Game design and production

Frequent problems in game development

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Abstract

This essay is about common problems that can arise during game development projects. It is focused around the production cycle and how the game industry treats the game development pipeline. It mainly describes issues with communication within game development teams, problems concerning planning and how the design process affects members of the game development team’s work process and efficiency. It includes an analysis of common problems that I have found during my studies of literature describing the game industry, a short research study of post mortems written by game developers and a survey about game design documentation and communication sent out to game developers and game design students.
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1.0 Introduction

Creating a game can be a complex process. Hundreds of ideas should to be tied together, transformed into pieces of a game and put together before they can be turned into a complete product. Many game projects start, games get developed but then never distributed and sold (Moore, Sward 2007:671). Many game projects get cancelled early in development by a client that might not estimate that the game will be a financial success (Irish 2005:228). Some of these productions however fail because of problems with delivering in time and on budget, which as an effect means massive delays in production and conflicts between those who pay for the product and those who make it.

Joystick.com put together a list of 8 major titles that were supposed to be released in 2012, but now have been pushed to 2013 or to an unknown date. Among the titles we find popular games such as Tomb Rider, BioShock and DMC – Devil May Cry (De Matos 2012).

Despite 12 years to development time (Diablo III), Diablo III still has major issues and the game is continuously being improved after the release (Gera 2012).

Why are these problems taking place and more importantly, exactly what type of problems are common within game projects during the making of a game? In this essay I will try to find out more about these problems and also try to find reasons to why they occur.
2.0 Background – game design

2.1. The game design and the development team

To make this essay a little bit more understandable I shall first define the concept of game design. Game design is deciding what should be in a game. How the game will work mechanically, what rules there are, how it will look, and how it will feel to the person playing it (Schell 2008:24). To create game design, ideas need to be communicated. The word communication means: “…the imparting or exchanging of information by speaking, writing, or using some other medium.” (Communication).

Why is communication so essential in game projects? All people involved in building the game has to work together to create the game. The designer that is responsible for the game design has to facilitate the knowledge of the team and communicate the design to them and then back from them. The designer needs to understand how the team thinks and why they make certain decisions (Schell 2008:34 – 35).

A typical game production team usually contains other people than just a designer. You will often find the following roles represented in a game project (Betke 2003:39); programmers, 3D artists, 2D artists, animators, a lead game designer, assistant game designers, sound creators and usually a producer that is responsible for the team, the budget and the overall process of the development (Irish 2005:41). At larger companies there can be groups with up to 200 people working with the same game project (Irish 2005:1). (Because of this, there is a significant amount of other roles represented in game projects across the world that I have and will not mention in this essay due to space and time).

Some of these teams also have external contractors or auxiliary personnel (Betke 2003:183), (Moore, Sward 2007:213) working from somewhere else with specific tasks, such as creating 200 3D models. (A 3D model is a virtual representation of a character, object or other property in a three dimensional space) (3D Models – Definitions, Examples, Resources). These people are not part of the internal production team, but they still work with the design as they interpret it when they produce assets, or parts, of the game.

2.2 The game and the publisher

“If you are making a game for someone else, you should probably know what they want.” (Schell 2008: 420)

Apart from the internal team and contractors there is usually a publisher responsible for funding the project and doing marketing of the game. The publisher is the development team’s client.
The publisher sometimes belongs to the same company as the game development team, but can also be an entirely free standing company that cooperates with the game development company (Moore, Sward 2007: 669), (Betke 2003:12). At the publisher there are marketing staff and public relations staff that needs to understand what the game is about to be able to sell the game to the customers (Moore, Sward 2007: 638). Another very important reason for a publisher to know how the game will be built during the development is so that they can ensure that they will get what they were promised for the money that they have lent to the developer.

In my essay I will sometimes refer to the publisher as the stakeholder. A stakeholder is in the game industry referred to as the company or person who is affected by how the game project turns out. It is usually a publisher or a company that have invested money in the project. In some cases it can be a private investor. I will only focus my attention towards game projects that have an outside economic provider such as the ones mentioned above (Stakeholder).

2.3 The game design documentation

All of the people that I have previously described have one thing in common. They need to know how the game works. This information is usually covered by the design documentation. The design is formulated by the designer and handed down to the team, the producers and the publisher in form of a design document.

The person responsible for formulating, documenting and communicating the design is the designer, in many cases acting as the lead designer. He or she works together with the producers to inform the team of what the design is about (Pedersen 2003:5).

The main difference between a game designer and a lead game designer is that the lead has a managerial position and are responsible for all design created for the project, whereas a game designer with a non-lead position only is responsible for certain parts of the game design, such as the interface or the gameplay. A non-lead designer does not have any managerial responsibilities in the group. If the game project is smaller there might only be one designer, which in that case makes him or her responsible for the design. The lead designer’s or the designer’s job is to maintain the overall vision of the game and make sure that all people that develops the game understands his or her vision (Oxland 2004:293).

A game design document can be many things depending on where the project takes place. It depends on if it is a small or large project, a startup or experienced company, and so forth. It also has to do with what the designer is trying to communicate and which method he or she finds most suiting for this purpose (Schell 2008:384).

This means that in some game projects there is no design document at all. The information might be handed out to the team in verbal form through meetings. In some projects a wiki is used to exchange design ideas and keep track of the design. (A wiki is a digital database or website).
In some game projects the game design document is a 600 pages long document that is changed along the way as the design is developed further. Regardless of which method people chose to use, the design needs to be communicated to the project team and the stakeholders (Betke 2003:157).

The time for when to communicate the design differs slightly from project to project, but since game development is considered an iterative process the design is expected to be developed continuously during the whole production process. This also means that the design needs to be communicated through all of the production cycle. The production cycle consists of three major phases; the first which is called the pre-production phase, the second which is the actual development phase and the last which is the post production phase. The first draft of the design is usually developed in the pre-production phase (Moore, Sward, 2007:163).

As I mentioned in the introduction, it is not that unusual in the game industry that a game is released after the set release date. The process of making games is far from uncomplicated and many games never get released at all. Very often a game is planned, produced and released as a totally different product than what was intended initially. The scope of the game might not be realistic, the planning might not be sufficient from the start, and the project direction could change multiple times during the process of creation. All of these issues are known problems in the game industry (Betke 2003:25).
3.0 Purpose and questions

The purpose of this essay is to find out which the most common problems in a game production cycle are and if there are any possible solutions or ways to avoid these problems. My goal is to analyze the problems from different angles and establish a deeper understanding as to why they occur and how they can be avoided.

