

The Game Development Conflicts According to the Game Industry

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Abstract

The growth in the game industry was never so evident, what has motivated many studies on the various areas involved in the task of creating such products. Some of these studies reported problems in production processes that generate losses, dissatisfaction and can be a barrier to the industry success. We note that one of these problems are related to conflicts between the pre-production and production, for which the literature does not provide adequate answers production. Our aim in this paper was to identify such conflicts from a reflection on the study of literature and interviews with industry professionals. Our understanding is that there is a mismatch between what the academy indicates as needed and what the industry really needs.

Keywords: Game Requirements, Game Pre-Production, Game Methodology

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1. Introduction

In the last two decades, the games industry went through a notable increase in revenues [ESA 2012], however, despite the numbers, many argue that the industry is experiencing an advance unsustainable [Macedo and Rodrigues 2011], which involves an increase in production costs, publishers of unauthorized charges, breach of studios and diminished the developers' quality of life [Potanin 2010].

Moreover, studies of Gamasutra [Sheffield 2009] indicate that the problems in the industrial development of games remain the same of ten years ago, revealing a lack of maturity proved by the industry [Petrillo et al. 2009] in their analysis of documents postmortems in the game development field.

The pre-production phase, which consists of tasks like creating the game concept, the Game Design Document (GDD) [Harris and Adamo-Villani 2009], the project planning and other artifacts was pointed as part of the problem. In fact, according to Callele et al. [2005] the generated artifacts are not sufficient to assist the development team during the production. This situation creates conflicts and yields a bad integration between these two stages as we already pointed out previously [Machado 2009].

Indeed the GDD the main deliverable of the pre-production stage often have different no standard in terms of content or format [Schell 2008]. This

generates conflicts. For instance, either the documents are extensive and difficult to read, or they are too simple and misunderstood.

We observed that in the Cinema industry, there is a great investment in the pre-production [Kellison 2008] where the generated artifacts are capable to serve as a precisely guide of what will be necessary to do to finalize the production and deliver a film. But in the game industry, we could not see such effort in the pre-production stage [Machado et al. 2011] and its objective and the set of artifacts that it must generate to guide posterior steps are not clear.

Given this context, this paper reports an investigation on the problems that occur in the transition between pre-production and production of games, more specifically on the problems related to the elaboration, interpretation and evolution of the GDD.

The ultimate goal of our research is to propose solutions that can mitigate such conflicts.

2. Conflicts (within and) according to the literature

There is no literature putting together, in an organized and systematic list the conflicts between pre-production and production. In this section, we will gather issues raised by different authors. As it is shown, there is no consensus nor regarding what should covered in each of these stages of game development neither on the standardization of the GDD with respect to format and content.

According to Rouse III [2001], the GDD is a tool used in the development of digital games as the main form of communication record of ideas, concepts and descriptions of its elements. However, also according to Rouse III [2001], the effectiveness of this tool is questioned arguing that many game designers cannot fully express the concept through a document.

In reports obtained with professionals, both within Brazil and internationally, this document is not even read. When asked about their activities, the Game Designer Lang [2009] reports: "I write documents that nobody reads." This fact can be observed for two main reasons: the documents are arranged such that the relevant information is difficult to access or that the designers write more than they should.

2.1 The "starting" GDD

The search for the ideal tool to construct a good GDD is an evident concern in the literature of game development [Cook, 2011; Lang, 2009; Moura et al.,

2010]. With the right tool, formatting, use, alteration, insertion of images, queries can become more dynamic and easier, thereby maximizing the potential use of a document and securely providing greater cohesion in the team running the game. But is there an ideal tool?

For Rollings and Morris [1999], a game design document will never be complete by its nature interactive and dynamic. Is proposed then the Wiki format as the most suitable because of its version control and it is easily accessible to all involved in the project.

Lang [2009] raises some negative points about this model like editing not as simplified to any type of user, you have to learn wiki markup, difficulty of printing the entire document, difficulty in importing tables and images and still can not use external links.

