (ATMSG)	Design – SG	Carvalho *et al.* (2015)
Student-centred Digital Game-Based Learning (SCDGBL)	Development – SG	Coleman and Money (2020)
Framework for interactive and iterative scenario generation for Serious Games	Development – SG	Luo *et al.* (2013)
Commercial-off-the-shelf (COTS)	Evaluation – SG	Ulrich and Helms (2017)
Mechanics-Dynamic-Aesthetics (MDA)	Design – GD	Hunicke, Leblanc and Zubek (2004)
Design Pattern Canvas (DPC)	Design – GD	Zavcar, Mayr and Petta (2014)
Game Object Model (GOM)	Development and Evaluation – GD	Amory (2007)

5. Teach eSports to Stakeholders: Development of a Serious Game

The development of a serious game will adopt a constructivist pedagogical approach, achieving the sole purpose of providing a learning platform, insight for potential stakeholders interested in the industry, and informing them about the concepts and career opportunities. These stakeholders will primarily focus on entry-level students and staff to support gaining further knowledge or revision. The design and development of a serious game gives opportunities to address a new learning and teaching approach for this domain, teaching the diverse fundamentals of the industry using the virtual environment of esports, games, and genres to create simulated experiences for the player to interact with.

Thus, presenting a game-based approach solution, this addresses a knowledge gap within both serious games and esports, addressing and giving justification to the development of a serious game in the domain of esports. Between serious games and esports, popular definitions exist in the academic literature. According to Werder (2022, p.394), esports is the "competitive or organized technologically enabled activities encompassing varying degrees of physicality, virtuality and technological immersion" adapting from Cranmer *et al.* (2021). In the domain of serious games, according to Laamarti, Eid and El Saddik (2014), serious games are "an application with three components: experience, entertainment, and multimedia" highlighting the different between serious games and terminology such as "training simulation, computer game, and sports". See figure 2 that gives a visual diagram expanding this, highlighting the possibilities that could are achievable with the development of a serious game.

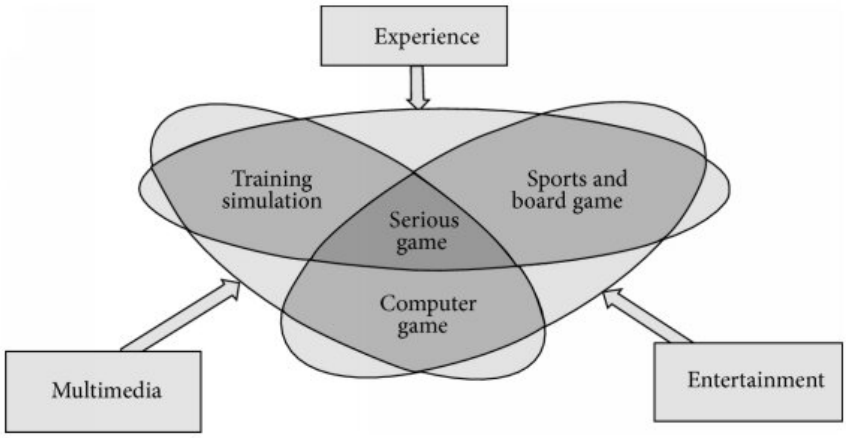

Figure 2: Definition of serious game (Laamarti, Eid and El Saddik, 2014).

Prior to any development, it is important to consider the learning and assessment outcomes and the content integration to the game. Initial stages of research will follow a user requirements analysis, aiming at the inclusion of gaining external knowledge from peers and representatives involved in or around the industry. From the serious game development side, it will be important to analyse already existing serious games such as Marine Doom (Loh, Sheng and Ifenthaler, 2015) and specifically their genres, giving insight to best practices to demonstrate an educating, yet entertaining experience for the player through simulated scenarios.

5.1 Research aim

The primary aim of this research is to develop a serious game to educate stakeholders, primarily teachers and students, about the esports concepts and career pathways. The additional purpose of the serious game will be to educate individuals about the esports industry, while exploring the history, games, genres, ecosystem, and the career development opportunities. This will explore the personal skill development in the industry, inform students of the widespread meta skills, and technical, with association to a potential career in esports.

