Implementing Digital Fun
Locating success factors in PC games

Implementering av Digital Spelglädje
Att hitta framgångsfaktorer i PC spel

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Abstract
The purpose of this paper is to explore the technical implementation of common game design theory in successful PC games today. The study uses a quantitative study to analyze 23 modern successful PC games to identify common success factors which are connected to Arrasvuors et al. (2009) theory of the Playful Experiences Framework, Sutton-Smiths (2001) seven rhetorics of play and Max-Neefs (1991) human needs matrix. The results is a practical checklist of 63 success factors for use in game development. These success factors are present in the successful games and described for implementation in game design for the PC platform.

These success factors are then divided into the 7 categories: freedom, immersion, challenge, multiplayer, personal, preference and human needs to provide a better overview of the success factor checklist and connect them to proven game design theory.

Keywords: Software, Success factors, Game design, PC games, PLEX framework
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1 Introduction

1.1 Problem background

Running a successful IT business today means competing with constantly growing companies and newcomers alike. The gaming industry is growing each and estimated to reach a total worth of $91.5 billion in 2015, an increase by 9.4% from 2015 according to Sinclair (2015).

The core PC worldwide gaming market being around $27 billion of this according to Galyonkin (2016) and the sales of online distribution channel Steam alone being an estimated $3.5 billion, goes to show that there is a lot of money to be made in the PC gaming industry and in digital distribution. While Galyonkin (2016) estimates a large part of this to be made by the large gaming companies, there is also a big increase in the number of smaller independent game developers in the past years. To be a successful part of the growing industry, all developers must make sure that their games are successful.

Many software projects are developed today in the gaming industry and while the market grows, so does the competition, according to Lahti (2015) and Clark (2015). There are many well-made games today that have good potential but end up unsuccessful according to Clark (2015). While a big reason is drowning in the increasing number of released games, the general rule is still that if the game is good enough, it the quality will help it stand on its own Clark (2015).

This leaves game quality as a big reason some developers fall short of the user expectations, as the end product isn’t appealing enough to make the purchase. It seems many common mistakes are made and that these products successes could be greatly increased if the developers had better knowledge about what motivates the users to enjoy their product.

The reasons for these unsuccessful titles may be related to many different reasons, such as marketing, release strategy, budget constraints, time constraints, development methods or other reasons. This paper mainly focuses on the reasons for high product quality, namely design choices and technical implementation (see 1.4 Limitations).

While there is a fairly large amount of good theory on game design, much of this is in an abstract form to apply to any type of game design for any platform. There is also a large amount of technical books focused on programming techniques on how to implement certain features, but not connected to the game design theory itself.

Both new and experienced game developers may find themselves wanting to create successful games to be successful in today’s growing industry, and while they may have a lot of great ideas and business plans, and even great implementations, their market success may fall short on only a few deciding factors which they have overlooked but are highlighted after release by reviewers and consumers after release. Even if the mistakes are corrected, usually the damage will already be done as most PC games market success is decided at their time of release.

1.2 Purpose

This paper aims to identify the practical implementations of game design in successful PC games and build a checklist with concrete factors for aiding development of successful games.
1.3 Target Audience

The result of this paper is targeted for software developers within the gaming industry to help them better achieve successful results and academics interested in the development of better software development and design. It specifically is focused on what concrete technical design choices can be made to digital gaming to better appeal to the gaming market, thus making this paper targeted mainly at anyone involved in the development or design of digital gaming products.

This checklist is aimed to help anyone creating digital game products, but may also be used for other game design contexts such as gamification or other real life game design contexts. While the focus of this paper is games targeted for the PC platform, most of the content works just as well for other platforms as well. As the discussed topics are general for design theory, which is directly connected to the motivational drive of human beings, it may also be of interest in gamification contexts and those interested in why we like to play games.

1.4 Limitations

It is important to note that even though most of the theory and findings of this study is applicable for most types of platforms and genres, this study is mainly about the mainstream type of games for the PC. This means mainly action, RPG, strategy, adventure, story driven types of games, and excludes sports, racing and simulation games as well as platform specific games for handheld devices as these are usually split into different consumer groups.

Another limitation is that this study does not directly evaluate each success factor individually to see which factors are more important than others.

The concepts this paper discusses and the checklist it generates focuses mostly on the usage for digital gaming products. However, most of the concepts are applicable for other contexts related to game design as well. For example, usage in gamification, board game, educational games, social games, mobile app development, etc. The main focus of this paper is on the motivation for users to play games for entertainment, these factors are also applicable for other uses as well, but these uses are not discussed.

This paper opens up quite a broad question and therefore there are many other important factors that also affect the success of games but fall outside the scope of this paper. Here we try to go through a number of these factors which also have a lot of importance on the success of a game. While these are all important things in themselves to consider, it is not realistic to get them to fit into this study.

1.4.1 Time & budget constraints

Some developers may be aware of the success factors brought up in this paper, but they simply do not have enough time or budget to make sure that they are implanted properly or at all. It is common with tight deadlines, stress and removing planned features within the gaming industry.

It is important to keep deadlines, but it’s all for naught if the project ultimately is considered a failure, so it’s also important to be able to be flexible with deadlines to ensure a high quality product. While there are many companies that are strict with deadlines and have successful businesses, some of the most successful developers, namely Valve Software and Blizzard Entertainment, are known for their trademarked “when it’s done” release date policy to avoid giving unrealistic deadlines, and end up
creating very well received games. This has led to a term known as Valve Time according to Valve Developer Community (2015), which refers to the difference between Valve time and actual time.

1.4.2 Marketing & release strategy
While making a quality title is an important factor for a games overall success, there are studies that show that a large marketing budget may be just as important as a development budget (Martin, 2009). While this may be mainly connected to the initial sales statistics type of success measure which may not be the most important factor, it is still a very important ingredient to a successful game.

1.4.3 Peer pressure
Even though initial and total sales may not be at all be directly connected to the true success factors that users relate to and that many well marketed and well sold games may be regarded as bad, there is also the fact that a well sold game, i.e. popular, game is more likely to be interesting to others simply because it is popular according to the mindset “if everyone else is playing it, it must be good”.

The opposite effect may also be true, even if a game is extremely well made, if it hasn’t gained much popularity when released, many consumers be very skeptical to give the game a try.

1.4.4 Development methods & strategy
This paper focuses on the success factors within the actual finished game product and why it is important to implement them in the development of the product. However, it is equally important that the actual development of a game is done in a correct and well-functioning way using strategy and good planning in both preproduction, production, team-management, postproduction & testing. While a product in theory may be exceptional, it may never see the light of day unless the development works well so that the product is completed.

1.5 Definitions

1.5.1 Users, Players & Gamers
Three terms which in a sense are referring to the same people and are for the most part interchangeable in this paper, they are the people who use the products and play the games. Most often the end users are the same people who purchase the products for themselves. Sometimes the actual buyer can differ from the gamer, for example in parent-child cases, but as this is irrelevant for this paper as we are looking at what motivates the actual product user.

More specifically, a user specifies the person using the product, a player is a person playing a game, and a gamer is a person who plays games, usually used as a term for those who play games a fair amount and has it as a hobby.

1.5.2 Avatar
An avatar is the digital representation within the game world of the person playing a game. Usually avatars are humans or some other life form the user is playing, but can also be objects such as cars or ships. Generally users only play one avatar at a time, but they may be able to create several different ones to switch between them as they choose.
1.5.3 Game
For this paper, a game refers to a digital game product which is runnable on a computer, a video game console or handheld devices such as smartphones or tablets. Generally games are made for the purpose of entertainment, but they are also used for education, therapy and art expression.

1.5.4 Massive Multiplayer Online – MMO
Games which include connections to very many other players. Usually MMO games are played solely on servers with several thousands of other players within the same game world and limited to only playing there, but games may also be used as MMO elements where only certain things are connected to everyone else.

Most often seen in the term MMORPG (Massive Multiplayer Online Role Playing Game) where each player has an avatar which they improve by playing in a massive world filled with thousands of other players.

1.5.5 E-Sports
These are games which are played competitively in tournaments with prizes and spectators much like real sports. There can be professional full-time paid teams with sponsors and large big prize pools. While e-sports have been around since the early 1970’s, it mainly started to get a foothold in the early 2000’s and has grown significantly after 2010 (Wikipedia, 2015).