To lead me through this essay I have chosen the following questions:

- Which common and general problems occur during a game production cycle?
- Why do they occur?
- Are there any known solutions to these problems?

3.1 Limitations

The essay will only consider game productions with a stakeholder or an external funder. Since every project is different from one another, there are possible problems that can occur in game productions that will not be mentioned in this essay.

I will only discuss issues I have found commonly reoccurring based on the literature and data I have gathered during the time I wrote this essay.

I will not research or write about the game customer in this essay even though they are affected by the design and decisions made by the production team and stakeholders. My main focus will instead be the people working with developing the games, the business partners and stakeholders directly connected to that group.
4.0 Method

My essay will be based on inductive qualitative data and quantitative data collected through:

1. A survey (quantitative data) that contains questions regarding communication in design projects.
2. Post mortems (qualitative data) written by professional game developers within the game industry.
3. Data collected from books and articles describing methods of design and game design, production planning, communication and group dynamics.

I have chosen three methods to investigate my thesis because the documentation of the internal structure of development in the games industry is scars. I wanted the collected data to strengthen my thesis from as many angles as possible.

4.1 Validity and reliability

4.1.1 The survey

In my survey I asked a group of game developers and game students with different roles, working for different companies, to answer 23 questions regarding communication and design documentation in game productions. The questions that I asked the selection group to answer in my survey were partly regarding communication in form of communication channels and how well they believed that they communicated with others, and partly about which role the design document had in their current game production and in a more general perspective. Some of the questions were pre-set options where the reader only could pick one answer, and some were empty text fields where the reader could write down his/her answer. All questions were mandatory which meant that the reader could not send in the survey with un-answered questions.

The purpose of the survey was to find out more about how people that work in game projects see communication and how communication affects their daily work. The total amount of answers added up to 75.

There are some questions that I have decided to not use in this essay, since I believe that those questions might be irrelevant. The full survey with all questions and answers are found in appendix 01. The ones that I have used as material in this essay are marked in red.

I believe after finishing my analysis of the survey that I should have asked other types of questions than I did. I was unsure of the direction of the survey and exactly what I wanted to know and therefor what I should ask. There were many questions I could not use in the essay since it seemed irrelevant in retrospective. After studying the subject literature more carefully I also found that I had many questions that I wish I would have asked instead, something that I
think makes the survey less useful. I still chose to use some of the data from the survey in the essay because I believe that it provides some interesting thoughts on communication and of how game developers use design documents.

Above all I think that I should have gathered more answers from more people as this would have increased the validity of the survey.

The final thing that might decrease the validity is if people have not been entirely honest in their responses. The survey was anonymous, but there is always a risk of people answering the questions as either how they perceive their situation or how they hope for it to be, and not as it actually is. I also noticed when going through the survey that some of the answers were slightly fuzzy which made it more difficult for me to interpret the answers correctly.

4.1.2 Post mortems

Post mortems is what the designer, team members or sometimes the producer of a game project writes after the game is finished and released. It usually contains a description of how the game production period has worked out, what went well in the project and what did not go so well (Moore, Sward, 2007:626,627).

In the selection of post mortems I have chosen to only analyze those who are major projects. By this I mean that they;

1. Have a team that has at least 6 people per project at once during development.

2. Have an external publisher/stakeholder funding the project.

This is to ensure that all the post mortems has similar conditions. All post mortems are written by professional game developers. All post mortems is collected from the site gamasutra.com.

One possible issue with the post mortems is the amount. The post mortems are a collection of what some people in the industry perceive and believe.

Finally I would like to add that the ideas and suggestions that these people express in their texts are what these selected individuals believed at the time when they wrote the post mortems. Due to more experience and different projects, these ideas may have changed.

4.1.3 Literature and other data collection

To make sure that the information that I analyzed and collected from the post mortems and the survey was analyzed correctly, I have gathered a variety of books that focused on design and the design process. I also collected information from books and research papers that discussed the topics of group dynamics, planning, communication and production planning.
To ensure I would cover as many areas of the problem analysis as possible, I tried to find as many sources as possible. I also aimed at finding literature that was fairly new to not analyze material from a view that might be outdated. All literature that I have used is written in English as the essay is written in that language.
5.0 Theory – common problems in game productions

5.1 Design documentation and pre-production

There are many different ideas about why it is difficult to produce games efficiently and according to plan. One side of the critique leans towards the pre-production phase. Pre-production should be the part of the production when the teams and the management plans the project, creates prototypes, finalizes the design document and prepares for the full team to enter and start building the game (Irish 2005:5). This is rarely how it is done in reality.

“True preproduction would be the distillation of all the game’s requirements, an analysis stage to determine the implications of these requirements, a culling stage to meet the business parameters, and a detailed game, art, audio, and technical design to detail the requirements.” (Betke 2003:26)

This is how Erik Betke starts to describe the purpose of preproduction. At the same page he moves on to criticizing the game industry for continuously reducing the time spent on preproduction.

“Instead, the industry responds to the intense competition by compressing preproduction into the shortest period of time possible.”(Betke 2003:26)

My understanding of this is that pre-production is very much neglected in the industry. The development phase often starts parallel to the pre-production phase, meaning the production team relies on unfinished documentation and a lack of analysis of project demands and target group. This leads to unreliable planning, which in return can lead to confusion among the team members and misunderstandings regarding what the project is supposed to become. The outcome of this might be bad or unfinished games and loss in income for those who have invested money in the project (Betke 2003:26).

A more general view of design and the process of creating a product are described in the book, “Universal principles of design”. The authors identify four stages of development that is necessary to create any product; requirements, design, development and testing. Depending on what type of product is being created there are two main methods for development, the iterative or the waterfall method.

The largest difference between the two methods is that the waterfall method does not allow for any changes of previously completed features of a project while iterative methods rely on continuous testing and iteration of features. The waterfall method is divided into stages that are closed as they are finished while the iterative methods are flexible and encourage alterations and improvements to previously created features (Nayab, McDonough 2012). The iterative process
(Lidwell, Holden, Butler 2003: 78-79) means to identify everything that needs to be done, create a first drafts and prototypes of the different parts, and then re-iterate several times to make those parts flawless (Irish 2005:19).

