Gender integration into game design methods

Katholieke Universiteit Nijmegen

nijmeegs instituut
voor informatica en informatiekunde

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Date: June 2004
Thesis number: 04 IK / Information Science
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Abstract

The computer games market is very popular at this moment in time and high sales revenues are generated. Every week new games are brought onto the market that are even faster and more beautiful than the previous ones. Most computer games currently on the market are targeted at a male audience of which boys largely make part of. The female audience is not really in sight yet although the female population of the world is about half of the total population. Then why is the female part of the population not fully targeted yet? Could it be grown into a habit? Is it the risk of targeting an unfamiliar audience? Or could it be something else?

A lot of computer games exist and each game contains other game aspects and belongs to other game genres. Looking at the aspects of games clearly shows they differ in gender connotation. Roughly a tripartite divide can be detected resulting in aspects appealing to either girls or boys and also more neutral aspects can be identified. This divide is also confirmed by questionnaires filled in by boys and girls of a primary school.
Besides containing aspects games also belong to one or more genres. Each genre includes several game aspects and as the aspects have influence on the actual content of the game also the genre is influenced by the aspects. Relating the gender connotation of the game aspects to the game genres by the use of questionnaires, results in a gender classification of the genres. This shows most game genres have a male connotation (7) or are of neutral interest (9) and only with two genres it resulted in a female connotation.

The information about game aspects and game genres can be used in designing games as game characteristics. Some methods exist that obtain information about game characteristics (explicit methods) and other methods can be used to apply the characteristics for game design (implicit methods). A model of an overall method is created using the existing explicit and implicit methods, the game characteristics and the outer worlds; the games market and the game industry. This model globally covers the field of user representation to the required information for game design.

The model is a step into the direction of designing games for a wider share of the games market by actively using the information about game characteristics combined with the knowledge of explicit and implicit methods. Using characteristics and the methods in a more structured way could result in games that appeal to a wider market share. And as the interviews at game companies confirm, another step into the right direction is creating awareness with the game designers what to take account for when designing games for an audience with more neutral interests.

Definitions

Computer game

A game is in fact a contest of skills and strengths requiring the participants to follow a set of rules in order to achieve the goal of the game. And with a computer game this contest is held by the use of consoles or personal computers and quite often computer games are played over the Internet or a network to compete with each other.

Game aspect

Game aspects are in fact attributes that can be found in a computer game. Each game contains multiple game aspects matching the content of the game. Often a game aspect has influence on the type of game or excludes some game types i.e. a family game will probably contain (almost) no violence.

Game genre

A game genre defines a group (or type) of games containing certain game aspects. By defining game genres the players can use genres to understand what kind of games they like by using a common reference. A computer game can belong to one or more genres as game aspects can belong to more than one genre, implicating that a game can contain game aspects from different game genres.

Game design method

The game design methods as described in paragraph 5.1 (defined by literature) are primarily used to produce user representations (explicit and implicit methods). The model displaying the overall method as result of this thesis (paragraph 5.3) uses the explicit methods to obtain information about the users and the implicit methods to interpret this information and applying it in the actual game design.

Preface

Users and software are terms often used within the study of Information Science. These terms are translated to my thesis subject by looking at computer games combined with children as users of the games. The link between these two elements is made by gender differences, which are visible both with children as in computer games. With this thesis I have tried to obtain insight into the relation between users and software through the interdisciplinary aspect of gender.

This thesis is the result of reading an awful lot of literature, interviewing people from game companies, processing questionnaire results of children and conversations with people having different backgrounds. But without the help of a lot of people this result would not have been possible, so I would really like to thank all of them and some in particular.

First of all I would like to thank my supervisor Erik Proper for his feedback regarding the content of my thesis as well as his support with the process of writing my thesis. His often wise remarks certainly helped me in reaching this result even though it was not the easiest subject to choose. Also my thanks goes out to Els Rommes for the conversations and the feedback on the subject. Her guidance has been very useful because she is an expert on the field of gender and ICT. And I would like to thank Franc Grootjen for additional information.

Furthermore I would like to thank friends, fellow-students and primary school "De Wiekslag" for their cooperation in filling in the questionnaires which provided me with the empirical data needed as verification on the theory found in literature. Also the effort from the people who work at game companies is highly appreciated. And last but not least I would like to thank my parents and brother for their support during the past years.

Wout Lemmens
Nijmegen, June 2004

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1. Introduction

After four years of Computer Science at Fontys Eindhoven, I wanted to study something different, but still related to the field of Computer Science. The Master in Information Science focuses more at the human side rather than solely the technology side of Computer Science, and it is the human side which especially interests me. One specific aspect characterizes the study, which is the difference between *'building the software system right'* and *'building the right software system'*. This aspect applies to software itself as well, because it relates software with its users. And the relation between software and users is also the starting point of the subject chosen for this thesis.

1.1. Research path

The world

During the search for the final subject of this thesis, my supervisor prof. dr. Erik Proper described this starting point as looking at the world as a whole, which is far too wide to comprehend. By zooming in at the two main subjects, software and users, the focus can be narrowed down. Conversations with people having different backgrounds and having read a lot of literature supplied enough information to base decisions on.

The chosen theme will be further described by using the parallel of zooming in step by step from the world to a city, which results in a specific part of the chosen theme. A schematic display of the zooming in process can be found in figure 1.

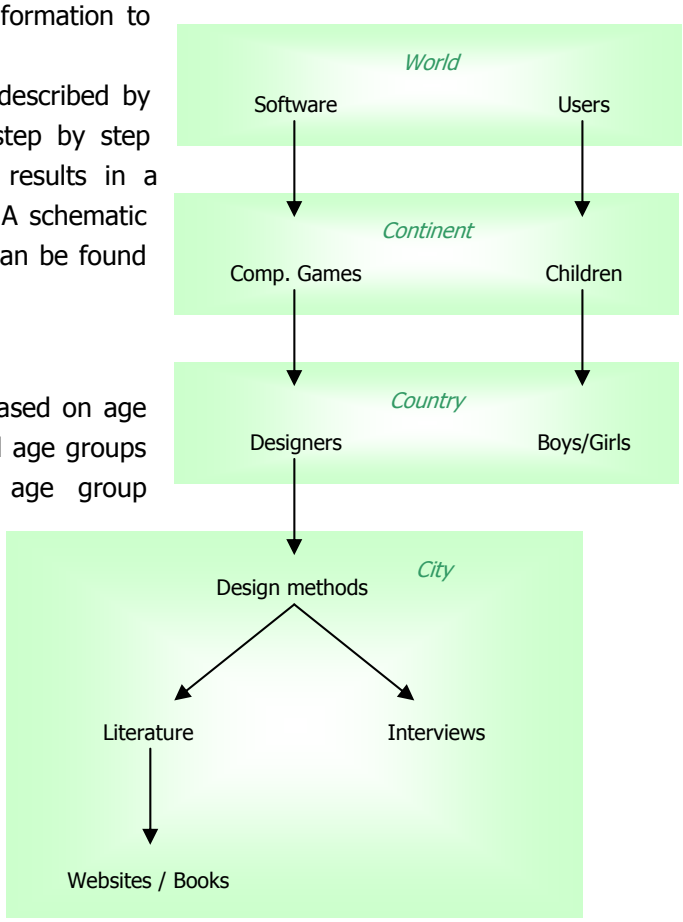

Figure 1 Schematic display of zooming in process

A continent

Looking at the users, a selection based on age can be made so that several typical age groups can be formed. An interesting age group consisting of children between the ages of six to fourteen is chosen, because specific characteristics can be found within this user group which cannot be found in other groups. One of these characteristics of children is that they are not as influenced by external factors as older people are, because they do not have the experience or knowledge on which important decisions can be based [NOR02, p143] and they are not as developed by i.e. having had a specific education. Also exposure to the world has a great influence on people, and children are less influenced than older user groups because of the simple fact that they are younger. But on the other hand children are more easily to be influenced and thus an easy target for the games industry [MOL01].

With zooming in on software, this can now be related to the chosen user group. Two types of software are interesting to look at with children: educational software and computer games. Educational software, because it is not as focused on the intended audience yet as it should be [MOL03; RED03], contrary to what probably most people think. And computer games are interesting because more and more children are playing computer games [IPB03] and the market is still growing [NZE00; AMM03; CHA96]. Both options are relevant to take a closer look at, but computer games are chosen because of my personal interest.
Like users, computer games also have characteristics that can be related to this thesis. The fact that children play computer games for leisure purposes [YAT99, p566], often contrary to educational software, and high sales revenues are generated, make computer games an interesting subject to take a closer look at. Secondly the subject computer games itself is of importance. Each game has one or more genres or types it can belong to, like adventure, role playing and simulation. Often a specific game type contains a certain set of game aspects, like active control, competition and communication.

A country

When looking at children, and people in general, differences exist based on origin, race, looks, gender and numerous other characteristics that create their identity. In this thesis one specific difference is chosen to look at, which is gender. In many articles the term gender is often confused with the term sex. Gender can be described as the social, cultural and psychological constructs of femininity or masculinity. As sex refers to the differences between men and women rooted in biology [JAN87, p46-47; ANS98, p1-10]. So gender is not identical to biological sex, but in most cases they do correspond to or influence each other [JAN87, p46-47; BRO98, p206]. And it has to be said, gender is not a simple variable on which everything can be based and with which everything can be explained [YAT99, p567]. But it certainly has a huge influence on how the games market designs games at the moment and probably also on how it can be changed.

About the gender differences, women in the game industry claim there certainly is a gender gap [NZE00] or at least gender differences exist in the use of ICT's for leisure purposes [YAT99, p566]. This gap is not the product of innate physical or psychological abilities, but is a result of the social and cultural context of software [YAT99, p572]. Since game companies almost only created games for the 'sweet spot', which a few years ago consisted mainly out of male adolescents, the female segment of the market seems to be forgotten. This resulted in not knowing what kind of games are appealing to females and girls in particular [GRI97-3] and with that in mind, the link to the game designers can be made.

As said, a gender gap in the games industry does exist [GRE98] and one of the causes of this fact lies with the designers. Most of the game designers build games based on their own interests, and consequently not targeting the audience [GRI97-2]. Because a lot of designers are male, logically male interests are implemented in to the games. This is not appealing to all markets [AMM03], including the girls market. And even if the designers are female, this absolutely does not mean all adult women can imagine what a young girl needs in a game [GRI97-3]. This is the same with men and boys, but since computer technology has always been targeted at a male audience [CHA96; YAT99, p566], this focus of computer games on boys may have grown like this and has become a tradition [GRI97-1]. And maybe men can

imagine to some extend what a boy needs in a game, because some truth could be in the Dutch saying: *'mannen blijven kinderen'* (translated freely: '*boys will never grow up*'). But slightly adjusting games by replacing simple aspects like 'he' and 'she', does not do the trick [FAI00]. To create games that appeal to a wider share of the market, a different way in design is needed [GRI97-1; FAI00].

A city

When looking at designers, the design process with its design methods plays the most important role. Different ways of identifying design methods are possible. There needs to be taken account for that a difference exists between available and used design methods. Some methods could provide a good way of working in designing games combined with relevant information, but if game companies do not see the benefit of this particular method, it will not be used by the game designers.

The first way of identifying game design methods is by reading literature about game design and related books, articles or Internet sites. The information provided by the Internet sites will need to be considered as additional information to the information found in scientific books and articles. Other way of identification is by having interviews with game designers or people related to game design. Companies like Engine Software, Guerilla or Davilex develop games and can be contacted. Based on the outcome of these interviews, one can determine for what audience the companies are developing games and in how far gender aspects are used in game design. Also contacting other persons in game design, gender studies or other related areas can provide information about the available and used game design methods. By visiting the SIGIS[1] conference in Brussels contacts with relevant people can be made to obtain additional information.

By combining the design methods with the knowledge of games and gender differences, a result could be to develop an additional design method. Such a new method could be (a part of) the answer to the main question of this thesis:

> "*How can computer games be designed that appeal to a wider share of the games market, keeping in mind the gender differences and the specified user group?"*

[1] Strategies of Inclusion: Gender and the Information Society, 20 January 2004, Brussels

1.2. Report outline

Chapter 2 will describe the problem description including the main research question including the sub research questions (paragraph 2.1). Paragraph 2.2 contains the individual approaches used to answer each question. The main research question is derived from the introduction.

As can be read in chapter 2, the main research question will be split up into three sub questions and the following three chapters will describe an answer to each question.

In chapter 3 "Game aspects" the first sub question will be answered. Mainly through literature identification is made which can be read in paragraph 3.1. Also the gender classification of the aspects is visible in this paragraph. Furthermore paragraph 3.2 will describe the questionnaires used with the game aspects and the results of the questionnaires.

The following chapter 4 "Game genres" will be used to show a possible genre division in paragraph 4.1 as there does not exist a definitive genre division. Also with the game genres questionnaires are used of which the questionnaires itself as the results will be described in paragraph 4.2.

The third sub question is about game design methods and will be described in chapter 5. The methods itself will be divided into two categories, explicit and implicit methods, and can be found in paragraph 5.1. The next paragraph describes game characteristics (game aspects and game genres) as used in the model. The model in paragraph 5.3 is created out of these methods to visualize the different interpretation of the methods as literature defines them. Furthermore some of the results of the interviews with game companies or game related companies are added as paragraph 5.4. Only the questions about game design methods are discussed in this paragraph. And as the game design methods are not the only important issues in game design, paragraph 5.5 describes some influential actors in the games industry.

Chapter 6 describes the question remaining which is needed in answering the main question. The last one will cover the issue about the usefulness of changing, improving or extending one of the existing design methods or creating a whole new method. In answering this additional sub question the information provided by the three sub questions is needed too.
Furthermore an answer to the main question will be provided through the use of the answers to all sub questions. Consequently this will result in a conclusion of the thesis.

2. Problem description

Based on the main research question, sub questions are formulated which are explained in paragraph 2.1. The approach in answering each of these questions is described in paragraph 2.2.

2.1. Research questions

The main research question as described in the introduction concerns:

> "*How can computer games be designed that appeal to a wider share of the games market, keeping in mind the gender differences and the specified target group?"*

By using a specific game design method it should be possible to create games that appeal to a wider share of the games market, including both boys and girls (aged 6 to 14 years) which is the target group. If existing methods do not satisfy the needs of this target group, a new method should be developed, keeping in mind the gender differences. To look at these gender differences two issues, which are strongly related to gender differences, are of great importance with games: game aspects and genres. Each of these issues raises another question.

> "*Which game aspects can be identified and to which gender does each aspect relate?"*

Every game contains quite some game aspects, which can be seen as the ingredients of a computer game. Therefore game aspects are important to take account for when designing games. Some of these are typically boys' aspects and on the other hand others are typically girls'. Also neutral aspects can be identified just as aspects that are preferred a bit more by girls than boys or the other way around. The third research question raised by the gender differences are game genres, with which the game aspects can be used actively.

> "*Which game genres can be identified and which game aspects can be related to each genre?"*

As every game contains game aspects, also every game belongs to one or more game genres. With game genres a lot of inconsistent definitions can be found in literature and on Internet sites but despite of that it was possible to create a list of genres. After identifying the game genres a similar classification needs to be made as with the game aspects. Then it can be determined if some game genres belong to a certain gender classification and are thus interesting for a certain target group. After defining both the game aspects and the game genres, the main research question raises another question about design methods of games.

> "*Which game design methods are available at this moment in time and which method keeps gender differences in mind?"*

In designing games applying a method will guide the designing process to create a satisfying result. Before being able to use a design method, available and used methods will need to be

identified. By knowing what each method stands for, a choice can be made which to use and which method actively uses the gender differences as described with the game aspects and game genres. The last question will use the information of the prior three questions to answer the last question.

> "*Is it useful to change/improve/extend one of the existing design methods or does a new method needs to be developed, based on the acquired knowledge about games and gender differences?"*

Whether a new method needs to be developed or not and what information is needed will be described last. Some information of the interviews will be used to illustrate one and another.

2.2. Research approach

The research approach used with this thesis is based on the research questions. Also the order in which each part of the thesis is studied and described is determined by the questions. With each question a slightly different approach is used to provide the individual answer. As the thesis also the approach will be described in order of the stated research questions. A more detailed description per question can be found in each chapter.

> "*Which game aspects can be identified and to which gender does each aspect relate?"*

With identifying the aspects and creating the gender classification, reading literature played a major role. Also interviews with game companies and game related companies were useful in both identifying game aspects and providing the possibility to check on the descriptions and classification. A final check on classification is performed by letting the target group fill in a questionnaire which also resulted in a more detailed classification by combining the literature with the questionnaire results.

> "*Which game genres can be identified and which game aspects can be related to each genre?"*

Like with the game aspects, literature was again the starting point for describing game genres. Because of inconsistent genre descriptions the list defined in this thesis does not contain the conclusive genre division, but it certainly contains the most important genres. For creating the gender classification in the game genres questionnaires are used although it was impossible to use the target group with this questionnaire due to the language and difficulty.

> "*Which game design methods are available at this moment in time and which method keeps gender differences in mind?"*

Literature is the main source of information in identifying game design methods. Because it is inadequate to use a questionnaire as check for the methods, reviews will be used instead. The interviews with game design companies show both the actual use of the methods and the unawareness of companies in the existence of design methods. Also the interviews are

used for some additional information on the methods as some information about the gender influence with some of the methods.
Besides the design methods which certainly have influence on the final result of the game, also some influential actors can be identified, from both literature as interviews, which should not be ignored or at least taken some account for.

> "*Is it useful to change/improve/extend one of the existing design methods or does a new method needs to be developed, based on the acquired knowledge about games and gender differences?"*

The answer to this question will be derived from the answers to the prior questions. Thus indirectly the answer is based on a combination of literature, interviews, questionnaires and reviews. Also a possible follow-up to this research will be sketched in the conclusion.

3. Game aspects

As described in chapter 2 "Problem description" the following question will need to be answered first:

> "*Which game aspects can be identified and to which gender does each aspect relate?"*

The first step in this process is to identify game aspects of computer games. The second step is to make a classification in these game aspects based on gender (boy, girl, neutral).
Several actions are taken to answer this question and the first one is by reading a lot of literature (paragraph 3.1 "Literature"). Most game aspects were to be identified by reading articles and books, and by visiting Internet sites of game developers or related subjects. The articles and books were used to make the gender classification and the Internet sites contained mostly general information about games and game aspects.
Besides reading literature also interviews with game companies and game related companies were useful in identifying game aspects. Although most game aspects came from literature, some additional aspects were the result of the interviews. The interviews were also used to check on the game aspects and the gender classification.
By these two actions the most important game aspects were identified and related to each corresponding gender. A final check is performed by a questionnaire (paragraph 3.2 "Questionnaire") filled in by the target group of 6 to 14 year old children. This resulted in a more detailed gender classification in which not only each aspect is related to each corresponding gender, but also the interest of the opposite gender is specified with each aspect.

3.1. Literature

The descriptions of the game aspects below are sometimes expressed using stereotype formulations. By using this way of describing, the ambiguity about gender in the aspects is less than when more vague expressions are used as '*girls often like*' or '*besides girls also boys like*'. When these stereotype ideas or formulations about femininity or masculinity are used, these aspects actually have a feminine or masculine connotation.
Game aspects as described in this paragraph are based on literature primarily and used later on in the game design methods. For all the aspects a classification is made which will also be used with the game design methods as with the game genres which will be identified in paragraph 4.1 "Literature".
This paragraph contains descriptions of all game aspects which are used in this thesis. It is not required to read all descriptions to understand the following chapters. Though if the names of the game aspects are not self-explaining or unclear, reading the concerned description is recommended to understand the questionnaire results (paragraph 3.2, page 18) better.

