Improving Game Development Process Applying Multi-View Game Design Documents

Article · July 2014

CITATIONS
0

READS
951

2 authors:

Pablo Correa
Technische Universität Ilmenau
10 PUBLICATIONS **0** CITATIONS
SEE PROFILE

Luisa Möller
Technische Universität Ilmenau
2 PUBLICATIONS **0** CITATIONS
SEE PROFILE

Technische Universität Ilmenau

Institut für Medien- und Kommunikationswissenschaft

Trends in Media and Communication Science

Prof. Dr. Wolfgang Broll

Sommersemester 2014

Improving Game Development Process Applying Multi-View Game Design Documents

Submitted by:

Luisa Möller
Mühlenstraße 7, 98693 Ilmenau
Master Media and Communication Science
luisa.möller@tu-ilmenau.de
matriculation number: 53566

Pablo Correa Gonzalez
Am Ehrenberg 6, 98693 Ilmenau
Master Media and Communication Science
pablo.correa-gonzalez@tu-ilmenau.de
matriculation number: 53274

Date of submission: 24.07.2014

Table of contents

1. Introduction

As a resolution-problem process, software development has the challenge of overriding team communication issues in the whole production process of designing, programming and testing the product before it is delivered to the final users. An inadequate communication leads to a poor description of the problem that team is intending to solve, forcing it to work based on an incomplete understanding of users needs. As a result of this, users will get an unsatisfactory system that they will be forced to accept [1] or dismiss, being the last one a common choice among videogame players (see also fig. 1). As technology has advanced, the development of video games has followed this evolution from one-man efforts and small teams to multidisciplinary large groups of programmers, artists, designers, producers, testers, music composers, sound designers and writers [2]. In such complex environments converge art, music, graphics, human factors, psychology, computer science, and engineering dealing with *non-functional* requirements in order to *entertain* the user. Thus, the special demands of these requirements process bring together the critical importance to avoid communication issues that arise from misunderstanding very different perspectives. Sometimes, concepts like "*fun*" and "*absorbing*" or other pieces from creative vision of game designers, are not well understood by software engineers. On the other hand, game designers may not know limitations of artificial intelligence or understand the rush to ship the final product [3]. The game development process starts in the design phase or preproduction stage by defining the main concepts and registering them into the Game Design Document (GDD), the most essential asset for the game production phase as it *describes* every single element inside like graphics, sounds and programming [4]. The GDD is the critical communication tool used to communicate the designer's vision to the development team [5], ensuring what is wanted to produce is what is actually produced [6]. However, several authors complain about the difficulties related to its employ and the lack of a standardized GDD template [7, 8, 9, 10,11,27].

In this paper is presented a literature review from researchers and practitioners in the industry of videogames like books, conference papers, editorials, websites, doctoral theses, software and other electronic resources. It firstly introduces a basic structure of the GDD, followed by the alternative game design methodologies and a review of alternative tools for authoring a Game

01 — Ellen Haas
2-8 — 7 notes:
9-13 — 5 notes:
14-20 — 7 notes:
21-28 — 8 notes:
29-30 — 2 notes:
31 — Ellen Haas

Design Document. Finally it does an explanation of the relevance of the multi-view methodology and provides our conclusions.

32

Ellen Haas

2. Towards a standard structure of the Game Design Document

33-39
7 notes:

40-42
3 notes:

43-46
4 notes:

47-49
3 notes:

50

Ellen Haas

If something exists in a game, it must appear and be described in the Design Document. Despite the vital importance of the GDD as "the soul of the game", no standard has emerged to describe how, when or to what purpose it should be written. Furthermore, if the same GDD is sent to different production teams, it is highly probable to get different games as a result. Therefore, organizing and structuring all game information into appropriate sections is one of the vital challenges in writing a good GDD [11]. The structure based on IEEE 830-1998 standard for Software Requirements Specifications (SRS) proposed by Salazar, Mitre, Olalde and Sanchez, is used in this paper. They studied several models of GDD defining a common and innovative basic structure constrained by the IEEE standard, dividing the sections of the document as follows: "*overview*", "*mechanics*", "*dynamics*", "*aesthetics*", "*experience*" and "*assumptions and constraints*". The *overview* section summarizes the key elements of the game like objectives to be achieved by the game, core game-play (the main activity the player will be doing in the game), features, genre (basic rule set that describes the nature of the game), number of players, target platforms (like computer, consoles or smartphones), theme (guidelines to the aesthetics of the game) and a history summary. It should include the relations with other documents and a common language for common understanding. The *mechanics* section is used to describe elements of the game like element categories (enemy, boss, weapon, world or music), core elements with attributes and their behaviour, rules of interaction and artificial intelligence, game world elements and the assets list. In *dynamics* are included the intended interactions like the game world (like theme detail, levels flow, and detailed history), levels elements (like primary and secondary objectives, implicit and explicit rewards, challenges) levels description, special areas and game interface. Normally, design documents combine the mechanics and dynamics parts in one single section. The *aesthetics* section traces what the player perceives by his visual and auditory senses (like visual and sound assets). The *experience* section addresses to define the expected experiences of player, including quality attributes and game's tradeoffs. This section is not normally included in design documents, but authors affirm that this lead to the enhancement of the game and to know what to expect from the test on prototypes and future

game development phases. Finally, *assumptions and constraints* section covers the business and technical limitations that affect directly the game design decisions (see also fig. 2). It should include the knowledge of game parts for reviews [4].

3. Alternatives to the "traditional" Game Design Document

The traditional, text-based game design document is not the only tool used for gathering, presenting and communicating information during the game development process. Several other tools are used which, in some cases, serve as a complement or can be a full-value substitute for the classical word-processed option. Most of these tools use the opportunity of visualization. Data visualization has a positive impact on communicating what is important, as it increases the ability to understand and memorize the communicated topic or subject.

51 Ellen Haas

52 Ellen Haas

A popular approach to enhance the communication within the development team is the One-Page Design. As the name suggests, the design document confines itself to just a single page in this case. This is based on the assumption, as [12] describes it, that any information which is not right in front of someone had the potential to be ignored. One-Page Designs are following ideas from the pre-gaming era, respectively non-gaming realms. These are, for instance, building manuals, cutaway diagrams or even kid placemats. The benefits of those single-paged designs are indisputable: They are easy to share cross the whole design team and project managers can make sure that the designs at least have been seen at some point. One-Page designs forces two things on the responsible person which may constitute an enhancement for the communication within the development team: First, there has to be a complete understanding of the game and thus a prioritization of the different game features, choosing which ones are important enough to be depicted in the One-Page Design. Synthesizing on this, there also has to be a concise design, which extracts only the core elements of the game and simplifies them to their essence [12].

53-54 2 notes:

There are a broad variety of visual tools and One-Page Designs, which can be used; a few of them shall be introduced in the following.

55 Ellen Haas

Illustrations are worthwhile complements for the game design document, as they increase the motivation within the team by displaying a visual goal that is supposed to be achieved in the end. Furthermore, they help the iteration of different versions created in the development process and

56 Ellen Haas

57-59
3 notes:

ding up step by step from the visual prototype to the final fully functional, playable version . A special type of illustration is the concept art. It is more an emotional way to express a certain scene or surrounding and it is considered to show rather the art design than the actual game design (see also fig. 3) [12].

60
Ellen Haas

wcharts and diagrams show more of the actual game mechanics and dynamics. They diagram all of the basic elements of the game, how they interact with each other and they are particularly good at showing relationships between systems .