The tool most frequently used by the community of game designers is without doubt the simple text editor such as Microsoft Word. And what would be the reason? Because almost every personal computer has a text editor, it is easy to use and we already know how to use. The problem with this format is because usually the game design documents become massive, with hundreds and even thousands of pages, so this file becomes too large to email or even to be loaded [Lang 2009].

Another big issue is to find the information that you want, even taking advantage of the search function of the program itself. Further many people cannot edit the same document simultaneously. At this point it looks like the Wiki, where various documents are grouped together into a single, easy handling, but he remains a huge file.

In an effort to join two different forms of presentation, flowboard offers an interesting solution. This model, as its name suggests, attempts to be a junction between the flowchart and storyboard [Rollings and Adams 2006].

The storyboards are linear documents used by the movie industry to plan a series of scenes. As for the flowcharts are used by programmers to document an algorithm. A flowboard seeks to unite these two concepts to document the structure of a game.

Although it can be created editing software and screenflows such as Visio (Microsoft) and OmniGraffle (Omni Group), the authors show that it is easier and faster to create in a series of papers and fixed in a wall. Each sheet of paper is used to display a game screen or an aspect of the current game mode. On its top, it should contain the screen name. Then, in the center of the page, draw a quick sketch of this screen, showing perspective and interface items present there.

You should leave some room around the edges to make notes about their operation to be written or demonstrated there as text, information, commands, challenges, etc. This sheet must connect to another by arrows indicating that will guide the flow of the game.

Insertions are easy to make, however, depending on the size of the project, it may be difficult to understand the entire vision of the game.

2.2 GDD Maintenance

There are still those who believe that the specification document is part of only one stage of production of the game, but then must be discarded. Winget [Winget and Sampson 2011] describes in his article Game Development and Institutional Documentation Collection Development Policy "...in the later phase like vertical slice, moving up toward production, the GDD is less important. It's a repository for ideas for why we wanted to do things, for the philosophy of why we wanted to do them, but as they get moved into the game one at a time and/or cut, the GDD becomes less relevant and the game itself is the document".

This approach atypical of most other conventional forms, as well is used by industry today. In reports provided by professionals (discussed in the next chapter), some companies do not even avail themselves of any documentation, but in such cases other factors must be taken into account as culture, exclusive dedication to just one particular project and deadlines. One of the major problems of documentation in Game Design is that it is in constant development and evolution. Brathwaite and Schreiber [2009] call the GDD a living document and that reveals the full picture of the game by the team. The form of the document must conform to the team and not vice versa.

Some teams then prefer to make use of agile methodologies that do not extensive use of written artifacts. These methods found in AgileManifesto.org are widely used by teams of software for various purposes.

Still searching for an alternative and fast solution but keeping the idea that the game design documentation is made still necessary, the game designer Daniel Cook [2011] proposes the Design Logs. Quite objectively, the concept of the game is written between 2-10 pages, containing enough images, text and inspiration for the development team understand the overview of the game and can develop a first prototype. When this is created, is added every day in the log what are the next steps for the game to evolve its primary idea. The author asks the question at each new iteration: "How to improve the game from its current state?" Thus, every two or three days, the team returns to this log, see what was done, check if there is something not done as desired and plans which will be the next idea to be implemented.

In terms of tools, the Design Logs adapts to the usual tools of communication as free conversation, emails or activities listed in table or wall.

2.3 Postmortems

As the game industry tends to be quite enclosed and there is great difficulty getting to GDD research, the use of documents known as postmortems ends up being a good option. The game analysis through these documents is widely used in digital game development community. This use can be seen by the large number of articles and journals published in this subject¹.

A study developed by Petrillo et al. [2009] from publications of postmortems games on the website gamasutra.org had the objective of identify a set of critical factors and a set of good practices that could guide future productions. The author made an analysis of 20 documents, using as the only criteria that the document belonged to a finished game. The critical factors were drawn from the analysis of discourse in the "what went wrong in the project" and good practices were drawn from the same type of analysis in the "what worked in the project." Although interesting and useful, the study may have some errors in the results, because many of the games shown were produced in very distant times and consequently in different contexts. An analysis considered such points could be even more accurate diagnoses. Also, why not study the documents of not finalized games? will the production troubles that led to such status have nothing to teach the games industry?