1.6 Method
1.6.1 Choice of Data Collection Method
To achieve the purpose of this paper we need to study our conceptual frameworks and how they relate to real life situations, and to do this we need something to test them against. For this approach a quantitative study of which elements can be found in which games. Robson (2014) writes about how well quantitative data can be used to make statistical analysis and make graphical representations which make the data understandable. This type of study is well suited for the data this study collects as it is a large amount which can be in statistical analysis later on. In addition, the analysis itself is done in a qualitative fashion as the results are based on the observations in the data done by the author. Robson (2014) discusses how qualitative research is a good tool for more complex relationship and research is need which cannot be shown in numeric data, which is the case for the resulting success factor checklist of this paper.

Early on there were plans to make a questionnaire asking participants to help locate potential success and motivational factors in games for them. This kind of a study for this paper would turn out to be quite complex and difficult to complete. There is also the possibility that the collected data would prove too one sided and mainly focus on the most apparent success factors as most users may not be aware of the technical details of why they like certain things. While this would be an interesting study in itself, considering the amount of work needed for the rest of the paper, it was decided that this is outside of the scope of this paper and no questionnaire was included. Instead it was decided to mainly focus on success factors which can be based on preexisting conceptual frameworks, along with what the author can find during his own analysis.

To be able to find a better list which also featured success factors not easily found by the average user, a research group built up by professional game designers would be ideal to help build a complete list. However, researching the games in the manner described in this study is not done by a simple
questionnaire and requires many hours of research work, so it was deemed unrealistic to be able to find enough professional game designers willing to help out. Therefore it was decided that the research of each game was left solely up to the author who has quite a lot of experience from within the gaming industry. For details on the author, see 1.8 Considerations about the author, and for what limitations this implies, see 1.7.3 Critique of method.

1.6.2 Literature
The search for literature was done in several different places. Electronic sources where searched for in the University of Karlstads online library system, the DIVA database, google scholar, google search and reference searches for earlier papers on similar subjects.

Several other thesis’s where found from other students at Karlstad University which mainly discussed the use of gamification in different aspects. These where studied but as their focus is on gamification, their use is limited for this papers purpose. The initial search terms that were used were: game design, game development, implementation, and gamification.

This paper goes deeply into the realm of game design, which is yet to be a faculty in its own sense, but a subject that is included in many university courses for different programs. Several university programs were looked at to see which literature sources often were used and two main literature theories were found mainly from game design courses at Luleå University of Technology (Luleå Tekniska Universitet, 2009). Using literature and conceptual frameworks that have been used in university has high credibility as the professors of that university have seen the sources as trustworthy on the subject.

The first one being Sutton-Smiths (2001) The Ambiguity of Play, which focuses a lot on its seven rhetorics of play, a list of seven main reasons for human beings to play. Sutton-Smith bases its conceptual framework on over one hundred years of play theory which uses play as a need to fulfill human needs and is applicable not only for digital or even real life games, but also in education, sports and natural behavior.

The second main source is The Playful Experiences Framework by Korhonen, Montala and Arrasvuori (2010). It’s a more focused list that lists 22 categories or elements which they claim should be included when creating games.

Several articles are also selected which support and test the PLEX framework and the seven rhetorics. Additionally Max-Neef (1991) book Human Scale Development was included to make sure the connection to our basic needs was included during the analysis, as both other conceptual frameworks base their findings in fundamental human needs dated thousands of years back and Max-Neefs work is a strong source on the subject.

1.6.3 Data Collection
The main data which is collected for this paper is a set list of games, from which we analyze according to our conceptual frameworks, to be able to pinpoint actual concrete success factors. We also look at how well the chosen games have succeeded, for this we have collected the user review score collected for the digital distribution platform by Valve Software named Steam. Steam has a system (Steam Website 2015) that does not give users the ability to choose a score, but rather have a simple positive or
negative choice for their reviews, accompanied by the ability to write a more detailed description of the users’ thoughts in text. This created a very straightforward way to measure how well a game succeeded according to its actual users, not taking into account sales or other factors which can affect the market success. While there may be some cause the question the scores collected from steam, the author believes that this is one of the best ways to measure the users overall game specific experience, as the source of each review can be seen, the reviewer must own the game and how long each player which has written the review has spent in the game. In addition, the Metacritic score for each game was collected from the Metacritic website (Metacritic, 2015). Metacritic collects well respected professional review scores and supplies an average score based on this data for movies, games, TV and more (Metacritic, 2015).

Game choices were chosen under several different criteria. While there are thousands of games available on steam. The following factors were the guidelines for which games were selected for further data collection. These criteria was selected to build a good base of a general population of good & modern games that give a good mainstream representation of what most game developers would be aiming for when building new games.

- Each game must have at least 1000 total user reviews
- Select games from a broad scope of genres
- Select games from a broad scope of release date, but focus mainly on modern games.
- Each game must be obtainable for study by the author through the Steam distribution platform at the time of writing or easily available in other means.
- Each game can be analyzed and tested against the list within one hour per game.
- Games that fall within the studies limitations in platform and genre.
- Successful and well known titles to the author are prioritized as the quality of analysis is better with much knowledge of each game, as there isn’t enough time to spend several hours in each studied game.

The resulting games for analysis that were chosen were:

- Borderlands 2
- Braid
- Call of Duty 4
- Counter-Strike: Global Offensive
- Diablo 2
- Dota 2
- Fallout 3
- FTL: Faster Than Light
- Grand Theft Auto V
- Half-Life 2
- Left 4 Dead 2
- Max Payne
- Minecraft
- Ori and the Blind Forest
- Quake Live
- Rise of Nations
- Roller Coaster Tycoon
- Spelunky
- Team Fortress 2
- The Binding of Isaac
- The Elder Scrolls 4: Skyrim
- Unreal Tournament 2004
- Worms Armageddon

While there are thousands of games on the PC market, using the given criteria and limitations these should be representative of the core PC gaming market. However, choosing a truly well represented list may be difficult in the same way as choosing 20 movies from the film industry that should represent the entire mainstream industry, as there are as many tastes in movies as there are movies.
1.7 Measurement of successful games

Much of this paper aims to find underlying success factors to why certain games success and others don’t. For this we need to have something to measure success by. There are many things which could factor in for the success of a game depending on who is making the evaluation; the users, developers, reviewers and stockholders may all have different points of view. Here are some main factors which could be used for the measurement of success.

- The amount of copies are sold at launch and post-launch. Most games sell most of their total sales within the first week of launch. Selling large quantities at launch can often be the result of big marketing budgets, where if a game sells well even a year after release is usually a sign that it’s well received by its players, but can also be an effect of sales or product upgrades.
- Professional game reviewer review scores.
- Player generated review scores.
- How much a game is actually played and how many hours per player it is played.
- The lifespan of the game and how well the product handles the passage of time when looking at how many players play it several years after release.

Defining a true one dimensional measure of success can be very difficult and outside the scope of this paper. Most focus will be on the success measures which are generated by users rather than sales, namely player generated review scores. As our success factors are focused on the end quality of the game for the user, we will be using this as our measurement. Also, sales data for the gaming industry is not as readily available as it is for other industries.

To validate the list of games which were researched. Their steam reviews where collected from the Steam service (Steam Store, 2015) and/or the Metacritic review scores were collected from the Metacritic website (Metacritic, 2015).

1.7.1 Individual game analysis

Each game was researched by playing it in the intended fashion. The length of each session could vary depending mainly on how long it takes to get a good impression of most of the features in the game. When a new element was identified it was added to a temporary list, this list was then processed to try to describe what the core of the element was, and finally try to find a connection to our presented conceptual frameworks. This new item was then looked for in the other games as well to see if it was a reoccurring factor or not. Factors which had more than one occurrence stayed on the list, while those which only appeared once where removed or merged with other similar factors. This meant that the research of games and building of the success factor checklist was an iterative process that required several steps so that each factor finally was checked with each game.

For simplicity, each factor was either deemed as present or not present, even though in some games may have barely incorporated some factor in some cases, and extremely well in others. This also needs to be taken into account when evaluating the results.

While it may have been interesting to rate the presence of each factor on a scale, this would prove much harder to do in an objective fashion as the actual implementation of each factor can vary much, because as it is the effect of each factor which governs the success or not, not the definition of the factor itself.
1.7.2 Example of game analysis session
As an example, here is a textural walk-through of what a research session could look like in locating existing factors and identifying new factors.

The game Spelunky is started, the author looks through the list of current factors to continually try to find if any of them are present, he notices that the factor “Easy Access” is present as it's possible to start up a new gaming session within only a few seconds without any previous knowledge of the game or having to go through several menu levels of settings or pre setup options.