3.1.1. Boys' aspects

Physical violence

In the early days, games had only themes like space exploration and violence. By using these aspects most popular games at that time were focussed at boys and fewer girls than boys

were playing these games [GOH02]. Nowadays a lot of games still contain a lot of violence or violence related aspects used both in senseless ways as in combat.
Research suggests that girls do not find violence appealing. For instance, girls did not like a video game when an aggressive fantasy theme was added to it compared to the same game without the aggression. Others suggest that girls find the violent content of computer games boring. The empirical evidence confirms that boys are more likely to play games requiring aggressive and violent competition. In line with these tastes, other studies found gender differences in the games designed by the children regarding feedback resulting from a player's action during the game. Reported is that the feedback in boys' games was overwhelming violent, whereas the feedback in girls' games was overwhelmingly non-violent [CAS98, p51].

Combat

Combat with monsters is important for both sexes, though girls like combat primarily when they are cooperating with team members to defeat the enemy. Also the combat should not be poorly designed and too easily won. A great difference between combat in adventures or role playing games and flight simulations or 3D action games, is that in the latter combat has become the entire focus of a game and not just a part of the story. Boys do like combat as ultimate goal in a game but girls do not [GRI97-1, part 1]. Also game related companies agree on this statement about combat. In interviews with some developers it became clear that combat for girls is a way of reaching a goal and thus combat is not the goal itself. This is in contrast with boys who do see combat as the primary goal of a game [COM04].

Figures in action

Games containing action figures, which are sex independent, are very popular, especially among boys [ECK99, p42]. Girls tend to say they do not like games with this aspect [SCH04]. Possible causes for this could be that these games containing figures in action are associated with conflict and danger and often contain violence, which is not appreciated by girls [ECK99, p41].

Both male and female figures

Boys both like male and female characters. Male characters, as they are strong and mighty, being able to conquer the whole world and saving the 'princess' at the end of the game. And female characters shown and used in stereotype ways: sexy, vulnerable and submissive which is completely contrary to girls' preferences about female characters [GOH02]. But it is said men and boys do like female characters portrayed as sex objects [GRI97-1, part 2] which is confirmed by the success of the game Tomb Raider.

Competition

The socialization and education of children continues to emphasize rivalry and competition with others for boys. And looking at games, the result is that it seems winning is the only thing that matters [FAI00; LIT98, p328]. As described with the violence aspect, empirical evidence confirms that boys are more likely to play games requiring aggressive and violent competition [CAS98, p51].

Mastering

With limitless strength boys can vanquish enemies but also get killed, over and over, along the way, until they have achieved the degree of mastery that makes them champions. Then another challenge can be accepted and the mastering of skills starts over again [CAS98, p86]. Girls are not interested in mastering a game to boast about reaching i.e. a certain level [GRI97-3], but they do like mastering to improve their skills to compete with themselves. But because the interviews with game companies showed mastering skills are most often used to compete with others, it is assigned as a boys' aspect instead of a gender neutral aspect [COM04].

Stereotypes

The literature used for this thesis always projected stereotypes in games at game characters. After the interviews with game companies a second way of looking at stereotypes became visible; stereotype game elements. Game elements are things like crates containing the most impossible items in a given situation. Often crates contain machine guns, magic crystals and other special items. Other examples of elements in games that could be called stereotype are switches used in games. They are always enormous and can not possibly be missed by the player [COM04].
The other way of stereotype is looking at the characters and often in combination with the theme of a game. Some adventure games for example, contain rescue and romance. Boys do like the part of strong mighty men and the women to be rescued. Girls on the other hand do not want to be rescued but want to do the rescuing themselves [CAS98, p83]. Following the game companies interviewed, women having the lead role in a game should at least have the looks like Lara Croft in Tomb Raider [COM04].

Moving objects

The moving objects in a game can be from a simple and old fashioned 2D jumping game to 3D objects in a lately released game. But all objects have to contain some sort of action to participate with to appeal to boys. By using moving objects in a game the player is forced to react to the situation created [ECK99, p42]. This influences the pace of the game and girls tend to dislike a fast pace and prefer to define their own pace [STE03, p6].

Games that provide fun

Boys want to play a game that provides fun like a shooting or warfare game. After school they often do not want to be bothered with more learning and other educational games or tools. Girls often do like the educational elements of a game besides a fun element as fun primarily is more important to boys [GRI97-1, part 4].
As illustrated by the interviews of game companies; also parents decide on what their children will play. First of all, mothers will be less likely to enter a games shop compared to fathers, because fathers are often more interested in games themselves. For example when a father is accompanying his daughter, he wants the game to be non-violent and keeping in mind genres like racing or warfare are not appealing to girls. This often results in games belonging to edutainment because almost no other titles are available for girls. But when he is accompanying his son, he will be more likely to buy racing games or fighting games because of his own interests and to compete with son [COM04].

3.1.2. Girls' aspects

Identification

Super heroes in a fantasy world full of magic forces and bizarre adventures combined with the latest trends in the real world. These essential aspects of involvement and identification can be found in quite some games. Also by using the 'first-person perspective' in which a gamer looks through the eyes of the hero, makes identification possible because the gamer somewhat becomes the hero [VAL97, p114]. Adding female characters to this helps females identify with the game, which is important for this type of gamers [ECK99, p42; GRI97-1, part 1]. Especially characters with realistic roles are identified easily with, contrary to fantasy characters [CAS98, p60]. Identification can have a positive effect on girls to engage with the games [LIT98, p338]. But when female characters are portrayed as i.e. sex objects or vulnerable creatures, females do not identify with or want to be related to them [GRI97-1, part 2].

Female figures only

When women are portrayed in games, usually as non player creature (NPC), they are nearly always sex objects. It is said men and boys do like this, but as described with identification, women and girls do not appreciate it [GRI97-1, part 2]. Girls complained that females were rarely cast in the role of a main character. Female protagonists have become optional in some of the hand-to-hand combat games, but when they are included they are aggressive and have the physical attributes of a male-defined sex symbol [CAS98, p59]. So females are often portrayed negatively in computer games, if portrayed at all [YAT99, p568]. But when female figures are used in games in a more normal way, it is greatly appreciated by girls.

Reality by appearance

Reality in games has two sides: reality by appearance and reality in gameplay. The first side will be discussed here and the second one can be found with gender neutral aspects.
Girls are appealed more to reality based games than boys are [ECK99, p41]. This can be seen in the results of research done on children who could describe how a game would look like when they could design it. Six out of eight girls used more realistic and familiar settings for their games, such as a classroom, ski slope or an airport. In contrast to boys, who mainly used fantasy settings for their games [CAS98, p56-p57]. A good example is the game The Sims, which is greatly appreciated by girls and is very close to reality by appearance, and even very close to reality in gameplay. But the first aspect is more important to girls.

Problem solving

Most games have an element of problem solving build in and with other games the problem solving is the key element. By doing certain actions in a specific order, solving a puzzle in a game, collecting a number of items or anything in between, belongs to problem solving [YAT99, p574]. In contrast with boys, who like to play mindless games like Doom, girls often want to learn something from their games, and games including problem solving can satisfy this need [GRI97-1, part 4]. Also puzzles are appreciated more when solving contributes to the story of a game. On the other hand, boys primarily appreciate puzzles to gain more points [CAS98, p84].

Cooperation

Girls are supposed to prefer working together as teams instead of working as an individual [MCS01], which is also confirmed in other research [CAS98, p55]. Some even claim girls are natural team players [GRI97-1, part 1]. As a lot of activities on a computer are coupled with and individual mode of working, including playing computer games, girls tend to find the experience alienating and therefore preference working in a collaborative way [LIT98, p328].

Relationships

The socialization and education of children continues to emphasize the acceptance of others in real life and this can also be seen in games [FAI00]. For example the interaction between the main character and other characters in a game is important [GRI97-1, part 1; GRI97-1, part 4]. One specific example of this relationship is giving attention to another character in a game by stroking or feeding [HOL03] and thus caring for the characters [GRI97-1 part 4], which attracts girls mostly. Also the interaction between the gamer and the game figure is of great importance to girls with [HCC04]. Girls are more likely to have a favourite game figure within a game, which could not be seen with boys [LIT98, p338].

Low frustration level

Structural features in a game are often appreciated by girls and are suited to girls' computer experience and skills. By creating a menu-driven game, with meaningful icons and few surprises, the trial-and-error strategy is not required. By providing the gamer a limited set of choices, which makes it easier to comprehend, an astonishing variety of creations are possible by combining some of the choices available.
Also by adding tutorials, or as in the Barbie game called workshops, the gamer can experiment and learn how to use the game at the pace the gamer prefers [CAS98, p63]. This is all in contrast to boys, who do like games at a fast pace and they often use the strategy of trial-and-error to find out how a game works.

Social

Helping people or animals in distress is liked by mainly young children and in particular girls [PLA04]. At LAN parties, a few girls are present and even less are actively playing. Most of them just like the pleasant atmosphere instead of playing games which are mainly quite aggressive [SCH04]. The BBC claims more games could be attractive to women and girls by implementing more emotions [HCC04] and this is also confirmed by others [GRI97-1, part 1]. An example of a game that has a strong appeal to girls is The Sims which has a lot of social aspects [AMM03]. The literature on social behaviour suggests that compared to boys, girls are more likely to be a member of a group and that they are more interested in social activities. In their play activities, girls have been found to be more socially oriented than boys [CAS98, p53].

Colours

In another game especially for girls, Barbie Beauty Boutique, colours play an important role [MCS01]. The game figures can be changed with a different outfit, head-dress, make-up, nails, etc. By applying these changes, a wide variety of colours is needed to create enough possibilities to manipulate the appearance [HOL04-1].

Personal exploration

A lot of girls do not play games just for fun but they do want to learn something from it [GRI97-1, part 4]. Games can also be used to explore a new world and to see what happens when certain actions are performed without influencing the real world [GRI97-3]. It is like as if being in an unknown place, looking around, going through doors and finding out what is in the next room and discovering things [YAT99, p574].
Also girls want to explore on the personal field by examining their feelings and problems. They want to see how certain clothing and hair dresses look on them and how people react on them in specific situations. Role playing associated with a future job can be interested just as finding out what kind of boyfriend matches their personality [ECK99, p41].

Communication

Girls are very interested in letter-writing and in other forms of communication across a variety of media. They like to think about what to say and how to say it. Girls enjoy analyzing responses, pondering over phrasings, and testing alternatives. They like to illustrate their messages, comment on them, and compare and contrast them with other statements. Girls might be interested in games that focus in how things are communicated, not just on what is being said [CAS98, p84].

Graphical images

Girls like images of people, plants and animals [MCS01; ECK99, p40-41] which can be seen in i.e. Barbie Horse Adventures (contains horses and people) [HOL03]. Also other games, like Putt-Putt and Freddi Fish, contain images of animals [PLA04]. The images have to be relatively large and need to contain a lot of details. Peaceful and friendly scenes are also appreciated by girls [MCS01; ECK99, p40-41].
These types of images are more important to girls than to boys because it can possibly motivate girls to use the computer more often. Besides the importance of these images, girls tend to like these types of graphics more than boys. Boys more often appreciate images with people in action, with means of transport and images representing conflict, danger and excitement [ECK99, p40-41].

Analog aesthetics

Many games (but certainly not all) have a particularly dark and 'digital' aesthetic; there is definitely a need to create applications and content that are not within these categories to appeal to a wider range of people; children and adult, male and female alike for whom leisure use of existing products remains largely unattractive partly due to what products look like [STE03, p19].
The results of the research with the KidCom case did not have the outcome that girls wanted 'pink boxes'. On the contrary, they wanted darker colours and less childish forms than the designers had suggested. Girls even claimed they would be even more interested if the product was not positioned as a typical girls' product [ROM03, p39-40]. This particular example is about a piece of hardware, a communication device for girls, but it can also be easily translated to computer games.

Evolution and development

Besides an evolving story, also the characters in a game need to develop during the game. A good example of a game which contains development of characters is The Sims. It starts with

moving out to an own apartment and getting a job. After a while the Sim gets a job promotion and consequently starts to earn more so a new home needs to be found. This kind of character evolution and development provides more commitment and involvement to the player of the game [GRI97-1, part 4;].

Nurturing

One of the developers of a game company spoken to develop a game with a memory like element created around a baby. The idea of the game is to give the baby some toys by looking at a series of available images of toys and finding the corresponding series of images the baby asks for. Taking care of the baby by providing the toys is the nurturing aspect in the game [COM04].
Another example of a game containing the nurturing aspect is the Tamagotchi. In the first version the Tamagotchi had to be taken care of by giving it attention, feeding it, etc. With the new released version of the Tamagotchi, it is even possible to get in love, date and have a child [DIJ04].

3.1.3. Gender neutral aspects

Active control

Playing games provide active control contrary to i.e. watching television. The gamer can choose a game, the difficulty, character to play with or any other aspect available in a game. This control is appreciated by a lot of gamers, both male and female [VAL97, p113]. As with any 3D shooter like Doom or Quake, games often appealing to boys, the gamer can choose a level, difficulty, sometimes a character to play with and during the game plenty of weapons are available to choose from. Looking at a game like Barbie Fashion Designer, the player is made the main character that can choose the steps to take in designing an outfit, which head-dress and make-up to wear, and choosing the character to apply it to [HOL04-1; CAS98, p60-61]. Also girls like to be able to have control over the timing aspect and the direction in which a game is heading so they can have control over their environment [CAS98, p63]. Concluding, being in control in a computer game is important for both girls and boys but each in a different manner.

Challenges and complex activities

Most games are programmed in a way they provide a gamer with a difficulty the gamer can just handle. In the start of a game the levels are often quite easy to let the gamer practice some basic skills and further on in the game the levels get harder. With each obstacle in a level it must be possible to get over it so the gamers keep being motivated to play on. Some game companies even have a special hotline to solve game problems to make sure gamers keep motivated [VAL97, p112-113].

Storylines

The correct way of using stories in a game depends on the game. Given the game Doom a story would have really taken away from the point. It was the first mass market first person shooter and it depended on to something raw in all of its players to just run around shooting things. It was more of an emotion then a game in a lot of ways. However is still had a story, although a very small one.

While looking at Barbie Horse Adventures, three different story lines are used to extend the size of the game. By using multiple story lines in a game like those in Barbie's game, makes it more attractive to girls than a game like Doom [HOL03; GRI97-1, part 4]. Not all games can follow Doom in this respect though, while some games are just fine or even better without a story, others leave the player feeling like they are in a vacuum. Once again a balance needs to be found between what type of game it is and how it will present something [HOW98-3]. As shooters are not suitable for a very detailed storyline, games like role playing which are greatly appreciated both by boys and girls are quite impossible to create without a storyline.

Rewards

Like with sports or making music, feedback is provided instantaneously in forms like extra lives, ammunition, energy, power or medals. A gamer who is rewarded is stimulated to continue the game for the next reward [VAL97, p113-114]. Besides rewards in the form of extra items that can be used in a game, also rewards in other forms are possible. Some games, like The 7th Guest but also more recent games, can contain frustrating puzzles. After completing those puzzles an extra piece of the story is revealed sometimes as very impressive Full Motion Video, which makes completing the puzzles well rewarded [HOW98-1].
This is an example that rewards can be given in several forms which do not all appeal to both boys and girls. The first sort of rewards will be more appreciated by boys, as this reward will be used more in games following boys' preferences. The second sort of rewarding is used in all types of games, from warfare to puzzle games. So this sort of reward will be appreciated by both girls and boys.

Humour

People, both male and female, talk about humour, mimic jokes they've heard, and idolize people that use comedy effectively. If a game can make good use of comedy, the game will reach wider audiences and be much more popular [GRI97-2]. For example, girls appreciate humour based on character and situation rather than putting down. A certain level of sarcasm can be a lot of fun, as long as it is not pointing out someone's shortcomings [CAS98, p83].
Humour can obviously be a very tricky thing to add effectively, but players really appreciate it. Developers should thoroughly consider whether comedy would work within their game. Afterwards, they must thoroughly consider when, how, and what types to add. Even though humour can be hard to add, it should certainly not be neglected as it is a valuable quality for any developer [SOW01]. And any great game should contain, at least, some amount of humour to be called a great game [GRI97-2].

Means of transport

In quite some games means of transport are used like cars, planes and ships. Most often these means of transport have a masculine association. More gender neutral means of transport could be ponies, rowing boats and balloons, which are less mechanical than the ways of transport mentioned previously [LIT98, p337]. Barbie for example has developed a game called 'Horse adventures' which is mainly targeted at girls, but it appears to be also boys enjoy playing this game, but they did not admit it [HOL03].

Reality based gameplay

Besides reality by appearance also reality in gameplay is very important. Reality in gameplay is an aspect that can be found in most games, because wherever a game is about, it has to

feel right. When a ball falls down, it has to accelerate; when driving a car and making a hard turn, it has to slide in a correct way. These are elements in gameplay that are of equal interest for both boys and girls.
Both literature and game companies agree on the fact that making gameplay in games too much like reality, the complexity increases. Like in flight simulations, the complete cockpit of an airplane can be implemented, but the complexity of controlling the airplane will push aside the fun of flying it, which is the core idea of a flight simulator [COM04; WIK04].

Fantasy

Looking at the large number of fantasy novels written by female authors, this infers that the fantasy world does appeal to women [GRI97-1, part 1]. A game could be a fantasy world in which all sorts of magical things can occur [GRI97-3]. But also a fantasy world based on more real world situations like day-dreaming of the future, romance, going out and eroticism are appealing to girls [VAL97, p117]. But also boys do like a fantasy world, as can be seen as result of research. In contrast to girls, when boys are asked to describe a game they can design, seven out of eight boys had a fantasy setting, such as an imaginary city, island or country [CAS98 p56].

Graphics and sound effects

Game companies try their best to make the audio visual effects compelling [GRI97-2]. By watching new trends in i.e. music and taking account for the preferences of the targeted audience, games can be created one can not let go off [VAL97, p112]. But also with games primarily boys like, graphics and sound effects are important and game companies try their best to make it look and sound like reality [MEI03], which is in fact quite impossible because most of those games are in a future setting. Girls do like graphics based on actual reality.

Experience the game / Emotions

As game developers claim, a game really needs to be experienced, and not just be played. A player needs to be involved in the game by a good story, detailed characters, great audio and other elements a game should contain. But even when a game does contain all those elements it is possible a game will be no fun playing. The right balance between all those elements is the key to a game that will be a success [COM04].
Both boys and girls are both emotionally involved with games, but often in a different way. As shooters are games played mostly by boys, emotion by winning or losing is quite obvious to observe after playing such a game. Colours for example can evoke other emotional reactions of players, which are more important to girls than boys. For example, brides often wear white dresses and this combination is associated with happiness. The opposite is the colour black, which can be seen as a symbol of mourning [GDN99].

Creating curiosity

Finding traces in a game to continue i.e. to the next level is appreciated by both girls and boys [HOL03]. Just like bringing figures or objects in a game together at the right place and at the right time which results in something special [PLA04]. Curiosity can be created by an exciting story with events containing things like an unopened treasure box or sounds behind a locked door [VAL97, p112].

Multiplayer, playing together and network

A great game should be multiplayer by using a network [GRI97-2]. The networked computer games, which are location and time independent, did not have one specific preferenced group [YAT99, p570]. But not only multiplayer is important, just playing together behind one screen is appreciated by gamers. By doing so, problems can be solved earlier and it makes playing more fun [VAL97, p114].

