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A CONCEPTUAL FRAMEWORK FOR SUPPORTING GENDER INCLUSIVITY IN GAMES

by

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ABSTRACT

Gender inclusivity in games is still exploratory and, despite an increase in games and gender research, many challenges remain in designing a more gender-inclusive game. This thesis addresses the problem of how to support gender inclusivity in games by combining theories in games and gender. Existing research in games and gender tend to focus on finding out how each gender plays and their preferences in games. However, there is little evidence that researchers have approached the issue of gender inclusivity in games with the intent of building a cohesive understanding of gender inclusivity in games and the relationships that exist between the different dimensions and components. Consequently, this research has developed a conceptual framework that supports gender inclusivity in games.

A central contribution of this research is the development of a *Gender Inclusivity Framework (GIF)* to support an integrative approach to understanding and evaluating gender inclusivity in games. The framework enables understanding of the makeup of gender inclusivity in games and measures the level of gender inclusivity in games. Drawing upon established theories and prior research findings, the framework indicates that gender inclusivity in games can be determined by three dimensions: (1) *gameplay,* which relates to game behaviours; (2) *content,* which relates to aesthetics elements of a game; and (3) *genre,* which relates to types of games. Each dimension in the framework is divided into individual components that can be modified or further investigated in future studies. Each component in combination describes the dimension in terms that can be measured and evaluated in empirical studies. Hence, the combination of dimensions and components used to construct the framework provide the description of gender inclusivity in games, which in turn predicts the degree of gender inclusivity in games.

An example of GIF application has been demonstrated through the development of a novel measuring instrument called *Gender Inclusivity Rating Scale (GIRS)* and through a series of experiments, the GIRS has been validated and used in a research scenario to investigate the differences in gender inclusivity in game component between a gamer's gender role orientations.

This thesis presents a detailed discussion of the GIF development, validation and application. For researchers, the GIF provides a common framework in which to conceptualise their research and make it easier to see how individual variables fit into the larger picture. For game designers, the GIF enables deconstruction of the concept of gender inclusivity in games into smaller, conceptually distinct and manageable components to guide the design of gender inclusivity in games.

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DECLARATION OF AUTHORSHIP

I, **Roziana Ibrahim**

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and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

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- where I have consulted the published work of others, this is always clearly attributed;
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During this research period, I have worked with a great number of people whose contribution to the completion of this thesis deserved special mention. It is a pleasure to convey my gratitude to them all in my humble acknowledgment. In the first place, I owe my deepest gratitude to Dr Gary Wills and Mr Lester Gilbert for their supervision, advice, and guidance from the very early stage of this research as well as giving me extraordinary experiences throughout the work. Above all and when it most needed, they provided me unflinching encouragement, and support in various ways which has enabled me to develop an understanding of the subject. Their scientific intuition made them a constant oasis of ideas for research, which exceptionally inspired and enriched my growth as a student, a researcher and an educator.

My parents deserve special mention for their prayers and their passion for intellectual pursuit inspired the joy of continuous learning in me. Words fail me to express my appreciation to Mr Tahir Iqbal for his dedication and persistent support. Finally, collective and individual acknowledgments are also owed to my colleagues at the Learning Societies Lab (LSL), University of Southampton.

Definitions and abbreviations

Chapter	Abbreviation/Symbol	Description
1 & 2	Games	Computer games, video games
	BAFTA	British Academy of Film and Television Arts, a charity that organizes annual awards for excellence in film, TV, video games and animation.
	AIAS	Academy of Interactive Arts & Sciences, a non-profit organization of industry professionals only. It promotes computer and video game and hosts an Interactive Achievement Awards ceremony annually and winners are voted by members only.
	IGN	Imagine Games Network, news and review website specifically for video games, films, music.
	ESA	Entertainment Software Association, a trade association of the video game industry in USA. Members of ESA include Atari, Capcom, Disney Interactive Studios, Electronic Arts, Konami, Microsoft, Midway Games, Nintendo, Sega, and Sony Computer Entertainment.
	IGDA	International Game Developers Association, a non-profit professional society for video and computer games developers worldwide.
4	*M*	Mean (arithmetic average)
	SD	Standard Deviation
	ANOVA	Analysis of variance
	F	Fisher's F ratio
	CI	Confidence interval
	χ^2	Computed value of a chi-square set
	p	Probability
5	*r*	Pearson product-moment correlation
	r^2	Pearson product-moment correlation squared
	α	Alpha; Cronbach's alpha index of internal consistency
	MMO	Massively Multiplayer Online, a game that can support a very large number of players simultaneously in a virtual game world.
	MMORPG	Massively Multiplayer Role Playing Game, a role playing game that can support very large number of players simultaneously in a virtual game world.
6	MANOVA	Multivariate analysis of variance
	F	Fisher's F ratio
	df	Degree of freedom
	Wilks' Lambda (Λ)	Lambda (cap); Wilk's multivariate criterion
	d	Cohen's measure of effect size

1 Introduction

Gender inclusivity is the new catchphrase in the game industry. Many long-held assumptions about games and gamers, understandably associate game-playing activities and consumer electronics with the male gender and masculine activities. However, recent market studies have shown that women have a large share of the games and consumer electronics market. The Entertainment Software Association (ESA) in 2010 reported that, in the United States of America alone, computer and video game software sales generated $10.5 billion in 2009 with 67%, which is equivalent to more than two thirds, of American consumers playing games. In a recent finding from the NPD Group, global market research reported American consumers spent $1.36 billion on video games by February 2011 which was an increase of 3% (Mazel, 2011). ESA (2010) also showed that the average gamer is 34 years old and has been playing games for 12 years. More importantly, 40% of the market consists of female gamers over the age of 18 and they represent a significantly greater portion of the gamer's population (33%) than boys aged 17 or younger which is 20% of the gamer's population. Similar findings were reported by the Association for UK Interactive Entertainment (UKIE) (2010) where female gamers are 31% of the United Kingdom's gamers market.