61-63
3 notes:

To achieve that, firstly all the nouns of the e are used as the nodes. These are, in most cases, art assets representing the different components of the game. As an example, the popular game “Pac-Man” includes the components Pac-Man, small dots, large dots, ghost, fruit, score, and the level map/labyrinth. The next step would be the nnecting of those components and their interdependence among themselves

64-68
5 notes:

. These include actions the player can take and effect on other game features and

69
Ellen Haas

er order relationships, which aren’t necessarily in the players control but serves to make the game more fun [12]. To stick with the example, this would be for instance Pac-Man – eats – fruit, Ghosts – chase – Pac-Man and so on (see also fig. 6). Diagrams can vary widely depending on what special aspect of the game needs to be visualized. There are

70
Ellen Haas

ng diagrams, showing where the player should be in terms of the location as he or she proceeds in the game (see also fig. 5). It shows t

71-75
5 notes:

elationship between space and time . There are as well bat diagrams showing the dynamics of attack and defence patterns, diagrams showing relationships between

76-80
5 notes:

dules and such wing relationships between units .

81
Ellen Haas

If several illustrations are stringed together in a logical order, oryboard is created as another special form of the flowchart. They show not every moment like traditional storyboards from movies, but only the key moments of the game in a scene-wise manner from the introductory tutorial to the end game .

82-84
3 notes:

To enhance those more or less static methods for visualizing the game design, there are strategies to visualize the idea behind the game in a more dynamic way. On one hand, there are those methods that do not require any programming and, on the other hand, those with an actual function.

For implementing the first type, there are numerous tools that can be used. Slide show software like Microsoft PowerPoint and others can be used slightly different from their original purpose to create a dynamic vision of the game. With such tools comes the possibility to present moving details and illustrating steps within the game-play. The slide show can be seen as a mock-up and it invites questions and discussion that provides valuable input in the development process (see also fig. 4) [13].

The second type is actually a basic prototype of the game. Prototypes are probably the closest to the final product in comparison to the other described methods when it comes to dynamics and mechanics, as well as the basic art design. “One of the surest ways to communicate your vision is to make it playable.” This prototype can include the basic geometry, simple scripts and a single art pass. It can help to carry the overall feeling and thus the player experience [13].

Practitioners may prefer a mixture of both the classical GDD and the visual alternatives. Since people tend to learn better then given redundant information [13], this is the best way to ensure overall understanding and memorizing the aspects to be communicated. Most of the presented methods will be used anyhow within traditional word documents as well as in wikis and blogs.

4. Web based tools

Nowadays, the advantages of using web-based documents are evident: many people can have simultaneous access to them, and they are easy to edit. Unlike a linear sequence document made in a word processor, a web-based GDD document can divide every level on its own page, and make them accessible from every page.

In the early stages of game development ideas are rough and speed is essential, so it is imperative that the authoring medium needs to be easy to use to ensure that team members will take the time to put their design thoughts down. Using a blog as a GGD authoring tool is a fast and easy solution that gives a sequential snapshot of the author, with date and time in each post. They display a rather narrative style of writing rather than the traditional GDD stating the hard facts about the game. They are more reader friendly since they build up like a story in a novel, mentioning relationships among items and featuring more casual language. Also, the blogs outperform over highly specified “good” design word processor documents that are difficult to read, blurring the understanding of the full picture. Blogs are easy to search, allow send to

97-98
2 notes:

someone a single feature in a link, speak with one voice (with posts as the authority) and have a comment section as feedback mechanism to address concerns, worries and other ideas. Blogs have their own very special way to approach the reader. However, as documents get long, blogs could be hard to navigate without some sort of index or tagging system, and while it is possible to edit entries, there is no way to control or check the history of changes. Also, there is not a feature that automatically makes links referring to a set of terms or articles [15] and also is not possible to link external files, unless those files are web-based.

99

Ellen Haas

In Contrast to blogs, a wiki is a type of website that allows multiple users to collaboratively create and edit interlinked web pages via a web browser, hence it offers several advantages for GDD authoring like searching for content in articles, private configuration options, simplicity for updating articles, support for images and videos, linkable entries inside and outside the wiki, multi-tabbing within the browser, update and change information via RSS and support for version control (unlike blogs). It does not have any predefined structure, therefore the user is in charge of organizing the information and this can be seen as both a positive and negative property. As drawback, the wiki lacks of a formal approval and sign-off, so multiple authoring can lead to disjointed design and warring editors. Constant publishing means also that version control is erratic and content is like a moving target for production team. Wiki is not formatted for printing and is not organized for reading end to end [16]. Furthermore, blocks of linked text written by multiple users are not necessarily narrative, can lack linearity and are not convincing when someone must pitch the design [15].

100-103
4 notes:

104-106
3 notes:

107-108
2 notes:

Both wikis and blogs have the common advantage that they are opened in a browser, which is usually the first thing people at work are starting in the morning after tuning on the PC. Thus, the design document is always “on the spot” and constantly a part of the everyday workspace. They both allow easy working from home or journeys by simply accessing them through the web using a secure login.

On the contrary, they both lack sentence based comments, the ability to export or print and they may not fit every type of game and every style of development process. Thus, there are other standalone tools that may improve the game development process in their very own way. Some of them shall be introduced in the following.

109
Ellen Haas

5. Standalone Tools

Mind maps are diagrams used to visualize ideas and concepts that are linked to each other and frequently ordered in relation to an essential concept, and as are used to memorize information,
110-112
3 notes:
e problems and organize ideas [17], subsequently can be used to create a GDD. Although there are available many mind map software tools, "TheBrain" [18] is chosen as example because it has a customizable interface, it is exceptionally cross-platform and it can sync and share
113
Ellen Haas
information easily over the Internet. Inside the application's mind map graph, concepts are nodes that are connected to each other through links. The user explores by selecting a concept and
114-117
4 notes:
matically the mind map rearranges the concepts around the selection . There are numerous potential visualizations that establish the way concepts are ordered around a selected concept and the user can define a personalized allocation. "TheBrain" dynamic and customizable
118-119
2 notes:
interface mixes y kinds of external information into the mind map such as emails, web pages, , videos and images.

120
Ellen Haas
"t" is a software application originally released by Microsoft Live Labs and designed for exploring, interacting and sorting large collections of data sets, with smooth visual interactions that help the users to understand the operations of classification and redistribution that are performed [19]. It can also be used to browse "the web as a web" rather than as isolated pages [20]. "Pivot" has desirable features for GDD authoring because it makes simpler the access and interaction with huge amounts of unstructured data (like pictures, videos, maps, averages and
121-124
4 notes:
ncials), without any sort of hierarchy or key structure. According to user-selected criteria, it sorts data dynamically with visual transitions between the orderings like the data flying away or changing position to perform a new ordering on the screen.

125-126
2 notes:
"hinations" is a theoretical framework written by Doris Jormans that ides a graphical representation describing interactively games as dynamic systems and offering a new perspective
127-129
3 notes:
on the "intuitive and delicate practice of game design and balancing" also fig. 7) [10].

130-131
2 notes:
The core of chinations" is a graphical notation designed to capture the dynamics of games allowing the user to create game diagrams that are both interactive and dynamic. However, only focuses on rules and mechanics and does not include all elements of game design (like all elements of level design), so it is more useful for most board, strategy and management

simulation games. While “Machinations” will still be applicable to games that depend more on level design, for these, it can only describe a part of the picture. ¨Machinations¨ is not a full replacement for GGD authoring, but allows games to be simulated with no interaction with real users to experiment and gather quantitative data from simulated play sessions into automatic charts [22], that can be used later to improve the game design in general (see also fig. 8). Also, because it is designed with Shockwave Flash, ¨Machinations¨ could be easily integrated into any web-based Game Design Documents discussed in the previous section of this paper.