Single player

Also a lot of games exist that can be played by only one gamer. Most of the games have both a multiplayer as a single player mode with missions or assignments to reach a certain goal. This can be from a modern warfare game to the old and famous Tetris game.

Collecting and trading

In most game a collecting element is implemented like collecting coins to gain lives or collecting pieces of a special item to recreate the item. As with one of the companies interviewed, they implemented collecting tokens in a special series of games which can be traded with other players to create special series. With these series of tokens levels in other games can be unlocked to be played [COM04].

Management

There is almost no end to management in games, by definition games are about management of one sort or another. Management is sometimes used as a term for a game genre but in fact it is a necessary component of all games. Games that are very management based include Civilization, SimCity and Railroad Tycoon. Games that are fairly management based extend into games such as Command & Conquer and Warcraft, which both depend on management of the units as much and often more than ability to actually move them around quickly.

Management in games can allow the player to feel a sense of accomplishment that other types of games do not fulfil. In a game where a player must make a complicated jump over obstacles the player may feel a sense of satisfaction or excitement at being able to complete the difficult manoeuvre, but they have not really done the manoeuvre themselves. Managing aspects of a game though is exactly like managing anything in real life. If you succeed in managing in the game you will feel a sense of real accomplishment, you may not have become a millionaire in real life, but if a real-life event was modelled like the situation in the game you certainly would have [HOW98-2].

Goal driven

Games with a goal are appreciated equally by both boys and girls. One of the game companies added that when games do not contain a goal like bringing the lost pieces together or saving the world, and have primarily activities like fighting against each other or pointlessly driving a car through a city, girls will not be appealed as boys are [COM04].

3.2. Questionnaire

A questionnaire is used to verify the game aspects on gender classification. Unfortunately not all game aspects described are included in this questionnaire, because a few originated through reviews and interviews after the questionnaires were filled in. As result with the game aspects both the literature and the questionnaire results will be combined to one gender classification per aspect. This classification can be different from the gender classification as described in paragraph 3.1 "Literature". Though this new classification can not be seen as the conclusive classification, because some aspects were missing in the questionnaire, the results of the questionnaire could be influenced by the way the questions were stated and also the interpretation of the data could possibly influence the result. But it certainly does illustrate the resemblances and differences between the literature and the actual interests of the children involved.

3.2.1. Target group

The target group used for this questionnaire can be defined by the following data:

Grade	Girls	Boys
All	47	41
age	10,4	10,6
5	11	10
age	9,0	8,8
6	13	5
age	9,8	10,0
7	9	12
age	10,9	10,8
8	14	14
age	11,6	12,0

Table 1 Target group definition

3.2.2. Questions

The questionnaire contains 32 questions and in each question the target group had to choose between two statements. Each statement contains a game aspect and the target group had to choose between on of the statements by filling in one of the six boxes. The statements contain contrary aspects or aspects strongly related to each other and often the statements are contrary in gender classification. Figure 2 contains a selection of the questions translated to English. This is purely intended to give an idea of the questionnaire and the complete questionnaire (in Dutch) can be found in appendix 3.

I often play computer games	□ □ □ □ □ □	I sometimes play computer games
play against each other	□ □ □ □ □ □	play with each other
play by yourself	□ □ □ □ □ □	play together with others
to talk to each other in computer games	□ □ □ □ □ □	to fight with each other in computer games
advance in a game by problem solving	□ □ □ □ □ □	advance in a game by mastering

Figure 2 Selection of questions from questionnaire translated to English

3.2.3. Results

Below table 2 displays the gender classification of the game aspects. The first classification is derived from paragraph 3.1 "Literature" and only contains one character rating the game

aspect as neutral (N), for a boy (B) or for a girl (G). The second and third classifications are created with a different setup than the first and contain more information. Unfortunately this type of rating was not possible to use in the literature classification, because the required information was not available.
The second classification is created out of the questionnaire results and contains both a score and a rating (the score is used to derive the rating from). The third and final classification combines the rating of the questionnaire and the literature.

Game aspects	Classifications: Literature	Questionnaire: score G	Questionnaire: score B	Questionnaire: rating G	Questionnaire: rating B	Final G	Final B
Active control	N	3,34	3,66	±	±	±	±
Both male and female figures	B	2,67	4,17	-	+	-	+
Challenges and complex activities	N	3,88	4,21	±	+	±	+
Colours	G	4,17	3,42	+	±	+	-
Combat	B	2,45	3,46	-	+	-	+
Communication	G	3,51	3,68	±	±	+	±
Competition	B	3,79	3,68	±	±	±	+
Cooperation	G	3,51	3,41	±	±	+	±
Creating curiosity	N	3,65	3,35	±	±	±	±
Evolution and development	G	3,84	3,08	+	±	+	-
Fantasy	N	4,14	3,47	+	±	+	±
Female figures only	G	4,18	2,77	+	-	+	-
Figures in action	B	3,12	4,29	-	+	-	+
Games that provide fun	B	3,53	3,88	±	+	±	+
Graphical images	G	3,94	2,70	+	-	+	-
Graphics and sound effects	N	3,62	3,73	±	±	±	±
Humour	N	4,16	2,90	+	-	+	±
Identification	G	3,26	3,45	±	±	±	±
Low frustration level	G	3,38	2,76	±	-	+	-
Mastering	B	3,58	3,29	±	±	±	+
Means of transport	N	3,84	4,23	±	+	±	±
Moving objects	B	3,06	4,30	-	+	-	+
Multiplayer, playing together and network	N	3,28	3,37	±	±	±	±
Personal exploration	G	2,65	2,06	±	-	+	-
Physical violence	B	3,16	3,93	±	+	-	+
Problem solving	G	3,43	3,71	±	±	±	±
Reality by appearance	G	3,48	3,52	±	±	±	±
Relationships	G	3,51	3,29	±	±	+	±
Rewards	N	3,50	3,50	±	±	±	±
Single player	N	3,94	3,57	+	±	±	±
Social / Emotions	G	3,56	3,21	+	±	+	±
Stereotypes	B	3,50	3,47	±	±	±	±
Storylines	N	3,05	3,95	±	+	±	+

Table 2 Game aspects: literature combined with questionnaire results

Legend:
+ : Interests target group
± : Neutral of interest
- : Disliked by target group

All game aspects used in the questionnaire are displayed with their corresponding ratings by gender. Figure 3 purely contains data from the questionnaire itself and is not combined with the classification found in literature. The rating associated with the aspect is determined

sometimes by only one statement but most of the times it is the average of ratings of statements covering the aspect.

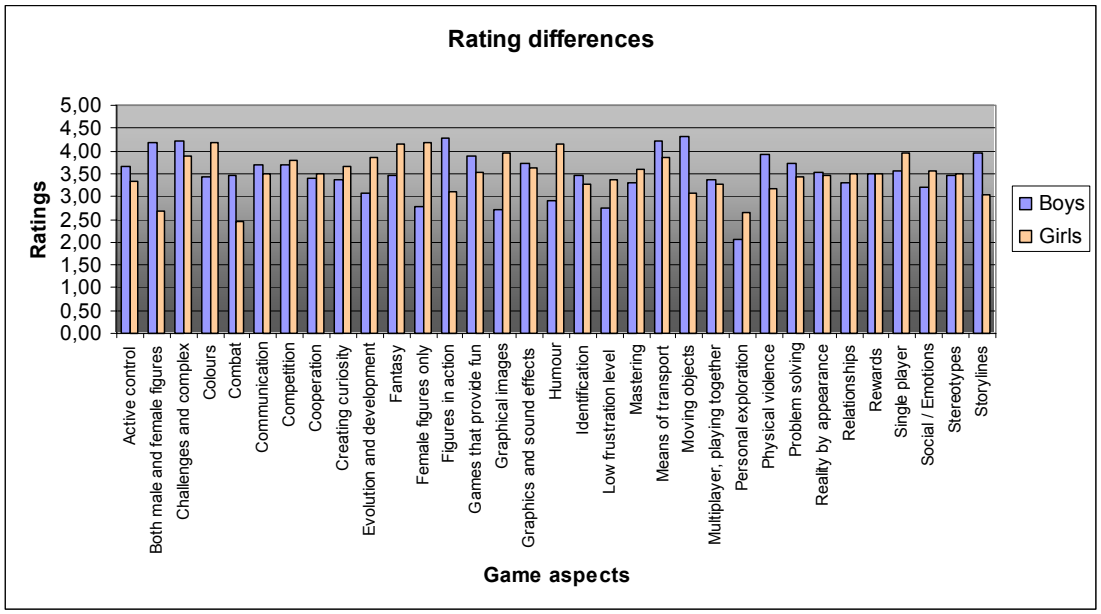

Figure 3 Game aspects: interest rating by gender

The game aspects listed in table 3 were added after the questionnaires were filled in or the questions stated did not cover the aspect enough after all. The aspects added later on are the result of interviews with game developers or other companies interviewed. The rating given to each of these aspects is based on interviews or literature, but is has not been checked on the target group.

Game aspects	Classifications	Literature	Questionnaire				Final	
			score		rating			
			G	B	G	B	G	B
Analog aesthetics		G	…	…	…	…	+	±
Collecting and trading		N	…	…	…	…	±	±
Experience the game		N	…	…	…	…	±	±
Goal driven		N	…	…	…	…	+	±
Management		N	…	…	…	…	±	±
Nurturing		G	…	…	…	…	+	-
Reality in gameplay		N	…	…	…	…	±	±

Table 3 Game aspects added later on or uncovered by questionnaire

Another way of looking at the data is by determining the differences between the gender ratings per aspect. Because each aspect's rating is determined out of one or more statements the ratings between the different aspects can not be fully compared, as the way in which each statement is put into words can have a possible influence on the score. Using the differences within each aspect makes the comparison fairer because the gender ratings within one aspect can be compared. After calculating the differences and ordering the game aspects, the graph as shown in figure 4 will arise.

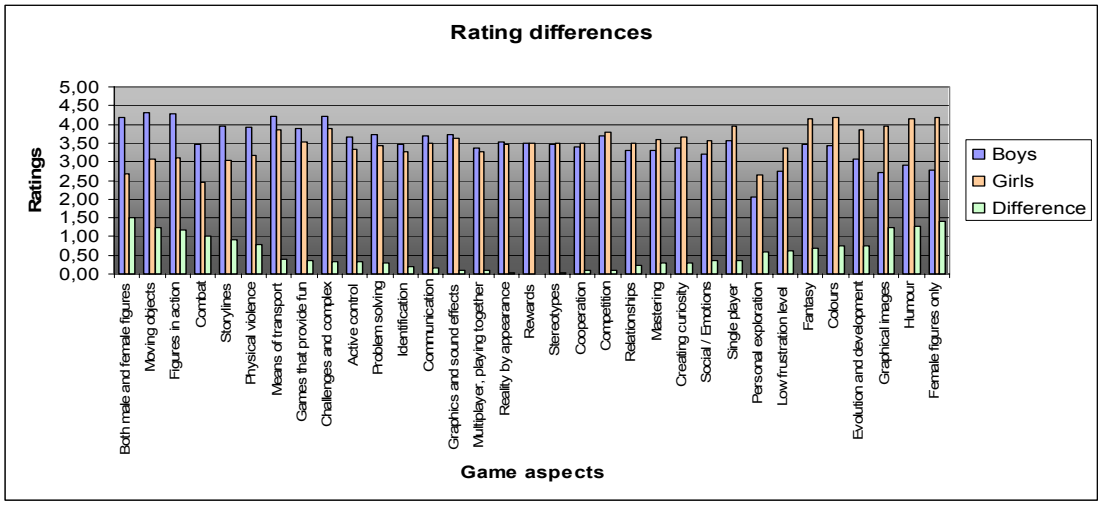

Figure 4 Game aspects: sorted by rating differences

Figure 4 contains a gender classification in game aspects as boys, girls and neutral aspects can be roughly identified from the graph. When taking a closer look at the data on which figure 4 is based, this gender classification can be compared to the literature gender classification (table 4).

Game aspects	Literature	Boys	Girls
Both male and female figures	B	4,17	2,67
Moving objects	B	4,30	3,06
Figures in action	B	4,29	3,12
Combat	B	3,46	2,45
Storylines	N	3,95	3,05
Physical violence	B	3,93	3,16
Means of transport	N	4,23	3,84
Games that provide fun	B	3,88	3,53
Challenges and complex activities	N	4,21	3,88
Active control	N	3,66	3,34
Problem solving	G	3,71	3,43
Identification	G	3,45	3,26
Communication	G	3,68	3,51
Graphics and sound effects	N	3,73	3,62
Multiplayer, playing together and network	N	3,37	3,28
Reality by appearance	G	3,52	3,48
Rewards	N	3,50	3,50
Stereotypes	B	3,47	3,50
Cooperation	G	3,41	3,51
Competition	B	3,68	3,79
Relationships	G	3,29	3,51
Mastering	B	3,29	3,58
Creating curiosity	N	3,35	3,65
Social / Emotions	G	3,21	3,56
Single player	N	3,57	3,94
Personal exploration	G	2,06	2,65
Low frustration level	G	2,76	3,38
Fantasy	N	3,47	4,14
Colours	G	3,42	4,17
Evolution and development	G	3,08	3,84
Graphical images	G	2,70	3,94
Humour	N	2,90	4,16
Female figures only	G	2,77	4,18

Table 4 Game aspects: literature vs. empirical data

The table is ordered by the difference between the two gender ratings, meaning the top of the table should contain the aspects with a 'B' classification and the bottom of the table thus should contain the aspects with a 'G' classification. When comparing the empirical order of the game aspects with the theoretical order, some resemblances are visible. The most important resemblance is that the first girls' aspect is at the 11th position from the top and the first boys' aspect is at the 12th position from the bottom of the table.

The neutral aspects are not really in the middle of the table as expected because other non-neutral aspects showed less difference in gender rating. Two possible causes to this can be identified; the way the statements were put into words has a negative effect on the rating of neutral aspects, or the aspects classified as boys' or girls' aspect are more neutral than thought at forehand.

Concluding, figure 4 roughly shows a gender classification is present in the game aspects, as was expected through literature. Although this result shows enough to confirm what is found in literature, this definitely could use some further research to study it in more detail.

A slightly different element in the playing of games is about the playing time of children. As can be seen in the questionnaire, the first question is about the playing time. This is also an interesting issue when looking at gender differences with playing computer games. Although results based on one question in a questionnaire do not say everything, it certainly gives an indication of how the playing time between girls and boys differs.

Figure 5 shows children in general play a lot of computer games. When looking at the gender divide, boys play significantly more computer games than girls do. The results of this table could be influenced by several factors like peer influence (children could be influenced by other children in their surroundings) or computer attitude (primarily girls have a negative attitude towards computers and computer games) [MOL01, p27, p48]. But as can be seen in figure 6, which is from a study about children marketing of computer games [MOL01, p24], the trend of boys playing more computer games than girls is also visible, although it is not as strong as in figure 5. With comparing the two figures there should be taken account for that the study about children marketing is already three years old, which could explain the shift to playing a lot of computer games.

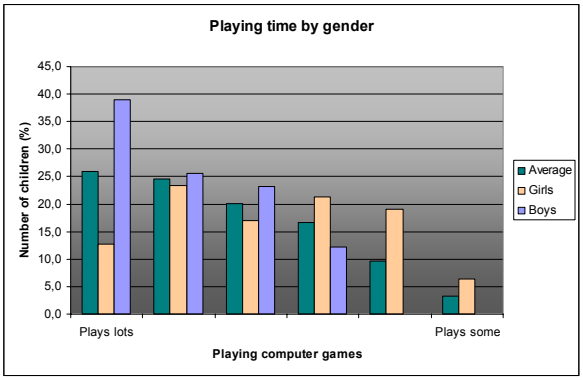

Figure 5 Playing time of boys and girls

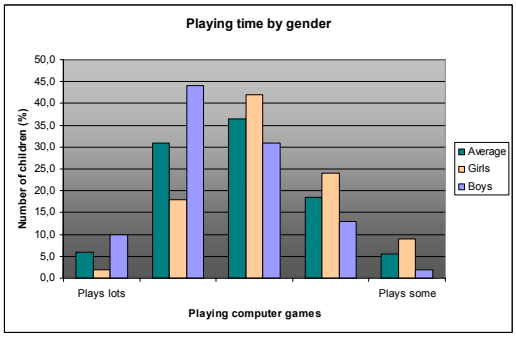

Figure 6 Playing time of boys and girls by [MOL01]

Also the playing time of boys and girls separately and divided by grade (which is almost similar to age) is interesting. As can be seen in figure 7, boys from the 8th grade and girls from the 5th grade play most games. This could indicate that boys are more interested in playing games, but it could just as well be influenced by peer influence and computer attitude as described before.

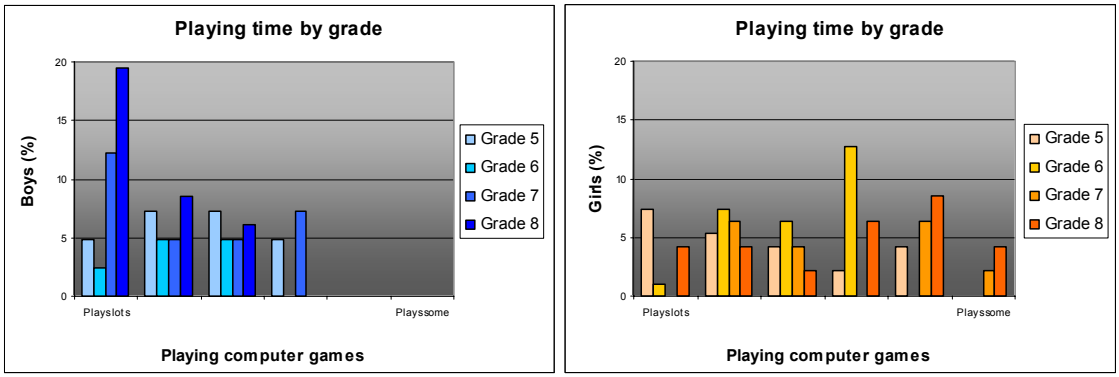

Figure 7 Playing time of boys and girls separately and divided by grade

4. Game genres

As described in chapter 2 "Problem description" the following question needs to be answered next:

> " *Which game genres can be identified and which game aspects can be related to each genre?"*

By identifying the game genres and creating the gender classification as with the game aspects, this information can be used together with the game aspects to base design decisions on. Also this process is divided into two steps: identifying the game genres (paragraph 4.1 "Literature") and making the gender classification via a questionnaire (paragraph 4.2 "Questionnaire").
For identification of the genres primarily literature in the form of articles or Internet sites was used to compile the list as described in paragraph 4.1. The literature used for this paragraph contains quite some inconsistent definitions of genres. Therefore genres as used on game sites are very important because it is of little purpose to deviate from the definitions in the games market. The list of genres is given to people working in the games industry to check on them. The list as can be found in this paragraph does not contain the conclusive genre division. Often a genre like Sports is defined as genre itself, but it can also be defined as sub genre of Simulation games. A choice had to be made and the result can be read in paragraph 4.1 "Literature".
The second step is making a gender classification as with the game aspects. To do this, the game aspects with its classification are actively used in the questionnaire. Unfortunately it is not possible to use the target group for this questionnaire because it would be too complicated for them to understand. Therefore people, mostly students, who play games in any amount are asked to fill in this questionnaire. The result is a gender classification of the game genres in the classes: girls', boys' or neutral genre. Also a mix of classes is possible in case a genre is not simply assignable to a single gender class.