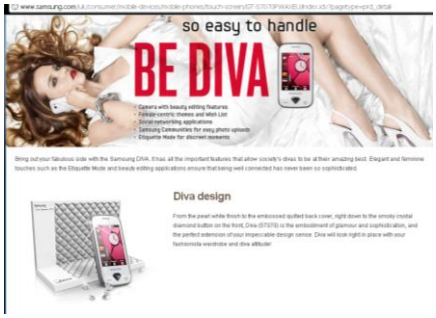
A research partnership between Mindshare, Ogilvy & Mather and Microsoft Advertising (Bennett, Uyenco, & Solomon, 2009) found that women account for 85% of all consumer purchases, and women in the USA spend more than $5 trillion annually on consumer goods and services with 66% decision on all PC purchases. About 22% would spend time shopping online at least once a day and 61% influence consumer electronic purchases. The rise of these is taking the technology industry by storm and leading consumer electronics brands are trying to close this gap by designing products with the female gender and their feminine tastes in mind. In 2008 Hewlett Packard (HP) worked together with Vivienne Tam, a couture designer, not only to design its HP Mini Netbooks but also mice and clothing line (see Figure 1-1a). The Butterfly Lovers netbook sports a butterfly image on the casing to reflect the 2010 spring season and comes with an animated butterfly start menu, customized Vivienne Tam icons and coordinated wallpapers.

A similar strategy was adopted by Samsung when the company launched a touch screen mobile phone called Diva in 2010. Samsung Diva was promoted as a fashion accessory and comes with female-centric themes in pink coloured tone. Another example can be seen in Figure 1-1c is Nintendo *Wii Fit Plus*, an exercise game targeted at the female market. It makes use of a balance board and includes various types of exercise such as hula, yoga and jogging, which the gamer can personalise and track. It

was introduced in December 2007 and currently *Wii Fit Plus* is the third best selling console game with 22.6 million copies sold as of May 2010. An exemplary technological advance which targets families and female gamers is *Kinect* for Microsoft Xbox 360 game console (see Figure 1-1d). It uses a sensor peripheral device to detect a gamer's gestures and spoken commands. *Kinect* marketing strategies include a female-friendly website with good use of white space, bright colours and fluid design elements, highlights how easy it is to get started, focuses on the effects it has on people as opposed to the technology itself and emphasises it as a shared activity that brings people together. Currently *Kinect* sells an average of 133,333 units per day with a total of 8 million units from November 2010 to January 2011 within its first 60 days (Alexander, 2011).

These trends reflect how the consumer electronics industry and games industry landscape is facing a major shift in its consumers' demography and economic powerhouse. Today, women are major contributors to the household income, have the purchasing power, are internet savvy and, have large networks both offline and online. Specifically for a gamer demography, this is a change from the common assumption that a gamer has to be male between the ages of 18 to 34 and must be technically savvy. One of the implications of these trends is that it is not enough just knowing what women want but to fully understand the intricacies. Consequently, it is a misguided assumption that all female likes things in pink, fluffy and sparkles.

a. HP website showing the HP Mini 210 Netbook designed by Vivienne Tam



b. Samsung Diva touch screen mobile phone

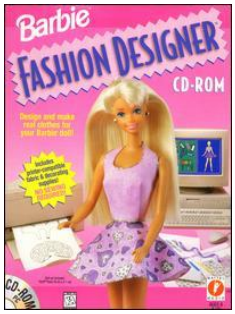
a. Nintendo's Wii Fit Plus console game

b. Microsoft Game Studios Kinect for Xbox 360

Figure 1-1Major consumer electronics brands designing and creating products for the female market

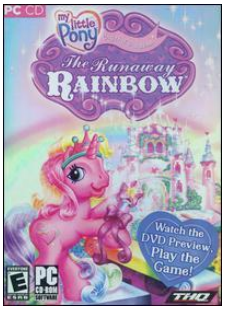
The girl game movement has seen its fair share of bubble gum pink and sparkles. In 1997 Mattel Interactive launched *Barbie Fashion Designer* and sold 600,000 units within the first year (see Figure 1-2a) (Krotoski, 2004). It is a dress-up game that allows girls to choose style patterns, colours, accessories and let a virtual model wear their creations. The kit includes a game CD and a selection of shoes, rosettes, ribbons, sequins, tulle and an instruction manual so girls can design on the computer and at the same time creates their designs using real materials. Although there is still a demand for *pink games* such as *Powerpuff Girls*, *My Little Pony* and *Disney Princess* series (see Figure 1-2b-d) (Kafai, Heeter, Denner, & Sun, 2008), but this intense pink-ness and focusing on traditional feminine sex roles created a small niche market and may have excluded a larger gamer's market of male players, different age levels and even female gamers who do not like the colour pink.