“Scrivener” is a word-processing program developed by Literature and Latte that provides an administration system to organize notes, concepts, research, metadata and whole documents (PDF, text, web pages, images, audio, and video) for easy access and reference [23]. It has a full-screen mode, a split screen mode to edit numerous documents simultaneously, an outliner, a corkboard (see also fig. 9) to drag-and-drop virtual index cards for files rearrangement and can take "snapshots" of a particular document before any radical changes. It allows collaborate online easily with common file-sharing tools [24]. In addition, the user can compile the finished draft for printing or exporting to web, e-book formats or a word processor for final formatting. Because of its wideness of interfaces and features (see also fig. 10) (like templates for description of characters and places) (see also fig. 11), we believe this literary "project management tool" is very suitable for GDD creation.

6. Multiview methodology

The term “Multiview Game Design Document” does not exactly exist in that way in the research literature. But there are several approaches to that term we found during our research that shall be touched at this point. The simplest interpretation could be, that the multiple ways the same information can be packed up using different methods, tools and GDD alternatives that have been introduced in this paper, are “multiview” in this context. As a second approach, [25] states, “multiview”, as a contingency approach, addresses stages relating to human and social dimensions as well as technical aspects. “It attempts to address questions related to the organisation on a whole, the people working within the organisation the human computer interaction, the various functions that the information system has to carry out and the technical

specification for performing those functions." It is meant as a flexible approach to deal with organizational problems in terms of the best-suited methodology for a very specific problem. The multiview here consists of five elements: the human activity, the information modelling, the socio-technical aspects, the human-computer interface and the technical aspects. Transferring this to the Game Design Document, it would mean not only to focus on the technical aspects and the game itself in a narrower sense, but also on sociological aspects and human-computer-interaction thoughts. That is, how different team members, developers, designers or project managers approach the GDD as a complex system, and also how the actual user in the end receives the game.

148
Ellen Haas

A third approach would be a sheer technological one concerning the question on [illegible] multiple persons can actually *view* and *work on* the same document at the same time. There are several commercial tools, which enable development teams to achieve this. A popular free tool for private use would be [illegible]gle Drive, enabling multiple users to view and edit the same text document simultaneously. The editors can see where and what the others are writing and what they are highlighting. [illegible]spiration Pro is a commercial tool with a little different, more administrated functioning. [illegible]llaborative window shows which user is actively editing and which ones are reviewing the document. When he or she clicks "Pass Control" they return to the reviewer mode and the next-in-line user is selected. The new user receives a short notification that he or she is next. Reviewers can request Edit mode by clicking or leave their place in line for other reviewers and editors [26].

149
Ellen Haas

150-151
2 notes:

As shown above, the multiview approach can refer to different interpretations and therefore has the potential to motivate further research. An especially the topic would be, how different team members with diverse backgrounds in profession and education can access the same document while the latter maintains its informative content and does not only address one target group.

7. Conclusion

Game development teams are getting bigger, with not only developers included but also professionals in design, economy and management, making the whole process more difficult. It is important to simplify communication within the team in order to stay organized and retain the focus in the development process. Because games are getting bigger the GDD sizes are growing

proportionally, so new methods must be applied to ensure a clean project management. Every team member always needs to know what is going on in the very moment of the development process, without reading filling pages of technical-jargon-packed GDD Therefore, easy editing tools that reinforce creativity and collaboration by quickly allowing the development team to create, insert, search, sort and filter the huge amount of the information that contemporary Game Design Documents require.

References

[1] Enciclopedia Micomputer, Tomo 4 Editorial Planeta, 1984.

152 Ellen Haas Rogers, S. “Level Up!: The Guide to Great Video Game Design.” 1 Edition. Chichester: Wiley. 2010.

[3] Callele, D., Neufeld, E. and Schneider, K. “Requirements Engineering and the Creative Process in the Video Game Industry.” In 13th IEEE International Conference on Requirements Engineering, 2005.

153 Ellen Haas Salazar, M.G., Mitre, H.A., Olalde, C. L. and Sanchez, J.L.G. “Proposal of Game Design Document from software engineering requirements perspective,” in 2012 17th International Conference on Computer Games (CGAMES), 2012.

154 Ellen Haas Lemos,T. and Machado, A. “Game Development Guidelines: Practices To Avoid Conflicts Between Software and Design.”, 2010.

155 Ellen Haas Orita Almeida, M. S. and Soares Corrêa da Silva, F. “A Systematic Review of Game Design Methods and Tools.” In Entertainment Computing – ICEC 2013. Springer Berlin Heidelberg, 2013.

156 Ellen Haas “Creating A Great Design Document.” Accessed April 21, 2014. http://www.gamasutra.com/view/feature/3224/creating_a_great_design_document.php

157 Ellen Haas Pedersen, R.E. “Game Design Foundations.” Wordware Inc, Paperback, 2003.

158 Ellen Haas Bethke, E. “Game development and production.” Plano (USA): Wordware! Publishing, Inc, 2003.

159 Ellen Haas Dormans, J. “Engineering emergence: applied theory for game design.” PhD dissertation. University of Amsterdam, 2012.

160 Ellen Haas Rouse, R. “Game Design: Theory and Practice.” 2 Edition. Plano, Tex: Jones & Bartlett Learning, 2004.

161 Ellen Haas Librande, S. “One-Page Designs” Accessed July 15, 2014 http://www.stonetronix.com/gdc-2010/.

162 Ellen Haas Robinson, E. “5 Alternatives to a Game Design Doc”. Accessed July 15,2014. http://livelyivy.com/gravityghost-com/5-alternatives-to-a-game-design-doc/.

163 Ellen Haas Feil, J.H. and Scattergood M. “Beginning Game Level Design.” 1 Edition. Boston, MA: Cengage Learning PTR, 2005.

[15] Cook D. “Lost Garden: Using a Blog as a Game Design Document.” Accessed May 11, 2014. Http://www.lostgarden.com/2005/06/using-blog-as-game-design-document.html.

[16] Ryan, T. “Learning the Ways of the Game Development Wiki.” Accessed May 30, 2014. http://www.gamasutra.com/view/feature/4094/learning_the_ways_of_the_game_.php.

164 Ellen Haas Buzan T. and Buzan B. “The Mind Map Book”. BBC Books, London, 2 Edition, 1995.

165 Ellen Haas “The Brain”. Mind Mapping Software. Accessed May 30,2014. http://www.thebrain.com/products/thebrain/

166 Ellen Haas Gayoso Fernández, S. “GDD as a communication medium. Design of the structure and communication”. MSc thesis, Royal Institute of Technology, Sweden, 2011.

[20] Foley M. J. “Pivot: Microsoft’s Experiment to ‘View the Web as a Web.’” ZDNet, 2009. Accessed May 30, 2014. http://www.zdnet.com/blog/microsoft/pivot-microsofts-experiment-to-view-the-web-as-a-web/4612.

167 Ellen Haas “Microsoft Live Labs Pivot.” Wikipedia, the Free Encyclopedia. 2014. https://en.wikipedia.org/w/index.php?title=Microsoft_Live_Labs_Pivot&oldid=580403372.

[22] “Machinations Framework”. Accessed May 30, 2014.

http://www.jorisdormans.nl/machinations/wiki/index.php?title=Machinations_Framework

168 Ellen Haas

"Scrivener (software)." Wikipedia, the Free Encyclopedia, 2014 https://en.wikipedia.org/w/index.php?title=Scrivener_(software)&oldid=605022351.

[24] "Scrivener 2". Literature and Latte. Accessed May 30, 2014 http://www.literatureandlatte.com/scrivener.php

[25] Ogunbiyi, W. "MULTIVIEW - The Methodology explained. Accessed July 15, 2014 http://www.waleoguns.itgo.com/multiview.html.

[26] "Webspiration Pro" *Multiple users editing the same document.* Accessed July 15, 2014 http://www.webspirationpro.com/gettingstarted/help/multipleusers.

