On the Scientific Relevance of eSports

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Abstract - *Competitive computer gaming or eSports is a phenomenon that has become a fundamental element in today's digital youth culture. So far very little effort has been made to study eSports in particular with respect to its potentials to positively influence research developments in other areas. This paper therefore tries to lay a foundation for a proper academic treatment of eSports. It presents a short overview on the history of eSports, provides a definition that is suitable for academic studies on eSports related issues and discusses first approaches to this topic that might lead to results that are applicable to problems in seemingly unrelated fields such as strategic decision making or management training.*

Keywords: Computer Game Studies, Game Theory, eSports, Digital Culture, Competitive Computer Gaming.

1 Introduction

While the study of computer games in general is slowly becoming accepted in the academic world, the scientific investigation of competitive computer gaming, also called eSports, is still in its infancy. One of the main reasons appears to be that in western culture competitive gaming is usually only seen within the context of first person shooting games. Almost any attempted academic discussion is therefore immediately locked into a debate about game ethics [2]. This debate, however, represents only a small part of the whole spectrum of competitive computer gaming that should be of interest to academia.

As pointed out by Fromme [1], any formal educational effort which aims at teaching media or ICT competencies to children is usually preceded by informal and non-formal learning processes of children within their computer gaming culture. Research into intrinsic motivation further shows that individuals high in achievement motivation will prefer competitive activities and that competence valuation from competition can have positive motivational effects on all individuals provided that valuation feedback is given properly [12]. This seems to indicate that especially children with high achievement motivation are likely to gain much of the media and ICT competencies from informal learning processes during competitive computer game play. The more it is surprising that so far very little research has been done into exploring what exactly individuals learn when they compete in non-educational or "unserious" computer games.

The main aim of this paper therefore is to foster an academic discussion on eSports or competitive computer gaming emphasizing the investigation of training effects in the semi-professional or professional use of rich interactive environments. It will show that this approach to eSports as a training science will allow the development of tools and techniques that can for example be utilized for setting up high-performance teams in virtual and hypercompetitive business environments.

2 A short history of eSports

The term "electronic Sports" or "eSports" dates back to the late nineties. One of the earliest reliable sources that use the term "eSports" is a 1999 press release on the launch of the Online Gamers Association (OGA) in which then Eurogamer evangelist Mat Bettington compared eSports to traditional sports [9]. Around that time, the sports discussion was also fuelled by a failed attempt of the organisation of the UK Professional Computer Gaming Championship (UKPCGC) 1999 to have competitive gaming recognized as an official sport by the English Sports Council [5].

The emergence of eSports as a business factor in youth culture is quite often described as a ubiquitous cultural phenomenon of worldwide importance. The reality, however, shows two different gaming cultures separated by eastern and western value systems.

In the United States and Europe, the history of competitive gaming is usually associated with the release of networked first person shooting games, in particular the 1993 released game "Doom" and the 1996 follow-up title "Quake" by id software [6]. During that time, teams of online players, also called "Clans", started to compete in online tournaments. By 1997 several professional and semi-professional online gaming leagues had formed, most noticeably the still influential "Cyberathlete Professional League" whose business concept was modeled after the major professional sports leagues in the United States [10].

Among the first CPL tournament events held in front of live audiences was the "The Foremost Roundup of Advanced Gamers" otherwise known as "The Frag" in 1997 [8]. In the philosophy of the CPL, professional computer gaming was now considered an emerging spectator sport. In 1999, game development company Valve released the game "Counter-Strike" as a

modification of their first person shooter "Half-Life". The game quickly replaced Quake in popularity in competitive gaming and has since then remained the central element in western eSports events.

Eastern eSports culture started out in Korea [4]. In the mid-nineties Korean policy-makers had deregulated advanced telecom applications causing a rapid growth of the Korean broadband infrastructure. This infrastructure needed to be filled with content, which was mainly provided through digital television and online gaming. In contrast to the United States and Europe, however, Koreans preferred "Massively Multi-user Online Role Playing Games" (MMORPG), such as the 1998 released "Lineage" by Korean game development company NCSoft, and "Real Time Strategy Games" over first person shooting games.

Since the late nineties the Korean gaming market has been dominated by the multi-user real time strategy game "StarCraft", released in 1998 by Californian Company Blizzard Entertainment as a successor to the 1994 title "WarCraft". This game is particularly well suited for competitive game play. The vast broadband infrastructure in Korea furthermore favoured the creation of television stations that were able to focus on broadcasting computer gaming events. The combination of these elements resulted in a gaming culture in which individual StarCraft players are able to gain a cult-like status similar to professional athletes competing in major sports leagues.