“Excellent design is usually accomplished through careful research of existing or analogous solutions, active brainstorming of many diverse participants, ample use of prototyping, and many iterations of trying, testing, and tuning concepts.” (Lidwell, Holden, Butler 2003:78)

The iterative process is useful when creating games since game development is unpredictable and risky at its core (Schell 2008:79). Jesse Schell talks of an iterative process that he calls looping, which essentially means to design, test, and iterate again (Schell 2008:80).

What does a lack of pre-production mean for the game design document? The design document can be seen as one of the channels for communicating the design to the multiple audiences being the team and the external stakeholders. It is the manual that the team uses to build the game. When the manual is unfinished or not thorough enough, the risk for a flawed product is greater (Oxland 2004:240). This leads back to the idea that the pre-production phase is essential in a game production.

When a game project turns from being an idea into an actual product, it is not only the team that is going to create the game that needs to understand the vision of the game they are building. The stakeholder invests in the game project so that the developer can afford to build the game (Moore, Sward 2007:236). The stakeholder therefore wants to assure that they get something in return from their investment (Moore, Sward 2007:235). To assure this, they acquire documentation regarding how the game works, how it is supposed to earn money back, and how long it will take to build depending on what type of game it is.

“To establish a budget for the game, the publisher looks at the timeline developed by the producer to determine how much money will be spent on a monthly basis throughout the production cycle.” (Moore, Sward 2007:235)

The budget is set based on the design documentation. This type of design documentation is created and delivered at the beginning of a project, and is called the concept document (Oxland 2004:275.) To follow how the production is coming along the publisher also requires seeing the game as it progresses. This is usually carried out by so called deliveries where the development team sends the publisher a version of the game for them to look at. The deliveries are planned in advance to be sent to the publisher at certain dates, called milestones (Oxland 2004:106). These milestones are deadlines that occur several times during the production. There is usually some type of punishment for milestones that are not met, such as cancelled payment to the development studio (Moore, Sward 2007:669).
“One of the primary reasons for failure to deliver the product on schedule is that game producers begin working on a product before the design is complete.” (Irish 2005:104)

Naturally, a cancelled payment creates extra stress for most development studios since it can lead to that the team working on the game not being paid, or being paid later than expected. As the quote above suggests, this can be prevented with good planning and design written before the team starts working on the game. With this in mind I would like to point out some important requirements for design documents.

The game design needs to be documented form the start of the project to make sure that all features of the game is thought through. If not, the design can become “under-designed” and while in development lead to poor decisions made in rush (More, Sward 2007:269, 271).

Another important thing to understand when it comes to game design documents is that they need to be detailed enough to be able to assist the team in development. A design document that lacks vital information is not useful, nor is it useful if it is not updated product changes. For a design document to be working as a proper tool during the production it needs to up to date (Moore, Sward 2007:355). If not, there will be different views regarding what the project is and should become. It will also be discouraging for a team to read a document that is outdated. To make sure the design document is up to date it should be reviewed continuously during the development time (Betke 2003:127).

Design documents should also be well-organized. The vision should be clearly stated early in the document, and there should be logical sections so that people can easily find the areas they need to read about (Betke 2003:106). If this is not the case, problems with lost vision and unrealistic scope might come about.

### 5.2 Lost vision and unrealistic scope

The vision is the overall idea of what the game should be. The vision is what the team is supposed to aim for when they create the game. It is the designers job to create and maintain the vision and also, with help from the producer, to ensure that the team understands the vision. If the team does not understand the vision the game may become uneven and straggly (Irish 2005:102).

One way of keeping the vision intact and inform the team of it is to document it. If the vision is written down there is always something to go back to and look at.
“Yet good design depends on consistency because users count on consistent approaches to the user experience. Documents that capture that vision, those unifying themes, help remind the people working on the project of the appropriate direction.” (Brown 2011:3)

It is easy both for the designers and the team to track the project through the documentation and thereby ensure that the vision and the actual game are at the same place. Ensuring that the vision is kept also minimizes problems with unrealistic scope that might be a consequence of a lost vision.

“…virtually every game project I know of suffers from a disparity between what the expectations are for the project and the resources and time allocated to the project.” (Betke 2003:17)

As the quote above suggests there is another problem that springs from a failed vision (Betke 2003:24). To make sure that the vision is clear at all times during the project the major part of the planning and the design in a game project should be aimed at determining the vision (Irish 2005:240). The vision is the overall goal for what the game should become and the scope is the volume of how much to put into the game before it is finished. If the scope becomes unrealistic and the game starts growing and growing the scope will become unrealistic.

If the vision that the design is built upon is not carefully thought through and planned, the documents that are supposed to be the blueprint for the project will change so often that the team creating the game will have a hard time understanding where the product is going (Betke 2003:241). This might mean that many of the features in a game will have to be thrown out or totally changed. If this happens the developer might lose control over the design and the game they are creating. One common issue than then can occur is something called “feature creep”. Feature creep is when the project group and the people invested in the project have lost control over its scope (Irish 2005:162). The team keeps adding features to the game, seemingly without consideration for the consequences.

The effect of feature creep is essentially that it eats away time that was planned for other activities such as reductions of technical defects and balancing of gameplay. If continuously adding new features to the game there will not be enough time to test and assure that the game is ready for release. This means that the game most likely will be created under great stress during the end of the project, and the features put into the game late cannot be securely established as interesting, complete and well-functioning (Betke 2003:24).
5.3 Communication issues and group behavior

As many game productions are created by teams I wanted to find out how the teamwork, communication and group dynamics affected the production. I searched for problems that could be connected to these specific areas of the production.

When communicating with others - either person to group, or group to group, there are hindrances to information flow. Selective perception is when the message is encoded and interpreted based on the needs, emotions and motivations the receiver has. This means that the message can become distorted and changed in the mind of the receiver. Language is also an important part of how a person or group receives information. Words can mean different things to different people. This is important to understand since this can lead to misunderstandings and miscommunication. (Robbins, DeCenzo, Coulter 2011:350).