169 Ellen Haas

Schnell, J. "The Art of Game Design: A Book of Lenses." 1 Edition. Amsterdam ; Boston: CRC Press, 2008.

Other resources

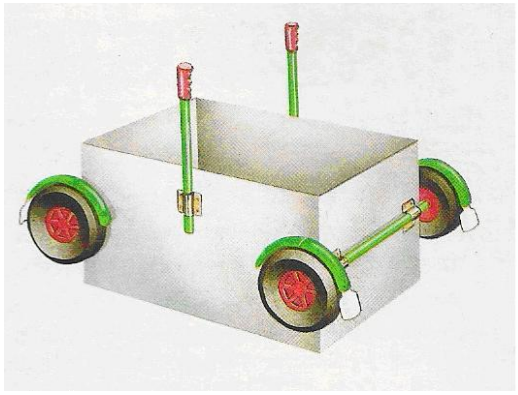
M. Baldwin, "Game Design Document Outline." 2005.

B. Bates, Game Design [Paperback]. Premier Press; 2nd Revised edition edition, 2004, p. 450.

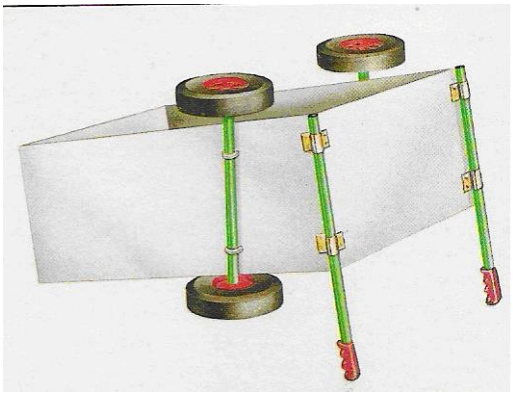
A. Rollings, E. Adams on Game Design. New Riders; 1 edition, 2003 M. K. Oxland, Gameplay and Design [Paperback]. Addison Wesley; 1 edition, 2004

C. Taylor, "Design Template." 1999 Available: http://www.runawaystudios.com.

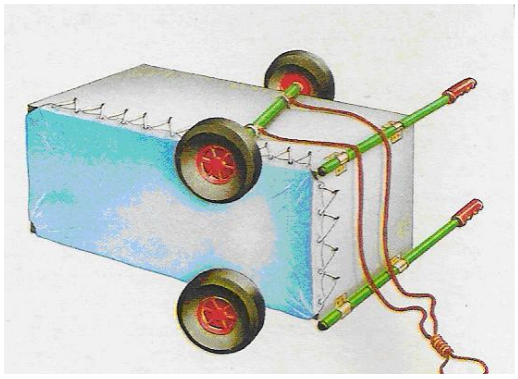
Appendix



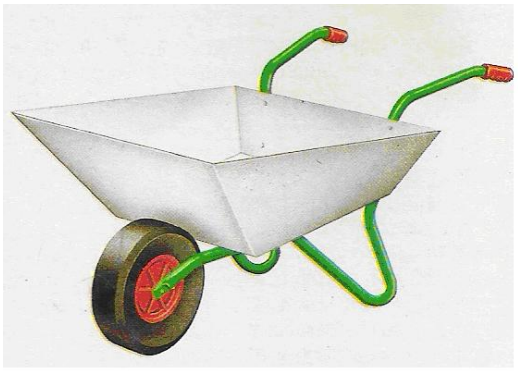
1. Designer's vision about customer's problem



2. Programmer's interpretation of designer's vision



3. Final product in the market



4. What in reality the user really needed

Fig. 1: Scheme showing how communication affects software design and production [1]

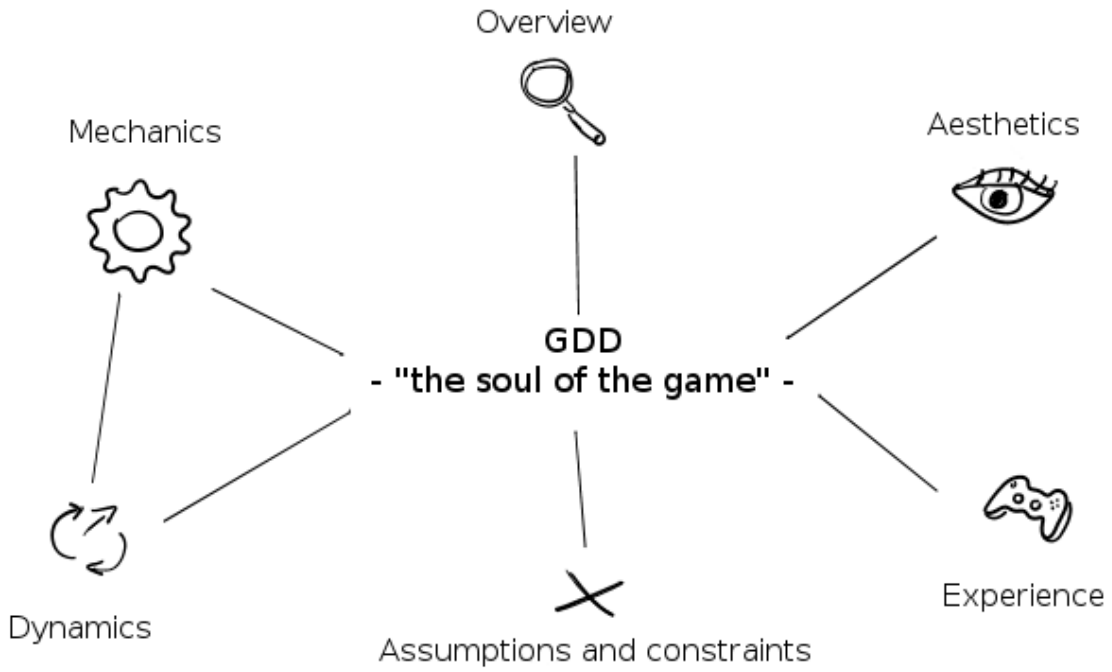


Fig. 2: The scheme of a Game Design Document (Own figure).

Fig. 3: A concept art from a combat scene of the game Diablo II [24].

Fig. 4: Simulating game dynamics using a slide show [23].