4.1. Literature

The game genres are identified for multiple reasons. First of all it is relevant to the games industry as game genres often decide on what kind of game is going to be developed. Also with describing them an idea was created what each genre meant. And another reason why the genres can be found here is that they are used to provide the respondents of the questionnaire with information. The game genres are vital to game development and thus they will be used as input for the game design methods besides the earlier described game aspects.
Like with the game aspects, reading all the descriptions of the game genres is not required to understand the following chapters but only if the reader is familiar with the genres. Knowing the meaning of the game aspects and game genres will support understanding the questionnaire results as described in paragraph 4.2 (page 32).

4.1.1. Action

An action game is a very general type of genre as almost every game contains action elements. These games contain a lot of activity in the form of running, jumping, leaping and climbing in combination with reacting to objects and situations. The pure action games are

seen as games for hardcore gamers [HOW98-1; HOW98-2]. A main issue in pure action games is to beat the bad guys to reach the end of the game [AEC00].

As said almost every game contains some sort of action, but two main action sub genres exist which are almost purely based on action: shooters and fighting.

Shooters

Within shooters excitement and challenge is created by using life or death situations. By shooting enemies, which exist in various forms like humans or aliens, health and armor are drained till the enemy has died. Sometimes the players in shooters have lives but often the player is being regenerated at a starting point and with default weapons. The area in which is played is fixed and on specific spots in the area weapons are available with which the enemy can be defeated. Shooters are often played as a multi player online game but it is also possible to play shooters in single player mode by fighting against the computer or by accomplishing missions [WIK04; HOW98-1; IHO04]. Most common perspectives used with shooters are first person and third person.

Figure 8 Quake

Fighting

Fighting games contain one-to-one combat between two players or between a player and the computer. The main goal is surviving by beating the opponent using different moves available in the game. Often the game is brutal and very violent and is played at high speed and thus requires excellent hand-eye coordination [WIK04; AEC00; IHO04].
Two perspectives in fighting games exist: 2D and 3D. Generic elements in fighting games are the choice of multiple characters with special abilities, several rounds per fight with often a time limit each round, beating the opponent by draining the life meter and they both contain standard moves like kicking, punching and blocking. 2D fighting games differ from 3D in graphics, as 2D contains hand-drawn, digitized and animated sprites and 3D on the other hand contains polygon-based models which are more flexible in movement. In 2D the only movement possible is left, right, jump and duck in a fixed side perspective. 3D has no fixed perspective which enables rotating and shifting perspective. Also sidesteps and moving around the opponent is possible in 3D fighting games [WIK04; AEC00].

Figure 9 Soul Calibur 2

Adventure

In adventures the player is taken on a journey in which the story unfolds during the game. The story is the drive behind each task like gathering inventory and collecting clues [AEC00]. These games demand logical thinking and great determination of the players as the story is slowly uncovered by solving puzzles or performing other tasks. The story is very important as it involves the player in the game and submerging the player in a world of depth and compelling ideas. Fundamental elements in adventures are a main character, game environment, non-player characters and objects. The player controls the main character and is assigned a specific role in which it has to interact with the other elements [GRC03; HOW98-1; HOW98-2; WIK04].

Figure 10 Zelda Windwaker

4.1.2. Simulation

In short, a simulation game is a replication of real-life situations, which can be both real and fiction. Conditions of a particular environment are simulated in which the situations take place [AEC00; IHO04]. Also physics and other real life limitations are taken into account to create a simulation as real as possible [WIK04]. Though a balance has to exist between trying to simulate the reality as much as possible and the fun a game should provide. When too many details of the real-life situation are implemented into the simulation, it is too hard to control the game. In a true simulator all these aspects are of great importance as it should be a representation of reality. But a simulation game should provide the player fun and it should also enable players to do things they are not capable of doing in real life [HOW98-2].

Figure 11 SimCity 4

Quite some types of simulation games exist and the main types which are often used will be described below [HOW98-2; VOG04].

Racing

Sometimes racing simulators are seen as a genre itself, but as it actually is a simulation it is assigned as a simulation type. Within racing games the player is in the driver seat of one of the vehicles available in a game. Different types of goals are used in racing simulations like completing a course, finishing within a time limit or competing against player of computer opponents [WIK04; AEC00; IHO04].

Figure 12 F-Zero GX

Sports

Figure 13 NBA Jam

As with racing games, also sports are often considered a separate genre. But as with racing, it also is a simulation of the real thing. Most often traditional sports are simulated in these games like soccer. Most often emphasise is on the actual playing or the strategy behind the sport [WIK04; IHO04]. A main element in sport simulation games is following the rules and often managing the players and the team is part of the game [HOW98-2]. Even sports games focussed mainly on management without seeing the actual sport exist [AEC00].

Flight

With flight simulators the focus is on flying rather than on combat, as combat flight simulators belong to the warfare type of simulation games [AEC00]. The idea of a flight simulation game is to replicate or simulate the experience of flying an airplane. It has to be as realistic as possible without making it too complex to control [WIK04]. As said before, with a simulation game the emphasise should be on the fun element in stead of creating a real representation of the actual environment.

Figure 14 Microsoft Flight Simulator 2000

Warfare

Within the simulation type warfare or combat simulations, subtypes exist [WIK04; AEC00].
Land combat simulations are designed to show the player of what it is to experience combat inside a vehicle such as a tank. There could be some confusion with games focussed on combat with other types of vehicles through the use of weapons. But warfare or combat simulations are primarily focussed on a game based on a single type of vehicles and not purely contain player to player combat but combat in a warfare setting.
Space and flight combat simulation games have a lot in common. Both types simulate the experience of fighting the enemy while being inside the cockpit of an air plane or spaceship. The main difference is the environment in which the combat takes place. This also implies the difference between the reality of flight combat simulators and the fiction used in space combat simulation games.

Figure 15 Wing Commander

A last type is the naval combat simulation game. Within this type submarines, destroyers, frigates and other seafaring vessels are used to fight with. The focus can be on a single ship or it can cover an entire fleet. Typical elements in a naval combat simulation are navigating through waters by using the sonar, firing torpedoes or other projectiles at enemy vessels and managing the crew of a ship including aspects like communication.

4.1.3. Puzzle

The puzzle genre requires players to use skills and provide clever solution to problems. Each puzzle or problem needs to be solved to clear the field or to advance to the next level. Often puzzle games have a typical look in which coloured shapes are used to piece together patterns and forms [AEC00]. The environment in which puzzle games play is often an abstraction of some sort and not a representation of the real world [IHO04]. Some puzzle games are not labelled as puzzle games as their interface is not typically puzzle like but the content of the game is in fact based on puzzles [HOW98-2]. Often puzzle games cross over with other genres like adventures or educational games [WIK04].

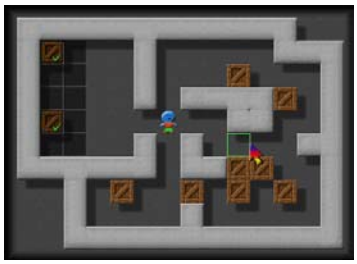

Figure 16 Sokoban

4.1.4. Traditional

Figure 17 Battle Chess

Most traditional games are based on board and card games or other non-electronic games. Some exceptions do exist as for example pinball games belong to the traditional games as well [AEC00]. The disadvantage of traditional games translated to computer games, is that most often they lose their appeal as players for example can not sit around the table playing the game facing each other [HOW98-2].

4.1.5. Strategy

Strategy games focus on planning and resource management in order to achieve victory. Also players are required to use skills to make clever strategic decisions to defeat the enemy [WIK04; IHO04]. The two main subgenres are turn-based strategy (TBS) and real-time strategy (RTS) which will be described below.

Real-time Strategy

A RTS game is a type of computer game which does not have turns like TBS games but game time progresses in real time [WIK04]. Often RTS is a mix of other genres or game elements like action and management. The fighting in this type of game often comes down to Rock, Paper, Scissors with different types of units with each having specific abilities [HOW98-2]. Management includes obtaining resources, building units and equipment with the resources, and placing the units and equipment [HOW98-1]. The strategy element in this type of game is often the timing of an attack, taking away resources from the enemy and spending resources on the right units or equipment [WIK04].

Figure 18 Command & Conquer Generals

Turn-based Strategy

As with board games, TBS games are turn based to prevent the gameplay to get out of hand. These games consist of rounds in which each player takes a turn. After the round is over often special shared processing is done [WIK04]. Because TBS is turn based and not limited by time each turn, a TBS game can contain more detail in graphics as in information provided to the player. Because of the often quite enormous amounts of information, this game genre is considered as a genre for hard core gamers [HOW98-1]. But as shown in figure 19, TBS games can also be nice and simple.

Figure 19 Worms 3D

4.1.6. Role Playing

Most of the role playing games (RPGs) on computers are quite similar to the traditional RPGs except the computer records all the changes made and actions performed. Also the environment in which computer RPGs take place is comparable to the traditional version as most often a fantasy or science fiction setting is used [WIK04].

Figure 20 Final Fantasy

Just as some other genres a RPG is a combination of other genres and game elements. Action is an important element as it is used for combat between characters, player or non-player. An in-depth story is responsible for the adventure element in the RPG. Also quite some management elements are used in RPGs as the player has to gain and spend resources wisely, decide on which type of characters are needed in the party and which characters skills to advance first [HOW98-2; IHO04].

4.1.7. Rhythm-Dance

This type of game is totally different from other games as it requires the player to be physically in action; from tapping out rhythms using a game controller to dancing in sync to the music provided by the game [IHO04; WIK04]. The story line of the game progresses with the player's skills as the player has to figure out what to do by looking at the actions performed at the screen [IHO04].

Figure 21 Space Channel 5

4.1.8. Platform

Figure 22 Super Mario 64

The platform genre is also called a side-scroller as the game contains a side perspective. Traditionally the platform genre is in 2D perspective but nowadays platform games also make use of 3D perspective. Elements used in platform games include running, jumping and fighting [WIK04]. In platform games the player goes through a number of levels and the goal is to finish each level by performing a task or defeating an enemy. Most often the last level contains a final enemy to defeat before the game is over. The game can also be lost by losing all lives or when the life bar is drained by suffering damage [VAL97, p107; IHO04].

4.1.9. Educational

This genre attempts to teach the player something by using the game as some sort of vehicle. Often educational games are called edutainment as it is a combination of education with entertainment. The target audience contains most often players from the ages of three to mid-teens. Past the mid-teens the subjects become too complex to be taught via a game [WIK04]. An important issue in these kinds of games is skill development like hand-eye coordination, concentration, memory and problem solving [MCF02]. Some examples of educational games are games that are designed to develop the math skills of users. Quiz like games are often used to learn the user miscellaneous things through the use of questions.

Figure 23 Carmen Sandiego

4.1.10. Activity Games

The activity games are not a genre that is easily found at sites or in literature. Though from interviews with game companies it appeared to be a genre that is used often to address a specific audience. These games are typically for children and usually contain multiple games with a variety of genres and all of these games are specifically focussed at children. Most often these activity games have quite some edutainment level because parents are more willing to buy edutainment games than games purely focussed at fun. Often this type of games contains activities like racing, puzzling and drawing. Besides the type of activities, the game should not contain a story line that is too complicated or contains some sort of message, because the age group for which the game is created are not able to understand such a story line. Only short and simple story line should be added to a game like this [COM04].

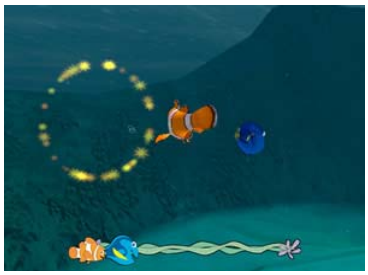

Figure 24 Finding Nemo

4.1.11. Family Games

As with activity games, family games are also not easily found as a typical genre. Game companies use this genre for a selection of their games. The interviews showed that this genre has an obvious characteristic that whole the family can join the game and also have fun playing. This means no age or gender specific aspects should be added or a fair composition of game aspects should be made. Some aspects like sex or violence will need to be excluded anyway, because addition of these will exclude a huge part of the intended audience [COM04].

Figure 25 Shrek Super Party

4.2. Questionnaire

A questionnaire is used to create a similar type of gender classification as with the game genres. In this questionnaire the described game aspects with its gender classification (paragraph 3.1 "Literature") had to be associated with the game genres as described in chapter 3 "Game aspects". Respondents filled in a matrix containing the aspects and genres with which the gender classification of the genres could be made. Because the questionnaire took at least an hour of each respondent to fill in, it was hard to find people willing to spend this amount of time. Nevertheless still quite some people did fill in the questionnaire and the result of all the effort can be read below.

4.2.1. Target group

The target group used for this questionnaire can be defined by the following data:

	Female	Male
All	1	10
age	most of them between 18 and 26 years	
Students	1	6
Employed	0	4

Table 5 Target group definition

4.2.2. Questions

The questionnaire contains 38 game aspects and 18 game genres. Each relationship in the matrix between an aspect and a genre needs to be rated '0' (genre does not contain aspect) to '5' (genre does fully contain aspect). Table 6 contains a selection of the matrix used and the complete matrix including the data can be found as appendix 5.

Game aspects	Shooters	Fighting	Adventure	Simulation	Flight	Warfare	Racing	Sports	Puzzle	Traditional	…
Active control											
Analog aesthetics											
Both male and female figures											
Challenges and complex activities											
Collecting and trading											
Colours											
Combat											
Communication											
Competition											
Cooperation											
Creating curiosity											
Evolution and development											
Experience the game											
Fantasy											
Female figures											
Figures in action											
Games that provide fun											
Goal driven											
Graphical images											
Graphics and sound effects											
…											

Table 6 Selection of matrix used as questionnaire

4.2.3. Results

As shown in the matrix containing the data (appendix 5), all the ratings of the people who filled in the questionnaire are averaged. In all game aspects belonging to a gender class are averaged for each game genre. This shows the average gender rating per genre. These values are compared with each other and a gender classification is added to every genre.

Gender	Shooters	Fighting	Adventure	Simulation	Flight	Warfare	Racing	Sports	Puzzle	Traditional	Real-time Strategy	Turn-based Strategy	Role Playing	Rhythm-Dance	Platform	Educational	Activity Games	Family Games
Boys	4,34	4,36	3,02	2,67	2,06	3,69	3,08	3,02	1,57	2,01	3,49	3,20	3,60	2,44	3,48	1,49	2,03	2,28
Girls	1,95	1,49	3,15	2,69	1,82	2,03	1,80	2,10	1,69	1,97	2,43	2,43	3,43	2,14	2,06	2,30	2,34	2,52
Neutral	3,06	2,77	3,85	3,03	2,91	3,19	3,03	2,62	2,12	2,14	3,44	3,25	3,78	2,50	2,96	2,29	2,57	2,51
Average	3,12	2,87	3,34	2,80	2,26	2,97	2,64	2,58	1,79	2,04	3,12	2,96	3,60	2,36	2,83	2,03	2,31	2,44
Classification	B	B	N	N	N	B	B	B	N	N	B	N	N	N	B	G	N	G

Table 7 Average ratings - totals

Rendered in a graph (figure 26) it immediately shows the extremes in the result. Some genres have a very high score with a boys' classification, but almost no genres have a high score at girls' classification. As the figure shows there are quite some genres with a neutral classification, and thus containing aspects interesting for both boys and girls.

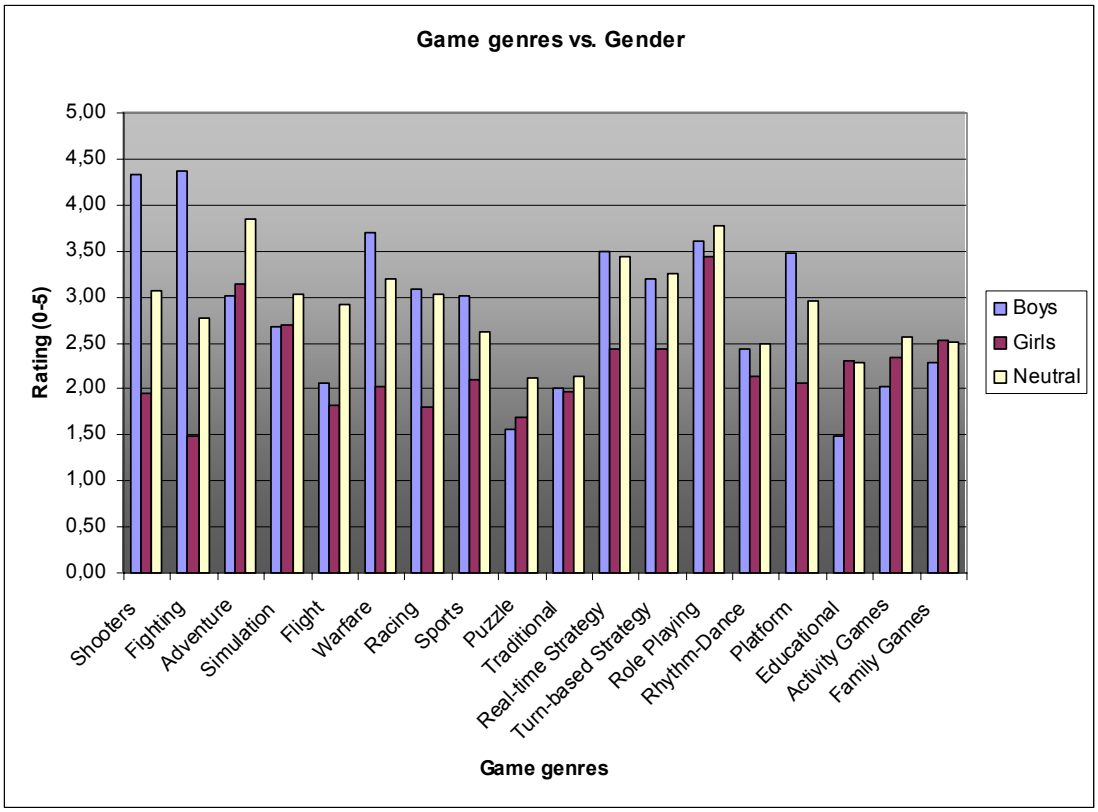

Figure 26 Game genres vs. gender (averaged ratings)

5. Game design

As described in chapter 2 "Problem description" the following question will need to be answered now:

> " *Which game design methods are available at this moment in time and which method keeps gender differences in mind?"*

The main issue in this question concerns identifying the design methods to be found at this moment of time. Also in answering the stated question, literature is again the main information source and interviews are used complementary as can be read in paragraph 5.1 "Methods". Quite some of the methods do use gender differences actively, but others ignore it totally. With these methods it is difficult specifying a target group to check on, and therefore some reviews will be used instead.
Besides the design methods more elements are vital in the success of computer games. One of these elements is influential actors (paragraph 5.5). Even when a game is developed following design methods, one or more of the influential actors can prevent the game from becoming successful.

5.1. Methods

In literature two types of design methods are described; explicit and implicit methods. Explicit methods are based on special skills, qualifications or knowledge in the area of defining or interpreting user representations. A wide range of people are involved with this technique to make it independent of individual influences. On the other hand implicit methods rely on statements made on behalf of the users, which could be stated by just one or a few individuals like spokespersons of designers or experts [AKR95, p169]. Leaving the categories intact, another way of interpreting these methods is possible. With each type of methods the other way of interpreting will be described.