Another study about postmortems was done by Sheffield [2009] based on articles published in Game Developer magazine, from 2006 to 2009 revealed some common flaws in game development, including some that are clearly related to the lack of an escalation in step pre-production, such as the lack of a document that communicates well the whole team, problems of scope to add new features not present in the document, no game designers on the project full-time for questions related to the concept of the game and lack of technical documentation for existing profiles in the team. These flaws are pointed out from carelessness in pre-production games.

¹ Several of these articles can be found on portals such as: www.gamasutra.com, www.gamecareer-guide.com. And in magazines such as Game Developer (<http://www.gdmag.com/>) and Casual Connect (<http://casualconnect.org/magazine-archive/>)

3. Methodology

As observed, a great amount of the related works are about the elaboration of a game design document.

Many formats were described and practically for each solution developed by a particular approach, a new problem raised immediately. By considered the practical results revealed by [David Callele et al. 2009; T. L. de A. Machado 2009; Souza 2009; Potanin 2010] we could note that the communication problem in the proposed document can not be only on the document itself, but in the entire pre-production generating conflicts between this phase and the posterior game production. Understand these conflicts and its problems, what defines the division between the pre-production and production, find what are the painful tasks in the game process and consequently what are the solutions encountered by the industry are our goals.

The methodology of this present study considered the following question: *What are the conflicts faced by the current Game Industry between the pre-production and production stages?*

In this section we present our methodological considerations to reach this answer and we intend that

to reveal an Industry diagnosis about the current problems and solutions faced by game developers.

3.1 Subjects

Twelve participants collaborated with this research, they are members of the Game Industry and employers of five different Game Companies.

The average age of the participants is about twenty nine (29) and the years of experience in the Game Industry is about seven (7). We were interested in pursuing a global view, but depth in details to reach a great variety of practices and stages in the Game

Production Process utilized. So we focused in four roles: Producers, Game Designers, Artists and Programmers.

3.2 Case Studies

Our research's participants were employees of different Game Companies which develop different kinds of Games, from Casual to AAA titles.

According to these characteristics we adopt the protocol of Case Studies, cited by Yin [2008] as one of the principal tactics to increase the research's reliability. According to the protocol, this is a Holistic Multiple-Case study. Holistic, because was considered an unique unity of analyses, the Game Development Process. Multiple-cases, because were considered different companies.

3.3 Semi Structured Interview

Based in the Related Works, presented in the previous section, we defined a small set of issues for a number of semi-structured informal interviews; these interviews were answered for Producers, Engineers, Designers and Artists in their own workplaces.

The objective was to extract opinions regarding how are the principal problems, necessities and practices faced by the Game Industry, especially consider alternatives to solve conflicts surrounded the Design and Development stages.

The Semi Structured Interviews followed a script of questions, but was freely conducted due to the conversational possibility allowed by the technique as described by [Merriam 2009; Runeson and Host 2008].

The case studies was conducted during one month, the interview sessions had an average length of twenty minutes. We utilized an audio recorder to register the sessions and provide an easy posterior transcription.

3.3.1 Narrative Interview

Many of the questions of our Semi Structured Interview could be better answered as a narrative, we considered use this technique as an alternative to approach the subjects experience regarding the several issues discussed in the script interview or brought by the participants during their sessions.

3.4 Procedure Analysis

Our Procedure Analysis was generated from the text transcriptions of the interviews discussed in the previous section. We used the Codification Theory, which consist in generate conclusions in a clear and systematic form from the collected data [Runeson and Host 2008] to be codified into categories which help the researcher to develop a based theory [Flick 2004].

3.4.1 Qualitative Content Analysis

The Qualitative Content Analysis is considered as a classical procedure to analysis text materials, which varies from media products to interview data [Bauer and Gaskell 2000], one of its principal features is the categorization, normally originated from theory methods like Codification theory. Despite others approach, the main objective in this analysis is to reduce the material [Flick 2004]. This proposed reduction helped our analysis process, because we needed of a quick and easy way to manage the gathered data.