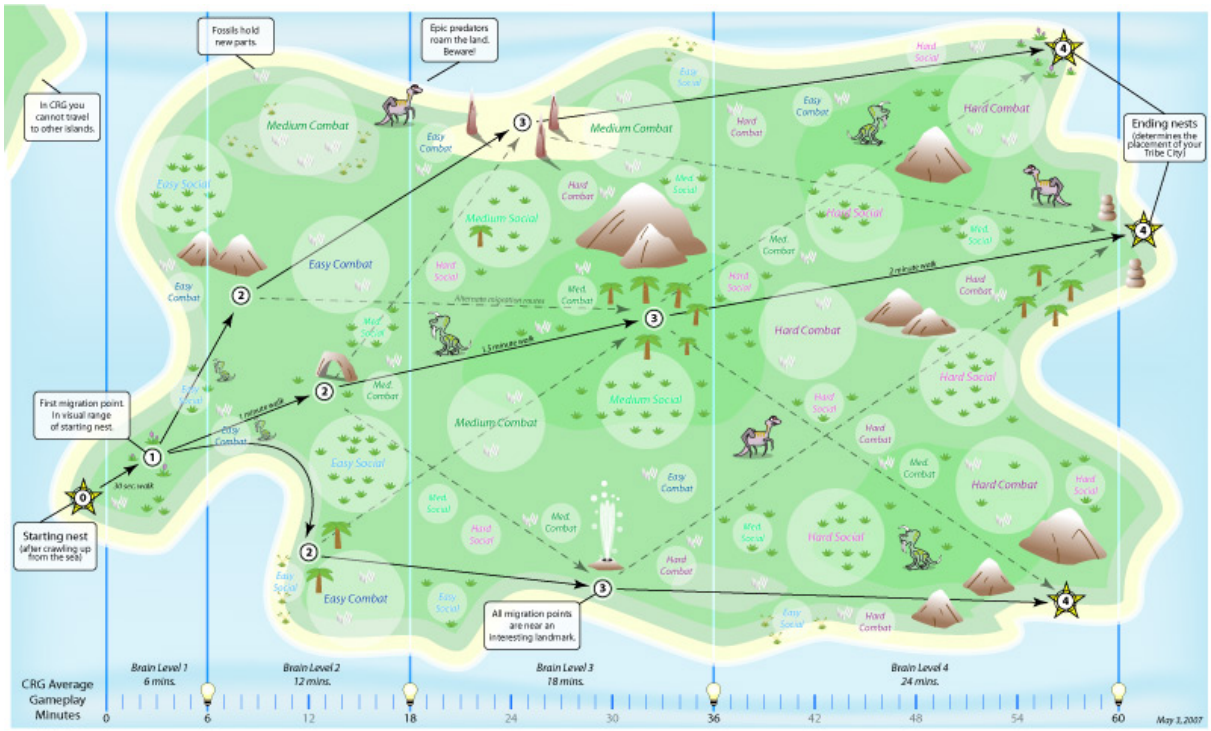


Fig. 5: A timing diagram [24].

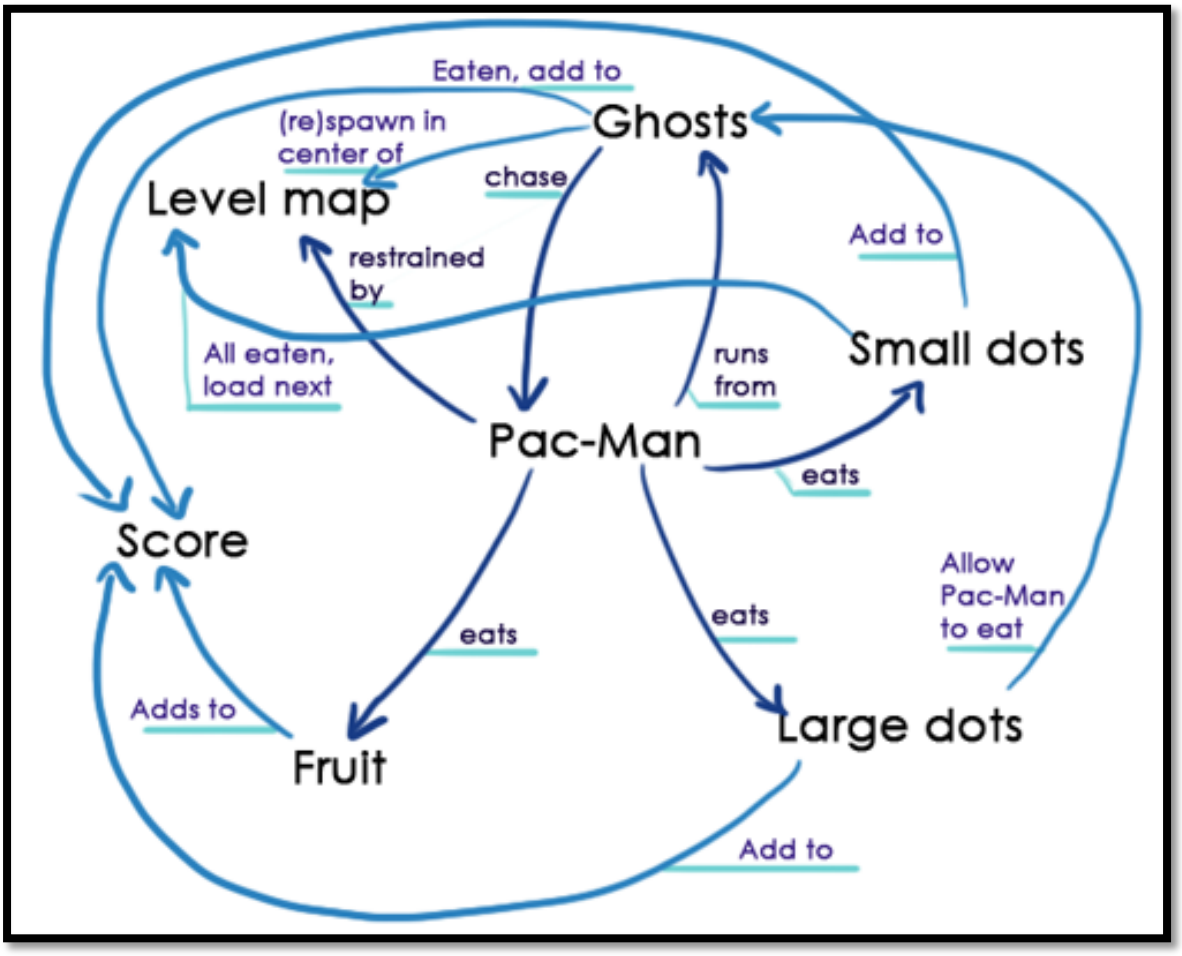


Fig. 6: A flowchart showing the interconnections between features in the game Pac-Man [23].

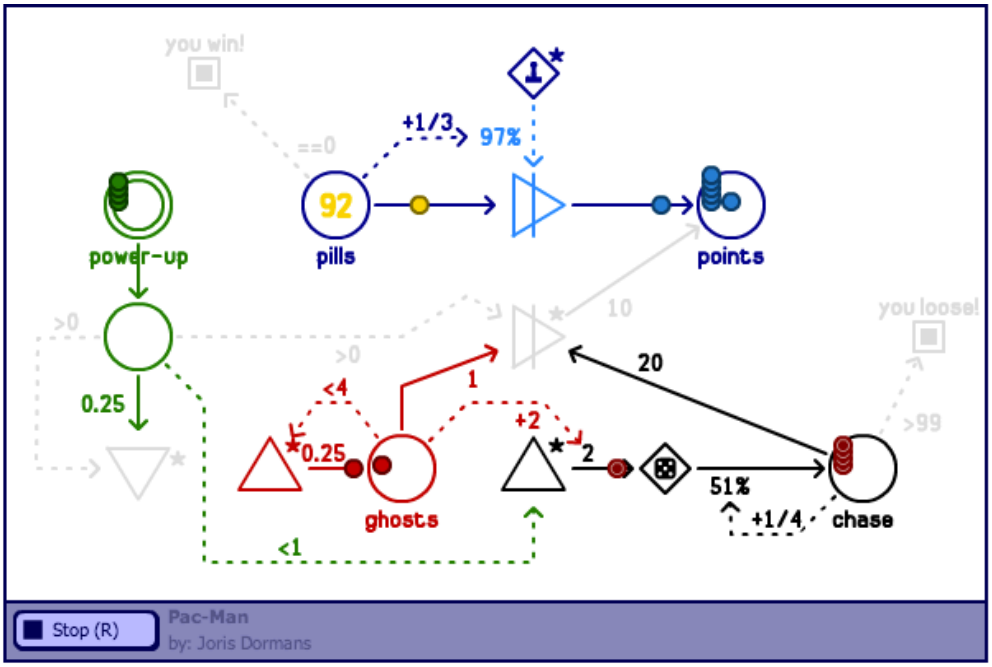


Fig. 7: A Machinations diagram for Pac-man game mechanics.[22]