5.1.1. Explicit methods

The explicit methods can be seen as ways to collect data about the target group's preferences. By combining the data from market surveys, testing and feedback, characteristics of the target group can be formed. Also literature can be used in characterising the target group, keeping in mind literature is often based on research like surveys and the author probably influenced the results of the research which is done.

Market surveys

With market surveys the target user group is studied and can possibly be involved in several phases of the design process. To start with i.e. the I-methodology (will be described later on) or research material can be used to base first concepts on. Market surveys can be used to change these concepts or add information to fine tune the concepts by getting insight into the users' interests, daily life activities and environment. Inviting women to join the design team and experts on a specific field, studying psychological literature on gender and inviting girls and boys for an interview are possible activities to gain knowledge about the potential user group [ROM03, p11-p12].

An advantage of knowing the target group well is that this type of explicit representations helps to form a more uniform representation for the whole design team. This in turn helps to prevent misunderstandings within the project team and thus speeds up the project progress [ROM03, p13]. A great disadvantage of this method is that it is too expensive for most firms and takes too much time. Therefore this method will hardly be ever applied fully, but some parts will definitely be used quite a lot in projects. A second disadvantage encountered in a more general setting, but also relevant to games development, is that a market survey is often used to persuade the higher decision-making authorities to support the project but the report is rarely consulted during the development. Also the report is often of low quality and even sometimes no report is to be found of the study at all [AKR95, p169-170].

Consumer testing

The goal to reach in user or consumer testing is to prevent a lot of work in redoing a specific part of a game. The earlier the target group is involved into the design and implementation phase, the less chance that the designers will be on the wrong track. Because of input from the target group influence is exerted on the design of the game [ROM04, p58].

With consumer tests of a new product or game, a sample group is often used to represent the future users. As a first and easy consumer test the sample group could contain some employees of the company itself or employees of related companies. The investment will be low but the test will not cover the real future users and thus delivers partial results. Another way of consumer testing is questioning users about the game. With questioning special emphasis can be placed on some issues, but it will not cover the real situation because it misses a lot of aspects like the usage in its intended context or environment. A slightly better test is letting users play with the game in a test setting. Often cases are created to cover specific issues and thus a typical and simplified situation is used to demonstrate particular user responses. Cases make testing efficient but also limit the true relevance of the results as they can not entirely be compared to the real situation [AKR95, p170-172]. Besides the advantages of testing for the product itself, testing also has a more general purpose. By testing the game on different user groups, play styles of the groups will become visible. This knowledge can be used together with the characteristics, enabling designers and developers to even more directly approach a specific target group or contrary to approach a wider target group [STE03, p13-p15]. These choices in approach are described in chapter 5.2 "Game characteristics".

Feedback on experience

This is only possible when the game is finished and used by the intended users in the intended environments. The feedback about games or consoles will be passed through retailers and possibly other agents. This has a disadvantage that the feedback is filtered twice, by the users themselves because they only pass the remarks they consider as relevant and by every agent in between the user and the developer with the same reasons [AKR95, p172-173]. But as interviews show, most often no feedback is received at all by the developers which results in not being able to improve or adjust the game if the users might not be as satisfied [COM04].
An advantage of feedback on experience over the "laboratory" consumer testing is it shows other issues and problems than consumer testing can possibly provide. But with games it is

hardly ever possible to change what is wrong because updates are impossible with most games and with only a few games a patch will be possible [AKR95, p172-173].

5.1.2. Implicit methods

The implicit methods are more a way of using or applying the information delivered by the explicit methods. With other products a similar process is applied in forming the product, so the characteristics in the product are used directly in the game to develop. Also experts will use the characteristics which are a result of the explicit methods. The experts will look at the characteristics in an objective way and filter out information not relevant to the developers. The developers themselves can use the I-methodology, which is in fact applying a subjective filter. Two versions of this method exist; in the first version the developer will unconsciously apply certain information directly from the games market and will assume he or she is a representative for the target group. The other version is when the developer or designer really is a representative for the target group (or thinks he or she can act as a representative) and actively uses the characteristic game aspects and genres. One of the case studies of the SIGIS project [ROM03, p11] described this as a 'reflective' form of the I-methodology.

Established products in the market

The market can be a source of inspiration for games with the advantage of drawing on established products that are known to have a market [STE03, p15] or even creating similar type of products in other entertainment [CHA96]. Besides the inspiration for the game itself, also the user representations present in products considered to have something in common with the game to be developed can be used to decide on adopting or rejecting representations for new games [AKR95, p174-175]. These equivalent products (or its ideas or themes) can vary from movies to magazines or from books to sports [COM04; STE03, p5, p8, p19].

Plenty famous examples of games derived from movies are available, like The Matrix, Men in Black, James Bond and several Disney productions. Elements of the movie like characters, environments, stunts and artefacts are used in the game to provide it with familiarity. At one of the visited companies they were creating a cdrom alongside a magazine. Also sports can be used to inspire a game. Besides it decides the type of sport to be implemented, also famous names in that sport can be used to give the game more esteem.

A great advantage for the game companies is that when a game has a title containing a famous name like 'The Matrix' (international) or 'Pipo the Clown' (national), it will sell anyway because it uses the familiarity and good name of the existing product to sell itself. This is a great disadvantage for the users because the chance of disappointment afterwards if the quality of the game does not satisfy its expectations. But using an established product does not always imply bad quality; it can also be a great game along with i.e. a great movie like 'The Matrix' or 'Man In Black' [COM04].

The experts

Two important departments in product development and thus also in games development, are the technical and marketing department. The activities of these two departments should be united and both should have influence on the game or product to develop, although this does not always occur. With the marketing department having more influence, more concerns

are with the user's market role which may result in neglecting the user in his technical role, which could be seen in games as the gameplay or the game content. On the other hand, when the technical department is more authorized to represent the users, the focus could be too much on the technical aspects of the product and probably neglecting the users on this field as a result [AKR95, p173-174].

As shown, representing and characterizing the gamer as end-user is not as simple as it may seem. Each user group has several different characteristics which are sometimes not easily combined into one definitive end-user. But by introducing a wider range of disciplines to the project organization, the different characteristics on the technical field of the product and of the end-user may be more united. By including a specialist on a specific field to the team, this expert can use his experience of user relations in similar products as a basis to produce user representation with other projects [AKR95, p174].

I-methodology

As said in the short introduction of implicit methods the I-methodology is applied by the developers or designers themselves. These (most often technical) specialists rely on their personal experience with other products, games (or in general computer programs) or even experiences based on users in their surroundings. A lot of reasons may cause the use of the I-methodology like when the design team is isolated from or not involved enough in the targeted user group. Also when the team does not contain people to represent the marketing, ergonomics or media side of the product or game, it is likely the I-methodology might be applied. Just as when no means of bringing in the users of games, or when testing is too complicated or too expensive this method can possibly be applied [AKR95, p173].

When the I-methodology is used in designing a game, the designers will use their own tastes, wishes and preferences as the basis of making design decisions [GAN03, p5; STE03, p12]. By doing so, the actual preferences of the target group (like elderly, girls, boys, women or men who are not typical gamers) to which the developers most often do not belong, are ignored and thus no clear perspective on the preferences can be formed [ROM04, p38-39].

Interviews with game companies show that when the I-methodology is used, it is crucial that the designers are very similar to the end-users of the game. When the designers creating a game belong to the target group, the chances of success will be greater than when designing for other user groups. Also when the characteristics of games (aspects and genres) are actively taken account for, it will possibly result in a better game. With one of the companies at which an interview is held, quite some women are in design positions with games for girls because the company believes women are more capable of designing games for girls than men are [COM04]. This is also mentioned in research as women are not only hired for their designing capabilities but also for their acquaintance with the girl target group [ROM03, p11]. By consciously involving women in the design team and actively using the game characteristics indicates the reflective I-methodology is used.

Three elements need to be taken into account though with the reflective I-methodology. When this method is used and female designers are included in the design team, the hierarchical position of these female designers is very relevant. Having good ideas does not

always imply them being accepted and implemented when this person is for example a junior developer without direct input in the development process. Sometimes the power of the argument counts, but also influence depends on the position in hierarchy [ROM04, p56]. As interviews confirm, choices are often made in consultation with the whole development and design team. This also implies the I-methodology is often not applied to the letter, because the ideas are somewhat influenced by consulting each other [COM04].
Secondly, not every woman is a representative of the women in the target group, even if the female designers are comparable to the target group in terms of age and interests. The fact that these women are in a design team implies they have access to the latest technology and are associated with skilled computer users, makes them quite different from most of the women in the target group [ROM04, p56].
And the third element to keep in mind is about the characteristic game aspects and game genres itself. This element contains both a positive and a negative side. By using the aspects and genres to focus on what girls want could strengthen and give value to skills and preferences with a female connotation. The negative side on the other hand could be that by focussing on the differences between boys and girls, and respectively using the boys' and girls' aspects and genres, could reinforce and confirm the perceived gender differences [ROM03, p3-4].

Summarizing, the I-methodology is a quite dominant design method, where designers see themselves as typical users and use their own tastes and preferences as the basis of making design decisions. The method has both its positive and negative elements, but used correctly and keeping in mind its characteristics, it can be used for development but needs to be applied with care [ROM03, p56]. Perhaps with some modifications like incorporating aspects of other methods, the I-methodology will deliver a better result [GAN03, p5].

5.2. Game characteristics

As described with the explicit methods, these will provide the information that will be used by the implicit methods. The information which is mentioned contains characteristic game aspects and game genres as described respectively in chapter 3 and 4. A vital element in these two chapters is that both the game aspects and the game genres have a gender classification.

The information about the aspects and genres combined with the gender classification are derived from literature mainly and is combined with results of interviews. Questionnaires are used to check on the validity and feedback along with the questionnaire results is sometimes used to slightly adjust descriptions. Chapter 3 and 4 form a base on game aspects and game genres and additional information can be added by using the explicit methods or by adding information from unused literature.

One thing needs to be kept in mind; the characteristics often have a male or female connotation and some are even quite stereotype. The use of stereotypes in games can be very successful but is not really necessary for a game to be a success. Although it is not necessary in games, stereotypes do improve recognition of game elements and thus indirectly influence the gameplay of games.

With the use of these characteristics the implicit methods can be applied. But before applying these methods a choice needs to be made about which audience to target. In the model of figure 28 four choices are mentioned; Boys, Girls, Multi layer and Gender cross-over. In the description of the choices the boys and girls are combined to one.

5.2.1. Boys or Girls

Most often with designing games the choice is made between boys' and girls' games. In the game to develop gender dichotomised characteristics are used to focus on the target group. Also often a lot of very stereotype ideas are implemented as the developers and designers try to make the game as appealing to the target group as possible.
Most games currently on the market are for boys or girls separately, and of these games most are for boys. Therefore the choice can be made to develop games for a different target group than the target group currently used most. One approach is to create games for girls and (intentionally) ignoring the boys group. Two other approaches are described in the paragraphs below.

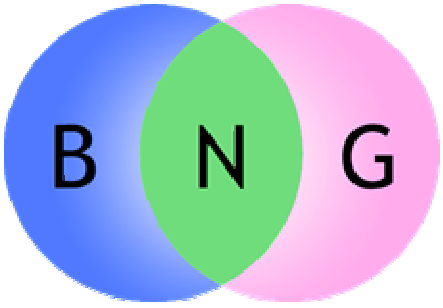

Figure 27 Boys', neutral and girls' market

5.2.2. Multi layer

The concept of using a multi layer approach in applying the characteristics to games is creating games that have content of equal interest to both boys and girls. This wide appeal to

boys and girls is not accomplished by using neutral characteristics but by using opposite characteristics instead. By this way the game is provided with different interaction styles and content with which a wider audience can probably be attracted [STE03, p16].

The difficulty in this approach lies with the designers as they need to have the ability to see what others, the wide target group, do with the game. The main factor in making games for a wide target group is as said before the content of a game. Using specific themes and interests in games and presenting it in a way the target group can engage with it easily is a part of the content. Other less concrete but certainly not less important parts are how the game is put together and how it works as a play environment [STE03, p13-p15].

This approach is sometimes used successfully with games like 'Grand Theft Auto' and 'Rollercoaster Tycoon', but more over applied to educational games because edutainment should not be gender specific as it is for example being used within schools [STE03]. Therefore the boys' and girls' aspects described in chapter 3 as the game genres in chapter 4 will be used within this approach.

Concluding on the use of this approach, game companies agree on the fact that if applied correctly, it will be a good way to develop games. But the down side of this approach in developing is that it will be a very hard applying correctly [COM04].

5.2.3. Gender cross-over

Designing more flexible and cross-gender games would possibly appeal to both boys and girls. This approach is called gender cross-over or trans gender as these games are based on gender neutral characteristics contrary to the characteristics as used within the multi layer approach as described in the previous paragraph. By using gender neutral characteristics the gender dichotomies are to a certain extent blurred instead of emphasised [ROM04, p40].

This approach will actively use the gender neutral aspects as described in chapter 3 "Game aspects" and the boys' and girls' specific aspects are of minor importance or should even be left out of consideration. By focussing on the gender neutral part of the market a partly new, uncommon and unfamiliar group of potential gamers will be addressed.

By targeting at the boys a slight part of the neutral market will also be address but none of the girls' specific part. This is the core target group at this moment of time. Targeting at the girls only, and as with the boys also including a slight part of the neutral market, is often too risky for game companies or publishers. This target group is mainly uncommon and unfamiliar. A way in between is targeting at the neutral part mainly, and thus also addressing a slight part of both the boys' and girls' market. The neutral market contains players already familiar with targeting at and also new type of players. Using this method can possibly open the way to non-core players who can be potential players.

5.3. Model

The described methods can be related in a model.

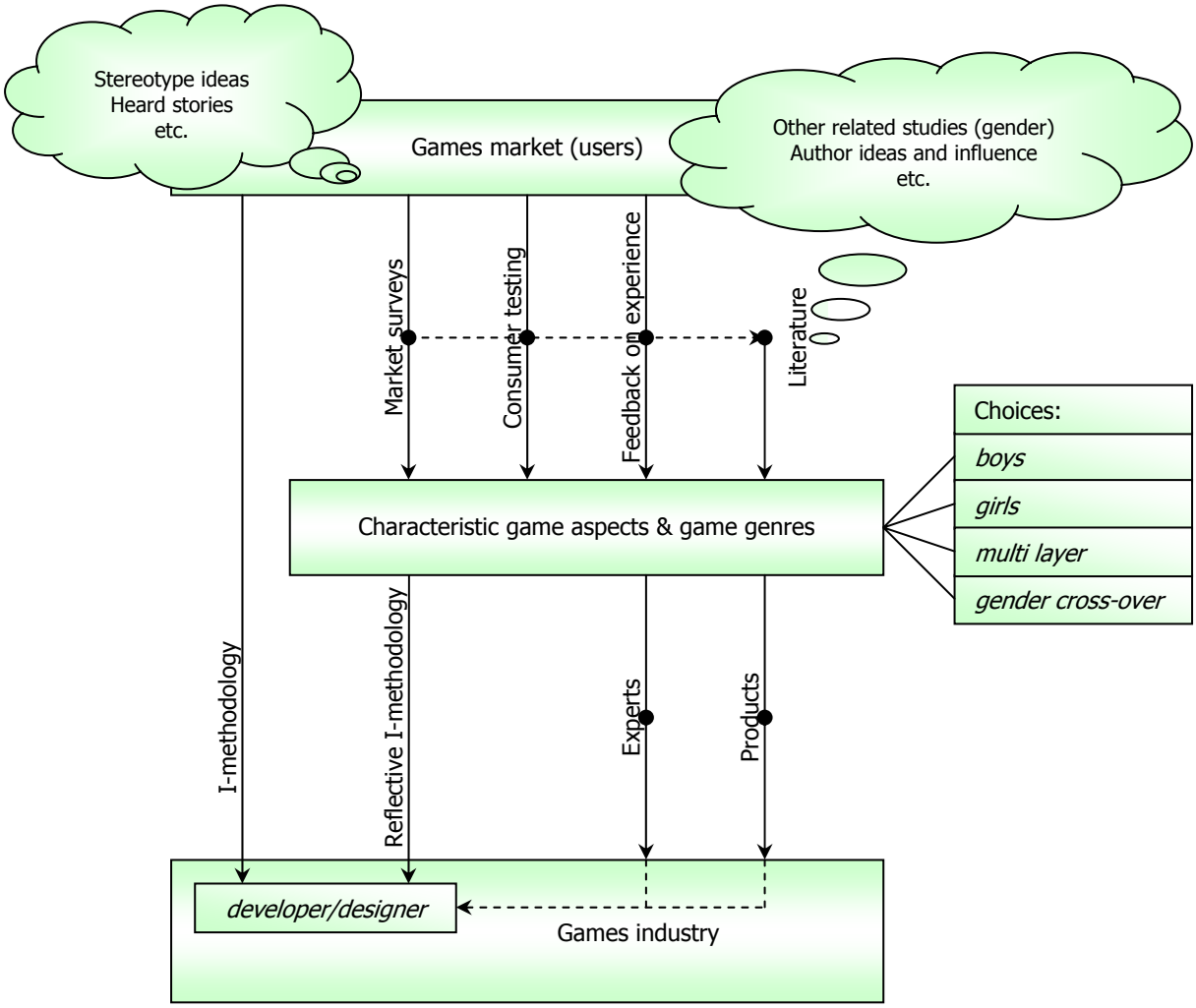

Figure 28 Model of method relationships

Data can be collected from the games market via methods like market surveys, consumer testing and feedback on experience. This data can be used to create information about how to target the group for which a game is developed. Also literature, containing ideas from the author and data collected via the earlier described ways, is used to create information about what kinds of games are appealing to the target group. The information created out of the data related to this thesis are characteristic game aspects and game genres.

Besides methods to retrieve data, also methods to use the data exist like the I-methodology, the experts and by using existing products. With I-methodology the developer within the games industry will function as a (subjective) filter and applies the set of characteristics on his own way. This influences the characteristics with the ideas of the developer himself. By involving experts in the project the stereotypes can be used too. The expert will function as an objective filter and will provide the games industry with an advice on how to create a game or specific game elements. A third way of using the characteristics is by looking at an established product in the market. This product, like a magazine for boys or girls, already has

characteristics implemented and these can be combined with other characteristics collected via the methods to retrieve data.

With every game the set of characteristics will differ from the set of another game because other methods and sources will be used with each game. Several choices can be made to decide on which characteristics to use. When the target audience exists of girls or boys mainly, only girls' respectively boys' aspects can be chosen to use. And if the target group contains both boys and girls, the game can be made multi level or neutral by applying the appropriate choice.

Even within a game different sets of characteristics exist as for example the expert will use more information than the developer because the expert has more knowledge on this subject than the developer has. With products, other research on which the product is based has produced characteristics which will be combined with a different set than the developer will use. The set of characteristics will contain only relevant characteristics to each method.

5.4. Interviews

To feed this thesis with extra information, eight game companies or companies related to game design have been interviewed. Also information is obtained by having contact with other companies via mail or by phone. More companies than those who are interviewed were contacted but did not have the resources to cooperate and also quite a lot of companies unfortunately did not even respond to my e-mail. A complete list of companies is added in appendix 2 and can possibly be used to contact in case of future research.

Providing the interviews with structure a list with questions is used. This list contains questions and additional explanation and information, and was provided to the companies at forehand. A short list of the questions can be read below:

1. For what audience(s) are your games designed?
2. What are the sources of inspiration with designing a new game?
3. What are the most important aspects to take account for with designing a game?
4. What is the goal to achieve with designing games?
5. What methods are being used with designing games?
6. How are design decisions made?
7. Is it possible to look back at the design process of a game?