We followed a small set of steps defined to conduct this approach [Mayring 2004], that consists in: material selection (in our case, the transcribed interviews), analysis the situation which the data were collected (participants, how the material was produced, etc.), describe the material in a formal manner (how it was documented and edited), direct the analysis (included what interpret from it) and define the analytical units (the atom unit of the material to be analyzed and codified).

3.4.2 Qualitative Analysis Supported Software

To help us with the process of analyses the text materials, codifications and categorizations we utilized the ATLAS.ti [ATLAS ti 2012] free trial version [Figure 1]. The software provides a series of functions to facilitate the navigation into transcribed materials, organize the codifications, categories and allow the use of query functions.

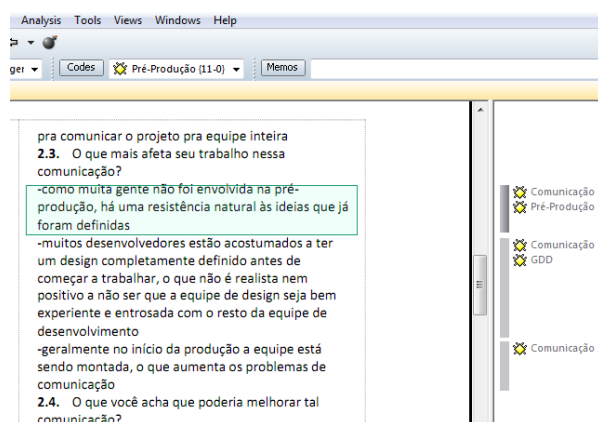


Figure 1. The text material (left) and the codifications (right) related to its contents showed in the ATLAS.ti interface.

4. Results

As said in the previous section, we applied the Qualitative Content Analysis in our transcribed text interviews. This material was codified into categories [Flick 2004], the categories in our research represented aspects of the problem contained as a cause or consequence in the research question.

We will present our main considerations in the next subsections, each subsection reflects one of the principal conflicts that our participants are facing in their process or practices that they adopt to solve them.

The speech of the participants will be showed as quotations to reinforce our considerations.

4.1 Game Pre-Production

The Game Pre-Production generated comments with lots of differences between the participants, below one of them discussed that the gap between the pre-production and production is hard to identify and changes according to the projects.

"The pre-production is: brainstorm, concepts, prototyping... of everything: Design, Art, Programming... But, its end is unclear. You have to think that every game project is an unique case."

Another participant listed all the tasks and artifacts that are present or generate during his pre-production.

"Our pre-production is about define a Game Concept, an Art style, a technical architecture, platform and technologies, develop prototypes to prove project particularities, crew, market analysis, single page Game Design Documents, scope and schedule estimations"

Of course that to produce and to work in all the tasks and artifacts listed above, a considerable investment has to be employed in the pre-production. Below, another participant gives us more ideas about the time and investment made during his pre-production.

"Our pre-production is about three to nine months and during this time we planned the game concept, we have a team responsible for the game story, they are part of the game design team. Their main objectives is to prove through prototypes that the game mechanics works into the game context. For the programming team it is a bit different, we define a lot of technological requirements to create a production environment and we define how the elements we need to buy and what elements will be build in-house."

Meanwhile a participant claimed to have more time and investment in his pre-production to develop games with better guarantees.

"We need of more time and more specified data in the pre-production, we work with a lot of information"

explained in general terms. It is insufficient to produce a study about the team efforts needed to complete the game."

4.2 Game Design Documents

We observed that the Game Design Documents continues to be a non-standard artifact in the industry.

Many of the main conflicts of it are the same that was discussed in Related Works or Introduction sections, the participants mentioned that is almost impossible to generate a document which treats all aspect of determined kinds of Games and expect that all team members will read it.

"The Document, depends of the game, can be a huge document! So, it can be a wasteful of time to read it..."

And even when it is read, the team is not safe from future problems. The conflicts of comprehensions affects teams and clients.