Emerging from the misses of the *pink games*, a different take into girl games goes on to create games that focus on real world interests such as building connections or friendships and sharing. Purple Moon, a company founded by Brenda Laurel in 1995, spurs the so-called purple games with the launch of *Rockett's New School* shown in Figure 1-2e. It is a social interaction game which tells the story of Rockett Movado's first day in school, how she interacts with other characters in the game and the resulting unfolding plot based on those interactions and decisions. Although the company did not survive, and closed down in 1999, the purple games did. Examples of successful purple games include the *Nancy Drew* game series, *Animal Crossing* and *Diner Dash (*see Figure 1-2f-h). In particular, the *Nancy Drew* game series, produced by HerInteractive, has been so successful that it received the Parents' Choice Award 22 times for best software since the launch of their first title in 1998 *Secrets Can Kill.* The game series is based on the popular book *Nancy Drew*, written under the pseudonym Caroline Keene, which tells about an amateur detective solving crimes using her unique problem solving approach and independent attitude. Currently the *Nancy Drew Adventure* game series is in its twenty-third instalment. In 2007 it was released on Nintendo DS, called *Nancy Drew: Deadly Secret of Olde World Park,* and most recently in February 2011 launched its first Nancy Drew application*, Nancy Drew Mobile Mysteries: Shadow Ranch*, which is available on the App Store for iPhone, iPod touch and iPad. According to Megan Gaiser, the owner of HerInteractive, one of the reasons behind the success of the *Nancy Drew Adventure* game series is due to the portrayal of a positive female protagonist and role model (Gustafson, 2010).

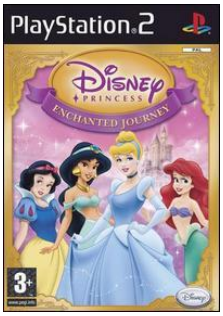


a. Barbie Fashion Designer by Mattel Interactive, 1997

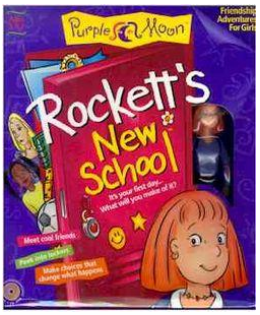
b. Powerpuff Girls: Relish Rampage



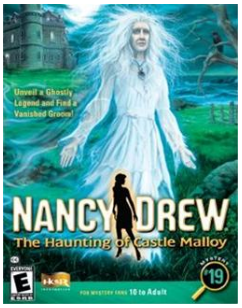
c. My Little Pony by THQ Inc.



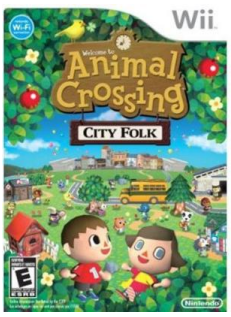
d. Disney Princess: Enchanted Journey



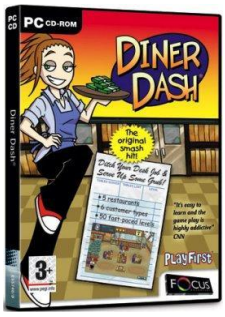
e. Rockett's New School by Purple Moon



f. Nancy Drew: The Haunting of Castle Malloy by HerInteractive



g. Animal Crossing by Nintendo



h. Diner Dash by PlayFirst

Figure 1-2 Games that characterise the girl game movement from the mid-1990s through 2000s

After more than a decade of the girl game movement, and in spite of efforts to accommodate female gamers with games by producers such as HerInteractive, Girl Games, GirlTech and Purple Moon, big production games are still being designed, developed, and marketed with the male player in mind. For example, the number one spot in the top-selling video games in 2009 goes to *Call of Duty: Modern Warfare 2* on Xbox360 (ESA, 2010) while *Call of Duty: Black Ops*, one of the *Call of Duty* game series is currently the highest selling game in the United States at 13.7 million units as of February 2011 (Mazel, 2011). The game is a first-person shooter military campaign where a gamer takes on the role of a member of an elite multi-national counter-terrorist unit. BBC News (2010) reported that an estimated $550 million in sales was made in the first five days of its launch in November 2009 with a total of $1 billion in revenue. Figure 1-3 shows a shortlist of ten games up for the most popular games award at the BAFTA award ceremony, with four games belonging to the action or shooting genres, i.e. *Call of Duty: Black Ops, Halo Reach, Mass Effect 2* and *Red Dead Redemption,* with two from the platformer genre, i.e. *Limbo* and *Super Mario Galaxy 2*, one game each from the sports genre, i.e. *FIFA11*, interactive drama, i.e. *Heavy Rain,* music genre, i.e. *Dance Central* and racing genre, i.e. *Need for Speed: Hot Pursuit.* The winner of the BAFTA Best Game Award 2010 was *Mass Effect 2* and GAME Award 2010 went to *Call of Duty: Black Ops,* both from the action-shooter genre.