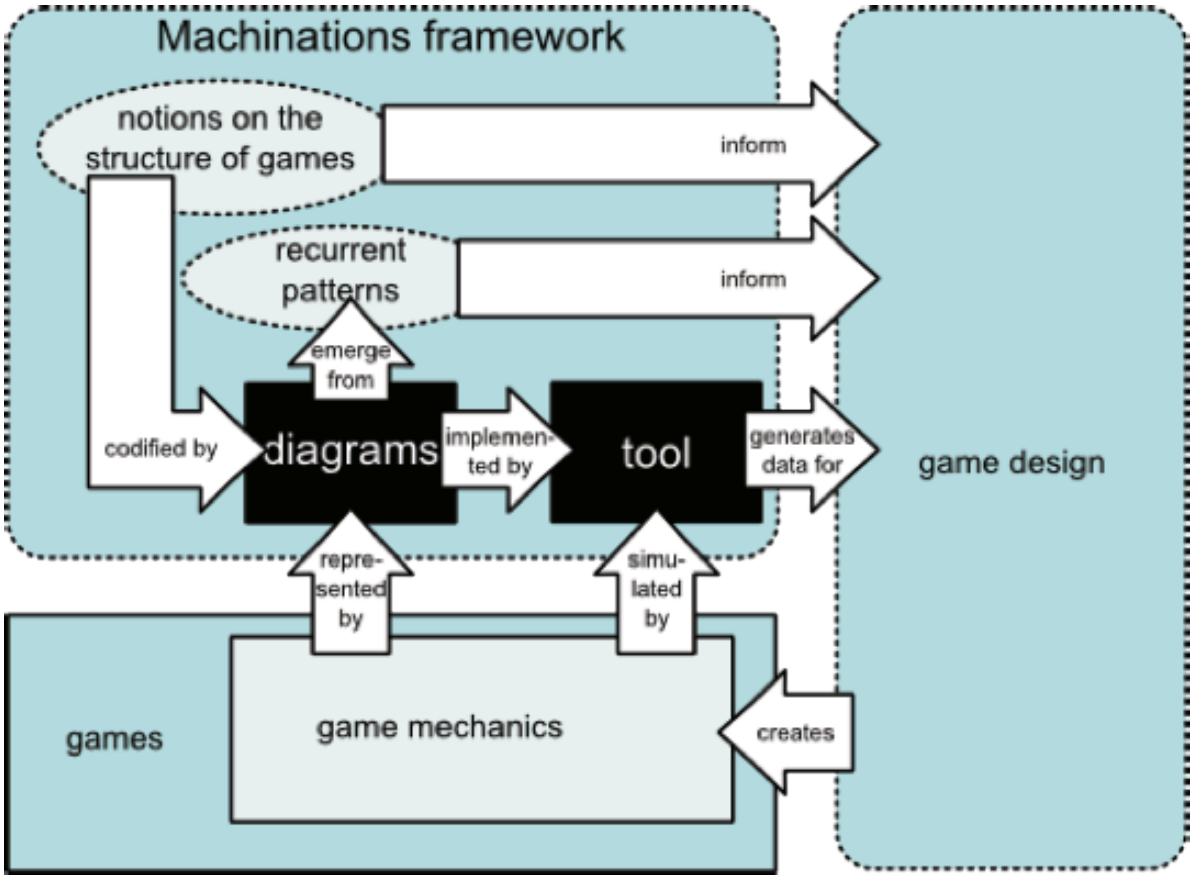


Fig 8: The framework scheme of "Machinations" [22].

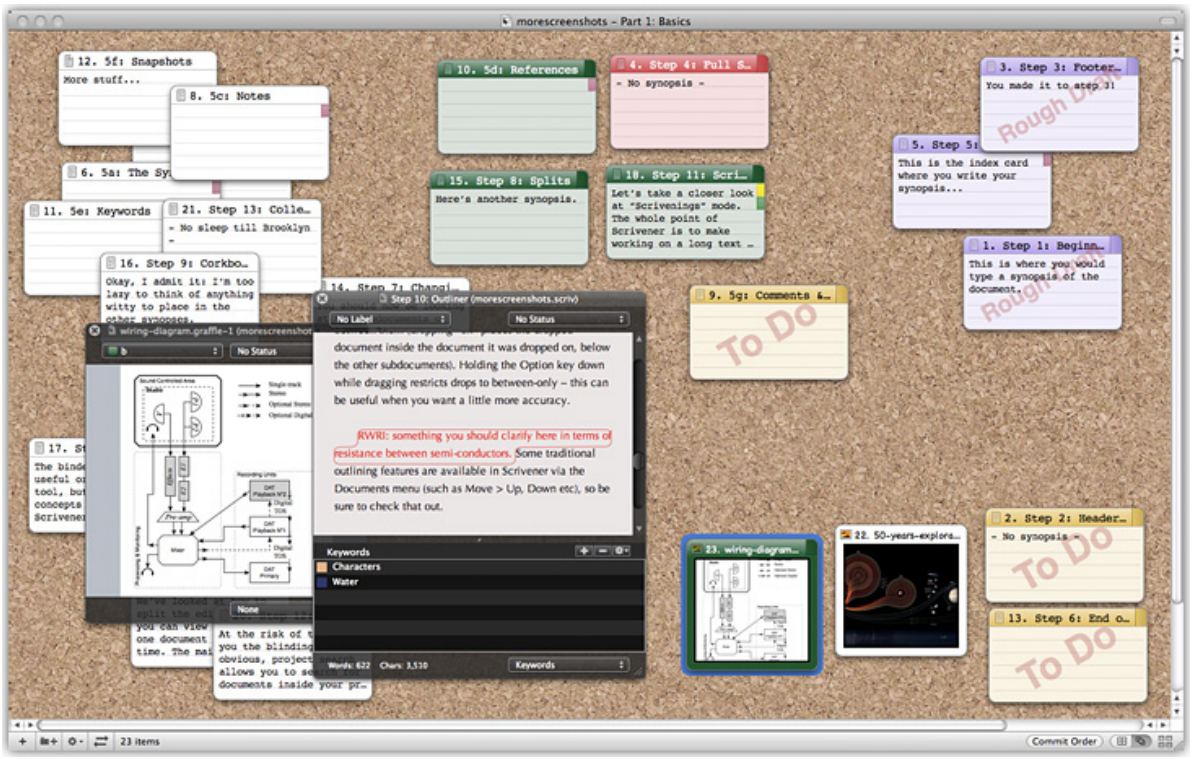


Fig. 9: An example of organizing features and characters using “Scrivener” [24].