"Both client and team project facing conflicts in certain aspects that weren't clarified since it starts. The fact that is written in a document don't give a guarantee that it will be read and that all will have the same product view."

4.3 Alternative Ways To Document A Game

Considered what was mentioned in the 4.2 section, we see that one practical utilized by some of the interviewees is not to concentrate all the info in a single or in small set of documents.

One of them uses a single page of Game Design Document always that a new stage of development starts. This page contains the instructions to be followed by its responsible in the current development phase.

"...we use a single page of Game Design Document to all game modules (...) we defined what needs to simplify on it due to the team capacity and to reach the priorities like release date..."

Another participant explained that he worked with the traditional Game Design Document, but he becomes reluctant because he considered it difficult to be maintained.

"We followed the traditional structure of a Game Design Document and it was very difficult to maintain due all the changes that the Game passed in our process, principally because we hadn't a person in the team allocated with this specifically task"

The solution pointed by the same participant was find with some research in alternative Game Design Document models.

"We are using a model, called Game Design Logs, that was created to support the 'live format of a Game Design Document' and it has been very productive to our current projects. All the documentation is made by short logs with short details and distributed by all the team, everyone can see the changes in real time or by a project timeline. So it has been very simple and suited to many of our necessities, principally in maintain a Game Design Document... Before it, the Design and the Game (in development) were always asynchronous."

Other participants emphasized that the Game Design Documents must be objective and must allow the team to easily define the work according to the team areas: Design, Art and Programming.

"The team is divided basically in three views: Game Design, Art and Programming. So we needed to think in elements to represent these areas... Here, we divide the work according to these views..."

With this approach, a team member can consult only the areas of his interest or the entire document if it is his preference.

4.4 Communications

Communications was one of the most common problems cited in small and big teams. The multi-disciplinary environment of a Game Production is a natural place to generate lack of communications between members of different disciplines [Barros 2009], but we surprised that it occurs even between members of the same team.

"It happens sometimes that the art leader don't have experience with the tools..., so, sometimes we need to have an orientation about to make something with the tools and he can't provide us..."

In the quotation above, a participant mentioned that is natural in his tasks communications problems because the artists and the art leader do not talk with the same technical terms that the tools they utilizes.

4.5 Prototypes

We could verify that prototypes have influence the Game Process in small and big development teams. It is used to a several number of tasks as declared one of the interviewees.

"We use prototypes for everything: for art, design, programming... It makes that we can find ways... and shows the way that the project is going."

Another participant informed that the use of prototypes promoted dramatic changes in the company's development process, below he talks about the team experiences without prototypes.

"We had a Gameplay team, so we observed that our process was 'head-over-heels' in the sense that if an artist wanted to make a spider he made a concept, modeled and delivered to the Programming team. Then the programmers noted that the spider is bigger than the space in scene reserved to it... Because of this problem, we had to do everything again: concept, model, deliver and program. It was very closer to a Waterfall Model"

In the next excerpt he relates the changes and benefits that the uses of prototypes brought to the development process in the company's teams that he works.

"After experiences like that, we started to work together. Both teams, Gameplay and Programming, develop many prototypes and we use boxes to simulate heads, legs and so on... for example. So we doing rustic animations, but we can prove that our ideas will work. Then, we stop to create documents to explain how the Games should be, we now develop prototypes and show how the Games should be. It is a practice that reduced our documentation process and let the things very simple to be specified and accomplished".

4.6 Fundamental Game Requirements

We asked the participants to imagine a scenario where were a super computer with a great level of intelligence and capable to write any kind of software. The only thing that it needed was a short conversation to gather the requirements to build the specified program.

After this imagination exercise, we asked the interviewees what they will specify (in a short conversation) to this computer if they want it to build a new game. The answers listed below help us to understand what can be the fundamental requirements to create a Game.

"I will focuses in let clear the basic mechanics, the game objective, the art style, the plot – the game is set in an apocalyptical world... - specify the conflictions' moments, the music..."