Some of the answers to questions (1, 2, 4 and 7) primarily provide background information about game design in general as other answers to some of the questions (2, 3, 4 and 7) are used to give information valuable to the previous chapters. The remaining questions (5 and 6) are mainly focussed on the design methods chapter and will be discussed here.

During the interviews the design methods were explained to the companies and their comment on and usage of the methods is described. Also more general information about designing games is provided by the companies.

Interview results

To design games for a wider share of the market in the future instead of designing for the current audience is generally agreed on by the companies. The issue to design games to include more girls in playing games is discussed more often nowadays. They realise the female population represents about half of the potential market, but most companies do not take the risk of being first in designing games to include more girls. Until a company starts changing their design strategy nothing will change and most games will be targeted at the currently biggest part of the games market; adolescent boys. When more games like The Sims will be created, which unintentionally appealed primarily the female gamers, the focus will automatically and slowly change to a wider share of the market. Side note; some of the companies mentioned the gender aspect is less present in edutainment as this part of the market is quite different (in profit, design efforts and commissioner) from the fun games market.

Looking at the methods described in paragraph 5.1, quite some companies applied some of the mentioned methods. Market surveys are applied less by companies as it is a very

expensive method. Therefore only some of the bigger companies are able of performing market surveys but most often more general reports based on market surveys are used which are written by experts in a specific field. One of the companies provided an example of a media company which did perform an extensive market survey in which they created a profile of their target group. Besides the market survey they also based their information on current trends and existing products like magazines. The resulting product was very pointed towards the target audience but did not contain spontaneous elements as the product needed to be based on the specific information provided by the costly method. This is an example in which the method became in control and was not supportive as it should be.

A different way of collecting information with which a product can be influenced is by testing parts of the (unfinished) project on the potential consumers or users. Assumptions can be proved or disproved and consequently the information can be used in future projects. When the game is almost completed, big changes are impossible to make but tweaking certain elements or slightly adjusting the difficulty rate are most often possible changes. One of the companies applied consumer testing in a game store they own. Asking feedback about i.e. covers of new games is made quite easy this way. Another company benefited from a different company in the same building which often had children visiting the location for input for their business. The game company was allowed to let the children play their games and thus testing them.

Close to consumer testing is feedback on experience with the difference feedback on experience is based on finished products which are already sold on the market. A great disadvantage of this method is the difficulty of obtaining information as almost no feedback is received by the designers. Still one company could provide an example of feedback on experience. They created a game about a museum for unmotivated pupils, which was really fun to play. After completing and deploying the game it appeared the pupils did not want to play a game at school but they wanted to learn something as they are able to play at home. The company made the assumption fun would motivate these pupils to use the game within school, but the opposite reaction was observed.

In creating games the I-methodology is frequently applied by a lot of the companies. Choices are often based on guesses or what the designers think the target group would like and they base their decisions on their experience in game design. At some companies decisions are also often based on creative issues and within these companies the artists have the final vote in these issues. Also mentioned by some companies is the fact that the freedom in designing games is not that great as a lot of games are based on specifications by external parties. Another company also added that when designing within a team the result of a game is more general than when a game is based on one designer only.
One company mentioned they create games because they really enjoy the creating and when having to take account for several aspects the fun in making games would be less. They also added that they would apply a certain strategy if they know it could possibly result in a larger target group, but only if their initial idea could be maintained.

As pointed out at the market surveys, experts often perform these surveys to base reports on. One of the companies interviewed makes use of a booklet containing information about

interests of the target group and the current trends. This company also takes part in an independent group which performs research and organizes meetings in the field of computer games and this group can be considered as an expert. Another company makes use of the knowledge of an independent advice bureau within the same building. And most companies do make use of reports or studies performed by others. Only one company mentioned the whole games industry can be labelled as 'incestuous' as a lot of companies base their decisions on what other game companies claim, as if they consider each other as experts.

Also the use of existing products is mentioned with the market surveys. When a game is created around an established product the manufacturer decides on the message the game has to contain and brand recognition has its impact on the visual aspect of a game. Often game companies do use products as it has the advantage of the reputation the existing product already has. Besides the reputation, working together with i.e. magazines for children enables the game companies to be brought into contact with the target group. This is exactly what one of the companies interviewed does, basing their games on magazines or movies for children. Even one company claimed it almost is a condition a game needs to satisfy to. But as another company said, trying to create a game based on hypes is not wise, as the hype will probably be over when the game is finished.

Three of the companies mentioned other methods of designing games. One of these methods is to create a document in which the focus is on the content, structure, appearance, behaviour and environment of games. The other method is to use a game design document in which all details of a game are described without mentioning any technical aspects. In my opinion these 'methods' are ways to document findings of the methods described in paragraph 5.1 and they are not methods on their own. With designing edutainment other methods (didactical and educational) do exist as edutainment belongs to a separate part of the games market and not the market of purely fun games.

Concluding, most companies combine several methods or use specific parts of methods. Quite frequently the I-methodology is applied and also games are often (partially) based on existing products. Market surveys are rarely performed to obtain information about the target group due to the high costs but often experts do perform these surveys to base their reports on. Only sometimes real experts are involved into the game design process itself but quite often their reports or other documentation is used to base design decisions on. Consumer testing is applied quite often and provides companies with valuable information with which they are able to change to game before going into the stores. When the games are on the market, it is quite hard to receive feedback about the game as the game company does not have direct contact with the gamers themselves. Furthermore, all companies thought the subject was interesting to look at and would probably be added value to their current design process.

5.5. Influential actors

Not only the design methods of games decide if a game will be a great success or not. Several influential actors are of great influence as well as displayed schematically in figure 29. Therefore it is useful to keep in mind the following actors and its influence.

Console manufacturers (Hardware)

The current games market is profitable and the market segment consists mainly out of male (both children and adults) consumers. The way consoles are marketed at the moment is towards the previously specified market segment because it is quite safe [COM04]. But as described, girls belong to a different segment but are certainly a potential market for the games industry. A danger manufacturers are afraid of is that when targeting at both the segments, the male segment will lose its interest because the product does not belong to them anymore. This phenomenon is called revaluation and is applied to the consoles by both segments.

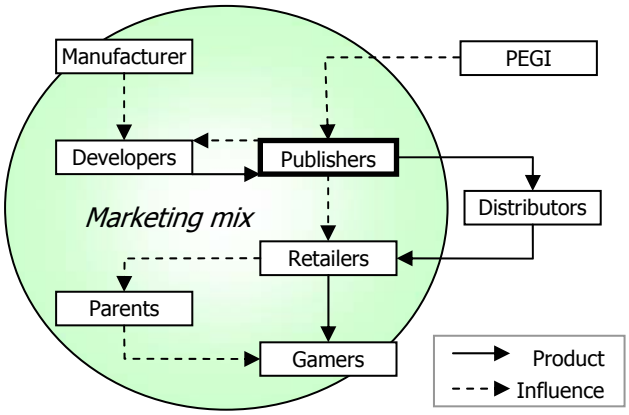

Figure 29 Schematic display of development chain

Computers and consoles are seen as a symbol of status and importance and because boys use them most for games, boys are seen as more important at this specific item than girls are. When consoles will be targeted more at girls and girls playing more games, the consoles will decrease in value. Consequently because of the devaluation of the consoles, boys will be less interested in consoles and the manufacturers may lose a part of their current market.2
At this moment of time, four popular consoles exist: PlayStation2, GameCube, Xbox and the GamboyAdvance. The Xbox and PlayStation2 are much marketed towards boys and thus the games available on this console use the same marketing. On the other hand the GamboyAdvance is marketed towards a more neutral market which could be the result of technical limitations influencing the games produced for the GamboyAdvance. The GameCube can be positioned in between resulting in games for both girls and boys.

Game design companies

This actor in the game development chain does not have a very influential position, but it does influence the game itself. Most of the times with developing games, game design companies do not have the freedom in choosing the content they would like to see. One common reason is a lot of games are developed following a licence of an already established product like a movie or books. But when a game is developed without having to work following guidelines as in a licence, the company has a lot of freedom and also a great influence on the game [COM04].

[2] Method of revaluating is used from: [JAN87, p61]

Then the game companies will need to apply one of the design methods or a combination of two or more methods. This often results in game developed following the I-methodology together with elements from another method [STE03, p17], but also other (combinations of) methods are being used.

Game publishers

Publishers acknowledge that girls are an important market that is not addressed well by industry, but that girls like to play as much as boys. They are not willing to take risks with products that are unlikely to be a big success due to high development costs and limited shelf space, and girl games are not seen as being able to deliver [STE03, p17].
But as can be seen in paragraph 3.2 "Questionnaire" quite some girls do play computer games. Still not a lot of games are produced for girls and when a game is produced, compared to a lot of games for boys, the sales revenues are minor. A possible cause could be that boys' games are often based on very successful movies (mostly targeted at a male audience) and the game is using the marketing of the movie. When a game is not based on a movie or something else and does not have the advantage of the marketing of that movie, a game will sell less as with most girls' games.

Distributors

The distributors do belong to the chain of game development, but they do not have influence on the games itself or on the sales. The distributors have to make sure the games are distributed from the production companies to the retailers. They are also often used for their storage space to store games and related products for later use.

The retailer

The retailer is responsible for the actual selling of the games. As there are three large retailers of computer games in The Netherlands (Bart Smit, Intertoys and Free Record shop), the distributors and publishers do not have much of a choice where to go to. Therefore the retailer has quite some power on the fact if a game will sell well. Several elements can be named that have influence of which two important ones are: the advertisement book of the retailer and the shelf space a game has in the retailers shop. Games with less famous names and lower production costs will also be sold at other retailers than the main three mentioned above [COM04].

Parents

Parents are represented as being keen to have their children learning, at least a bit, when they spend time in front of the computer. They are also seen as the gatekeepers and purchasers of software for children. Literature suggests that many parents have different attitudes to girls and boys playing, and to their use of computers [STE03, p17].
One important factor about the market for children's games, especially under 12s, is that as said before purchases are to a large degree mediated by parents, who screen the content, provide the terminals, and decide the spending. This has a number of implications for use of games for girls. Research suggests that in many cases parents do not encourage girls to play 'time wasting' games as much as they let boys play. This implies that the amount of money available to buy 'pure' games for a specifically girl's market is limited. In particular girls are encouraged to use technology as a tool or in education, not for play. This suggests that the content of products for girls may tend to be more 'educational' [STE03, p9; ROM03, p41].

Gamers

The games created in the whole development chain should be for the gamers, children in this research. As children do decide on if they play a game or not, they already own the game and thus it is already bought by them or their parents. A sold game is the most important for the development chain as it delivers revenues. On the other hand, game quality, gameplay, graphics and other aspects are of importance to the gamers. But these aspects are of secondary importance to the companies trying to make a profit out of computer games. Most of the times the gamer will be satisfied with the game anyway and if not, the game will disappear in a box to be never looked at again. A gamer will keep on buying games anyway, because new versions are brought out or a friend owns a game which results in peer pressure [MOL01] as described in other research.

Marketing mix

An overall element in the chain is the marketing used with games. With marketing a specified target audience is tried to be reached. By specifying an audience, a different part of the total games market is excluded which can be in the field of boys and girls, but also with age, interests, daily activities or a lot of other fields.
The marketing mix contains a set of elements used with targeting a game at a specified audience. The one often used as first, is promotion of the game. With games based on existing products, it can use this reputation to start from. Magazines and the Internet are good ways of promoting a game by allowing the magazine or site to publish a preview or review. When the game is available at the retailers, it needs to have the right shelf space to be sold. Also the game cover is of great importance for a gamer to decide on to buy a game or not. The game can be really good, when the cover looks bad, the game will probably not be bought. And if both the game is good and the cover looks great, a price needs to be in proportion with the game. The time of release is very important too, because if a game is released shortly after a similar type of game, the first game will probably be less profitable than the second one. The second one will get the best shelf space because it is the newest game in its type, the magazines will publish a review on this new game and probably the game cover will look more beautiful too. And thus the first game will be forgotten long before the required sales revenues are made.

PEGI (Pan European Game Info)

The Pan European Game Info provides games with ratings like 14+, 16+ and 18+ to indicate the suitability of a game to the potential buyers. Parents will be main users of these games, as they could have difficulty determining the suitability of games for their children by themselves. It is also used by retailers as they are not allowed to sell games to children under the age of the rating is indicating [COM04].

6. Conclusions and recommendations

6.1. Research questions

As described in chapter 2 "Problem description" the main research question to be answered in this thesis is:

> "*How can computer games be designed that appeal to a wider share of the games market, keeping in mind the gender differences and the specified target group?"*

The last sub question, as mentioned in chapter 2, is an additional question which assists in answering the main question. This additional sub question is:

> "*Is it useful to change/improve/extend one of the existing design methods or does a new method needs to be developed, based on the acquired knowledge about games and gender differences?"*

These questions will be answered by having a look at the game design methods and the choices to be made during development. Furthermore the limitations encountered during this research and the recommendations for further research will be discussed in this chapter.

6.2. Game design methods

The three sub questions as mentioned in chapter 2 will be shortly explained before the main question is answered. In chapter 3 the first sub question is stated:

> "*Which game aspects can be identified and to which gender does each aspect relate?"*

Literature and other information sources showed there is roughly a tripartite divide in the game aspects: boys, girls and neutral. With this tripartite divide there has to be kept in mind that some of the aspects do contain stereotype elements and it would have possibly been better if the descriptions of the aspects only had masculine of feminine connotations.

To verify the results found in literature, questionnaires are filled in by 88 children aged 8 to 13. By translating the results from the questionnaires to scores for each aspect, a boy and girl rating could be assigned to each aspect. Also the literature resulted in a rating (each aspect B, G or N), but the questionnaire results are more detailed as each aspects has two ratings (boy and girl) and with each rating +, - or ± is possible. In comparing the results from literature with the ratings from the questionnaires, the questionnaire results often confirm the divide mentioned by the literature. If changes were present, the results of literature and questionnaire are averaged and added as a final rating.

Another way of looking at the scores provided by the questionnaires is using the differences between the boy and girl score with each aspect. These differences quite clearly showed the tripartite divide as with the literature. A side note has to be made that the neutral aspects

were quite scattered through the ratings contrary to the boys' and girls' aspects which were quite strongly divided.

The second sub question in chapter 2, which is answered in chapter 4, is:

> " *Which game genres can be identified and which game aspects can be related to each genre?"*

The first part of the question is answered mainly by information from internet sites and documents found on sites of game developers. The result is that 18 game genres (or sub genres) are identified and described shortly.

The second part of the question is about relating these game genres to the game aspects identified with the first sub question. Also with the second sub question questionnaires are used not to verify information but to visualise the relations between genres and aspects as no literature was found on this specific issue. Only 10 people responded to my request to fill in this questionnaire, probably due to the amount of time it took to fill in.

Averaging these results show only two genres can be titled as girls' genres, seven genres got the boys rating and the resulting nine genres can be considered as gender neutral. This divide in genres is possibly caused by the chosen game aspects as they may not cover all primary aspects or a lot of aspects are considered masculine by the respondents and thus resulting in the current divide.

In chapter 5 the last sub question, as stated in chapter 2, is answered:

> " *Which game design methods are available at this moment in time and which method keeps gender differences in mind?"*

And as with the other two sub questions, literature is used to answer this question combined with interviews with game companies. Literature defines two types of methods; explicit and implicit, which are considered as separate design methods in literature. In my opinion these methods can be interpreted differently as the explicit methods can be considered as methods to gain information and the implicit methods use the information gained by the explicit methods.

The information gained by the explicit and used by the implicit methods is about game characteristics. These characteristics contain both the information about game aspects as the game genres but with emphasis on the gender differences. In the use of the game characteristics a choice has to be made to create a game for boys or girls, or for both boys and girls. When creating a game for both, two ways of using the characteristics are possible; using contrasting gender characteristics (multi layer) or using corresponding characteristics (gender cross-over).
Chapter 5 contains a model in which the explicit and implicit methods, the game characteristics, design choices and influences are visualised.

Now the additional sub question can be answered as the other sub questions are explained:

> "*Is it useful to change/improve/extend one of the existing design methods or does a new method needs to be developed, based on the acquired knowledge about games and gender differences?"*

The third sub question partly covers this question, as they both contain the issue about game design methods. But this question covers specific issues about what to do next with the existing game design methods.

As the model chapter 5 shows, interpreting the existing methods in a different way, and using information which is more structured towards gender could possibly change the way games are designed nowadays. Introducing another game design method will probably not yield into a better way of designing games. Also changing the existing methods will not produce the desired results. By describing the game aspects and the game genres, in fact all implicit methods are extended with the knowledge gathered in this research, as they can actively use the information provided by the explicit methods.

With the answers to the sub questions, the main question can be answered:

> "*How can computer games be designed that appeal to a wider share of the games market, keeping in mind the gender differences and the specified target group?"*

Games that appeal to a wider share of the games market can possibly be designed by actively using both the game aspects and the game genres as they are focused on the gender differences of children. Combining this knowledge with the information about game design methods could possibly result in using the game characteristics in a more structured way and thus the game will be targeted better at the specified audience.

But probably the most important issue in improving the game design in general is creating awareness with the game designers of what to take account for when designing a game for a specific audience. This could be in the form of information about the game aspects and genres itself but also information about the described game design methods, as this thesis both provides.

6.3. Limitations and further research

Every research has some limitation issues that can be used in further research. First some limitations will be discussed and next issues for further research will be described.

Limitations

There are several elements in my research that limit the results. The first and a major one is the lack of experience in this field of research. With my background in software engineering, research was hard to perform due to the impact of the gender element. Together with my own lack of experience in this field, the study of Information Science also has to contend with these limitations. This made it hard to obtain the required information and thus resulting in using a set of literature which does not contain all the required information.

Using a more narrow set of literature consequently has influence on the result of the research, in a way that this thesis forms a base on this subject and does not go very deep into the matter. This also resulted into a more explorative than a quantitative result because there also is a time limit which influences the priorities of certain parts of the research.

Concluding, the subject might have been a bridge too far at this moment of time for both me as the study Information Science, but I certainly learned a lot about performing a literature research and obtaining knowledge in a field which is unfamiliar to me.

Further research

One of the major issues in further research is more cooperation between the study Information Science as a Beta study and Alpha studies, resulting in an interdisciplinary study as which Information Science is profiled.

Regarding the content of the research, some issues could use some additional attention:

- With the interviews only game companies and game related companies are visited and by visiting studies in the field of computer game design could possibly yield in more satisfying results.
- By having more interviews and consulting more literature, probably more game aspects and game genres can be described, and the existing ones can possibly be described more extensively.
- An additional issue with the game genres could be to look at sales revenues of computer games and relating these to game genres resulting in knowing which genres are most popular.
- Using other questionnaires with the children and letting more respondents fill in these questionnaires might result in a more fine tuned game aspect gender classification.

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Atari Benelux	- Eindhoven	- *www.atari.com*
Engine Software B.V.	- Doetinchem	- *www.engine-software.nl*
IDG (PCZone/GamePro)	- Haarlem	- *www.idg.nl*
IJsfontein	- Amsterdam	- *www.ijsfontein.nl*
Gamica	- Schiedam	- *www.gamica.com*
Little Chicken Game Company	- Amsterdam	- *www.littlechicken.nl*
Three Little Witches	- Breukelen	- *www.threelittlewitches.nl*
Topami Ori B.V. / Witan Studio's	- Haarlem	- *www.witan.nl*
Triumph Studios	- Delft	- *www.triumphstudios.com*
Two Tribes	- Harderwijk	- *www.twotribes.com*

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Appendix 2: List of companies

For future research it might be useful to include a list of (mainly Dutch) game companies found during the writing of this thesis. Also three other companies are added as well, as some may be interesting to look at or to retrieve contacts from.