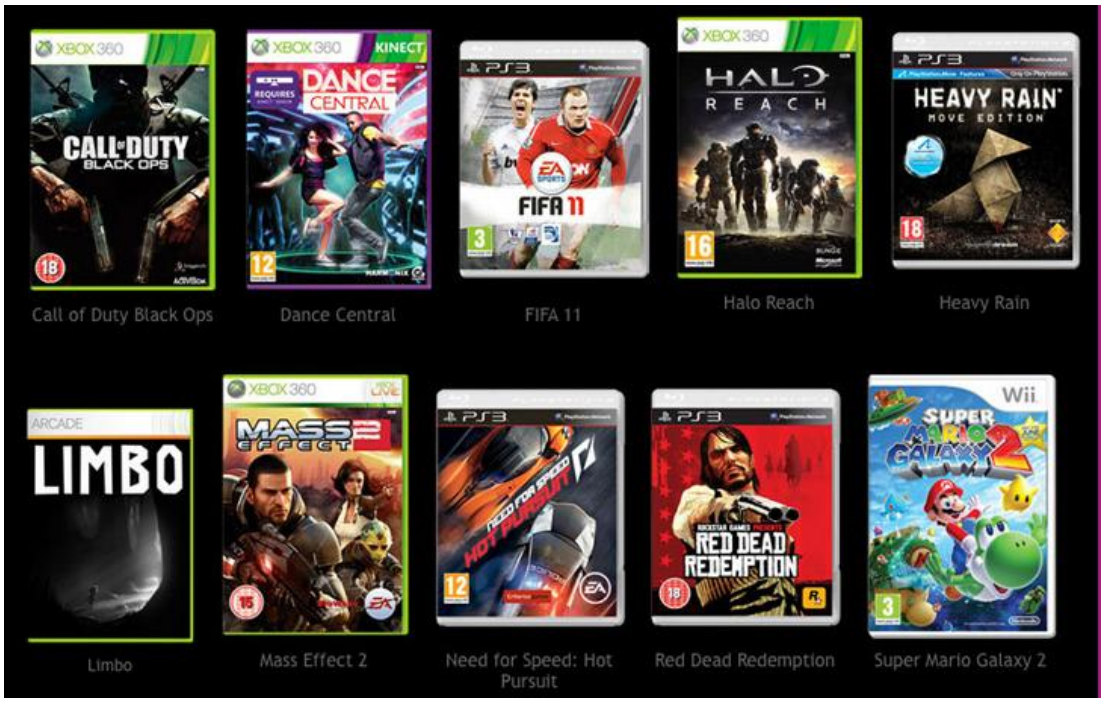


Figure 1-3 Ten shortlisted games for the BAFTA 2010 Games Award
From GAME website. Screenshot of BAFTA GAME Award 2010 shortlisted games. Retrieved 16th March, 2011 from http://www.game.co.uk/lowdown.aspx?lid=15422&cm_sp=bafta10-_-topnav-_-bafta10

A similar pattern of commercial and popular games with violent-action shooting content can be seen in Table 1-1. It is a list of award-winning games for the last ten years at the AIAS Game of the Year award ceremony, showing that almost all games that won the award are from either action, shooting or thriller (hack and slash) genre, with only two exceptions, i.e. *The Sims*, a life simulation genre in 2000 and *Little Big Planet*, a platformer genre in 2009. Seven of those award-winning games, i.e. *Diablo 2, Halo: Combat Evolved, Half-Life 2, God of War, Gears of War, Call of Duty 4: Modern Warfare* and *Mass Effect 2,* are categorised as containing mature content suitable for audiences aged 17 or older. A game rated as 'M' or mature content includes high levels of intense violent action, blood and gore, use of strong language and/or has sexual themes. Table 1-2 explains in detail the meaning of these terms used to describe 'M'-rated games. Retailers usually impose a parental approval restriction for buyers under the age of 17 when purchasing games in this category.

This situation with current games supports the hypothesis that large commercial and popular games are still being designed for the male audience. Hence, when Activision, developer of the C*all of Duty* game series and other popular games such as *Guitar Hero, World of Warcraft, Spider-Man* and *Crash Bandit*, claimed that having a female protagonist would not increase the sales of a game title (Alexander, 2010), it does not come as a surprise. Despite this rebuff, the girl game movement showed that there *are* female gamers, they play a lot of games, their gameplay style and choice of games are different, and not only are they gamers but also game designers and game

producers. For economic reasons presented in the earlier sections concerning the changing demographic of gamers and women's purchasing power, interestingly, the situation in current games also highlights the fact that there is still room for a bite out of the gamers' market and for design creativity an opportunity for designers to challenge their designing skills and find out what female gamers actually want in their games. Learning from the successes of games like *Barbie Fashion Designer, Nancy Drew Adventure* series, *The Sims* and *Little Big Planet* might uncover the *design magic* that made these games unique and popular.

Table 1-1 AIAS Overall Game of the Year Award winners from 2000 to 2011

Year	Game	Genre	Rating
2000	*The Sims*	Life Simulation	E
2001	*Diablo II*	Hack and slash	M
2002	*Halo: Combat Evolved*	First-person shooter	M
2003	*Battlefield 1942*	First-person shooter	T
2004	*Call of Duty*	First-person shooter	T
2005	*Half-Life 2*	First-person shooter	M
2006	*God of War*	Action-adventure game	M
2007	*Gears of War*	Third-person shooter	M
2008	*Call of Duty 4: Modern Warfare*	First-person shooter	M
2009	*LittleBigPlanet*	Platform game	E
2010	*Uncharted 2: Among Thieves*	Action-adventure game	T
2011	*Mass Effect 2*	Action RPG	M

Note: E – Everyone; T – Teen =>15 years old; M – Mature =>17 years old

Table 1-2 ESRB video game content criteria for 'M' or mature rating

Content	Description
Blood and Gore	Depictions of blood or the mutilation of body parts.
Intense violence	Graphic and realistic-looking depictions of physical conflict. May involve extreme and/or realistic blood, gore, weapons and depictions of human injury and death.
Strong language	Explicit and/or frequent use of profanity.
Sexual content	Non-explicit depictions of sexual behaviour, possibly including partial nudity.