As stated earlier the game project is bound together by several people working together towards the goal of creating a game. Often the group’s internal structure is formed by smaller informal groups within a larger formal group. The informal groups are usually structured by other things than pure work related matters such as shared ethics and values or common interests in the member’s private lives. Informal groups are founded by themselves and are not created by the organization or company (Robbins, DeCenzo, Coulter 2011:268). Informal groups or cliques are not necessarily something negative, but there are some common problematic behaviors that often arise (National Federation of Independent Business - The voice of small business).

One well-known behavior for an informal group can be conformity. Conformity, here, means that individuals in the group adjust their opinions to the dominant opinions of the group. (Robbins, DeCenzo, Coulter 2011: 272). When making a decision regarding a certain feature for example, some members of the informal group can feel pressured to agree with people they actually do not agree with, in hopes of being accepted by the group. In game projects it is vital that the team can communicate in an open way. An interested and effective team likes their game project and is interested in providing ideas and thoughts (Schell 2008:375). A way to avoid conformity can be to create and open atmosphere were the team members feel safe to speak their mind (Robbins, DeCenzo, Coulter 2011:272).

Jesse Schell has nine key rules (Schell 2008:376) to get the group to communicate and interact in an efficient way. Number three at his list is called “persistence” in which he describes the importance of writing things down. The reason for doing this is that it is easy to forget things that are communicated verbally. He also claims that this might reduce the risk for people feeling left out, since if notes are taken at meetings, everyone has the possibility to share the same information even if they were not at site when the meeting took place (Schell 2008:376). In the book “Foundations of management” there is a similar view on written communication that says that it is well suited for more “complex or lengthy” communicational situations. It is also mentioned that one strong benefit with written communication is that is less likely to be
forgotten over time (Robbins, DeCenzo, Coulter 2011:348). When planning a large project, such as a game project that often spans over 12 months or more, it would be impossible to remember all the decisions that have been made during that time.

Another important reason for keeping notes and above all, keeping everyone on the team informed of what is being decided is to avoid master suppression techniques. The master suppression techniques were first identified by professor Berit Ås in Norway during the 70s (Kilden – Information Center for Gender research in Norway). They are mainly aimed towards recognizing equalities between woman and men in hierarchal power structures, but can exist in any work place among same gender team members as well (The center for gender equality, Norway 2001:1). In the master suppression techniques there are five main problems to identify; making invisible, ridicule, withholding information, double punishment and heaping blame or putting to shame (The center for gender equality, Norway 2001:2-9).

The technique that relates to the subject discussed previously is withholding information. Withholding information means that there are people excluded from vital information in a workplace (The center for gender equality, Norway 2001:5-6). As all suppression master techniques can be put into action both unconsciously, (The center for gender equality, Norway 2001:1), one way to avoid withholding information is suggested by Schell, Robbins, DeCenzo and Coulter: keeping notes and actively informing other team members of changes made in the production. This means that updates in the design are noted and written down as suggested above, and all people involved in the project should be informed of the changes.

Another vital step to avoid withholding information is to never have informal meetings out of office, such as in private homes where some individuals might be unwelcome. It is also important to teach people working in projects and in companies in general about this as the awareness can reduce the risk for information to be withhold (The center for gender equality, Norway 2001:5-6).

Furthermore Schell mentions the importance of trust by saying that it is the quantity of communication that matters rather than the quality. He means that trust is built over time and team’s should therefore meet often and talk. Even if the subject of conversation is something trivial the act of casual meetings in itself enhances trust (Schell 2008:378). He also adds that virtual communication in this matter is not comparable since it lacks the nuances of face-to-face communication (Schell 2008:378).

Another risk with communication in general was brought up by Barbara O’Keefe in 1988 when she presented the theory of Message Design Logics (Morgan 2008). This theory describes three different ways of communicating among individuals. MDL is divided into three types of communicators; the expressive, the conventional and the rhetorical (Edwards, Rose, Edwards, Singer 2006:3).
“The three design logics, which are based on individuals’ levels of cognitive complexity, are characterized by different premises about communication, which manifest in messages of varying organization, content, and effectiveness.” (Edwards, Rose, Edwards, Singer 2006:3)

The three logics are based of levels of simplicity in the communication, making the expressive logic the simplest form of communication and the rhetorical logic the most developed. According to the Message Design Logics communication is believed to be goal oriented. This means that everyone that communicates has a goal with their communication. Differentiation of communication between the three areas (the expressive, the conventional and the rhetorical) creates the risk of misunderstanding. This is because each type communicates on different terms, and has different notions on how to communicate. Communication within logic areas is relatively simple, but communication across logic areas is prone to misunderstanding (Hart 2002:3).

The most interesting part of the MDL is that people in normal social interactive situations usually have no difficulty communicating with each other even though they might belong to different message design logics, however when it comes to more complex and varied communicational situations problems regularly arise.

“Complex situations are ones where there are multiple goals, which may be in conflict or inconsistent with one another, that are difficult to achieve. Such “prism” situations draw out these differences in communicators; that is, they splay messages into one of these three categories, Expressive, Conventional, or Rhetorical.” (Hart 2002:4)

Virtual communication can lead to something called Information Overload. This occurs when one person has too much information to take in. This can lead to information being disregarded, misunderstood or simply ignored. (Robbins, DeCenzo, Coulter 2011:351). IO can be an effect of too many communication channels, or too many different documents to read. A person that gets email, uses an instant message channel, have several design documents to read, and also needs to maintain verbal communication is an easy target for IO.

In some companies the need for more than one document is expected for reasons such as that the project is large and has several divisions of design, often meaning that there are more than one group of recipients or more than one contributor to the design (Brown 2011:206). In that case, the information needs to be structured after some type of general standard so that people easily know where to find the information they are looking for. However, it is usually easier to just maintain one document with separate sections for different areas of the design (Brown 2011:205, 207).
6.0 Analysis

61.1 Display of results from the survey

The questions I have chosen to focus on and analyze in my survey are question: 01, 04, 06, 09, 10, 11 and 14. (See appendix 01 for full description).

61.2 IM channels

As the information society grows it has become more common for people to use instant messenger channels, in the essay referred to as an IM channel, to communicate with each other when they work. An instant messenger channel is a program, usually downloaded and installed at the computer, which people then use to talk with each other in real time (Instant Messaging).

First of I wanted to know which software for instant messaging the group used most commonly, and the majority said Skype (About Skype). 55 out of 75 people used this as their primary IM channel when working (Appendix 01, question 01).