Game companies

Name	**Guerilla Games**
Visiting address	Herengracht 410 1017 BX Amsterdam
Telephonenumber	020 - 4272277
Contactperson	Nancy Gatehouse (PR Manager)
E-mail	nancy@guerrilla-games.com
Url	www.guerrilla-games.com

Name	**Davilex**
Postal address	Postbus 173 3900 AD Veenendaal
Url	www.davilex.nl

Name	**Engine Software BV**
Postal address	Postbus 252 7000 AG Doetinchem
Visiting address	Dr. Hubernoodtstraat 82 - Unit15 7001 DZ Doetinchem
Telephonenumber	0314 - 327685
E-mail	info@engine-software.nl
Url	www.engine-software.nl

Name	**Triumph Studios**
Visiting address	Phoenixstraat 66 2611 AM Delft
E-mail	triumph@triumphstudios.com
Url	www.triumphstudios.com

Name	**Nixxes Software BV**
Visiting address	Nieuwegracht 17 3512 LC Utrecht
E-mail	info@nixxes.com
Url	www.nixxes.com

Name	**Bumble Beast**
E-mail	info@bumblebeast.com
Url	www.bumblebeast.com

Name	**Khaeon Games**
Visiting address	Verlengde Tolweg 2 2517 JV Den Haag
Telephonenumber	070 - 3069501
E-mail	info@khaeon.com
Url	www.khaeon.com

Name	**Brainsmash Interactive**
Visiting address	Heer Bokelweg 36 3032 AD Rotterdam
Telephonenumber	06 - 41042292
E-mail	contact@brainsmash.net info@brainsmash.net
Url	www.brainsmash.net

Name	**Grendel-Games**
Visiting address	9724 HA Groningen Verlengde Nieuwstraat 3a
E-mail	info@grendel-games.com
Url	www.grendel-games.com

Name	**Little Chicken Game Company**
Visiting address	Singel 459 1012 WP Amsterdam
Telephonenumber	020 - 6202970
Contactperson	Michiel Sala (Marketing & New Business)
E-mail	info@littlechicken.nl
Url	www.littlechicken.nl

Name	**Overloaded**
Visiting address	De Lairessestraat 156 1075 HL Amsterdam
E-mail	britney@overloaded.com
Url	www.overloaded.com

Name	**Streamline Studios**
Visiting address	Karel Doormanlaan 140 1215 NR Hilversum
Telephonenumber	035 - 6236512
E-mail	questions@streamline-studios.com
Url	www.streamline-studios.com

Name	**Two Tribes**
Visiting address	Marie Curiestraat 55a 3846 BW Harderwijk
Telephonenumber	034 - 1423305
E-mail	office@twotribes.com
Url	www.twotribes.com

Name	**Gamica**
Visiting address	Schie 78 3111 PN Schiedam
Telephonenumber	010 - 2732496
E-mail	info@gamica.nl
Url	www.gamica.com

Name	**Topami Ori BV / Witan Studio's**
Visiting address	Wagenweg 16 2012 ND Haarlem
Telephonenumber	023 - 5345566
E-mail	dev@witan.nl
Url	www.witan.nl

Name	**Three Little Witches**
Visiting address	Lt. Maltbystraat 47 3621KN Breukelen
Telephonenumber	0346 - 283265
Url	www.threelittlewitches.nl

Name	**Putpixel**
Visiting address	Helena hoeve 31 2804 HV Gouda
Telephonenumber	0182 - 530243
E-mail	info@putpixel.nl
Url	www.putpixel.nl

Name	**PFF Software**
Visiting address	2e oosterparklaan 272 3544 AX Utrecht
Telephonenumber	030 - 2899521
E-mail	md@pff-software.nl
Url	www.pff-software.nl

Name	**Mach8**
Visiting address	Olympiaweg 59 1hoog 1076 VP Amsterdam
Telephonenumber	020 - 4714345
E-mail	lucas@mach8.nl
Url	www.mach8.nl

Name	**Artplant**
Url	www.artplant.no

Name	**IJsfontein**
Visiting address	Nieuwezijds Voorburgwal 130f 1012 SH Amsterdam
Telephonenumber	020 - 42000743
E-mail	post@ijsfontein.nl
Url	www.ijsfontein.nl

Name	**Atari Benelux**
Visiting address	Parklaan 81A 5613 BB Eindhoven
Telephonenumber	040 - 2393576
Contactperson	Jiska Ludikhuize (Product PR)
E-mail	jiska.ludikhuize@atari.com
Url	www.atari.com

Name	**Electronic Arts**
Postal address	Postbus 75756 1118 ZX Schiphol-Triport
Url	www.eagames.nl

Name	**Playlogic Game Factory**
Visiting address	Hoge Mosten 24 4822 NH Breda
Telephonenumber	020 - 6760304 06 - 51874971
Contactperson	Esther Berger (Communication & PR)
E-mail	eberger@playlogicint.com
Url	www.playlogic.nl

Name	**Organic Vectory**
Visiting address	Europark 26 4904 SX Oosterhout
Telephonenumber	0162 - 687330
E-mail	serge@organicvectory.com
Url	www.organicvectory.com

Name	**FJB Productions**
Visiting address	Leusdenhof 282 1108 DN Amsterdam
Telephonenumber	020 - 4531110
Url	www.fjbproductions.com

Name	**Quadgames**
Visiting address	Oudegracht aan de Werf 309 3511 PC Utrecht
Telephonenumber	030 - 2767806
E-mail	info2@quadgames.com
Url	www.quadgames.nl

Other companies

Name	**Young Works**
Visiting address	Hoogte Kadijk 143 F19 1018 BH Amsterdam
Telephonenumber	020 - 4199840
E-mail	info@youngworks.nl
Url	www.youngworks.nl

Name	**Syntens**
Postal address	Postbus 19408 1000 GK Amsterdam
Visiting address	De Ruyterkade 5 1013 AA Amsterdam
Telephonenumber	020 - 6231000
Url	www.syntens.nl

Name	**IDG Publishers** (PC Zone / GamePro)
Postal address	Postbus 5446 2000 GK Haarlem
Visiting address	Richard Holkade 8 2033 PZ HAARLEM
Telephonenumber	023 - 5461111
E-mail	redactie@pczone.nl
Url	www.pczone.nl

Other interesting resources:

www.gameskool.nl
www.gamasutra.com
www.lupinegames.com
www.gamedev.net
www.game-research.com
www.gamesdomain.com
www.allgame.com
www.thegamesjournal.com
www.gamegirladvance.com
www.igda.org
www.mcvuk.com
www.mobygames.com
www.gamefaqs.com
www.gamez.nl
www.gamer.nl
www.gamevillage.nl
www.gamelife.nl
www.gamersnet.nl
www.hccnet.nl
www.gamerankings.com
www.game-revolution.com
www.gamespot.com
www.gamevillage.nl
www.insidegamer.nl

Appendix 3 : Questionnaire children

The questionnaire below is held with children of grades 5 to 8 of primary school "De Wiekslag" in Duiven.

Leeftijd: 7 / 8 / 9 / 10 / 11 / 12 / 13
Geslacht: meisje / jongen

Wat wil jij liever in computer spelletjes?

1	ik speel veel computer spelletjes	□ □ □ □ □ □	ik speel weinig computer spelletjes
2	tegen elkaar spelen	□ □ □ □ □ □	met elkaar samen spelen
3	alleen spelen	□ □ □ □ □ □	samen met anderen spelen
4	in een spel met elkaar praten	□ □ □ □ □ □	in een spel met elkaar vechten
5	door problemen oplossen verder in spel komen	□ □ □ □ □ □	spel waar je door oefenen erg goed in wordt
6	spel in een drukke en onrustige omgeving	□ □ □ □ □ □	spel in een vrolijke en rustige omgeving
7	alleen voor de lol	□ □ □ □ □ □	iets van het spel leren
8	een spel figuur leren kennen	□ □ □ □ □ □	een spel figuur in elkaar slaan
9	mannen/jongens als spel figuur	□ □ □ □ □ □	vrouwen/meisjes als spel figuur
10	jezelf herkennen in spel figuur	□ □ □ □ □ □	mooi uiterlijk van een spel
11	vechtende spel figuren	□ □ □ □ □ □	spel figuren die samen iets doen
12	via een spel praten met elkaar	□ □ □ □ □ □	met meer personen spelen
13	grappige spelletjes	□ □ □ □ □ □	gevechten in een spel
14	ingewikkelde maar leuke opdrachten	□ □ □ □ □ □	makkelijke maar leuke opdrachten
15	als de toekomst er uit zien	□ □ □ □ □ □	als in het echt er uit zien
16	mooi beeld en geluid	□ □ □ □ □ □	uitdagende of ingewikkelde opdrachten
17	je fantasie in een spel gebruiken	□ □ □ □ □ □	vechten in een spel
18	kleurig en vrolijk	□ □ □ □ □ □	somber en spannend
19	meer met een computer doen dan alleen spel	□ □ □ □ □ □	spel moet snel en makkelijk te begrijpen zijn
20	spel dat je nieuwsgierig maakt	□ □ □ □ □ □	spel dat voorspelbaar is
21	zelf alles in een spel kunnen doen	□ □ □ □ □ □	tussendoor uitleg wat je moet doen
22	gewone normale spel figuren	□ □ □ □ □ □	gespierde mannen of sexy vrouwen
23	beloning met een mooi filmpje	□ □ □ □ □ □	beloning met sneller en sterker paard
24	meeleven met spel figuur	□ □ □ □ □ □	je fantasie in een spel gebruiken
25	een verhaal in een spel is belangrijk	□ □ □ □ □ □	lol is belangrijker dan een verhaal
26	schitterende luchtballon in de lucht	□ □ □ □ □ □	schitterende race auto op race baan
27	grapjes en humor in een spel	□ □ □ □ □ □	plezier in het spelen van een spel
28	iets van het spel leren	□ □ □ □ □ □	ingewikkelde maar leuke opdrachten
29	tegen elkaar spelen	□ □ □ □ □ □	mannen/jongens als spel figuur
30	gesprekken over een dagboek	□ □ □ □ □ □	kleurig en vrolijk
31	met elkaar samen spelen	□ □ □ □ □ □	gespierde mannen of sexy vrouwen
32	vrouwen/meisjes als spel figuur	□ □ □ □ □ □	jezelf herkennen in spel figuur

Appendix 4 : Raw data - questionnaires

The four tables in this appendix contain the raw data from the questionnaire (appendix 3) which was held with children of grades 5 to 8 of primary school "De Wiekslag" in Duiven. These questionnaire results are used to empirically determine the gender connotation of each game aspect as the scores of the statements can be translated to game aspect ratings. This translation from scores to ratings is explained in appendix 5. The empirical results are being compared to the results collected from literature (chapter 3).

Note: Some of the tables contain empty cells as some of the young respondents did not fully understand every statement. Because the results are averaged, this has very little influence on the final results.

Table: Grade 8

Gender		Girls														Boys													
Age		13	11	12	10	11	12	11	11	12	12	12	12	12	11	12	12	12	11	13	12	12	13	13	11	11	12	12	12
Score	1	6	5	1	2	6	3	4	2	5	1	4	5	4	5	1	1	2	1	3	1	1	1	1	1	2	2,5	2	3
	2		5	4	6	1	4	6	4	6	3	5	3	1	6	1	1	2	1	6	1	1	1	2	6	1	3	3	1
	3	1	1	3	1	1	2	1	3	1	3	5	6	3	1	6	4	5	1	3	2	5	2	3	4	5	2	1	3
	4	1	4	3	1	1	1	6	5	2	4	1	1	5	1		6	2	6	4	6	4	3	5	5	6	2	1	2
	5	6	6	4	1	6	6	1	2	1	1	5	3	5	1	1	1	2	6	6	5	6	6	1	6	6	6	3	4
	6	6	6	5	6	6	6	6	4	4	6	2	4	1	5	1	1	2	1	3	1	1	3	6	1	3	5,5	2	1
	7	1	4	3	1	1	4	1	3	3	1	1	4	2	1	1	1	2	1	1	1	2	1	3	1	1	1	1	1
	8	2	3	4	1	6	2	6	3	2	4	2	6	3	3	6	3	6	5	3	6	5	6	2	5	2	5	3	6
	9	6	5	3	6	6	6	6	6	5	4	5	3,5	3	6	1	5	1	5	1	1	2	3	3	1	1	1	4	1
	10	4	4	4	6	4	3	6	3	4	4,5	5	2	3	1	6	1	1	6	6	2	5	6	5	6	6	5,5	3	6
	11	5	3	6	6	3	5	6	4	5	2	5	3	3	5	1	1	1	1	5	1	1	1	1	1	6	3	4	1
	12	2	1	6	1	1	2	1	5	4	6	6	6	5	1	1	1	1	1	1	6	4	6	5	6	5	5	1	1
	13	1	1	1	1	3	2	1	1	1	3	2	3	3	1	6	6	6	6	2	6	5	6	1	5	3	3	5	1
	14	3	2	4	4	4	3	6	3	1	3	4	5	3	3	1	1	1	1	4	1	2	1	1	2	4	2	1	6
	15	3	2	5	6	1	5	1	2	4	6	5	4	3	6	6	1	6	1	6	3	3	3	1	5	5	3	6	4
	16	2	1	2	4	1	2	1	3	5	4	3	1	5	6	6	6	1	1	1	6	2	1	1	2	1	2	6	6
	17	2	1	2	1	3	1	6	2	1	4	1	1	3	1	4	4	6	5	1	6	5	1	2	5	1	4	4	4
	18	3	1	3	2	3	1	1	1	3	3,5	3	1	3	2	4	5	4	6	6	6	4	6	1	5	4	3,5	5	4
	19	4	1	5	1	1	2	6	4	2	2	4	4	5	1	1	1	2	1	1	1	2	1	4	2	5	3,5	3	3
	20	3	1	2	2	1	3	1	2	1	1	1	1	1	1	1	1	2	1	1	2	1	3	2		1	5	3	4
	21	4	1	2	4	6	3	1	5	3	2	3	1	1	1	3	1	1	1	6	1	2	1	1	1	1	1,5	2	2
	22	5	4	4	3	6	2	6	4	1	6	5	6	4	6	4	3	6	6	6	4	6	6	5	1	5	5	5	1
	23	3	5	3	6	6	2	6	4	2	5	5	1	6	6	1	6	1	6	1	6	5	1	1	6	6	5	3	2
	24	4	4	3	6	6	6	6	3	6	1	1	1	4	6	1	1	1	1	6	1	3	6	1	5	5	5	4	4
	25	5	2	5	6	6	3	6	5	5	6	3	3	2	6	4	5	1	6	4	4	4	1	1	3	1	5	5	5
	26	4	4	3	2	6	3	1	4	3	3	3	2	5	1	5	6	6	3	6	6	5	3	6	6	5	6	6	6
	27	3	1	2	1	1	2	6	3	2	2	5	1	5	1	4	6	6	3	6	6	5	1	3	5	6	5	3	6
	28	3	1	5	6		2	6	4	3	3	4	2	3	6	6	6	5	6	4	6	4	6	2	5	2	5	6	6
	29	3	2	4	1	6	2	6	3	3	1	1	6	1	1	1	1	1	6	4	1	2	1	2	2	1	3,5	2	1
	30	4	4	2	6	6	4	6	3	5	4	3	4	5	6	6	4	4	4		5	5	3	6	5	6	6	4	3
	31	4	4	5	1	6	1	6	3	1	4	3	6	2	6	1	1	1	6	4	6	5	6	2	1	1	3,5	5	3
	32	5	4	5	1	6	1	1	1	3	1	4	4	3	1	3	1	6	1	1	6	4	3	2	5	1	3,5	4	3

Table: Grade 7

Gender		Girls									Boys										
Age		11	11	11	11	11	10	11	10	12	11	10	11	11	11	11	11	11	10	11	11	11
Score	1	6	2	5	2	5	5	2	3	3	2	2	1	4	4	1	1	1	4	3	3	1
	2	1	1	5	1	6	1	3	3	1	4	1	3,5	4	3	1	4	6	6	2	3,5	2
	3	6		1	1	4	3,5	2	2	6	3	3	2	1	1	2	1	6	6	2	3,5	6
	4	1	6	1	3,5	1	6	4	2	4	3	2	3		4	1	6	6	1	3,5	2,5	5
	5	1	6	3	6	4	6	3	1	6	3	4	1	1	1	3	3	1	1	2	6	3,5
	6	1	1	4		5	1	1	4	5	5	6	3,5	5	1	3	1	1	1	1	3,5	2
	7	1	1	6	1	2	1	2	2	4	3	4	3,5	1	1	4	1	1	1	1	1	1
	8	6	6	1	6		6	5	2	3	4	4	1	6	4	1	6	6	1	3	2	2
	9	1	1	3		6	3,5	2	5	6	4	3	2	1	3	1	2	1	1	2	1	3,5
	10	1	1	4	6	6	4	5	5	3	3	6	6	3	3	2	6	6	6	1	6	6
	11	1	1	3	3,5	4	1	3	4	5	5	5	6		4	4	3,5	1	6	5	3,5	4
	12	1	6	3	3	1	6	3	3	2	2	6	5	1	6	6	4	6	1	5	5	6
	13	6	6	2	1	1	4	4	2	1	1	5	1	6	6	4	5	6	1	4	3,5	5
	14	6	1	2	1	4	1	1	2	1	2	4	1	1	1	1	1	1	3	1	1	1
	15	6	6	3	1	4	1	3	4	3	5	1	3,5	6	1	4	3,5	6	1	5	6	3,5
	16	1	6	3	2,5	2		4	3	6	2	1	3,5	1	6	4	3,5	6	1	1	3	1
	17	6	6	3	3,5	3,5	4	5	2	1	2	1	1	3,5	3	2	3,5	6	2	6	3	4
	18	3	6	2	1	1	5	4	3	1	2	1	1	3,5	6	4	6	6	1	6	4	2
	19	6	1	4	1	5	2	3	3	6	3	1	1	1	3	4	2	1	6	6	4	1,0
	20	1	1	1	1	2	2	3,5	1	1	3	1	1	1	1	1	1	1	1	1	2	2
	21	1	1	5	1	2	3	3	2	6	3	5	3,5	1	3	5	5	6	6	4	4	3,5
	22	6	1	4	3	3	3	4	2	3	3	2	3,5	3,5	2	3	2	1	4	3	3	1
	23	6	1	4	1	4	6	4	2	1	5	5	3,5	6	1	1	2	1	1	2	1	3,5
	24	6	1	2	1	3	1	2	3	6	5	1	3,5	6	1	3	1	1	2	6	1	3,5
	25	1	6	3	6	4	4	6	2	6	4	1	1	1	1	1	1	6	6	6	1	3,5
	26	6	6	3	1	2	6	4	4	3	6	3	6	6		4	4	6	6	6	3,5	6
	27	1	6	4	6	4	6	4	4	6	5	2	3,5	6	6	5	1	6	1	1	5	6
	28	6	6	3	1	3,5	6	5	2	5	5	1	5	6	6	2	6	6	5	3	6	5
	29	6	6	4	1	4	3	5	3	2	6	1	6	1	6	5	5	6	6	6	1	1
	30	1	6	3	6	6	4	4	4	3	4	6	5	1	6	6	4	6	6	3,5	3,5	3,5
	31	6	6	4	1	3	3	5	5	1	5	1	3,5	1	2	1	2	6	2	6	1	1
	32	6	6	2	1	2	4	3	2	4	3	2	1	1	1	5	5	6	4	6	2	3,5