Note. From Entertainment Software Rating Board (ESRB). Game Ratings & Descriptor Guide. Retrieved 10th October 2010 from http://www.esrb.org/ratings/ratings_guide.jsp

Although there are game models that can be used to guide game design (Aarseth, 2007; Barwood & Falstein, 2006; Bjork, Lundgren, & Holopainen, 2003; Consalvo & Dutton, 2006; Costikyan, 1994; Crawford, 1982, 2003; Fullerton, Swain, & Hoffman, 2004; Hunicke, LeBlanc, & Zubek, 2001; Jarvinen, 2007; Konzack, 2002; Koster, 2005; Kreimeier, 2002; Rollings & Adams, 2003; Salen & Zimmerman, 2005), these models rarely take into account gender preferences during designing. When creating a game, designers add features to their design with the intention of enabling certain gameplay experiences. However, there is a degree of separation between the desired gender-inclusive experience in games and the mapping of that experience. Currently, the determination of gender-inclusive features in games is not particularly documented and is largely based on a designer's experience and intuition and was

progressively developed based on prior designs. Consequently, how can we tell if the gender-inclusive gameplay experience is really compelling or even 'right'? There is little reported experience in the issues that arise in determining what features should go into a gender-inclusive game and for determining the success or failure in the evaluation of those features. Although the design process for current games is more established, for gender-inclusive games it is yet to take shape.

Current gender issues in games are concerned with:

- how each gender competes and their style of conflict resolution (Carr, 2005; Gorriz & Medina, 2000; Lewis, 1998; Miller, Chaika, & Groppe, 1996);
- how each gender take risks (Harris, Jenkins, & Glaser, 2006; Hillier & Morrongiello, 1998; Johnson, Wilke, & Weber, 2004; Turkle, 1986; Weber, Blais, & Betz, 2002);
- how each gender responds to stimulation (Bryce & Rutter, 2005; Denner & Campe, 2008; Krotoski, 2004; Miller et al., 1996; Ray, 2004).
- how each gender views rewards in games (Hoeft, Watson, Kesler, Bettinger, & Reiss, 2008; Miller et al., 1996);
- which genre and game content each gender prefers (Jansz & Martis, 2007; Miller & Summers, 2007; Ogletree & Drake, 2007; Pratchett, 2005; Roberts, Foehr, Rideout, & Brodie, 1999; Subrahmanyam & Greenfield, 1998);
- how each gender collaborates (Ding, Bosker, & Karskamp, 2011; Johnson et al., 2004; Weber et al., 2002).;
- what kind of play environment each gender prefers (Bryce & Rutter, 2005; Jenkins, 1998; Miller et al., 1996; Krotoski, 2005) and
- what kind of design features each gender prefers (Flanagan, 2005; Kafai, 1998; Miller et al., 1996).

Most previous research in gender, games and design only focuses on finding out how each gender plays and what their preferences are in games. It is conducted on specific content with specific players under specific conditions, and thus there is a lack of coherence – no integrative framework in which gender inclusivity can be interpreted or applied. The questions that arise from this situation are:

- What are the dimensions and components of gender inclusivity in games?
- How can gender inclusivity in games be defined?
- How can gender inclusivity in games be measured?

Figure 1-4 depicts a schematic illustration of the relationship between these gaps in research and the process of creating a more gender-inclusive game. As can be seen, these problems might hinder the creation of a more gender-inclusive game. It has no mechanism to paint a whole picture of how these findings fit together, how widely they can be applied, or how and why they are limited. Thus, this research will address several problems:

- Lack of integrative framework for understanding gender inclusivity in games.
- Lack of a common vocabulary for defining gender inclusivity in games.
- Lack of guidance to design a more gender-inclusive game.
- Lack of tool to measure gender inclusivity in games.

The remainder of this chapter sets the background for our research and outlines the objectives and thesis structure. In particular, Section 1.1 states the purpose of the research; Section 1.2 identifies the research questions, Section 1.3 outlines the overall structure of the thesis and finally Section 1.4 lists publications related to this research.

1.1 Purpose of the Research

The purpose of this research is to investigate how to support gender inclusivity in games. The aim is to develop and present a framework that can promote a methodological approach to support gender inclusivity in games. In general, the framework consists of gender inclusivity in games components, their descriptions and the manner in which they are related.