"Mechanics, line art and the sensations that the game must pass to its players"

"I think it is important to define the game concept, the gender, do market analyses... and define where the game can win... After that it is important to prepare game prototypes, a story and successive iterations to test the gameplay."

"The ideal is to specify the public. From a public X, research what are the best game mechanics which have a good appeal with this public".

"Whatever I was talk I will focuses on feelings, because I think that the main objective is to pass the correct feeling".

4.7 Necessities

As showed in [Kujala and Kauppinen 2004; Kujala 2002] a good way to find solutions is to face your necessities to discover what are your real problems. Based on it, we asked to our interviewees to answer what are their main necessities. Below, we listed some of necessities that we considered representative of our main question.

"I feel the necessity in terms of a more practical document than the Game Design Document, because it contains a lot of text, then it is easy to forget something. Maybe, I believe that would be more interesting to have something related to a checklist."

"The main problem is the amount of iterations that we have to do in our development process... Basically, you have to do changes all the time..."

"One of the problems that are more common is the scope management, because delays and changes always can happen. So you have to cut things and decide what will have less impact. If the change happens in a racer game, for example, you have fifth cars, but only twelve can be part of the final release. What cars will you cut out? What car has the best appeal with the players? These kinds of decisions made the scope management, one of our biggest problems."

5 Findings summary

We consider that the obtained results can serve as a preliminary industry diagnosis of the current challenges and practices adopt by game developers, in the following subsections we present our main considerations.

5.1 Pre-Production Investment

We could see that the Pre-Production issue generated a lot of discussions during the interview. We observe by the answers that the principal objective of this phase is to develop The Game Concept, which is much more simpler than the GDD. It was widely cited by professionals of small and big companies. It was a surprise considering that the Academy has a lot of efforts in produce the GDD as the principal artifact during the pre-production (section 2).

One of the participants, a member of an AAA company declared that its teams needs about three to nine months of pre-production in which one of the principal tasks is to define the game concept. Members of small companies also answered that the game concept is one of their principal activities during pre-production, but they are worried about the investment made in this stage, principally related to available time, considered insufficient by them.

5.2 Game Conflicts, Emotions and Feelings

We could note that the participants mentioned words like 'conflicts', 'sensations' and 'feelings' in a special context during the interviews as explained in section 4.5. Their comments about what information a super intelligent computer needs to build a game let us reflect about how that emotions are treated during a game development process.

Roughly, we can treat them like Non Functional Requirements and a lot of interesting works were done in this area [Callele et al. 2009]. But, in terms of specify a game project, we have not observed a great effort.

It is a common sense that Design, Art and Programming are the key tracks in a game project and many of the participants let it clear. All of the interviewees mentioned that they use Scrum to manage their projects and divide the tasks into these areas, but the tasks are always explained in technical aspects, in general: Design tasks describe rules and mechanicals, Programming tasks describe algorithms and functions and Art describe appearance and animations. As the participants suggest in section 4.5, the feelings, sensations and conflicts must be explicit when the game features are described. Since Scrum has a wide use, perhaps what can be done is a study to identify how the industry professionals intend to manage the records and associations of these emotions, feelings and conflicts with the game (functional) requirements.

5.3 Game Feature Management

As we observed in the section 4.7, the participants mentioned the number of iterations like a problem in their process. In fact, agile methods used by the visited companies provide more flexibility [Flood 2009]. But, as our interviewees said the changes happens all the time, what implies in a difficulty management of the game features.

These changes has a potential to affect the three main areas (Design, Programming and Art) and because of it a great amount of details can need to be discussed and refactored iteration over iteration, what can be even more dangerous in projects with a great scope. To find a solution for this problem we suggest further studies to understand the current best practices in agile methods for game development and how to manage the information's scalability over the iterations in a game project context.

5.4 Code vs. Document

A very important discussion that emerged from the interviews and supported by one respondent who works in a leading game development studio, that develops multiple AAA (triple-A) titles, is that the code of the game serves as a document, and even more it replaces the GDD.