While playing the author notices that multiple other factors are also present, such as “Uniform graphics” & “Defined art style & lighting” as all graphics in the game have a well-defined and even style through, “Music & sound effects” are present as there is a good balance in quality music and sound effect responses on things that happen in the game.

After playing a while, he grows tired of dying repeatedly, and looks around for what else there is to do, he notices that besides the main goal of trying to progress to the next level, he can try to aim for unlocking the next world, reaching high gold scores, beating time high scores, unlock extra characters, beat achievements, etc. This motivates the author to continue playing. When he looks over the list of success factors, he can’t find anything relating to having multiple things to aim for, and adds the factor called “Multiple Goals”, as he experiences that having these many different goals to aim for helps motivate him to continue playing rather than giving up. This motivation later leads him to become better at the game, further his main goals in the game, which ultimately leads to more enjoyment of the game.

Later when defining the success factor more in detail, the author finds that a connection between having multiple goals to Sutton-Smiths (2001) rhetoric of progress and the challenge category from Arrasvuorius et al (2009) PLEX framework.

1.7.3 Critique of method
This research aims to produce a certain result, and check its validity against collected data. All research has its pros and cons. As the question is quite broad and abstract, and while the author does his best to ensure everything is done in the best way possible, there is a certain margin of error for such a broad topic. Here are the known pros and cons of the chosen method for this paper.

While the author does his best to connect each found success factor in provided conceptual frameworks and analysis from multiple games. The direct connection between the existence of success factor and the end success of the game may be questioned as the final success is a sum of all success factors and many outside factors as well.

The qualitative data collected through the digital distribution platform Steam is maintained by the private company Valve Software. While this is a very well respected company and it is possible to check the sources users of all given user review scores, Valve does have complete control of the system and could use it to their advantage in an unethical way.

It’s difficult to get an overall grasp of the industry as a whole and the actual success of each game in such a relative small study as it’s such a big industry with many players and outside factors.

The identified success factors are found solely on the authors own analysis sessions and previous knowledge. While the author does have multiple years of professional experience within the gaming
industry, it is possible that some factors which aren’t as apparent to author may be missed. Having a bigger study with multiple researches or a co-assessor would ensure a more complete final checklist. For example, the author does lack experience with sports games, thus possible success factors directly connected to sports may be missing.

1.7.4 Ethical Considerations
Games are a very popular form of both entertainment and professional e-sport (Wikipedia, 2015). They are by design built to be as fun as possible, which leads to people wanting to play them more, which could possibly lead to some people spending so much time playing games that it affects their life in a negative way. It therefore important to make ethical considerations when building games to be more and more fun, as it could lead to more addictive products.

The choices of literature for this paper were chosen by the author according to what was thought to be the best sources on the subject. It is important to consider if these are the best sources to base knowledge on or not, as there may very well be other more suitable literature.

This paper bases its theory in given sources, but part of the generated knowledge is based on the findings of the author when collecting data, and also his personal experience from the game industry. It is important to consider the authors authenticity when evaluating this paper as a whole.

It is also important to note that while the selection of games to research was done after the criteria given in Data Collection 1.6.3, and one of the criteria was that titles which the author has previous experience with was stated, this leads to the possibility that the list is biased towards games that the author likes.

It is also important to mention the common rules and practices when conducting scientific research even though they are not all applicable to this study as there is no collection of personal data through forms or interviews. Patel & Davidson (2011) discuss these four practices.

- The **rule of information** says that the researching should inform everyone involved in the study about the purpose of the study.
- The **rule of consent** says everyone involved in the research are not forced into participating in the study and they are doing so of their own free will.
- The **rule of confidentiality** says that any information about those involved in the study is kept confidential. Personal information should be kept in a safe manor so that they cannot be accessed by unauthorized people.
- The **rule of information usage** says that any information gathered about persons involved in the study can solely be used for research purpose.

1.8 Considerations about the author
As the author of this paper I have significant experience in the field of study it is relevant to point out what previous knowledge I have.

Jonathan has approximately 12 years of experience within the gaming industry when counting the modding scene, professional game development companies and the indie development scene. He has

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played a major role in several released modding projects at an early age, worked as graphics artist for several professional game companies such as Electronic Arts Digital Illusions, Hi-Rez & Gearbox Software, and has worked as programmer on several indie development projects. He has experience in working with graphics design, technical graphics, gameplay programming and design within the gaming industry. Along with a major interest in the gaming industry and its development this has left Jonathan with much knowledge regarding the industry as a whole and of many games over the past decade.

This experience and knowledge gives me good basis on conducting this kind of a study from both a developers and consumers point of view, which may result in a study which could not have been done by a regular thesis student without industry knowledge. However, there may be some bias in my choices of games and my preferences and personality may alter which the success factors I’m able to locate. A different author doing the same study would most likely come up with different but possibly similar results.

It is important to take the authors authenticity and subjectivity into account when evaluating this paper as a whole. Mason (2010) says that the saturation of references on a subject is easier achievable when the subject matter is narrow and doesn’t stretch between multiple disciplines and when the questions raised are simpler. Goldkuhl (2011) discusses that while you need to ensure empirical saturation, there will always be more to learn on the subject, thus saturation can be achieved as long as a decent amount of time is spent on research. Gummesson (1985) points out that there is no way to be completely objective in any research as our understanding and reference scope is affected by what we see and don’t see. We should however try to be as objective as possible and aware of our position and keep this transparent at all times. The authors understanding of the subject may angle the study which should be avoided by keeping an open stance on the subject, study and analysis of data. By doing so I believe that this study was done in an as objective way as possible for a study of this kind.
2 Theory

2.1 Success Factors

Success factors are according to Huang et al (2013) deciding factors for reaching an organization or projects goals. The concept supports the leadership in planning, leading and aiding their organizations goals. In this study we are looking at the success of an individual game as a project, and their respective success actors are validated by the success of the game.

To translate this into elements which can be found in, and implemented into games, we need to know what the fundamental reasons that gamers like certain games and why the dislike others. I believe much of these factors are can be directly influenced if the right choices are made in both the design and implementation phases of development.

These factors are fundamental elements which for the most part are either included or excluded in a game, but for some may be included to a certain degree.

Not all factors can be implemented in all games. Depending on the design of the game certain features may not be applicable to implement. The checklist this paper provides is meant to both be used in early stages of design to map out which factors are possible to include, and also later in development to see which features may be added at that point.

Most of the core in each factor lies in as underlying psychological motivation in human beings. While this paper may touch on this subject, we will not go deeper into why humans are attracted to certain things and not to others, instead we will simply be stating what usually works and what doesn’t.

An important part to remember is that while these factors generally show positive results in players, each player is different and has different personal preferences and they are therefore attracted to factors in different amounts. While the checklists only lists positive factors, some of these may even be seen as negative factors for certain players. The possible negative effects will be lightly covered for applicable factors as well.

2.1.1 Conscious & unconscious factors

Some success factors players are aware of, and may even be straight out selling points which marketers will use in marketing material for games to directly influence the buyers’ decisions. For example, stating “4 player local coop & controller support” is a way to directly state that this is a game which you can play with three other friends in your living room, which will appeal to a certain type of user.

The author believes that other factors may be less conscious, making players quit the game with a bad feeling about the game which they may not even be able to describe. In the authors experience it is not uncommon for players to say things like “it looked amazing but I didn’t like it”, not being able to specify exactly what they didn’t like. These are factors which are a bit harder to pinpoint without directly looking for them, but just as important and more often overlooked. When taken to the extreme opposites, these factors may be more apparent and noticed by players. For example, bad frame rate (pictures per second) is not noticeable by most people until it drops below say 25 frames, where they will start being irritated and have a bad experience, but a solid 60+ frames per second will give a much more smooth experience which will make the overall feeling better for the player.
2.1.2 Applicability
While the factors discussed in this paper are all encouraged to use and generally the idea is that the more success factors you can use the better the product will become, it is important to note that not all of the suggested factors may be applicable in all games due to technical limitations or design choices by the developers. For certain games it may even be intentional to exclude some of the factors on purpose as they do not fit into the design or that there aren’t enough resources to include them.

For example, some games may be criticized by users that they do not have a multiplayer game mode, this may be a design choice where the designers didn’t feel they could include multiplayer at the desired quality level, that it doesn’t work with their intended design or that there were wasn’t enough budget for this. Todd Howard, Game Director and Executive Producer at Bethesda Game Studios, who are responsible for very successful games such as Skyrim & Fallout 3, explains in an interview (Onyett 2011) how multiplayer is their most asked for feature, yet they always decide against implementing it. In the end, the choice weather to include or exclude any of the discussed factors should be weighed by the designers for each game individually.