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</tbody>
</table>

I also wanted to know was how common it was in the group to use IM channels as tools for clearing out things in the design that they did not understand (Appendix 01, question 14). I asked them this: “I use an instant messenger channel to clear out design questions when I work…” with alternative options to pick that they found most suitting for them.

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>Several times a week (1)</th>
<th>At least three times a week (2)</th>
<th>Once a day (3)</th>
<th>At 10 different occasions a day (4)</th>
<th>Sometimes (5)</th>
<th>Not that often (6)</th>
<th>Other (7)</th>
<th>Not at all (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount (75)</td>
<td>14</td>
<td>13</td>
<td>10</td>
<td>6</td>
<td>13</td>
<td>8</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

The largest group, 14 people, said that they used an IM channel several times a week to clear up design related questions. The next largest group, with 13 people, said that they used it at least 3 times a week and 10 people said to use it once a day. When looking at the numbers I notice that
43 out of 75 people use it at least once a week and 32 people use it more sporadic. Only 6 people claim to never use it at all.

If we then draw a parallel to what Schell said regarding virtual communication (Schell 2008:37), this might indicate an issue. The majority of the people that took my survey use an IM channel to clear up things they did not understand in the design. If virtual communication is not the ultimate way to communicate complex matters, perhaps it will create more problems and more misunderstandings. One the other hand, IM channels are a written media, which means that the discussions people have over the design may become get documented. The fact that so many people seem to use a virtual communication channel to discuss game design ideas also brings up the question of information overload that I mentioned earlier (Robbins, DeCenzo, Coulter 2011:351). If discussing a set of complex ideas in a game project through a virtual media this could lead to that information gets lost on the way because of information overload. This might furthermore lead to misunderstandings among the team members about what the project is about.

6.1.3 Design documentation and communication

Another thing that I was interested in finding out was whether people saw design documents as something useful for learning about the design when they were working (Appendix 01, question 04). The question I chose to ask on this subject was: “I think that design documents are...” 1) A good/effective way of learning about the design, 2) A bad/ineffective way of learning about the design and 3) Other... I got four groups of answers which can be seen in the form below. Number 1 and 2 were pre-defined answers that the selection group could just click on, and number 3 required the person filling out the answer to write his/her own definition.

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>A good/effective way of learning about the design (1)</th>
<th>A bad/ineffective way of learning about the design (2)</th>
<th>Other (3)</th>
<th>No answer (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount</td>
<td>49</td>
<td>5</td>
<td>21</td>
<td>0</td>
</tr>
</tbody>
</table>

In the category other I noticed some patterns in the answers. 11 people found game design documents to be a good and effective way but also said that it depended on the purpose of the document. They claimed that a game design document could be good for delivering certain types of information or that they could be useful in certain phases in a project. 4 people said that it depended on the format of the document.

A document with no pictures or a document that was not updated often enough would be considered an ineffective way of communicating design. This specific belief is supported by Brown who says that design documentation needs to be consistent to be used in an effective way.
2 people believed that game design documents were good, but that they required design to be delivered in other formats as well, for example at meeting in the shape of verbal communication. Brown also mentions that it is natural to change the design during the production time, but that it is vital that the document is alive and updated during that time. The question is not whether the document will change, but rather who is responsible to make the changes in the documentation as the design evolves, and also navigate the team members to read the changed sections (Brown 2011: 229, 230).

I also wanted to see exactly what method of delivering the design that the selection group most preferred. The question was: “When I try to understand the design in a game project I prefer…” (Appendix 01, question 06). They got the following options to choose from;

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>Pictures with text (1)</th>
<th>Only text (2)</th>
<th>Tables with symbols and such (3)</th>
<th>Tables and diagrams (4)</th>
<th>In meetings when someone can explain things face-to-face (5)</th>
<th>I usually have a hard time understanding what the design is about (6)</th>
<th>Other (7)</th>
<th>Total amount (of 75)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>24</td>
<td>0</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

As illustrated in the form above the largest group said that meetings were the optimal way between the available choices. The second largest group preferred pictures with text. Two equally large groups were number 3 and number 4. To have meetings and discuss important matters in the design might be effective if things are written down during the meeting. This is to avoid withholding information from team members that perhaps cannot attend as that in return can lead to people feeling left out or to strengthen power equalities between team members (The Centre for Gender Equality, Norway 2001:5-6).

What is noticeable in this survey question is that there is a fairly large group that claims to think that face-to-face meetings are more valuable when trying to get a deeper understanding of design, something that is supported previously in my theory section in both “Fundamentals of Management” and “The art of game design – a book of lenses” by Jesse Schell (Schell 2008:378), (Robbins, DeCenzo, Coulter 2011:351). Equally noticeable is it that only 24 out of 75 people prefer face-to-face communication when trying to understand the design, a contradictory view to what the authors believe.

Looking at what earlier was brought up regarding spoken communication there might be another problem with face-to-face meetings. If a team gets design communicated in spoken form and
these people would belong to different message design logics, this might mean that misunderstandings about the design might arise during discussions about the design. This is contradictory of the goal of making the design in a game project clearer. (Hart 2002:4)

To further investigate what the people in the group thought about communication in game projects and how communication works specifically when you work with games, I asked the group the following question: “Do you think that communication is more important in game productions than in other industries? Why/why not?” (Appendix 01, question 10)

To summarize the answers from the survey regarding if communication is more important within game productions than in other industries I have noticed four types of answers. I have divided them into four categories: (1) those who believe that the importance of communication should be regarded as equally important no matter what type of industry you work within, (2) those who believe that it is extra important with good communication within the games industry, but agree that it might be equally important in other industries as well, (3) those who believe that it is more important with good communication within the games industry than in other industries. (4) The fourth group is those who did not leave an answer or did not know what they believed.

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>No/equally important (1)</th>
<th>Maybe/unsure (2)</th>
<th>Yes (3)</th>
<th>No answer (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount (of 75)</td>
<td>40</td>
<td>9</td>
<td>24</td>
<td>2</td>
</tr>
</tbody>
</table>

The majority said that they did not think that communication was more difficult in game projects than in other industries. 24 people thought that it might be with motivations such as the following:

“Yes, because everyone needs to know what the end result should be and if this isn't communicated properly time will be wasted on having to redo work that did not meet its standard.”