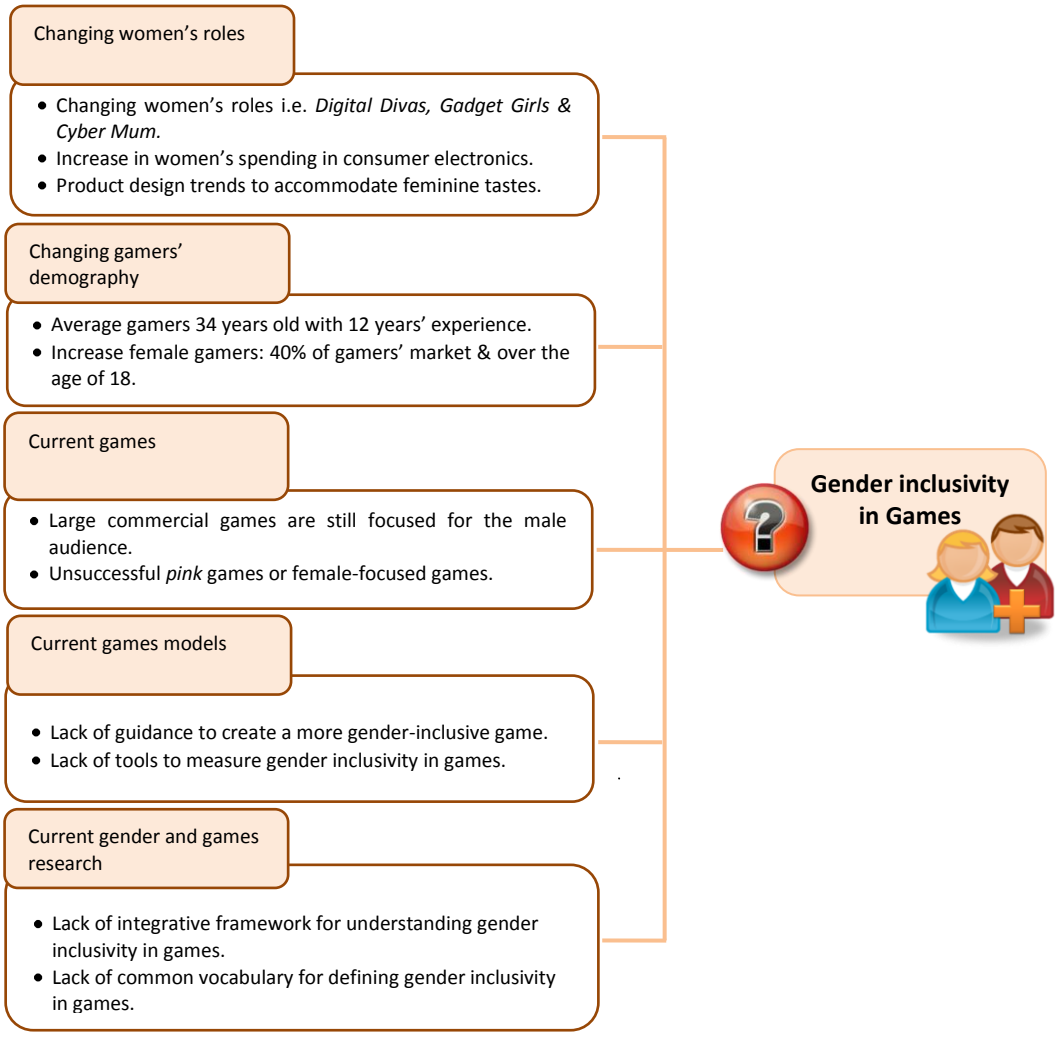


Figure 1-4 Current factors contributing to gaps in gender inclusivity in games research

1.2 Research Questions and Objectives

As mentioned in Section 1.1, there is a need to develop a framework for understanding gender inclusivity in games. With this in mind, this research aims to answer the following questions:

1. What are the dimensions and components of gender inclusivity in games?
2. How can gender inclusivity in games be defined?
3. How can gender inclusivity in games be measured?
4. Are there any differences in gender inclusivity in games components' scores between gender role orientations of gamers?

The term gender inclusivity in games is used to refer to a range of gameplay experiences through a variety of design components and behaviours. However, there exists no single theoretical perspective that can support a common communication platform when considering gender inclusivity in games. As initial analysis was unable to find evidence suggesting that a common set of terminology exists to describe gender inclusivity in games, this research hypothesised that a set of components for classifying gender inclusivity in games could form the groundwork for explicitly consolidating the subject into one reference point. Thus, this research aims to develop *a framework that can help understand the components of gender inclusivity in games*. Without a reference point it is very difficult to know what gender inclusivity in game even means, much less what gender inclusivity in games looks and feels like or to start designing one. In contrast, with a set of components to refer to, a designer can easily decide which component to include and design for a specific game.

At the same time, *the proposed framework can be used to define the development of a more gender-inclusive game.* It is desirable for the new framework to provide a description of each component, including its definition and behaviour. Without a detailed description of gender inclusivity in games, it would be difficult to design how the components would look and behave in a game. On the other hand, with a set of definitions and behaviour descriptions, more informed decisions can easily be made during the game creation process and therefore produce more accurate depiction of gender-inclusive components in games.

Finally, *the proposed framework can be used to measure the level of gender-inclusivity in games*. It is expected that the new approach can be used to evaluate the level of gender inclusivity in games. Without a detailed description of gender inclusivity in games, it is difficult to know how 'gender-inclusive' a game is or to know the right degree of gender inclusivity that is needed in certain games' genres. Alternatively, with a detailed description, it is easy to measure the level of gender inclusivity in games by comparing it against the definition and behaviour description.