2.2 Good game design results in fun games
The term fun is used in this study to look at the core of what makes games successful today and the reason for creating our list of success factors. While there are other usages of games for education and medical purposes, the general consensus about games is that we play them because they are fun, regardless of if we learn something from them or not.

Salen & Zimmerman (2004) describe on pages 32-37 that play is related to games and meaning where the goal is to create what they call meaningful play. They describe how meaningful play emerges from the relationship between player action and the system outcome. Play is an age old concept, Salen & Zimmerman (2004) cite Johan Huizinga in saying that “Play is older than culture itself”. Meaning can be found in many different ways, for the most part when discussing PC games most consumers buy them to be entertained, and they are designed to play on our senses to feel meaningful to us, and in laymen’s terms this is another way of saying that if a game is fun, we will want to continue playing.

As this paper studies games on the PC platform, we could add the term ‘digital’ to the ‘fun’ to limit what we are looking at to the digital platform as most of our success factors are directly connected to the technical implementation of each element in a PC game.

Thus we can define ‘Digital Fun’ as that which makes us want to continue playing digital games and the result of good game design in the gaming industry.

2.3 Foundations for an analytical model
Any success factor that is found also needs to be backed up by proven theory. In this paper our discussion is mainly based on game design theory, and also on Max-Neefs (1991) theory of human needs, as much game design theory is ultimately based on them. In this chapter we will go through our chosen references.
2.3.1 Seven Rhetorics of Play

Sutton-Smith (2001) describes what he calls the seven rhetorics of play which is a broad way of looking at play as applying to seven different aspects of utilization, see Table 1. These rhetorics are a general way of looking at the behavioral reasons behind why both humans and animals have a playful element. Salen & Zimmerman (2006) describes it as a deconstruction of play theories from the past 100 years and says that there hasn’t been a universal science for play, but rather a series of arguments, or rhetorics.

Beginning by quoting experts that say that play is difficult to understand because it is ambiguous, Sutton Smith (2001) tries to make sense of this throughout the book in his seven rhetorics and ultimately claims some valid internal coherence for each of the separate rhetorics, as well as their ambiguous connections to the effects on the theories of play.

Sutton-Smith (2001) describes his seven rhetorics on page 11 as not as singular items, but as ideological values which their respective holders use to persuade others to believe in and live by. He talks about how people take the concepts of play for granted, the fact that children develop as a result of play or that sports are a form of competition between countries or states, used in festivals, or other creative form, yet some question its authenticity and call it a waste of time.

The seven rhetorics of play are validated and built upon a number of criteria which Sutton-Smith (2001) describes on pages 15-17 which each rhetoric follows:

1. Has clear basis in cultural attitudes or contemporary or historical kind
2. Has their own specific group of advocates.
3. Applies primarily to a distinct kind of play.
4. Applies primarily to a distinct kind of players.
5. Holds an affinity between the rhetoric and the particular scholarly or scientific disciplines, as well as between particular play theory and play theorists.
6. There is a matching interplay between the nature of the rhetorical assertions and the character of the forms of play to which they are applied.
7. The group that maintains the rhetoric uses authority over players, competitors of those excluded from the group.
8. Belongs to one of the following scholarly disciplines:
   a. Play as an experience
   b. Play as intrinsic functions
   c. Play as extrinsic functions

Sutton-Smith (2001) goes on to describe each rhetoric in detail, see Table 1 for an overview. Sometimes, he says, it is easy to identification of rhetoric can be very easy, such as for a child playing soccer. In other cases it can be split between two, for example if a child's prank is in itself the expression of the way the child embarrasses the adult. In conclusion, while Sutton-Smith (2001) claims to have found some internal order using his rhetorics, his research illuminates why there are so many schools of thought with varying theories about what play actually is.
The playful experiences framework, or PLEX, was developed by Arrasvuori et al. (2009) and is a framework in game design. The framework consists mainly of a list of 22 categories, see Table 2, which cover different abstract areas which are directly connected with our motivation for playing games, and are therefore recommended to consider when working with the design of games.

Arrasvuori et al (2009) built the framework from a research of 13 participants where each participant played games and went through a semi-structured interview process afterwards, which the researchers used as a basis in creating their framework an each category was mentioned on numerous occasions throughout the interviews. While their results have been used afterwards in other studies, they also note that they are not certain that their categories capture the entire scope of the digital gaming or playfulness. The original study concluded in 20 categories, and was later increased to 22 in the revised playful experiences framework (Arrasvuori et al, 2010).

The playful experiences framework has been used in different types of gaming context. Lucero et al (2013) describes it usage for as a guide for expert evaluation and focuses on the importance of both play and fun as governing factors in a successful game design and how the PLEX framework can be used for evaluating interactive products as well as a checklist for assessing different aspects of playfulness.

### Table 1. The Seven Rhetorics of Play

<table>
<thead>
<tr>
<th>Rhetoric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Play as Progress</strong></td>
<td>Focuses on the development aspect of play and that children adapt and learn through playing. It is also linked to the study of animal play.</td>
</tr>
<tr>
<td><strong>Play as Fate</strong></td>
<td>Usually refers to games of gambling and games of chance and rests on the assumption that our lives are controlled by destiny.</td>
</tr>
<tr>
<td><strong>Play as Power</strong></td>
<td>Is focused on sports and contests. Sutton-Smith (2001) suggests that this is an ancient rhetoric as old as patriarchy.</td>
</tr>
<tr>
<td><strong>Play as Identity</strong></td>
<td>Looks at play as construction and confirming social identities by community, celebrations and festivals.</td>
</tr>
<tr>
<td><strong>Play as Imaginary</strong></td>
<td>Is focused on creativity, innovation and the human imagination.</td>
</tr>
<tr>
<td><strong>Play as the Self</strong></td>
<td>Refers mainly to individual playful hobbies and pursuits, where play is a form of relaxation and escape from everyday life.</td>
</tr>
<tr>
<td><strong>Play as Frivolous</strong></td>
<td>Refers to playfully protesting against the social and cultural order of regular society. It is associated with historical figures of tricksters and fools.</td>
</tr>
</tbody>
</table>

**2.3.2 Playful Experiences Framework**

The playful experiences framework, or PLEX, was developed by Arrasvuori et al. (2009) and is a framework in game design. The framework consists mainly of a list of 22 categories, see Table 2, which cover different abstract areas which are directly connected with our motivation for playing games, and are therefore recommended to consider when working with the design of games.
Captivation  Forgetting one’s surroundings  
Challenge  Testing abilities in a demanding task  
Competition  Contest with oneself or an opponent  
Completion  Finishing a major task, closure  
Control  Dominating, commanding, regulating  
Cruelty  Causing mental or physical pain  
Discovery  Finding something new or unknown  
Eroticism  A sexually arousing experience  
Exploration  Investigating an object or situation  
Expression  Manifesting oneself creatively  
Fantasy  An imagined experience  
Fellowship  Friendship, communality or intimacy  
Humor  Fun, joy, amusement, jokes, gags  
Nurture  Taking care of oneself or others  
Relaxation  Relief from bodily or mental work  
Sensation  Excitement by stimulating senses  
Simulation  An imitation of everyday life  
Submission  Being part of a larger structure  
Subversion  Breaking social rules and norms  
Suffering  Experience of loss, frustration, anger  
Sympathy  Sharing emotional feelings  
Thrill  Excitement derived from risk, danger  

Table 2. The PLEX framework consisting of 22 categories.  
Source: Lucero et al (2013) page 3

Lucero et al (2014) has also teamed up with the original author of the framework in creating a deck of cards which make the PLEX framework easier to learn and use which describe each category briefly and add two images which are directly associated with each category, see Figure 1. Lucero et al (2014) describes in their article the overall usability of PLEX and the work they have done with it.
2.3.3 Fundamental Human Needs

As gaming theory builds on what appeals to us as human beings, it is good to have a certain insight into the basic human needs. This theory is also used in the creation of the checklist and its categories.

Humans have a lot of different needs that we feel the urge to fulfill. Max-Neef (1991) has developed a matrix to map out these needs in what he calls Human Needs and Human-scale Development, see Table 3. These needs cover all aspects of the human mind and need for both survival, physical and mental health in many different ways.