The construction of prototypes, or even functional parts of the game becomes a tool in some cases much more expressive to communicate what the team should

construct. The documentation of the game is the game itself seems to be becoming an exit to the lack of standardization of traditional GDD and giving a better use of what is "documented".

With the appearance of that new scenario, we can think in unanswered questions, like: What are the consequences of not having a traditional GDD? Is it actually beneficial? How the project's tracking change is communicated to the team? And if the development team changes, how the new members would understand what should be done?

5.5 Academy vs. Industry

During interviews and analysis phase we observed divergences between Academy and Industry. What is seen, as a necessity by the academy is not faced by the industry with the same relevance. One example is the GDD. While a number of texts intended to propose formats to create it and adapt it to different teams, respondents from large and small companies state that the use of a GDD in their processes today is practically nonexistent and the main artifact in a pre-production phase is The Game Concept. It led us to think if a GDD is really necessary.

Another divergence is that there is an idea in Academy of a pre-production stage capable of describe every detail of any purposed game, which will let it simple to iterate in a production stage. However, the interviewees, by their narrated practices, refused to adopt this idea considered it expensive and unrealistic.

6. Conclusion

This work dealt with conflicts between the pre-production and production of games. To identify such conflicts and problems arising from them, we conducted interviews with industry professionals who shared their experiences and some practices.

As future work, we recommend further research on this issue because we found some differences between what says the academy and what the industry really needs. In addition we would like to evolve the discussion "Game as a document" because in some cases in the study was informed that the game in production explains better than any GDD.

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References

- ATLAS ti. 2012. Available at: <http://www.atlasti.com>.
- BARROS, R., 2009. *Investigando equipes Multidisciplinares em projetos de jogos: uma pesquisa qualitativa*. UFPE.
- BAUER, M.W.. AND GASKELL, G., 2000. *Qualitative researching with text, image and sound - a practical handbook*, London: Sage.