5.2 Gameplay Aims

The proposed serious game will follow set gameplay aims to support a strong developed game. These gameplay aims are as follows:

- To develop a serious game fulfilling the educational needs through entertaining, engaging, and high satisfaction gameplay, embedding the theory of intrinsic motivation.

- Create simulated experiences as an esports player from the amateur to professional stage through gameplay mechanics and genre-based scenarios with an element of challenge and reward.

5.3 Learning Outcomes

The important outtake from a serious game is to provide an innovative approach to not only educate stakeholders about gaining knowledge in the esports industry, but also to provide these stakeholders the opportunity to retain this knowledge and establish it in real-life situations. It is important that with these virtual scenarios through gameplay, it will give a visualised pedagogical focus in the game to assist with the knowledge retention. Through this design and development, it will be important to adhere and adapt from the cognitive domain of Bloom's Taxonomy (Buchanan, Wolanczyk and Zinghini, 2011) through the gameplay and mechanics creating challenged based scenarios related to esports. Due to the widespread of genres, the serious game will take inspiration from educational and industry games where the gameplay will assist in informing this. The learning outcomes of the game are as follows:

- Educate and familiarise the player with the esports industry.
- Educate and inform the player about the concepts of esports, exploring the history, the popular games and genres, and the ecosystem.
- Educate and inform the player about the skill development in esports, exploring the career pathways and opportunities available.
- Reflection of the esports industry through game-based learning content integration approaches (i.e. quizzes or NPC dialogue interaction).

5.4 Initial Game Design Considerations

As the core development of the serious game has not commenced and the initial game design stages are underway, Table 3 below gives mention to brief ideas surrounding basic game development decisions. These design considerations are as follows:

Table 3: Initial game design considerations for the game.

Platform	Windows PC
Development Environment	Unity Game Engine or Unreal Engine
Assets	***3D Assets***: Unity Asset Store or Epic Games Marketplace. ***2D Assets/ User Interface Design***: Unity Asset Store or Epic Games Marketplace & Adobe Creative Cloud Suite (independent designs).
Visuals	Mixed-style dependant on the scenario. Main style will be a stylised art style.
Audio	Use of royalty-free music for diegetic and non-diegetic sounds sourced from online resources.
Controls	Keyboard and mouse (use of W, A, S, D for movement and additional keys for actions).
User Experience (UX)	Progressive, immersive esports player journey from amateur to professional through gameplay mechanics.
Difficulty	Challenges designed through esports specific-based scenarios adapting from genre and game-based learning techniques.
Level Design	A hub-and-spoke with further integration of linear, semi-linear and open layout.

6. Future Directions

As presented in this paper, the design and development of the serious game is in the initial planning stages, with further research to begin soon. The development of the game will start with a small prototype addressing a sample of the pedagogical aims to evaluate and assess the feasibility of the outcome. The prototype design will be determined through the utilisation of the user requirements analysis to explore initial views with assets used for development from the Unity Asset Store, Epic Games Marketplace or any online resources sourced as appropriate. The project will evolve through enhancement of gameplay mechanics and features by including game techniques from research to adhere to the increased user experience and immersion. The player will be in a centralised hub area represented by an esports environment (i.e. stadium or arena) where you must build up your professional career through social media interactions and challenges. There will be interactive experiences for the player such as an esports 'Hall of Fame' which will break off into an integrated learning environment teaching about the history, games, genres, and ecosystem within esports. As you progress through the game, you will have features to support the user experience but also challenge it, having opportunities to level up through a league while having help from your virtual coach who will provide feedback to the player on a regular basis. You will see a mix of interactive experiences for the player with NPCs assisting at times too.

The applied techniques used in the serious game will reflect on educating and informing stakeholders about the intricacies of the esports industry and the application of the multifaceted career pathways. This will be adhered to using visualised scenarios in the gameplay with a pedagogical focus assisting in obtaining and retaining knowledge for stakeholders in a challenged manner. This will highlight the importance of how the knowledge gained applies to an industry or educational scenario while the use of an innovative game-based tool sustains a base knowledge about the esports industry to stakeholders. The development of the game will support an iterative development practice. As this progresses, it will be important to evaluate the appropriate stages to ensure all gameplay mechanics, features, and learning outcomes are effective. The serious game will use a mixed methods approach, primarily using questionnaires and surveys. Further evaluation in the final stages through interviews or focus groups to give a wider scope and informative feedback to aid the outcome.

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