He discusses these needs and their fulfillment through different types of potential satisfiers of these needs, which can satisfy given needs and help satisfy other needs, satisfy singular needs, over satisfy needs, falsely satisfy a need and even hinder satisfying of a need. When discussing games in relation to human needs, these would mostly satisfy the human need of leisure. More advanced game design, such as this paper discusses, does play on almost all aspects of the human needs as games are a way of creating an entire virtual world. This means that games may also fall into the category of pseudo...
satisfiers or even violators, where a player may feel that he is fulfill his human needs such as building a home or progressing a virtual character, when in reality this is not helping the individual at all in real life.

Max-Neefs (1991) matrix above is the same one as represented in his book, but a simpler version from Wikipedia (2016) is used in this paper as the same depth is not required since it’s easier to grasp and use.

<table>
<thead>
<tr>
<th>Need</th>
<th>Being (qualities)</th>
<th>Having (things)</th>
<th>Doing (actions)</th>
<th>Interacting (settings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsistence</td>
<td>physical and mental health</td>
<td>food, shelter, work</td>
<td>feed, clothe, rest, work</td>
<td>living environment, social setting</td>
</tr>
<tr>
<td>Protection</td>
<td>care, adaptability, autonomy</td>
<td>social security, health systems, work</td>
<td>co-operate, plan, take care of, help</td>
<td>social environment, dwelling</td>
</tr>
<tr>
<td>Affection</td>
<td>respect, sense of humor, generosity, sensuality</td>
<td>friendships, family, relationships with nature</td>
<td>share, take care of, make love, express emotions</td>
<td>privacy, intimate spaces of togetherness</td>
</tr>
<tr>
<td>Understanding</td>
<td>critical capacity, curiosity, intuition</td>
<td>literature, teachers, policies, educational</td>
<td>analyze, study, meditate, investigate, keep</td>
<td>schools, families, universities, communities,</td>
</tr>
<tr>
<td>Participation</td>
<td>receptiveness, dedication, sense of humor</td>
<td>responsibilities, duties, work, rights</td>
<td>cooperate, dissent, express opinions</td>
<td>associations, parties, churches, neighborhoods</td>
</tr>
<tr>
<td>Leisure</td>
<td>imagination, tranquility, spontaneity</td>
<td>games, parties, peace of mind</td>
<td>day-dream, remember, relax, have fun</td>
<td>landscapes, intimate spaces, places to be alone</td>
</tr>
<tr>
<td>Creation</td>
<td>imagination, boldness, inventiveness, curiosity</td>
<td>abilities, skills, work, techniques</td>
<td>invent, build, design, work, compose, interpret</td>
<td>spaces for expression, workshops, audiences</td>
</tr>
<tr>
<td>Identity</td>
<td>sense of belonging, self-esteem, consistency</td>
<td>language, religions, work, customs, values, norms</td>
<td>get to know oneself, grow, commit oneself</td>
<td>places one belongs to, everyday settings</td>
</tr>
<tr>
<td>Freedom</td>
<td>autonomy, passion, self-esteem, open-mindedness</td>
<td>equal rights</td>
<td>dissent, choose, run risks, develop awareness</td>
<td>anywhere</td>
</tr>
</tbody>
</table>


Max-Neefs (1991) matrix above is the same one as represented in his book, but a simpler version from Wikipedia (2016) is used in this paper as the same depth is not required since it’s easier to grasp and use.

2.4 Analysis model

The presented theories give us the basis on which to connect success factors to proven game design theory, and now we need to define how these will be located and how they will connect to our conceptual frameworks.
To build the success factor checklist we are both analyzing a list of games connecting empirics to game design theory for a final checklist. This process is outlined in Figure 2 below.

Each selected game is analyzed for recurring elements that may be connected to presented conceptual frameworks or are simply reoccurring elements which are an apparent reason for success according to the author. These factors are then in turn added to the final success factor checklist if they can be validated by seeing if they are also present in other games as well. Factors which are found in at least two or more games are kept, to avoid too game specific success factors, such as “batman is in the batman game, thus including a batman is a success factor”. This ends up in a success factor check list which then other games can be tested against to see how many of these elements they include.

![Figure 2. Analysis model for the process of creating the successfactor checklist](image)
3 Results

The collection of empirics was done in accordance with the model in 2.4. The main collection here is finding our success factors through the analysis of games. First we take a look at the chosen games and verify their success to validate them as analysis material. Then we go through each game from the list and look for success factors, when a potential success factor is found, we make sure that it is connected to our conceptual frameworks, then the success factor is cross-references with all other games to make sure it exists in at least two games before placing it in the checklist of success factors.

See Figure 3 to see the overall scores of the chosen games, the light blue staple represents the Metacritic score, ranging from 0 to 100, and the purple staple represents the percentage of steam user reviews which were positive.

![Game list Steam Review & Metacritic scores](image)

*Figure 3. Collected Steam Review & Metacritic scores of games researched in this paper*

3.1 Occurrence of success factors in games

The final results of the occurrence of each factor in each success factor is represented in Table 4 below. Each row represents a success factor and each column a game. A one (1) is set if the success factor is present in each game, and a zero (0) if the success factor is not present. The first gray column to the right shows the total amount of occurrences for each success factor, and the second gray column to the right shows a calculated “normalized” value which is number of occurrences divided by average number of occurrences, and is used in later calculations. The bottom gray row shows the total number of success factors for each game.

This table was built by multiple iterations of analyzing games to find success factors, and when a new success factor was found, already researched games had to be re checked to see if that factor also was present there, even though it wasn’t found in the first session.

Each factor is only considered to be either present, or not present. The degree of which a game has included a factor is not graded, as this would be much more difficult to give an objective result. Also, the nature of each factor is not that they are implemented in a specific way, it would be difficult to compare one implementation as a better or worse implementation than a different one.
Table 4. The occurrence of each success factor in each analyzed game.
4 Analysis

4.1 A practical checklist

As this study aims to build a practical checklist for creating successful PC games, we need to define what we mean by a practical checklist. The three conceptual frameworks presented in chapter 2, namely the PLEX framework (Arrasvuori et al., 2009), the seven rhetoric of play (Sutton-Smith, 2001) and the human needs matrix (Max-Neef, 1991), all give different ways to look at what should be incorporated into game design. However, most of our conceptual frameworks stay quite abstract in their results and tells us to implement things such as “fellowship” or “play as identity”, which in itself isn’t telling us much in how to design better games.

The aim is to take these theories, and take a look at a number of successful games, and see how these theories may have been implemented in a more practical form. Each given factor from our conceptual frameworks may be implemented in a number of different ways, and so multiple success factors may be created for each separate point in the conceptual frameworks.

Each factor which is added to the list should be more directly connectable to the technical implementation of the factor into a PC game, with a description of what the factor means to include in a practical way in PC game context, yet not so specific as to say that it has to be done in an exact way, as games still differ a lot and new games always by design invent new ideas. As an example the “Play as Progress” rhetoric translates to a number of success factors, such as including “Multiple Goals” which says that there should always be more than one goal to aim for, and “Future Goals” which says that there should always be short-term, mid-term and long-term goals.

To make sure that each factor is still connected to our conceptual frameworks, each factor is assigned a category which are based on the given theories. These categories can also be used as an overview of the checklist and what it includes to make it more easily used without having to read through each separate factor.

4.2 Locating success factors

When researching games there is a large number of similarities, and a large number of differences. Some games apparently succeed while others fail miserably despite these similarities and differences. The key here was to pinpoint different game elements that were present in some games, but were missing in others, that also could be directly connected to the overall feel of quality or fun while playing the game.

While some things may be obvious, such as if a game was made that was lacking any type of goal whatsoever, chances are that most people would grow bored very quickly. Other things might not be as obvious, but could lead players to get bored just as quickly. For example, a game which is lacking in the checklists Camera Positioning or Direct Movement factors may cause players to become frustrated and quit the game without immediately understand why.

When analyzing each game separately and looking at the PLEX framework, the seven rhetoric of play and human needs, and how these conceptual frameworks actually expresses themselves in practical form in the researched games, the author found a total of 63 identified success factors. While the author has
many years of experience in both playing and creating games, many of these were elements that the 
author had not thought of as separate elements prior to this analysis.

When a success factor was located, the conceptual frameworks were studied to see where the success 
factor fits in, to create a relationship between the success factor implementation and the conceptual 
framework. Which conceptual framework was connected to the success factor also affected which 
category it was placed in as the categories act as a type of connection to the conceptual framework, see 
4.3 for specification of the categories that were chosen.