“Yes cause everyone is working towards the same vision, that changes constantly! Also it involves both Technical and Artistic visions that shall be combined.” [sic]

This leads back to what Erik Betke said about how important it is that everyone in a team are at the same page from the beginning of a project and that a lack of pre-production can lead to problems in this area. I previously described this as the problem with lost vision, leading to lost concept of scope.
To find out more about the view the group had of communication in game projects I also had this question in my survey: “Do you think it is more challenging to communicate within a game production than in other industries? Why/why not?” (Appendix 01, question 11)

I divided the groups of answers into the following categories: Yes (1) for those who claimed they were sure that it was more challenging to communicate within game projects than in other industries. No/equally challenging (2) for those who believed there was no considerable difference between game productions and other industries and Maybe (3) for those who seemed unsure on what they believed. (4) The fourth alternative was for those who left a blank square.

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>Yes (1)</th>
<th>Maybe/unsure (2)</th>
<th>No/equally challenging (3)</th>
<th>No answer (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount (of 75)</td>
<td>25</td>
<td>18</td>
<td>30</td>
<td>2</td>
</tr>
</tbody>
</table>

Communication can be difficult in game development within specific areas. For instance, it can be unwise to hire auxiliary staff to do outsourced programming. The reason for this is the topic above. The amount of communication that is required between the programmers in a game project is massive. This means that there likely will be very difficult to use auxiliary staff to create even a specific part of the game (Betke 2003:185). The user interface is also something that relies heavily on communication between not only programmers, but artists, programmers and designers because of the changing nature of the user interface. A user interface needs to be iterated on many times before it is set and therefor relies on a steady and continuous communication (Betke 2003:189).

Another growing problem with communication within game projects is team size. As the companies grow larger and the games become more complex and the need for more staff is rising. This means that there are more and more people trying to share the same information. In combination with the changing nature of the game development process this can lead to problems (Betke 2003:74).

A more general problem with communication within game projects might be traced back to the Message Design Logics. If agreeing to the notion that people do belong to different types of communicational spectra’s, this means that there are several people trying to achieve the goal of understanding and communicating ideas hence operating under different ideas about how to achieve this goal (Edwards, Rose, Edwards, Singer 2006:3). Game projects often demands that difficult or complex information is transferred between people which according to the MDL means a risk for problems in the communication between people that does belong to different logics (Hart 2002:4).
Another question that relates to how people communicate design is how the people in the selection group got information about the design when there was something specific in the design that they did not understand or needed to know more of. “When I need to understand something specific in the design I usually…” (Appendix 01, question 09). The answers are divided into six categories.

<table>
<thead>
<tr>
<th>Type of answer</th>
<th>Ask a co-worker (1)</th>
<th>Ask the designer (2)</th>
<th>Read in the design document (3)</th>
<th>Work on something else (4)</th>
<th>Create what I believe is right for this specific issue (5)</th>
<th>Other (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total amount (of 75)</td>
<td>8</td>
<td>54</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

This idea is the opposite of what the survey selection group said to believe about how to find information about the design and what it is about. 54 out of 75 people asks the designer directly when they need to know something they do not understand in the design document where 32 people stated that they believe design documents of any sort described in the survey is an effective way to communicate design. Only 4 people out of 75 claims to read from the design document when they need to find an answer to something that has to do with the design. On the other hand a group of people (24) said that they prefer meetings when they did not understand the design when asked about the most preferred way of clearing out things they did not understand.

The result from this part of the survey is supported by the previous assumption by Schell who claims that people prefer to exchange information verbally and in a casual form and not only through documentation or through a virtual channel (Schell 2008:378).

But perhaps the most interesting discovery is that there are in fact so few that actually does read design documents. It is both contradictory to what they claimed when asked if game design documents where an effective way of learning about the design, where 49 people out of 75 people said that design documents were useful. It also partly goes against what most of the authors believed design documents where good for which was unifying the vision and explaining what the game project is about. Even though design documents are not the only way of getting information about the project, they should be used as tools for communication and open up for discussions. They should also help the team to understand the design as the project develops further (Brown 2011:228-231). A detailed design should help the miscommunication that can appear between different work units such as programmers and designers (Irish 2005:105).

This is also a risk if we take the Message Design Logics into consideration. If the designer of a project belongs to a different logic than the people in the teams that are supposed to understand what the designer communicates this will probably lead to misunderstandings. As previously
discussed, game design is built out of thousands of ideas knit together and therefore requires complex information to be communicated. If the person whom is responsible for delivering this information is at a different level of communication than the person who receives the information, the risk of failing to deliver the message is greater. (Hart 2002:4-5)
6.2 Display of results from the post mortems

6.2.1 Scope, bad planning and lack of design documentation

The game “Magicka” by Arrowhead was planned to be created in six months with five full-time developers on the team. When it was finished the developers had been working for 24 months with 8 full-time developers and between two and four part-time developers on the team (Pilestedt 2011:2). Magicka was the first project the company worked on together professionally and they realized late into the production that they had no planning for the development and therefore no clear direction or goals to reach (Pilestedt 2011:3).

The Magicka team worked several hours overtime every week before the milestone deliveries just to end up not delivering what they had promised. This situation caused stress for the team and brought on a constant fear of losing their company completely along with the money that they had privately invested in it (Pilestedt 2011:4).

It is not unusual in the game industry to work overtime to reach deadlines. Many publishers and developers allow and expect unpaid overtime to achieve goals such as milestones (Moore, Sward 2007: 204). Having demands such as that can cause stress for employees which in return can make people perform poorer. When people become stressed because they do not have the time or the resources to do their tasks fully it is called role-overload (Robbins, DeCenzo, Coulter, Mary 2011:228). This type of problem can in general also lead to very high turn-over of staff and poor implementation of features leading to a lesser product (McConnell 1996:207, 208).