Even though there are an increasing number of global eSports events, such as the World Cyber Games, which try to bring western and eastern eSports culture together, the two business ecosystems remain largely separated and seem to develop almost independently. This, however, is not unlike the situation in traditional sports where different cultures prefer different sports disciplines.

3 Defining eSports

The academic study of competitive gaming requires a scientific definition of what we mean when we talk about "eSports". Interestingly, there is currently no generally accepted definition of this term at all. Most often it is considered equivalent to "professional gaming", a competitive way of playing computer games within a professional setting [10]. At closer inspection this appears to be a far too narrow point of view.

As mentioned above the most dominant influence of competitive computer gaming is most likely to be found in the way children manage information and communication technology as part of the cultural development. Professional gaming plays an important part in how eSports is perceived in the general public but the real fundamental issues can be found elsewhere, in particular in private homes on family computers.

In order to develop an academically sound definition of eSports broad enough to merit scientific treatment we adapt a definition for the term "sport" proposed by sport scientist Claus Tiedemann [7]. This definition is particularly intriguing because it is already general enough to include eSports in its original wording. Tiedemann defines:

"Sport" is a cultural field of activity in which human beings voluntarily go into a relation to other people with the conscious intention to develop their abilities and accomplishments - particularly in the area of skilled motion - and to compare themselves with these other people according to rules put self or adopted without damaging them or themselves deliberately.

Let us rewrite this somewhat to better suit the application we have in mind. In particular, we delete the reference to skilled motion. While this phrase provides us with an explanation of how our traditional way of thinking about sport fits into sport science it does not add real value to the definition itself. Furthermore, we note that competition requires that contestants acquire some form of recognition for success. Since this is an important thought for the subsequently introduced approach to eSports we want to explicitly exclude activities that are not deemed important by a particular culture. We arrive at the following slightly reworded definition:

"Sport" is a cultural field of activity in which people voluntarily engage with other people with the conscious intention to develop and train abilities of cultural importance and to compare themselves with these other people in these abilities according to generally accepted rules and without deliberately harming anybody.

Similar to the original definition by Tiedemann, this definition is deliberately broad and needs further specialization when used for a particular type of sport disciplines. This is done by defining what particular abilities of cultural importance are trained through the respective sport activities. In the industrial age, for example, "physical fitness" became one of the most dominant values in society. Therefore, most traditional sport disciplines aim at measuring the physical fitness of contestants. They refer to abilities in the area of physical strength and skilled motion, an area that is covered in great detail in traditional sport science.

It has to be expected that the activities we will accept as sport disciplines will change as our value system change, for example due to technological progress. During recent years we have seen a rapid development and cultural integration of information and communication technology. The mastery of multimodal communication by means of synchronous and asynchronous voice and text messaging has become one of the most fundamental capabilities to acquire high status within a group, particularly in youth culture. It is therefore expected that anybody participating in this culture - in particular individuals with high achievement motivation - will feel the need to demonstrate this mastery by succeeding in competition. One of the most

obvious ways of doing so is by competing in computer gaming events.

The emergence of eSports can thus be interpreted as a logical and irreversible consequence of a transition from an industrial society to the information and communication based society of today. Underneath the Counter-Strike image, competitive computer gamers train and compare competencies in networked and multimodal communication strategies or, more generally, competencies in the use of information and communication technology, something one might refer to as "cyberfitness". Hence, we define:

"eSports" is an area of sport activities in which people develop and train mental or physical abilities in the use of information and communication technologies.

Even though this definition includes individual as well as team activities, the following will mainly focus on the study of team disciplines. Interestingly, team disciplines seem to be preferred by western eSports culture whereas individual disciplines are more popular in eastern culture.

4 eSports science

It has to be noted that there is no particular need to look at eSports as an area of disciplines that satisfy a traditional sport definition. We could just as well look at eSports as a completely separated field of study. The overrated question whether competitive gaming is a sport or not is to some extent irrelevant for the academic discussion of eSports. However, the above approach shows that there is a quite natural connection between traditional sports and eSports that goes far beyond the commonly used argument that eSports relates to the training of a proper hand-eye coordination through computer games. It furthermore allows us to borrow academic approaches and methodologies from traditional sport and training science and to apply them to what might be called "eSports science".