Table: Grade 6

Gender		Girls													Boys				
Age		10	9	10	10	10	10	10	10	10	10	10	9	10	10	10	10	10	10
Score	1	3	4	4	3	4	4	2	4	2	3	1,5	4	2	3	2	2	3	1
	2	6	5	4	1	1	3	4	6	1	4	1	4	1	6	1	3,5	2	3,5
	3	5	3,5	6	6	6	1	6	6	6	2	1	1	1	6	5	3,5	3,5	3,5
	4	1	1	1	1	6	1	1	1	3,5	2	1	1	3	1	6	3,5	6	3,5
	5	2	2	4	3	3	2	6	6	1	3	6	2	3	2	6	1	1	1
	6	4		6	6	3	4	3	3,5	1	4	1,5	3	6	1	1	1	2	1
	7	4	1	4	1	6	2	1	1	1	3	3,5	4	1	1	1	3	1	1
	8	3	2	1	1	3	2	4	3,5	6	2	2	1	1	5	6	3,5	5	6
	9	5	3,5	4	6	3	6	3	3,5	6	6	6	6	6	1	3	3,5	1	1
	10	5,5	6	1	1	3	4	4	4	1	4	2	5,5	1	1	1	3	3,5	3
	11	5	4	6	4	3	4	2	4	1	5	5,5	5	4	1	1	2	1	1
	12	2	3	1	6	6	1	3	1	5,5	4	5,5	2	6	1	6	1	1	3,5
	13	2	1	1	1	3	2	4	3	1	2	3,5	1	1	6	3	5	3,5	6
	14	2	2	1	3	1	2	2	3	1	3	1	1	3	1	3	1	3,5	1
	15	1	2	4	4	1	4	3	3,5	5	3	1	6	4	6	1	1	1	6
	16	2	1	4	3	3	4	3	3	6	4	2,5	1	4	1	1	3,5	5	6
	17	2	2	1	1	3	2	4	2	4	2	1	2	1	6	3	4	5	6
	18	3	3	4	1	3	3	4	2	6	3	4	3	3	6	3	3,5	3,5	6
	19	3	3	4	6	3	4	3	1	4	2	6	3	6	1	5	3	3,5	6
	20	2	1	4	1	1	3	1	1	2	3	1,5	3	1	1	1	1	3,5	1
	21	4	3	4	6	1	2	1	3,5	1	3,5	1,5	1	6	6	1	5	4,5	3,5
	22	4	3	4	2	3	3	3,5	2	5	3	5	1	2	5,0	3	5	4	5
	23	5,5	3,5	4	6	3	4	4	4	5	6	6	4	5	1	6	4	2,5	3,5
	24	3	4	3	6	6	3	3	4	5	3,5	6	3	3	1	2	3,5	2	6
	25	5	4	4	6	3	4	5	4	6	5	5,5	5	6	1	6	4	6	6
	26	3	4	4	1	3	2	3		3	3	1	4	6	6	6	3,5	6	6
	27	3,5	2	4	1	4	4	1	3,5	1,5	3,5	5,5	3,5	1	1	3	3,5	4,5	6
	28	4	6	4	6	1	4	6	6	5	3,5	6	5	4	6	6	3,5	6	6
	29	1	1	1	1	1	2	4	2	1	2	3	2	2	6	4	3	2,5	1
	30	6	3,5	4	6	6	3	3,5	6	2	4	4	5,5	6	1	4	3,5	4,5	1
	31	1	1	4	1	6	3	3,5	1	4,5	2	3,5	1	4	4	3	3,5	3,5	1
	32	4	3,5	4	1	3	3	3,5	5	2,5	1,5	3,5	6	4	6	6	3,5	4,5	6

Table: Grade 5

Gender		Girls											Boys									
Age		9	10	9	9	10	9	9	8	9	8	9	8	9	9	9	9	8	9	9	9	9
Score	1	1,5	2	3	5	1	1	1	3,5	5	3,5	2	3	1	1	2	2	3	3,5	3,5	4	2
	2	3	1	6	5	6	6	6	6	5	6	5	3	3,5	6	5	2	6	5	3,5	6	3
	3	6	6	4	2	6	6	6	3,5	2	2	1	3	1	3,5	1	5	6	4	6	6	1
	4	1	1	1	1	1	2	1	1		3	5	5	1	2	1	1	2	2	1	1	1
	5	5	6	3	5	1	1	6	1		6	3	1	1	6	5	6	3	2	5		3
	6	1	6	6	6	3,5	6	6	3,5	5	1	4	1	1	4	3	6	6	3	6	4	6
	7	3,5	6	6	5	4,5	3	6	1	3,5	3,5	4	1	6	1	1	2	1	3,5	3,5	3,5	1
	8	1	1	1	1	1	1	1	1	5	3	3	6	1	4	1	5	1	5		4,5	1
	9	1	6	6	5		1	1	6	2	3,5	3,5	1	1	3	4	3,5	4	3,5	2	1	1
	10	1,5		6	1		3	1	3,5		5	3,5	1	1	6	2	1	1	3,5	2	3,5	1
	11	6	6	6	5	6	6	6	4,5	2	4	3,5	1	1	6	3,5	2	1		6	2	2
	12	1	6	6	4	1	4	6	3,5		5	4	1	1	3	1	1	6	6	3	3,5	1
	13	1	1	1	1	1	1	4	4,5	5	2	3,5	6	1	4	2	1	6	5	1	4	1
	14	1	6	3	2	1	5	1	3,5	3	3,5	3,5	1	1	1	1	2	1	3,5	3,5	3	1
	15	6	6	1		6	5	6	3,5		3,5	1	1	1	1	6	1	6	3,5	5,5	3,5	3
	16	1	1	1	4	1	2	1	5,5	1	5	3,5	1	1	4	2	1	3	3,5	6	1	1
	17	3,5	1	1	1	1	1	2	3,5	1	3,5	6	1	1	2	1	2	3	3,5	1	2	1
	18	6	1	1	2		2	6	4,5	3,5	3,5	4	1	6	6	1	5	3	3,5	1	4	6
	19	1	6	3	4		1	2	2,5		6	3,5	1	6	1	2	1	4	5,5	3,5	3	4
	20	2	3	3	3	1	2	1	3,5	1	5	3,5	6	6	3	3	2	3	3,5	1		3
	21	1	6	3	3		2	2	1	2	6	4	6	1	1	4	2	1	4,5	1	2	1
	22	4	1	4	1	1	1	6	4,5	6	1	3,5	3,5	1	6	1	6	6	4,5	1	5	6
	23	1	6	6	1		6	6	3,5	6	3,5	1	6	3,5	6	1	2	1	3,5	3,5	4	3
	24	1		1	4		2	6	3,5	6	5	3,5	1	1	6	4	2	6	3,5	6	5	1
	25	1	6	4	4		2	1	6	2	3,5	4	6	1	6	2	2	6	3,5	6	5	1
	26	1	1	1	2	1	1	6	3,5	3	5	3	6	6	6	1	2	3,5	6	3	4	2
	27	1	6	4	3	6	6	6	3,5	2	6	6	6	1	5	2	5	3,5	5,5	6	6	3
	28	1	6	4	4	1	1	1	6	3,5	6	3,5	6	1	6	2	2	4	4,5	6	4	1
	29	1	3	1	2	1	1	1	5,5	2	5	4	6	3,5		4	6	6	6	6	6	1
	30	1	3	4	6		5	6	4,5	3	3,5	6	6	6		6	3,5	1	3,5	5		5
	31	1	1	4	1	1	1	6	6	6	1	5	6	1	6	6	2	6	5,5	1	3	1
	32	1	1	1	3		4	1	3,5	4	1	3	6	6	3	6	1	3	3,5	3,5	6	1

Appendix 5 : Translation scores to game aspect ratings

Each statement in the questionnaire represents one or more game aspects as defined in paragraph 3.1. The table below displays which statement and corresponding score belongs to which game aspect.

Table: Raw data relation game genres with game aspects

	(score:1) Questionnaire statements *(score:6)*		Game aspects	
1	tegen elkaar spelen	met elkaar samen spelen	competition	cooperation
2	alleen spelen	samen met anderen spelen	single player	multiplayer
3	in een spel met elkaar praten	in een spel met elkaar vechten	social	combat
4	door problemen oplossen verder in spel komen	spel waar je door oefenen erg goed in wordt	problem solving	mastering
5	spel in een drukke en onrustige omgeving	spel in een vrolijke en rustige omgeving	moving objects	NOT(moving objects)
6	alleen voor de lol	iets van het spel leren	fun	personal exploration
7	een spel figuur leren kennen	een spel figuur in elkaar slaan	evolution and development	physical violence
8	mannen/jongens als spel figuur	vrouwen/meisjes als spel figuur	male figures	female figures
9	jezelf herkennen in spel figuur	mooi uiterlijk van een spel	identification	graphical images
10	vechtende spel figuren	spel figuren die samen iets doen	figures in action	relationships
11	via een spel praten met elkaar	met meer personen spelen	communication	multiplayer
12	grappige spelletjes	gevechten in een spel	humour	combat
13	ingewikkelde maar leuke opdrachten	makkelijke maar leuke opdrachten	challenges and complex activities	fun
14	als de toekomst er uit zien	als in het echt er uit zien	NOT(reality by appearance)	reality by appearance
15	mooi beeld en geluid	uitdagende of ingewikkelde opdrachten	graphics and sound effects	challenges and complex activities
16	je fantasie in een spel gebruiken	vechten in een spel	fantasy	combat
17	kleurig en vrolijk	somber en spannend	colours	NOT(colours)
18	meer met een computer doen dan alleen spel	spel moet snel en makkelijk te begrijpen zijn	NOT(low frustration level)	low frustration level
19	spel dat je nieuwsgierig maakt	spel dat voorspelbaar is	curiosity	NOT(curiosity)
20	zelf alles in een spel kunnen doen	tussen door uitleg wat je moet doen	active control	NOT(active control)
21	gewone normale spel figuren	gespierde mannen of sexy vrouwen	NOT(stereotypes)	stereotypes
22	beloning met een mooi filmpje	beloning met sneller en sterker paard	rewards	rewards
23	meeleven met spel figuur	je fantasie in een spel gebruiken	relationships	fantasy
24	een verhaal in een spel is belangrijk	lol is belangrijker dan een verhaal	storylines	NOT(storylines)
25	schitterende luchtballon in de lucht	schitterende race auto op race baan	means of transport	means of transport
26	grapjes en humor in een spel	plezier in het spelen van een spel	humour	fun
27	iets van het spel leren	ingewikkelde maar leuke opdrachten	personal exploration	challenges and complex activities
28	tegen elkaar spelen	mannen/jongens als spel figuur	competition	male figures
29	gesprekken over een dagboek	kleurig en vrolijk	social	colours
30	met elkaar samen spelen	gespierde mannen of sexy vrouwen	cooperation	stereotypes
31	vrouwen/meisjes als spel figuur	jezelf herkennen in spel figuur	female figures	identification

Appendix 6: Raw data - Game genres vs. Game Aspects

This appendix contains the results of the questionnaires filled in by people as described in paragraph 4.2. The first nine aspects are boys' aspects, the following fifteen as girls' aspects and the ones that are left are gender neutral aspects. Table 7 in paragraph 4.2 contains the averages calculated from this table. For each game genre the averages of the three gender classifications is calculated by averaging the game aspect ratings.

Example: calculating the average of boys' aspects with the shooters game genre:
(4,9 + 4,5 + 4,9 + 4,7 + 3,1 + 4,2 + 3,7 + 4,2 + 4,9) / 9 = 3,34

Table: Raw data relation game genres with game aspects

	Shooters	Fighting	Adventure	Simulation	Flight	Warfare	Racing	Sports	Puzzle	Traditional	Real-time Strategy	Turn-based Strategy	Role Playing	Rhythm-Dance	Platform	Educational	Activity Games	Family Games
Both male and female figures	4,70	4,70	4,20	3,90	4,10	4,50	4,70	4,50	4,00	3,80	4,20	4,20	4,30	4,50	4,20	2,60	4,00	4,60
Combat	3,10	3,60	3,60	2,30	0,70	2,00	1,90	2,80	0,70	1,70	2,30	2,20	4,10	3,00	3,10	1,80	1,90	2,40
Competition	4,90	5,00	2,50	1,40	1,40	4,80	1,70	1,90	0,90	1,40	4,10	3,70	3,50	0,30	2,80	0,30	0,60	1,20
Figures in action	4,50	4,60	2,40	2,50	1,70	4,40	4,70	4,70	1,80	2,70	4,10	4,00	3,40	2,40	2,80	1,00	2,10	2,80
Games that provide fun	4,90	5,00	3,00	2,80	1,00	3,40	2,70	3,20	0,40	1,10	3,10	2,40	3,70	3,10	3,70	0,90	1,60	1,70
Mastering	4,20	4,40	3,00	3,70	3,90	3,70	4,10	3,70	2,90	2,60	3,70	3,60	3,60	3,60	3,80	2,70	2,50	2,30
Moving objects	3,70	3,00	3,20	3,20	2,60	3,70	3,30	2,40	1,40	1,50	3,20	2,60	3,00	2,30	4,00	1,30	2,10	1,90
Physical violence	4,20	4,00	3,60	2,60	1,70	3,10	3,20	2,80	1,40	2,10	3,30	3,10	4,00	2,40	4,20	2,40	2,50	2,80
Stereotypes	4,90	4,90	1,70	1,60	1,40	3,60	1,40	1,20	0,60	1,20	3,40	3,00	2,80	0,40	2,70	0,40	1,00	0,80
Analog aesthetics	2,33	2,22	3,44	3,89	3,44	2,89	3,00	3,56	1,78	3,11	3,00	3,00	3,22	3,00	2,67	2,78	2,44	2,56
Colours	2,60	2,10	3,00	2,60	2,40	2,60	3,20	3,10	2,60	2,80	2,70	2,60	3,10	4,00	2,90	3,20	3,70	3,50
Communication	1,90	0,60	2,90	3,00	1,90	2,50	0,90	0,90	0,80	1,80	3,10	2,90	3,80	1,50	1,10	1,60	1,90	2,20
Cooperation	3,40	1,60	2,60	1,90	1,20	2,90	1,00	3,00	1,20	2,00	3,40	3,20	3,50	0,90	1,30	1,10	1,90	3,10
Evolution and development	1,50	1,40	4,00	3,10	1,30	2,20	1,80	1,60	1,60	1,30	2,90	3,20	4,40	1,80	1,90	2,50	2,20	1,90
Female figures	1,60	2,00	3,00	1,80	0,60	0,80	1,40	2,20	0,60	1,10	1,50	1,80	3,60	3,00	2,20	1,80	2,00	2,50
Graphical images	2,40	2,40	3,50	2,70	1,80	2,10	2,10	3,20	0,80	1,50	1,70	1,60	3,90	2,30	2,40	1,40	1,70	1,30
Identification	2,40	2,00	2,60	3,10	2,70	2,40	2,70	2,50	1,80	2,80	2,00	2,20	2,70	3,80	2,50	3,80	3,40	3,30
Low frustration level	0,70	0,60	1,60	1,50	0,50	0,40	0,50	0,40	0,80	0,90	1,30	1,40	2,40	0,70	1,20	1,80	1,30	1,70
Nurturing	0,80	0,50	3,00	2,80	1,50	1,00	0,60	0,70	2,50	1,60	1,30	1,40	2,80	2,10	0,90	3,00	2,70	2,20
Personal exploration	1,50	0,70	4,60	2,40	1,60	1,80	0,70	0,90	4,30	2,80	3,00	2,90	3,90	0,70	3,20	3,70	3,00	2,50
Problem solving	2,70	1,80	3,10	4,50	4,10	2,60	3,80	4,10	2,10	2,80	2,80	2,80	3,10	2,80	2,00	2,80	2,80	2,40
Reality based appearance	1,20	0,70	2,70	2,20	0,60	1,10	0,60	0,60	0,60	1,10	1,70	1,70	3,60	1,00	1,40	1,10	1,30	2,30
Relationships	1,30	1,00	2,80	2,20	0,60	1,30	1,50	1,40	0,70	1,20	2,10	2,10	3,30	2,30	1,60	1,30	2,00	3,90
Social	2,90	2,80	4,40	2,70	3,00	3,80	3,20	3,40	3,10	2,70	4,00	3,70	4,20	2,20	3,60	2,60	2,80	2,50
Active control	3,30	3,00	4,60	3,80	3,80	3,70	3,50	2,90	4,70	2,70	4,20	3,80	3,50	3,00	3,30	3,70	2,40	2,70
Challenges and complex activities	1,50	0,80	4,10	1,50	0,50	1,10	1,10	1,20	1,30	2,20	3,00	3,10	3,80	0,80	3,10	0,80	1,80	1,40
Collecting and trading	2,40	1,60	3,80	2,10	2,00	2,20	1,20	1,20	2,60	1,60	3,00	3,00	3,80	1,70	2,60	2,80	3,00	2,40
Creating curiosity	4,00	3,56	4,56	3,56	3,56	3,78	3,44	3,22	1,33	2,11	3,89	3,44	4,67	3,89	3,11	1,89	2,89	2,56
Experience the game / Emotions	2,70	2,60	4,50	1,70	1,10	3,00	1,30	1,20	1,90	1,60	3,30	3,40	4,50	1,60	3,30	1,20	2,30	2,30
Fantasy	2,90	2,80	4,40	2,70	3,00	3,80	3,20	3,40	3,10	2,70	4,00	3,70	4,20	2,20	3,60	2,60	2,80	2,50
Goal driven	3,33	3,44	3,56	4,22	4,00	3,56	4,11	3,44	2,11	3,00	3,67	3,22	4,11	3,67	3,44	3,00	3,56	3,33
Graphics and sound effects	4,70	4,40	4,10	4,30	4,70	4,50	4,70	4,30	2,70	2,40	4,20	3,90	4,00	4,30	3,60	2,20	3,40	3,00
Humour	1,10	1,60	3,50	1,20	0,70	1,50	1,30	1,20	1,60	1,50	1,30	1,70	2,90	2,30	2,10	2,20	2,30	3,00
Means of transport	2,33	0,89	2,78	4,00	4,67	3,67	4,67	2,00	0,44	0,44	2,78	2,56	2,78	0,44	2,00	1,11	0,78	1,00
Multiplayer and network	4,70	4,20	2,80	3,40	3,20	4,10	3,80	3,20	1,40	2,90	4,50	3,80	4,50	1,90	1,90	1,10	1,90	3,60
Reality based gameplay	3,00	3,00	3,10	4,10	4,30	2,60	4,10	3,70	1,70	1,80	3,00	2,80	3,10	3,40	2,40	2,50	2,90	2,50
Rewards	3,60	3,40	4,20	2,20	1,90	3,10	3,50	3,20	2,30	2,20	3,40	3,30	3,90	2,40	3,30	3,70	3,10	3,20
Single player	3,60	3,90	3,90	3,90	3,90	3,80	3,80	3,70	4,50	3,40	4,10	4,30	2,90	3,90	4,20	4,20	3,90	1,60
Storylines	1,40	1,30	4,40	1,40	1,10	3,00	1,10	0,90	0,60	1,00	3,20	2,90	4,20	0,50	2,70	1,40	1,10	1,90