Even though Arrowhead had an overall vision (Pilestedt 2011:2) and a driven team, the production delay became massive. This situation is a good example of what can happen when the design and planning is not linked well. Dan Irish says it is important for developers to have a clear sense of what should be in a game before starting to make it (Irish 2005:104). This clear sense should be decided early in development during pre-production so that it is obvious when the project development time starts what the game is about. “Ideally, when the team begins production, all of the goals are clearly defined and the course is set.” (Irish 2005:5)

Although the Magicka team had a vision from the beginning, they did not have a clear plan as to how they were supposed to reach that vision. Nor did they have any tools or methods for planning projects which meant that they could not recognize dependencies (Moore, Sward 2007:226) and they put their effort where ever they saw it needed, leading to many small changes and no prioritizing of the most crucial game features. (Pilestedt 2011:3) Dan Irish suggests a time constrained scheduling model for determining in which order the developers should produce assets. This model only includes how time consuming each task is and which tasks in that case should be completed first. After determining that, the team should move on to do a resource constrained plan to see what each and every task requires in form of skill and
knowledge (Irish 2005:24). This method helps the development team realizing exactly how much work they have in front of them, and thereby enhances the possibility to in time understand if there are features that needs to be cut from the game (Irish 2005: 25).

2K Boston/2K Australia’s game “BioShock” also experienced problems connected to planning and resource demands. They implemented their narrative (the story in the game) very late in the production which caused unexpected implementation problems. (Finley 2008:3) Even though they had created a draft early in development they did not finalize the complete story until much later.

“Competing demands for time and resources meant that, unfortunately, some of the important narrative details of the game weren't created until the final rewrite, and therefore required quite a bit of work to retrofit them into an existing game.” (Finley 2008:3) Also in this situation they might have needed to put a larger effort into looking at what the narrative would mean in the concept of time versus amount of staff to realize early on that they might needed more people or more time to implement the narrative part of the game.

“BioShock” also suffered from the concept of lost scope. They claim to continuously overreach what they were capable of creating in a certain time, and just kept adding staff to be able to make the features that they wanted and needed to meet the deadlines. (Finley 2011:3) Something that might have been prevented if they would have analyzed in advance what each and every feature would mean in terms of effort such as Dan Irish suggests (Irish 2005:240). A problem of this type can also be called “overly optimistic scheduling”. This problem is common in all types of software development and leads back as far as to the 60’s. The issue comes from a desire to create amazing things but taking no consideration to what is actually possible according to time and resources. It usually means over-filled schedules with no room for mistakes of any sort (McConnell 1996:207, 208).

Another game project that had problems with planning and implementing the story were Lion Gate’s game “Black and White”. Peter Molyneux from Lion Gate says that they underestimated how long time it would take to write the full story and the process of writing in went on for some time before they had to hire an outside contractor to finish the job. (Molyneux 2001:3) A game narrative takes time to write because there are game mechanics that needs to function together with the narrative. To make the game design work together with the narrative this process should be started well in advance (Betke 2003:41). In this example we can ones again recognize how the lack of analysis of resources and time has been underestimated which in return gives a negative effect on the development.

Unlike Arrowhead that was a newly founded studio created by a of group students, the game “Deus Ex” by the developer Iron Storm was created and lead by an experienced game developer
by the name of Warren Spector (Warren Spector). The vision of “Deus ex” was developed and iterated on years before the actual game was created and Spector claims that the vision of the game was solid when starting the actual development. (Spector 2000:1). Furthermore Spector also says that one of the advantages with the project was that they had a proper pre-production before starting to create the game (Spector 2000:1)

The problem that the “Deus Ex” team experienced was that even though the goals they had set up where clear and solid, they were not realistic. The design ideas were not realistic and suiting for the tools that the team had and the developers spent too much time creating special solutions rather than general solutions for many features (Spector 2000:4) “The hardest tasks fall to the programmers because they usually deal with the most unknowns when coding.” (Moore, Sward 2007:234) According to McConnell, programmers tend to constantly underestimate how long time it takes to code a certain feature. “Programmers tend to underestimate their projects by 20 to 30 percent.” (McConnell, 1996:210).

An example of what massive technical changes can lead to comes from another project also created by Iron Storm called “Daikatana” which suffered from both financial losses and delays when they decided to retool their game engine in middle of production (Betke 2003:78).

Another example on problems with scope and inability to foresee the project magnitude comes from the company Real Time World and their game project “Crackdown”. Real Time World says to have lost control over the scope after some time into development and that they had to do a complete breakdown of the design to be able to create a plan for implementation. To solve the problem with the lost scope the stakeholders initially decided to hire more code resources instead of cutting features. (Wilson 2009:4) Adding new team members is not always a solution to problems like this. New staff also requires more attention from management to organize and lead. (Betke 2003:74)

Frozenbyte’s game Trine comes with many examples of things that could have been improved. They started off with a long pre-production period of two years. Ideas about what the game would be were developed early by a small group of key people. The initial game concept was small and grew larger when it was time for development. The whole project therefor became re-designed over a weekend. (Hyvärinen, Kinnunen 2009:4)

The Trine team says in their post mortem that they did not have any proper design documentation, no planning, no plan for the programmers and from time to time no supervision of the art team. In previous projects the company had similar problems due to bad planning where two projects became massively delayed, one of them got released two years after scheduled release. Despite this they admit that they made no changes in the way they handled planning or scheduling in the Trine project.
Frozenbyte’s game project Trine suffered from several other problems. Their initial measures of what the game would become did not measure up to anything similar to what they had thought. The budget grew from 30 000 euros to 800 000 euros, causing problems with the stakeholders which in return lead to Frozenbyte financing 2/3 of the game with their own money. The project-planning where inconsistent which meant that they had no control over the scope and many features therefor got cut or were made in a hasty way. The programmers started cutting corners due to tight time limits and too much input. In the end, the release of the console version became delayed which meant that the marketing was unsuccessful and they sold less than expected.

Looking at the previous ideas about how a game project should be executed to minimize issues, Trine is a great example on what not to do. Just like More and Sward says, the design should be the foundation of any game project, a needs to be finished as a first draft in the beginning of a project. (More, Sward 2007:269, 271). The Trine team did not have this foundation which might be one of the reasons for failure. As mentioned earlier, the budget of a game project is determined by what the design says about the project (Oxland 2004:275). Also this seems to have been a major problem in this development. The amount that was initially decided varies hugely from the number that the company ended up spending to make the game.

6.2.2 Communication and group dynamics

Going back to a previously mentioned project, “Deus Ex”, we find that they also experienced some communicational issues. The design was initially decided to be made by two separate teams. The two teams were given the task to design parallel to each other with two design-leads responsible for each team. In the end the two groups got merged together and only one of the lead designers kept its role. This situation could create a growing ground for role ambiguity and problematic group dynamics.