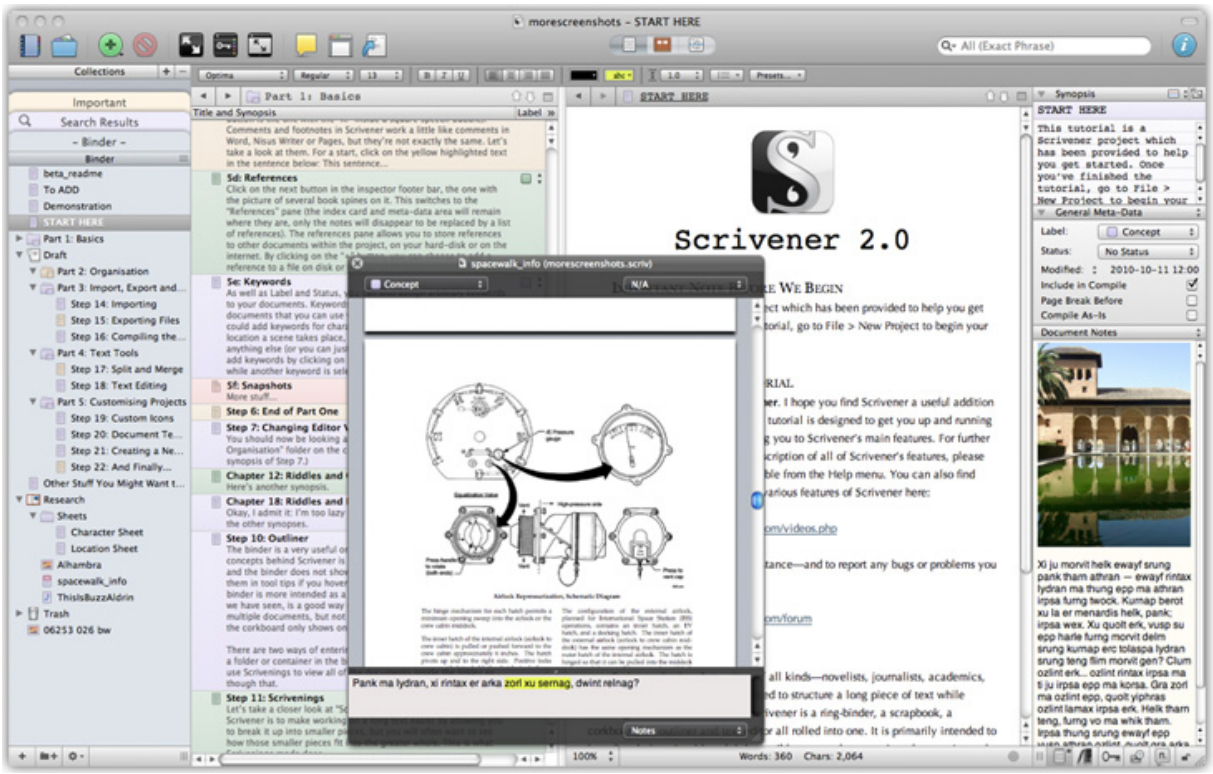


Fig. 10: An example of organizing features and characters using “Scrivener” [24].

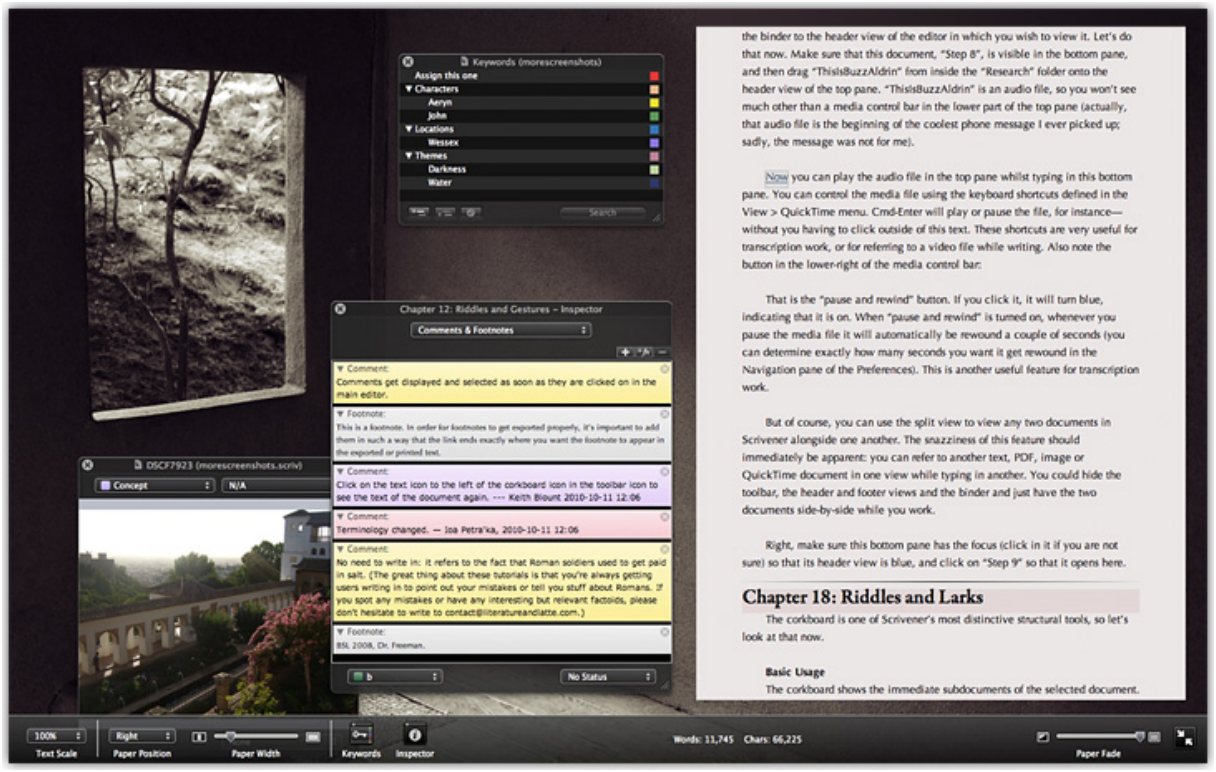


Fig. 11: An example of organizing features and characters using “Scrivener” [24]