- BRATHWAITE, B. AND SCHREIBER, J., 2009. *Challenges for Game Designers*, Paperback.
- CALLELE, D. AND NEUFELD, E., 2005. Requirements engineering and the creative process in the video game industry. *Requirements Engineering*, pp.240–250. Available at: <http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=1531045> [Accessed May 27, 2012].
- CALLELE, DAVID, NEUFELD, ERIC AND SCHNEIDER, K., 2009. Augmenting Emotional Requirements with Emotion Markers and Emotion Prototypes. In *2009 17th IEEE International Requirements Engineering Conference*. IEEE, pp. 373–374. Available at: <http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=5328497> [Accessed August 3, 2012].
- COOK, D., 2011. Game Design Logs. *Lost Garden*. Available at: <http://www.lostgarden.com/2011/05/game-design-logs.html> [Accessed July 15, 2012].
- ESA – Entertainment Software Association. Available at: http://www.theesa.com/facts/pdfs/ESA_EF_2012.pdf.
- FLICK, U., 2004. *An Introduction to Qualitative Research*, Sage Publications.
- Flood, K. 2009. Game Unified Process. GameDev.Net. <http://www.gamedev.net/reference/articles/article1940.asp>. [Accessed July 18, 2012].
- FLYNT, J.P., 2004. *Software Engineering for Game Developers*, Muska and Lipman Publishing.
- HARRIS, L.V.A. AND ADAMO-VILLANI, N., 2009. Effects of culture on the pre-production design of the HIV Game. In *ACM SIGGRAPH ASIA 2009 Educators Program on - SIGGRAPH ASIA '09*. New York, New York, USA: ACM Press, pp. 1–9. Available at: <http://portal.acm.org/citation.cfm?doid=1666611.1666616> [Accessed August 3, 2012].
- KELLISON, C., 2008. *Producing For TV and New Media, Second Edition: A Real World Approach for Producers*. FocalPress second.,
- KUJALA, S., 2002. *User Studies: A Practical Approach to User Involvement for Gathering User Needs and Requirements*. Helsinki University of Technology (Espoo, Finland). Available at: <http://lib.tkk.fi/Diss/2002/isbn9512259001/>.
- KUJALA, S. AND KAUPPINEN, M., 2004. Identifying and selecting users for user-centered design. In *Proceedings of the third Nordic conference on Human-computer interaction - NordiCHI '04*. New York, New York, USA: ACM Press, pp. 297–303. Available at: <http://portal.acm.org/citation.cfm?doid=1028014.1028060> [Accessed August 3, 2012].
- LANG, T., 2009. Four Ways to Write Your Design Docs. *Game career guide*, p.3. Available at: http://www.gamecareerguide.com/features/737/four_ways_to_write_your_design_.php?page=1 [Accessed June 9, 2012].
- MACEDO, D.V. AND FORMICO RODRIGUES, M.A., 2011. Experiences with rapid mobile game development using unity engine. *Computers in Entertainment*, 9(3), pp.1–12.
- Available at: <http://dl.acm.org/citation.cfm?doid=2027456.2027460> [Accessed August 3, 2012].
- MACHADO, T.L. DE A., 2009. *Guidelines Para a Criação de Jogos : Boas Práticas Para Reduzir Conflitos Entre o Design e o Desenvolvimento*. Universidade Federal de Pernambuco.
- MACHADO, T.L.A., RAMALHO, G.L. AND ALVES, C., 2011. Games as Cinema. *X Brazilian Symposium on Games and Digital Entertainment*.
- MAYRING, P., 2004. *Qualitative Content Analysis*, in U. Flick, E.v. Kardoff and I. Steinke (eds), *A Companion to Qualitative Research*, London: SAGE.
- MERRIAM, S.B., 2009. *Qualitative research: a guide to design and implementation*, San Francisco: Jossey-Bass.
- MOURA, L.J. et al., 2010. Ferramenta Wiki para Documentação de Game Design : Um Estudo de Caso. *9o Congresso Brasileiro de Pesquisa e Desenvolvimento em Design*, p.8.
- PETRILLO, F. et al., 2009. What went wrong? A survey of problems in game development. *Computers in Entertainment*, 7(1), p.1. Available at: <http://portal.acm.org/citation.cfm?doid=1486508.1486521> [Accessed July 18, 2012].
- POTANIN, R., 2010. Forces in play. In *Proceedings of the 3rd International Conference on Fun and Games - Fun and Games '10*. New York, New York, USA: ACM Press, pp. 135–143. Available at: <http://portal.acm.org/citation.cfm?doid=1823818.1823833> [Accessed August 3, 2012].
- ROLLINGS, A. AND ADAMS, E., 2006. *Game Design and Development: Fundamentals of Game Design*, Pearson Prentice Hall.
- ROLLINGS, A. AND MORRIS, D., 1999. *Game Architecture and Design*, Coriolis Group Books.
- ROUSE III, R., 2001. *Game Design: Theory and Practice*, Wordware Publishing.
- RUNESON, P. AND HOST, M., 2008. *Guidelines for conducting and reporting case study research in software engineering. Empirical Software Engineering*, 14th ed.,
- SCHELL, J., 2008. *Art of Game Design: A Book of Lenses.*, San Francisco: Morgan Kaufmann Publishers Inc.
- SHEFFIELD, B., 2009. What Went Wrong? Learning From Past Postmortems. Available at: http://www.gamasutra.com/view/feature/4001/what_went_wrong_learning_from_.php [Accessed May 27, 2012].
- SOUZA, L.J.E.A., 2009. Análises de Documento de Game Design: Interpretação e Resultados Gerados. In *VIII Brazilian Symposium on Games and Digital Entertainment*. Rio de Janeiro: PUC - Rio.
- WINGET, M.A. AND SAMPSON, W.W., 2011. Game development documentation and institutional collection development policy. In *Proceeding of the 11th annual*

international ACM/IEEE joint conference on Digital libraries - JCDL '11. New York, New York, USA: ACM Press, p. 29. Available at: <http://portal.acm.org/citation.cfm?doid=1998076.1998083> [Accessed July 18, 2012].

YIN, R.K., 2008. *CASE STUDIE RESEARCH – DESIGN AND METHODS* 4th ed., SAGE PUBLICATIONS.