It’s important to note that there may have been things that went unnoticed by the author because of his 
personal preferences and playing styles and that locating these factors as a larger research group and 
discussing them together would help make the final list more complete. Also, some elements that require 
a larger portion of time may also be missed as some games are designed to be played hundreds of hours 
but the session time per game is limited.

As the game list contains games which were released within the past 15 years or so, each game is 
evaluated for what it was when it released, thus games such as Unreal Tournament 2004 is graded as 
having “New Tech” even though it is now outdated, it was definitely as selling factor when it was 
released. As such, these factors are shown to be as important then as they are now, but as game design 
and techniques certainly does evolve and new functionality is possible, newer games do have more 
potential to include more factors than they did many years ago as it is technically easier to implement 
certain things now than it was then.

At the end of the last analysis iteration 63 success factors were found and chosen for the final list:

- Freedom of choice
- Freedom of movement
- Play Around
- Easy Access
- Consistent Functionality
- Play Styles
- Creative Expression
- Construction & Crafting
- Originality
- Main Story
- Backstory & World story
- Polish
- Sense of awe & magic
- Exploration
- Variation & Replay ability
- Asymmetry
- Defined art style & lighting
- Uniform graphics
- Music & sound effects
- Connected to senses
- Direct movement
- Natural Controls
- Response Signals
- Camera Positioning
- Multiplayer
- Team Spirit
- Roles
- Online Leaderboards
- Community
- Ease of access
- Competitive Multiplayer
- Cooperative Multiplayer
- Online Multiplayer
- Local Multiplayer
- MMO Elements
- Match based elements
- Spectating
- Learning Curve
- Future Goals
- Multiple Goals
- Complex System
- Death is meaningful
- Achievements
- Speed running
- Puzzles
- Collectibles
- Secrets & Easter eggs
- Detailed statistics & Personal profile
- Exclusiveness
- Inventory
- Journal
- Popularity
- Discussable
- Customizability
- Free to Play
- Gamepad support
- New Tech
- Nostalgic Tech
- Luck, Gambling & Randomness
- Farming
- Leveling system
- Sexuality
- Out of reach experience
- Expandable
4.3 Defining categories

The final list has many factors, some which are quite close and others which are two completely different types of things. To give some kind of meaningful overview of the list, and to build a more apparent connection to the conceptual frameworks, 7 main categories were formed and each success factor is placed in one of these. However, several of the factors are closely related others and their category is not completely given.

The categories were formed from a merge of all Arrasvuoris et al (2009) PLEX framework, the seven rhetoric of play according to Sutton-Smith (2001) and Max-Neefs (1991) human needs matrix. While these sources all give different ways to categorize what motivates us, some categories are very abstract, and others are not as important in a game design context. Therefore these new categories were formed as a merge of these sourcing with a more practical focus on game design.

The categories themselves are a way to group up the underlying factors and can be used to see that a design is well represented overall, not only focusing on a certain type of experience. However, this does not mean that it’s always necessary to be well represented overall, it is up to the designer to decide what is important for their design. As we can see from in chapter 4.4.2, some successful games are not well represented in each category but still are successful. Also, the factors are not evenly distributed over categories and the immersion category for example, has over the twice the amount of factors compared to preference and human needs. This be because most popular games are about building an alternative reality, and immersion is an important factor in connecting the player to that new reality.

- **Freedom**
  Factors connected to the freedoms the player are given and freedoms they experiences during play. Connects to the expression, control, discovery and captivation of PLEX framework and play as imaginary rhetoric as well as the human need of freedom and creation.

- **Immersion**
  Factors which help the player dive deeper into the overall experience, atmosphere and mindset and forget ones surroundings. Connects to captivation, discovery, exploration, humor, relaxation, fantasy, control, sensation and simulation PLEX categories, the play as imaginary rhetoric and the human needs leisure.

As the immersion category had the largest number of factors, it was split into three sub categories to make it easier to overview as they all refer to slightly different aspects of immersion.

- Intellectual Immersion
- Audiovisual Immersion
- Control Immersion

- **Challenge**
  Factors connected to offering the player a challenge and goals. Based mainly on the rhetoric of play as progress and the PLEX categories of challenge, completion, competition and simulation.

- **Multiplayer**
  Factors that make the experience something to share with others, either directly or indirectly. Connects to PLEX categories of competition, cruelty, expression, fellowship, nurture, submission and sympathy and to the rhetoric of power and identity.

- **Personal**
  Factors which make the game personal for the player, or make a personal connection to the player through for example ownership and value. This category is mainly based on the rhetoric of
play as identity and play as self, and also connected to the PLEX categories of humor, subversion and suffering.

- **Preference**
  Factors which offer the players personal playing preferences choices and which play on the preferences of certain player groups. Does not directly connect to the game design theory, as it is more concerned with different player preferences.

- **Human Needs**
  Factors which are directly connected to and build on our basic human needs such as sexuality and nesting. Mainly includes factors connected to Mas-Neefs (1991) human needs matrix, but also is based on the PLEX categories of eroticism and subversion and the rhetoric of play as frivolous and play as fate.

As we can see from the given categories, the PLEX framework (Arrasvuoris et al., 2009) and the seven rhetoric of play (Sutton-Smith., 2001) are represented in one or more categories. Max-Neefs (1991) human needs matrix is also represented in most part, though not all human needs are directly connected to games. It is important to have some connection to all of the conceptual frameworks to make sure that the new checklist and its categories which are created are not lacking in more general game design theory.

### 4.4 Scoring researched games with success factor checklist

To show that our success factors and categories are actually present and well represented in the selection of studied games, and to give a better overview of the distribution of occurrences, several figures are presented below. This shows us that the suggested success factors are actually well represented and not simply plucked out of thin air.

After the last iteration of game research was complete, each success factor was also split into the categories which have direct connection to our conceptual frameworks.

This checklist was then used to generate scores based on how well each researched game had occurrences of the generated success factors.

#### 4.4.1 Total occurrence scores

In Figure 4 below, we first will take a look at the total score of each game. This simply shows the total of how many different success factors where present in each game, color coded into different categories.

First off we can see that the number of total occurring success factors range from 17 in Braid to 46 in Team Fortress 2. This shows us that most games do have a large number of these success factors implemented, but also that it is not the amount of success factors that defines the games success. This shows us that it is necessary to value each success factor in a different way.

When looking at the data this way our top 5 games are in order Team Fortress 2, Grand Theft Auto V, Borderlands 2, Spelunky and Dota 2.
4.4.2 Scores based on normalizing by category

While looking at the total occurrences in Figure 5 we notice that there is an uneven amount of factors from different categories. While each factor is an individual success factor in itself, it may be interesting to look at the total scores if each success factors value depends on the category it lies in.

In Figure 6 below we can see the uneven distribution of success factors within each category. The immersion category is clearly the leader in amount of success factors connected to it, and the categories preference and human needs have the lowest.

*Figure 4. Each games total number of occurrences from the success factor checklist.*

*Figure 5. The amount of success factors from each category*
If we distribute the amount of present success factors as a fraction of the total success factor in each category, we get a similar total result, but with a better distribution between categories.

This shows us games such as Dota 2 & Team Fortress 2 having very strong presence in the Multiplayer category, as these very successful games fully rely on multiplayer, while other games such as Braid has a good amount of immersion, challenge and personal, but is lacking in freedom, preference, human needs and multiplayer.

![Category Normalized Total Score](image)

**Figure 6. Scores based on occurrence of success factors as a fraction of category**

### 4.4.3 Scores based on normalizing by success factor occurrence

When taking into account that a factor that is present more often is more valuable, we calculate a normalized occurrence value for each factor, which is shown in the complete list, see chapter 3.1. This gives each success factor a new normalized value between 0,16 for Nostalgic Tech and 1,84 for the few factors found in all games.

When looking at the distribution of how many times each factor is found in total, we also have quite an uneven distribution, see Figure 7 & Figure 8.
The distribution between individual factors in itself is fairly even overall, see Figure 8. Some factors have only a few occurrences, but most have a steady 15-20 occurrences throughout the researched games.

**Figure 7. Distribution of occurrences of success factors across all games**

**Figure 8. The total occurrences per success factor in all games**
It is when we look at the distribution between factors grouped per category that we see that immersion is much more represented and presence and human needs are the least found.