1.3 Thesis Structure

This thesis described a programme of research to investigate how gender inclusivity in games can be supported. Four main factors set the background for this research: (1) the changing roles of women in economy and society; (2) the changing gamers' demography; (3) the large number of gender-specific games in the market; and (4) gender issues in games. Following a critical review of relevant work in games and gender research in Chapter 2, a set of synthesised themes and components was produced as the foundation of the framework. Next, the development process and components of the newly-developed *Gender Inclusivity Framework (GIF)* was discussed in Chapter 3. The framework indicates that gender inclusivity in games can be determined by three dimensions: (1) *gameplay,* which relates to game behaviours; (2) *content,* which relates to aesthetics elements of a game; and (3) *genre,* which relates to types of games.

Having developed the framework, subsequently in Chapter 4, a panel of experts from the games industry and academia was invited to validate the GIF's components suitability within the framework structure. Positive results from this study demonstrate that components of the GIF are theoretically sound and that further applications of the GIF can be explored. Having established the validity of the framework, Chapter 5 demonstrated an application of the GIF through the development and validation of a novel measuring instrument called *Gender Inclusivity Rating Scale (GIRS)*. Positive results from the validation study supports the GIRS as a reliable measuring tool that can be used in a research scenario and suggest that findings from the GIRS can be used to inform research and design. Next, Chapter 6 demonstrated the use of the GIRS in a research scenario. Results from this study highlights that gender role orientation may not be the only factor influencing gender inclusivity in games scores.

The final parts of the thesis, in Chapter 7 and 8, brings together the work done thus far in this research programme. Chapter 7 presents a detailed discussion of the research, the theoretical and practical implications, and limitations of the research. Lastly, Chapter 8 highlights the contributions of the research and identifies several potential directions for future work in applying and refining the GIF. The chapter concludes by summarising the motivations, aim and contributions of this research.

1.4 Publications List

This section lists the publications in support of this research.

1. Ibrahim, R., (2011). Gender Inclusivity in Games: Towards Reliability and Construct Validity of the Gender Inclusivity Rating Scale (GIRS)**.** In the *5th European Conference on Games Based Learning (ECGBL 2011), October* 20th – 21st, 2011, Athens, Greece. (Accepted)
2. Ibrahim, R., Wills, G. and Gilbert, L. (2011) Gender Inclusivity Framework (GIF): Inter-rater Agreement towards the Components of Gender Inclusivity in Games. In *IADIS International Conference: Games and Entertainment Technologies part of the IADIS Multiconference on Computer Science & Information Systems (MCCSIS 2011)*, July 22th – 24th, 2011, Rome, Italy. (Accepted)
3. Ibrahim, R., Wills, G. and Gilbert, L. (2011). Development of a Conceptual Framework for Supporting Gender Inclusivity in Games. In *IADIS International Conference: Games and Entertainment Technologies part of the IADIS Multiconference on Computer Science & Information Systems (MCCSIS 2011)*, July 22th – 24th, 2011, Rome, Italy. (Accepted)
4. Ibrahim, R., (2011). A Conceptual Framework for Supporting Gender inclusivity in Games. In *3rd International Conference on Education and New Learning Technologies, EDULEARN11,* July 4th - 6th, 2011, Barcelona, Spain. (Accepted)
5. Ibrahim, R., Wills, G. and Gilbert, L. (2010) A Conceptual Framework for Supporting Gender inclusivity in Games. In *i<tag> Interactive Technologies and Games: Education, Health and Disability Conference*. October 26th – 27th, 2010, Nottingham, United Kingdom.
6. Ibrahim, R., Wills, G. and Gilbert, L. (2010) deGendering Games: Towards the Development of a Gender Inclusivity Framework (GIF). In *Grace Hopper Conference 2010: Grace Hopper Celebration of Women in Computing*, September 28th – October 2nd, 2010, Atlanta, Georgia, p.51.
7. Ibrahim, R., Wills, G. and Gilbert, L. (2010) deGendering Games: Towards a Gender-Inclusive Framework for Games. In IADIS International Conference: Games and Entertainment Technologies part of the IADIS Multiconference on Computer Science & Information Systems (MCCSIS 2010), July 26th – 28th, 2010, Freiburg, Germany. pp. 127-130.

2 Related Work in Games and Gender

The previous chapter sets the background and motivation for this research and outlines the questions yet unanswered concerning games and gender. The changing roles of women and gamers demography combined with the issues surrounding current games are the main motivation for this research programme. The goal of this chapter is to identify significant theoretical findings in games and gender research, which will be used as the foundation of the proposed framework to support gender inclusivity in games.

Chapter 2 presents a review, analysis and classification of related literature in games and gender research. There are three main areas covered in this chapter: (1) game genres; (2) game models; and (3) gender issues in games. Further analysis of existing theories and research findings lead to our proposed categorization of synthesized components from games and gender research.

2.1 Introduction

The first step is to identify the content area that relates to the concept of interest (Gable & Wolf, 1993; Waltz & Bausell, 1981). Lynn (1986) recommends that a comprehensive literature review helps in identifying all the dimensions related to the content domain. Related work pertaining to gender and games was reviewed using the ACM Digital Library, ERIC, PsychARTICLES, IngentaConnect, ScienceDirect and Google Scholar. Keywords for the search included gender AND video or computer or digital AND games. The review was limited to English research articles, conference proceedings and frequently cited books. The resulting search produced works spanning fifteen years and in the following sections, the review of related works and the resulting analysis which led to the proposed categorization of synthesized components are presented.