The potential of this approach lies on the fact that it does not only look at eSports as a phenomenon that deserves to be investigated purely for its influences on society and culture, for example by studying how a fast-paced FPS game such as Counter-Strike influences the use of communication and language of its players [11]. It looks at eSports as a field of study which in return allows us to derive novel approaches and methodologies to actively advance other areas of interest that are not directly related to computer gaming.

To illustrate this with one example consider the eSports discipline of Counter-Strike. In this discipline two teams of four to five players each compete against each other in a sequence of 1:45 minute game rounds in which they alternate the roles of terrorists and counterterrorist, respectively. The first team to win a given number of rounds wins the match. Detailed rules and regulations do not only specify tournament and match regulations, they also give very detailed technical instructions about game and server settings. As a result, teams are faced with an extremely well defined virtual environment in which the only way of winning a match is to find and execute strategies that outperform the strategies of the opposing team. This strategy focus is further amplified by the large number of quick rounds forming a single match. Winning teams therefore need to be trained in successfully implementing and changing game strategies quickly and efficiently.

In management theory, teams that exhibit such a high level of effectiveness with which they perform their various roles are called "high-performance teams" [3]. These teams play an important role in the development of effective organisations; they are usually autonomous in their decisions and operate both highly motivated and self-sufficient. In order to be successful, eSports teams train to become what one could call "virtual high-performance teams" exhibiting the properties of classical high-performance teams within a virtual environment.

We can furthermore think of the training necessary for developing this effectiveness as an inversion of usability engineering. Instead of optimizing a software system to the user needs and requirements, eSports training optimizes human skills for maximum performance within a fixed software environment. Main focus is thereby given the way team players communicate and interact in the execution of collaborative tasks.

If we learn to understand how eSports training builds highly effective teams through the above notion of inverse usability engineering, we should therefore be able to apply the same approach to building and advancing virtual high-performance teams in traditional hypercompetitive business environments. This transfer of methodologies obviously also applies to any situation in which a virtual team has to achieve high performance in the use of a given complex software system.

One additional observation that deserves mentioning stems from the fact that eSports is routed deeply in digital youth culture. Children, who are already very competent in their use of information and communication technology, further train their competencies through playing competitive games, whereas the majority of adults have not yet even taken notice of these developments. This seems to imply that we are currently seeing a social-technological generation gap that is rapidly widening.

If this observation is correct, the problem of integrating older generations into technological progress will become an increasingly important issue as the children who train their virtual communication skills today will most likely be influential in making decisions on the usability of technology in the future.

5 A game theoretic approach

Another aspect of eSports is that it bridges classical game theory with the new field of computer game theory through the common focus on competitive game play. This appears to be particularly important since the well researched field of game theory has enormous influences in economics, but has so far seen surprisingly little attention by researchers in computer game studies. A game theoretic approach to eSports, however, could for instance foster the importance of competitive computer games as a tool to train "high speed strategic decision making" in management training.

To illustrate this concept with a simple example we simplify the scope found in a typical round of Counter-Strike by reducing the number of players per team to two. We also remove the time limit. Furthermore we simplify the task by assuming that a team has won the round only if it eliminates the opposing team neglecting other ways of succeeding such as bomb defusal. Both teams start at positions in which they cannot see each others' team players. They both now need to make one fundamental decision. Should a team split up and should the two players search for their opponents independently? Or should they stay together and search as a team?

A game of this type is called a strategic-form game according to game theory. In order to find a solution, also called Nash equilibrium, we need to compute the so-called game matrix consisting of the individual payoffs or outcomes each team obtains from choosing one or the other strategy. Since the objective is to win, a proper choice for measuring this outcome is the probability with which a team wins the match. Obviously, different players have different strengths and weaknesses that will influence the game outcome and have therefore to be taken into account. One way of measuring this "fitness" is, for example, the probability with which a player wins a one-on-one match with a random opponent. Similarly, we can measure the fitness of a team as the probability the team wins a match against a single random opponent. A straightforward calculation then yields game matrix and Nash equilibrium.

It is obvious that as we introduce additional degrees of freedom into the game, such as increasing the number of players on each team, the situation gets increasingly more complex. Nevertheless, a game theoretical analysis remains possible due to the well defined virtual environment the game is played in: On one hand this opens up a completely new approach to eSports coaching. On the other hand, it can be expected that teams that train for eSports disciplines will increase their competency in making complex strategic decisions at a high speed.

6 Conclusion

This paper introduced eSports driven ideas and concepts such as inverse usability engineering or virtual high-performance teams. This list of potential applications of results that could be derived from eSports research is by no means exhaustive, it is merely meant as a starting point for further research activities.

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