If we divide the average value of each success factor by the number of success factors within each category, we get a new value to use for calculating the total score, see Figure 9. This shows us that while the immersion category does have the most success factors, it’s also the most represented factor in average as well.

![Normalized item values](image)

*Figure 9. Item value based on occurrences and number of items per category*

This gives us a new, more fairly distributed total score calculation in Figure 10 below. Though from what we can tell these results still aren’t very different from the initial results simplistic count of score found in Figure 4.

![Item & Category Normalized Total Score](image)

*Figure 10. Scoring of each game based on the normalized item score and normalized by category*
5 Conclusions
The purpose of this paper is to identify the practical implementations of game design in successful PC games and build a checklist with concrete factors for aiding development of successful games. This has been done by the study of a successful games, connected these success factors to three conceptual frameworks, validated them through finding multiple occurrences and described them in a practical check list as seen below in 5.1.

Creating both large virtual worlds and keeping everything fun and entertaining enough to be at the top of the market is not a very easy task. While there is a good amount of game design theory to build upon, there is less practical theory on what exactly should be included for a game to become successful, and this is what this paper has generated.

In this paper we have looked at a large number of games and analyzed these in relation to game design theory to build a practical checklist that can be used for helping developers produce games will appeal to its players. To keep high authenticity, the author stayed transparent and as objective as possible in his findings and conclusions.
5.1 Success Factor Checklist

Through multiple iterations of game research many success factors were found. In Table 5 below the list of all the success factors which were found when researching the games. They were later divided into 7 different categories. The category immersion which has the largest amount of success factors, is split into three subcategories to make them easier to overview. Each factor was assigned a simple title and a more detailed description.

<table>
<thead>
<tr>
<th>Freedom</th>
<th>Immersion</th>
<th>Multiplayer</th>
</tr>
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<tbody>
<tr>
<td>Freedom of choice</td>
<td>Intellectual Immersion</td>
<td>Team Spirit</td>
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<tr>
<td>Freedom of movement</td>
<td>Originality</td>
<td>Roles</td>
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<tr>
<td>Play Around</td>
<td>Main Story</td>
<td>Online Leaderboards</td>
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<tr>
<td>Easy Around</td>
<td>Backstory &amp; World story</td>
<td>Community</td>
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<td>Consistent</td>
<td>Polish</td>
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<tr>
<td>Functionality</td>
<td>Sense of awe &amp; magic</td>
<td>Competitive Multiplayer</td>
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<tr>
<td>Play Styles</td>
<td>Exploration</td>
<td>Cooperative Multiplayer</td>
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<tr>
<td>Creative</td>
<td>Variation &amp; Replay ability</td>
<td>Online Multiplayer</td>
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<tr>
<td>Expression</td>
<td>Asymmetry</td>
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<td>Construction &amp; Crafting</td>
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<td>MMO Elements</td>
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<td>Match based elements</td>
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<tr>
<th>Challenge</th>
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<tr>
<td>Learning Curve</td>
<td>Secrets &amp; Easter eggs</td>
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<tr>
<td>Future Goals</td>
<td>Detailed statistics &amp; Personal profile</td>
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<tr>
<td>Multiple Goals</td>
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<tr>
<td>Complex System</td>
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<td>Death is</td>
<td>Journal</td>
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<td>meaningful</td>
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<td>Achievements</td>
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<td>Speed running</td>
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| Human Needs     |                                |                        |
|-----------------|                                |                        |
| Luck, Gambling & Randomness |                        |                        |
| Farming         |                                |                        |
| Leveling system |                                |                        |
| Sexuality       |                                |                        |
| Out of reach experience |                        |                        |
| Expandable      |                                |                        |

Table 5. An overview of the final checklist of 63 Success factors

Freedom

1. **Freedom of choice** - The feeling that there is always something else you can do, or do differently. No dead ends. Optional paths and the ability to do as you please in as many situations as possible.
2. **Freedom of movement** - Many and fun ways to move around in the world and advanced techniques to master such as “bunny hopping” in Quake.
3. **Play Around** - The feeling you can just “mess around” with the game, use your creativity and fun even though not trying to achieve the games main goal.
4. **Easy Access** - Easy to jump in and start playing/playing around. Games with a lot of settings, tutorials etc. can be daunting to enter, good to have very quick way to start basic game to play around in some fashion. Party game elements – easy jump in, variation each game, talk at the same time or team tactic discussion. Quick and easy menus to navigate through.

5. **Consistent Functionality** - Things work as they are expected to work. If you can pick up boxes you expect to also be able to pick up rocks of similar sizes. Even if there is no initial reason for the functionality, this adds to the world’s plausibility and may open unexpected functionality.

6. **Play Styles** - Support to be played in different styles or mindsets, for example “high risk - high reward” or "slow and safe", simply by how the player approaches things, or by variation in what they player chooses for item builds or choices within the game, “do I take the tank or the airplane?”.

7. **Creative Expression** - You can express yourself creatively by for example drawing, building or other types of personal unique additions.

8. **Construction & Crafting** - Player can build and craft things using various ingredients or materials.

**Immersion**

**Intellectual Immersion**

9. **Originality** - The game offers some element of originality in some form which gives the player the feel of experiencing something completely new or original. Can be both visually, story wise, gameplay elements and other form.

10. **Main Story** - "Captivating story that leaves the player wanting more of it, asks more questions than answers. Should be optional to dive deeper for those that do not care about it. Character building and character development. Use strong drama moments from paths, character deaths, etc. to create connections to player. Make sure the evil side also has decent story and is not simply evil as there is no real evil without reason. Includes: Romance, Humor, Character Development

11. **Backstory & World story** - Convincing backstory to characters and world story that creates a plausible alternative reality. Exploration and secrets should provide additional backstory as value.

12. **Polish** - Polished feel of game and few bugs or graphical bugs that break the atmosphere. Also the feeling that there is so much in the game by adding everything that is needed in the game, and then doubling the amount of content or secrets.

13. **Sense of awe & magic** - The feeling of not being able to see through the game mechanics and how it works, feeling of smart AI, dynamic world which can’t be directly analyzed or why things work as they do.

14. **Exploration** - Large, exciting, rich and difficult world to explore

15. **Variation & Replay ability** - Playing the same section of the game should be just as fun, usually by making sure there is a lot of variation with both the world and available choices. Certain elements, or even whole game worlds, can even be procedurally generated, which means that portions may be completely different each time it is played. Generated content can also feel repeated, and variation within the variation is also important, by for example. Completely linear games usually lack this, but some games achieve variation there too.

16. **Asymmetry** - Asymmetry in design and balance between different items and races and worlds, also in difficulty curve and challenge as it can be good with an easy break now and then and not just constantly ramping up the difficulty.

**Audiovisual Immersion**

17. **Defined art style & lighting** - Attractive art style that sets the right atmosphere. Should set up its own style guide rules and follow them.
18. **Uniform graphics** - Independent on how complex the graphics are, it is extremely important that everything fits together and feels part of the same world. Usually this means to keep the same graphical complexity throughout the game on all areas and even making certain things less complex to make them fit in. i.e. Keeping polygon and texture densities even throughout.

19. **Music & sound effects** - High quality and immersive music & sound to set the atmosphere and deeper immersion into the world.

20. **Connected to senses** - Overall good combination of immersion into multiple senses to not break immersion. The feeling over overall quality in visual, audio, alternative control schemes, virtual reality headsets, tries to simulate smell, taste, touch, etc. And tries to create strong feelings such as love, hate, anger, sexuality, etc. First person games where you 'are' the character may help this feeling.

**Control Immersion**

21. **Direct movement** - Good possibility for high performance/FPS on most hardware, minimal input lag, and no real animation times on input response. The slower the response feels, the farther away the game is.

22. **Natural Controls** - Direct connection between the players input and what the player is controlling in the game and its response. Keep control schemes as natural as possible and easy to learn so that the brain adapts quickly.

23. **Response Signals** - Audio and visual response in actions performed by the player to immediately see the effects of your action.

24. **Camera Positioning** - Natural placement and movement of camera providing showing the player exactly what he wants to see without having to go out of his way to control the camera.

**Challenge**

25. **Learning Curve** - Well-designed learning curve, with and always keeping it a challenge to the player.

26. **Future Goals** - Short-term, mid-term and long-term goals to aim for.

27. **Multiple Goals** - There is always more than one goal to aim for while playing, so that if the player gets tired of the main goal, he can attempt the others.

28. **Complex System** - Robust, balanced and complexity in design to allow variety in strategy. Rock, paper, scissors design may be used. Enough complexity so that there is no real “best way” approach.