“Fundamentals of Management” describes role ambiguity as when a person is unsure of what their role is in a project and therefor becomes uncertain of what he or she is supposed to do (Robbins, DeCenzo, Coulter 2011:228). The result in this case was two teams with a great deal of tension between them that the management could not handle. (Wilson 2009:4)

“Crackdown” experienced an issue that I would describe as a discrepancy between what the development believed was right for the game project and what their stakeholder believed was right for the project. As the developer signaled that they needed more developers on the team, the stakeholder disagreed. The stakeholder did not believe that the game had reached up to their expectations at that moment, and the developer felt that they needed more staff to proceed on working. It took the developer near about a year to convince the stakeholder to hire auxiliary
personnel. At this point the developer had been assigned a new producer from the stakeholder side that met their requirements. (Wilson 2009:4).

There are several things that come to mind when reading about “Crackdown” and they all relate to the foundations of communication. It is difficult to know exactly when and where the miscommunications between the stakeholder and the development studio started, but one could interpret the situation as that there seem to have been different views about how much the developer should deliver in a certain period and exactly what quality the deliveries should be at. Language is the foundation of any communication, and like I wrote before, things mean different things to different people. I also think it might have to do with selective perception. The Stakeholder and the developer are in different situations, with different experiences and expectations (Robbins, DeCenzo, Coulter 2011:350). Stephen Barker and Rob Cole also mention the importance of leveling with the client in their book “Brilliant project management”. When a game developer works with a stakeholder, the stakeholder often have demands and therefor functions as a sort of client for the game development studio. Barker and Cole says that it is important to clarify early on in a project what the so called “big picture” is, so that misunderstandings later on can be avoided (Barker, Cole 2009:16).
7.0 Conclusion

I would first of all like to revisit the questions that I asked before writing this essay; what are the most common problems in game productions? Why do they occur? And, what known solutions are there for these issues?

The first issue that I can conclude being a common issue in the game industry is the lack of foundation that is the game design. There are several examples of projects above that has unfinished design even in the midst of production. Despite that many of my sources points out the importance of a clear and thought through design as one of the most important demands for a functioning game production, many of the projects I have mentioned in this essay seems to suffer from the lack of it.

The result of this lack of design seems to lead to several problems where one stands out more prominently. Bad design or no design leads to uncertain planning. When the planning is insufficient the following problems occur; the people involved in the game productions are unsure of what to focus their effort on and the people who are paying for the game projects to be developed are unsure of what they will get and when they will be handed their assets. This, to me, seems like a negative spiral where the stakeholder wants to have the product delivered in advance, which in return leads to cuts in the pre-production resulting in that the people developing the games are forced to take short cuts of fear of not delivering a product.

As to problems linked to communication I can distinguish some different possible scenarios. The lack of design gives no sense of direction to the team members. This can lead to stress connected to the inability to clearly communicate what the game is supposed to be, creating an environment where some team members will develop what they believe should be developed instead of what should be. This might result in a product that is broken. The solution for this problem would be as discussed before, a more solid design. The design should never be compromised because of time pressure or similar since this will only lead to more problems and greater time pressure further down the line.

There is one contradictory view that I have found that regards verbal versus written communication. Many of the writers claim that ideas need to be written down and that it is important to keep the design document in written form and updated. On the other hand, many in my test group seemed to prefer the information communicated in verbal shape. Perhaps these two are not contradictory to each other? Perhaps it is more a question of balance between the two. If there is a solid, updated design document, it will be easier for the designer to hold the team updated through meetings as well. He or she has the ideas well documented and discussions and meetings can then take place under more structured conditions.

Another possible communicational issue comes from the stress of performing. As we can see, deadlines in game productions often get very slim due to bad planning. Bad planning leads to
over time which in return could make team members in game productions of this sort afraid to make mistakes since mistakes might lead to even more delays. Therefore, the work climate might feel closed and people could be less reluctant to speak their minds and enjoy their work. When people are in this situation their productivity might decline as they feel less involved in the company and in the project they are working on. This negative spiral could also be reduced if the design was better defined since this would make the planning more sufficient and it would be easier to then create realistic deadlines.

There is also a risk of creating a flow of false information back and forth to the stakeholder if the developer is behind schedule. The developer is at risk of losing their funding if they do not deliver in time, which may cause them to lie about the actual status of the project. As we can read above there are even examples of companies that has lost their funding and ended up investing large parts of their private funds to be able to survive. This is not a good foundation for open communication between business partners. A problem here, as I see it, is that some publishers seem reluctant to let developers have an accurate post-production, possibly since it is hard for the developers to show what they are producing during this time period since it is less focused on asset creation and leaning more towards planning and prototyping.

My final conclusion after having read through my essay is the following. Game development is built upon a chain of stages or requirements necessary for each following one to be fulfilled. If one of the stages is not completed or fully worked through, all the following will suffer and the game production will be flawed. The flaws that can arise are such things as delays in production, misunderstandings between people involved in the game production, sloppy or unfinished work, unhealthy or stressful work climate, bad communication between team members and a lesser final product than intended. These are all unnecessary problems that can be avoided with better planning, structure and communication amongst those involved in a game production.
7.0 Sources

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7.2 Electronical sources

7.2.1 Post mortems:

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   Collected: 2012-08-25
3. Molynieux Peter, 2001
   *Postmortem: Lionhead Studios’ Black and White*
   Collected: 2012-08-25
   *Postmortem: Ion Storm’s Deus Ex*
   Collected: 2012-08-25

5. Wilson Phil, 2009
   *Postmortem: Realtime Worlds’ Crackdown*
   Collected: 2012-08-26

6. Hyvärinen Lauri, Kinnunen Joel, 2010
   Postmortem: Frozenbyte’s Trine
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**7.2.2 Other electronical sources:**

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   *Blizzard acknowledges “Further issues” could drop in ‘Diablo 3’, details future*
   [http://www.thewerge.com/gaming/2012/7/19/3169447/blizzard-acknowledges-further-issues-could-crop-up-in-diablo-3s-future](http://www.thewerge.com/gaming/2012/7/19/3169447/blizzard-acknowledges-further-issues-could-crop-up-in-diablo-3s-future)
   Collected: 2012-09-02

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