Improving Game Development Process Applying Multi-View Game Design Documents

Gonzalez, Pablo Correa; Möller, Luisa

01 Ellen Haas Page 4
7/3/2019 20:04

02 Ellen Haas Page 4
7/3/2019 20:04

03 Ellen Haas Page 4
7/3/2019 20:04

04 Ellen Haas Page 4
7/3/2019 20:04

05 Ellen Haas Page 4
7/3/2019 20:03

06 Ellen Haas Page 4
7/3/2019 20:04

07 Ellen Haas Page 4
7/3/2019 20:04

08 Ellen Haas Page 4
7/3/2019 20:03

09 Ellen Haas Page 4
7/3/2019 20:04

10 Ellen Haas Page 4

7/3/2019 20:04

11 Ellen Haas Page 4

7/3/2019 20:03

12 Ellen Haas Page 4

7/3/2019 20:04

13 Ellen Haas Page 4

7/3/2019 20:04

14 Ellen Haas Page 4

7/3/2019 20:04

15 Ellen Haas Page 4

7/3/2019 20:04

16 Ellen Haas Page 4

7/3/2019 20:03

17 Ellen Haas Page 4

7/3/2019 20:04

18 Ellen Haas Page 4

7/3/2019 20:04

19 Ellen Haas Page 4

7/3/2019 20:04

20 Ellen Haas Page 4

7/3/2019 20:04

21 Ellen Haas Page 4

7/3/2019 20:04

22 Ellen Haas Page 4

7/3/2019 20:04

23 Ellen Haas Page 4

7/3/2019 20:04

24 Ellen Haas Page 4

7/3/2019 20:03

25 Ellen Haas Page 4

7/3/2019 20:04

26 Ellen Haas Page 4

7/3/2019 20:03

27 Ellen Haas Page 4

7/3/2019 20:04

28 Ellen Haas Page 4

7/3/2019 20:04

29 Ellen Haas Page 4

7/3/2019 20:04

30 Ellen Haas Page 4

7/3/2019 20:04

31 Ellen Haas Page 4

7/3/2019 20:04

32 Ellen Haas Page 5

7/3/2019 20:04

33 Ellen Haas Page 5

7/3/2019 20:04

34 Ellen Haas Page 5

7/3/2019 20:04

35 Ellen Haas Page 5

7/3/2019 20:04

36 Ellen Haas Page 5

7/3/2019 20:04

37 Ellen Haas Page 5

7/3/2019 20:08

38 Ellen Haas Page 5

7/3/2019 20:08

39 Ellen Haas Page 5

7/3/2019 20:08

40 Ellen Haas Page 5

7/3/2019 20:08

41 Ellen Haas Page 5

7/3/2019 20:08

42 Ellen Haas Page 5

7/3/2019 20:04

43 Ellen Haas Page 5

7/3/2019 20:08

44 Ellen Haas Page 5

7/3/2019 20:08

45 Ellen Haas Page 5

7/3/2019 20:08

46 Ellen Haas Page 5

11/3/2019 14:39

47 Ellen Haas Page 5

7/3/2019 20:08

48 Ellen Haas Page 5

7/3/2019 20:08

49 Ellen Haas Page 5

7/3/2019 20:08

50 Ellen Haas Page 5

7/3/2019 20:08

51 Ellen Haas Page 6

7/3/2019 20:08

52 Ellen Haas Page 6

7/3/2019 20:08

53 Ellen Haas Page 6

7/3/2019 20:08

54 Ellen Haas Page 6

7/3/2019 20:08

55 Ellen Haas Page 6

7/3/2019 20:08

56 Ellen Haas Page 6

7/3/2019 20:08

57 Ellen Haas Page 7

7/3/2019 20:08

58 Ellen Haas Page 7

7/3/2019 20:08

59 Ellen Haas Page 7

7/3/2019 20:08

60 Ellen Haas Page 7

7/3/2019 20:16

61 Ellen Haas Page 7

7/3/2019 20:16

62 Ellen Haas Page 7

7/3/2019 20:16

63 Ellen Haas Page 7

7/3/2019 20:16

64 Ellen Haas Page 7

7/3/2019 20:16

65 Ellen Haas Page 7

7/3/2019 20:16

66 Ellen Haas Page 7

7/3/2019 20:16

67 Ellen Haas Page 7

7/3/2019 20:16

68 Ellen Haas Page 7

7/3/2019 20:16

69 Ellen Haas Page 7

7/3/2019 20:16

70 Ellen Haas Page 7

7/3/2019 20:16

71 Ellen Haas Page 7

7/3/2019 20:16

72 Ellen Haas Page 7

7/3/2019 20:16

73 Ellen Haas Page 7

7/3/2019 20:16

74 Ellen Haas Page 7

7/3/2019 20:16

75 Ellen Haas Page 7

7/3/2019 20:16

76 Ellen Haas Page 7

7/3/2019 20:16

77 Ellen Haas Page 7

7/3/2019 20:16

78 Ellen Haas Page 7

7/3/2019 20:16

79 Ellen Haas Page 7

7/3/2019 20:16

80 Ellen Haas Page 7

7/3/2019 20:16

81 Ellen Haas Page 7

7/3/2019 20:16

82 Ellen Haas Page 7

7/3/2019 20:16

83 Ellen Haas Page 7

7/3/2019 20:16

84 Ellen Haas Page 7

7/3/2019 20:16

85 Ellen Haas Page 8

7/3/2019 20:16

86 Ellen Haas Page 8

7/3/2019 20:16

87 Ellen Haas Page 8

7/3/2019 20:16

88 Ellen Haas Page 8

7/3/2019 20:16

89 Ellen Haas Page 8

7/3/2019 20:16

90 Ellen Haas Page 8

7/3/2019 20:16

91 Ellen Haas Page 8

7/3/2019 20:16

92 Ellen Haas Page 8

7/3/2019 20:16

93 Ellen Haas Page 8

7/3/2019 20:16

94 Ellen Haas Page 8

7/3/2019 20:16

95 Ellen Haas Page 8

7/3/2019 20:16

96 Ellen Haas Page 8

7/3/2019 20:16

97 Ellen Haas Page 9

7/3/2019 20:16

98 Ellen Haas Page 9

7/3/2019 20:16

99 Ellen Haas Page 9

7/3/2019 20:16

100 Ellen Haas Page 9

7/3/2019 20:16

101 Ellen Haas Page 9

7/3/2019 20:16

102 Ellen Haas Page 9

7/3/2019 20:16

103 Ellen Haas Page 9

7/3/2019 20:16

104 Ellen Haas Page 9

7/3/2019 20:16

105 Ellen Haas Page 9

7/3/2019 20:16

106 Ellen Haas Page 9

7/3/2019 20:16

107 Ellen Haas Page 9

7/3/2019 20:16

108 Ellen Haas Page 9

7/3/2019 20:16

109 Ellen Haas Page 10

7/3/2019 20:16

110 Ellen Haas Page 10

7/3/2019 20:16

111 Ellen Haas Page 10

7/3/2019 20:16

112 Ellen Haas Page 10

7/3/2019 20:16

113 Ellen Haas Page 10

7/3/2019 20:16

114 Ellen Haas Page 10

7/3/2019 20:16

115 Ellen Haas Page 10

7/3/2019 20:16

116 Ellen Haas Page 10

7/3/2019 20:16

117 Ellen Haas Page 10

7/3/2019 20:16

118 Ellen Haas Page 10

7/3/2019 20:16

119 Ellen Haas Page 10

7/3/2019 20:16

120 Ellen Haas Page 10

7/3/2019 20:16

121 Ellen Haas Page 10

7/3/2019 20:16

122 Ellen Haas Page 10

7/3/2019 20:16

123 Ellen Haas Page 10

7/3/2019 20:16

124 Ellen Haas Page 10

7/3/2019 20:16

125 Ellen Haas Page 10

11/3/2019 14:39

126 Ellen Haas Page 10

11/3/2019 14:39

127 Ellen Haas Page 10

11/3/2019 14:39

128 Ellen Haas Page 10

11/3/2019 14:39

129 Ellen Haas Page 10

11/3/2019 14:39

130 Ellen Haas Page 10

11/3/2019 14:39

131 Ellen Haas Page 10

11/3/2019 14:39

132 Ellen Haas Page 11

11/3/2019 14:39

133 Ellen Haas Page 11

11/3/2019 14:39

134 Ellen Haas Page 11

11/3/2019 14:39

135 Ellen Haas Page 11

11/3/2019 14:39

136 Ellen Haas Page 11

11/3/2019 14:39

137 Ellen Haas Page 11

11/3/2019 14:39

138 Ellen Haas Page 11

11/3/2019 14:39

139 Ellen Haas Page 11

11/3/2019 14:39

140 Ellen Haas Page 11

11/3/2019 14:39

141 Ellen Haas Page 11

11/3/2019 14:39

142 Ellen Haas Page 11

11/3/2019 14:39

143 Ellen Haas Page 11

11/3/2019 14:39

144 Ellen Haas Page 11

11/3/2019 14:39

145 Ellen Haas Page 11

11/3/2019 14:39

146 Ellen Haas Page 11

11/3/2019 14:39

147 Ellen Haas Page 11

11/3/2019 14:39

148 Ellen Haas Page 12

11/3/2019 14:39

149 Ellen Haas Page 12

11/3/2019 14:39

150 Ellen Haas Page 12

11/3/2019 14:39

151 Ellen Haas Page 12

11/3/2019 14:39

152 Ellen Haas Page 13

11/3/2019 14:39

153 Ellen Haas Page 13

11/3/2019 14:39

154 Ellen Haas Page 13

11/3/2019 14:39

155 Ellen Haas Page 13

11/3/2019 14:39

156 Ellen Haas Page 13

11/3/2019 14:39

157 Ellen Haas Page 13

11/3/2019 14:39

158 Ellen Haas Page 13

11/3/2019 14:39

159 Ellen Haas Page 14

11/3/2019 14:39

160 Ellen Haas Page 14

11/3/2019 14:39

161 Ellen Haas Page 14

11/3/2019 14:39

162 Ellen Haas Page 14

11/3/2019 14:39

163 Ellen Haas Page 14

11/3/2019 14:39

164 Ellen Haas Page 14

11/3/2019 14:39

165 Ellen Haas Page 14

11/3/2019 14:39

166 Ellen Haas Page 14

11/3/2019 14:39

167 Ellen Haas Page 14

11/3/2019 14:39

168 Ellen Haas Page 15

11/3/2019 14:39

169 Ellen Haas Page 15

11/3/2019 14:39