29. **Death is meaningful** - Dying can be penalizing but should not seem a chore to restart, even more importantly it should it no be irrelevant, so that the player simply continues completely where he left off. Make it a valuable part of gameplay where the player feels the value of life yet doesn’t stop playing when he dies. Optional “checkpoint” mode can be available for very challenging games where practice may be necessary.

30. **Achievements** - Outside of main gameplay adding extra challenges to come back for. Some can be achieved from regular play, but should mostly be actual achievements which the player has completed outside of standard gameplay. Inform players of why they get achievements and of halfway progress for long achievements to avoid unknown achievement message spamming before the player is settled in.

31. **Speed running** - The game works well to try to play as quickly as possible, preferably to be able to get a total time to compare to leaderboards. Should be fun to spectate speed running. Minimize tedious repeatable tasks that player skill cannot improve the completion speed of.

32. **Puzzles** - Puzzle elements that need problem solving.
33. Collectibles - Rare items & sets of things to collect, which may or may not give some kind of bonus, profile additions, etc.

**Multiplayer**

34. Team Spirit - You need others. In-game sharing & aiding others. A sense of belonging, teams or clans. Direct communication between players while playing helps the progress in the game.

35. Class system - Players and units have different roles which need other roles to win.

36. Online Leaderboards - Score based games will add the element of competition if you can compare your score to others. Being able to compare to local scores, online friends and global is a plus.

37. Community - Communication between players. Both inside and outside the game as chat, voice chat, web based bulletin boards, etc.

38. Quick setup - Should always be simple and fast to setup and start a game in the way the player. If a "lobby" is required to collect players before a game, try to make it interesting, possibly by adding mini-games or meaningful activities to do while waiting or a "warm-up" period while waiting for others. Local game functionality a plus.

39. Competitive Multiplayer - Compete against others. Preferably with ladder or tournament systems.

40. Cooperative Multiplayer - Players can play together with friends in teams cooperatively against AI opponents.

41. Online Multiplayer - Ability to play with others using an internet connection. Requires some kind of master server or server list to not count as local.

42. Local Multiplayer - Ability to play with others using local area connections.

43. MMO Elements - Playing the game gives the player some type of value which can be carried on to another game, or that the entire game is one long game. This implementation can vary much, be it an entire world, leveled character, cosmetics items, profile additions, etc.

44. Match based elements - Being able to start a game even years after its release and having the same potential value giving no real advantage to those who have played a lot, except that they may be more skilled. MMO games have a hard time with this

45. Spectating - If game is fun to watch, it may have the potential to become an “e-sport” having tournaments with paying spectators. Game length should correspond to a good way to have games in tournaments. In game spectators, preferably unlimited number of spectators and online systems to show popular games. Can including additional functionality only for spectators such as match information or betting.

**Personal**

46. Secrets & Easter eggs - Secret areas or items to find when going out of your way from regular gameplay. Make you feel the experience is yours.

47. Detailed statistics & Personal profile - Players can view match history, detailed statistics about plays, compare to friends, and keep track of overall progress. More detailed analysis of data a big plus, i.e. match list vs Dotabuff.com

48. Exclusiveness - Difficult to get access to game will make people want it more, through a private beta for example. Free to play games attract a certain crowd but others avoid them

49. Inventory - An inventory system to keep and make a personal connection to collected items for the feeling of possession. A popular method is to have items of different shape take different amounts of space in a grid based layout, such as Diablo 2.

50. Journal - A journal that keeps track of everything you’ve done that can serve as a “completionist” progress tracker.
51. **Popularity** - The consensus that “If everyone else is playing it, it must be good”. Overall quality affects, but also factors such as choosing a design and setting that appeals to the masses.

52. **Discussable** - Fun to discuss during lunch breaks or recess in school. Often a result of complex strategy, secrets, strong characters or challenging gameplay. Helps the game spread as well as get a foothold in the players’ memory.

### Preference

53. **Customizability** - Be able to change as many variables as possible for variation in gameplay. Often seen in multiplayer game modes.

54. **Free to Play** - The game is free, but may have some type of micro transactions to be able to earn money. Appeals to certain types of players which seldom pay for games. When large quantities of players are required for design to work. Usually includes micro-transactions purchases within the game as economic model, which is why others may avoid these types of games.

55. **Gamepad support** - Most PC games natively use mouse & keyboard as controllers, but in recent years gamepad controllers have become more popular as many like to play the game from their living room, blurring the line between video game consoles and PC games.

56. **New Tech** - Having cutting edge graphics and new technology with good looking graphics and impressive features.

57. **Nostalgic Tech** - Having tech which simulates old tech which may be nostalgic to certain player groups

### Human Needs

58. **Luck, Gambling & Randomness** - The element of surprise, chance and rewards. Randomness in items received, chests, mini-game gambling. The possibility of something really good & unknown.

59. **Farming** - Doing tasks over and over the same way may still be rewarding if there is a “farming” element to it where you are collecting something for a greater goal.

60. **Leveling system** - Directly showing progress by the player increasing in level and ability. Pros and cons of having it directly influence the players’ ability as some players avoid games where you need to “level up”.

61. **Sexuality** - Sexual elements & characters that the play may become attracted to

62. **Out of reach experience** - Getting to experience something that is out of reach in real life because of economy, far-off, dangerous or illegal actions, fantasy setting, etc.

63. **Expandable** - The game keeps updating and changing even after release, either by developer or the community. Often patches are released to fix important game breaking bugs, but may also balance out the game more or even add completely new content. Sometimes these are released for free and serve as constant reason for players to come back, but may also be released as separate optional purchasable expansion packs or downloadable content. Support for community mods.

### 5.1.1 Checklist usage

The checklist is neither a recipe for success nor a must-do-all checklist. Both during and after the designer should take a look at this list and decide which elements that fit the design or that may be beneficial to the final game and are realistic to implement before taking a stance on whether to include them or not.

While each factor is important, there is no real evaluation on how important each factor is or if one factor is more important than another other than that which was done by analysis the data in chapter 4.4.
They are simply identified as reoccurring factors which are connected to the overall quality of the game. Which factors are most important is up to the designer to decide for each given game design. The order they are given does not represent any type of sorted order. Researching the importance of each factor individually falls outside the scope of this paper.

It is however relevant to have at least some factors represented from each category as the author feels this is necessary for the game to be a full experience. Unless of course the design has chosen to disregard certain features altogether, which isn’t unusual for the case of multiplayer games.

Overall we can see that many of the successful games had a large portion of the success factors, but there were a few that only had a few and were still successful games. This shows us that it’s possible to make a successful game by only focusing on certain factors. Since this study does not grade to which degree each element is included, it is possible that those games which focus on less success factors, instead made their chosen factors much better than those that had many.

For a better overview each factor in the following checklist is placed in one a category, along with a description. Depending on the design a designer can also see how well the game fills each category.

### 5.2 Further research

While this paper has produced a good amount of knowledge, there is still many ways to build upon its findings. It would be valuable to do a similar study using multiple people who analyze games to get a broader perspective and find more success factors. Doing this with either experienced game developers or consumer only groups could provide additional insight and new findings. More study and evaluation of the individual weight of this papers success factors would also be valuable. Studying any relationship connections between success factors may also be interesting.

While the findings in this list are many, and they may be a big help for designers and developers in the gaming industry today. Evaluation of each success factor in the checklist individually would need more research to be able to say which factors are more important than others.

In addition, it would also be interesting to complete the same research using the same chosen limitations, but with a different author, to see what differences would be parent. It would definitely alter the given results, and would be needed before suggesting that a list could be considered final. However, even if such a study was conducted, as there are so many abstract elements in game design theory and conceptual frameworks, and that the identification of factors in games is so subjective, and since game design is always evolving and there is always the chance that a new game comes along with new elements that prove to be very successful, it is almost by impossible to make a definite and final list.

This suggests that even though this study is limited in itself, it may still provide a certain value to interested parties as it does give some insight to what may be contributing to a games success. If nothing else, it shows similarities between successful games, and it also shows what the author has found to be factors that contribute to a games success.
References


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Lastly I would like to thank all the game developers and gamers or of the gaming industry today which are together building a very exciting industry which through entertainment, education and medical purposes are building new worlds for everyone to explore.

Completing this paper has been very valuable for me. I’ve learned a great deal about the scientific process and about the chosen subject. I hope that the findings will be of value to someone and I hope to be able to continue developing this success factors list into something even more useful in the future.