2.2 Game Classifications

2.2.1 By industry rating

These rating guides are produced based on the evaluation of the game content. The aims of these rating guides are to inform gamers about the nature of the game content and to recommend a suitable age group for the game. Some of the content factors being evaluated in a game include cartoony imagery, fantasy, strong or mild language, excessive violence, sexual themes, crime, use of drugs or horror. One of the

widely used rating guides is from the Entertainment Software Rating Board (ESRB) consisting of six categories, i.e. Early Childhood (eC), Everyone (E), Everyone 10 and older (E10+), Teen (T) and Mature (M). Each of the categories presents a description relating to the game content with an age-appropriate recommendation. For example, a game with a high level of violence, blood, gore and strong language, such as *Resident Evil*, *Gears of Wars* and the *Halo* series, will be rated as 'M' and only suitable for gamers over the age of 17, while *Disney Learning Toddler* rates an 'eC' for young children and of educational nature.

Although some countries may have a different rating guide in terms of their labelling and age limits, the content descriptions are mostly similar to the ERSB rating guide. For example, the UK's British Board of Film Classification (BBFC) uses five categories i.e. 'U', 'PG', '12', '15' and '18', while Japan's Computer Entertainment Rating Organization (CERO) also has five categories in its rating guide i.e. 'A', 'B', 'C', 'D' and 'Z'.

In terms of age limit, some countries have a lower age limit compared to others. For example, the ESRB 'M' rating for mature content is set from 17 years of age but has a different age limit in the UK, Australia, Europe, New Zealand and Japan. In the UK and Australia, the minimum age for mature content is 15, in New Zealand and Europe the minimum age is 16 and finally in Japan and North America the minimum age is 17.

The application of these rating guides depends on individual countries, as some may have a more lenient view when applying the ratings. For instance, although *Halo 3* is rated as 'M' for containing mature content, the age limit is different depending on the country. The ERSB recommends the minimum age of 17 years old but in the UK and Australia it is rated as suitable from 15 years old while in New Zealand and Europe from 16 years old. The game *Half Life 2* is another example where the ERSB rated it as 'M' for audiences from 17 years of age, but in the UK and Australia it is rated as suitable from the age of 15, in most European countries from 16, but in Germany from the age of 18.

2.2.2 By genre

A more widely accepted method is by its genre (Kirriemuir & McFarlane, 2004; Oxland, 2004; Pedersen, 2003; Prensky, 2007; Rollings & Adams, 2003). One of the earliest descriptions of genre was proposed by Herz (1997) (as cited by Kirriemuir & McFarlane, 2004) and consists of eight genres, i.e. action games, adventure games, fighting games, puzzle games, role-playing games, simulations, sports games and strategy games. Although Rollings and Adams (2003) offer a slight difference with only seven categories, generally their taxonomy is similar to the one proposed previously. The game genres, their main features and some popular games that fall under each category can be found in Table 2-1. Fighting games from Herz's game genres were reclassified into the action genre because games in the fighting genre, e.g. *Mortal*

Kombat, Tekken and *Street Fighter*, in their basic form are simply action games. Five additional genres were added to the list, i.e. classic/board games, children's games, racing games, platform games and shooting games. Some may have been a subset of another genre but have grown into a genre by themselves to reflect the variety of genres available in the market today. For example, although the shooting genre was a sub-genre of action genre, a majority of games in the action genre are shooting games which accounted for 12% of the bestselling video games in 2009 (ESA, 2010).

Table 2-1 Classification in 12 genres with a short description and examples of game titles belonging to each genre

Genre	Characteristics	Example Game Titles
Action	Action-oriented with significant hand-eye coordination gameplay. Has little plot and often mission-based with a lot of actions.	Doom, Resident Evil, God of War, Mortal Kombat, Tekken
Adventure	Requires interaction with characters and objects in the game to complete the game. Usually has interesting plot with visually stimulating game environment.	Monkey Island, King's Quest, Globetrotter, Syberia
Puzzle/quiz	The main goal is to confuse the player through a series of challenging problems and the problems always have a solution.	Puzzles in Seventh Guest, Tetris, Literati Hoyle Word Puzzles,
Role Playing Game (RPG)	Players take on a third person view with repetitive story line and combat development.	Dungeons Siege, Ultima, Diablo
Simulation	Models real world objects or machineries such as trains, airplane and cars.	Falcon, Fleet Defender
Sports	A combination of arcade and simulation game that models renowned sports venues and popular athletes.	FIFA Soccer, Virtual Pool, ESPN Extreme Sports
Strategy	A highly competitive game environment where a player devises plans to conquer or build a city. The prevalent themes in this genre are war campaigns, city building and 'God-like' RTS.	Warcraft, SimCity Command and Conquer, The Sims, Age of Empires
Classic/Board	Adaptations of classic board games.	Monopoly, Mancala, Reversi, Scrabble
Racing	A player takes part in a racing competition using on land, air or sea vehicles.	Mario Kart, Gran Turismo, Forza Motorsport, Formula One Championship
Children	Usually educational and based on children's popular cartoon characters such as Dora the Explorer and Arthur.	Dora the Explorer: Lost City Adventures, Disney's Princess Magical Dress-up, Arthur's Computer Adventures
Platform	Usually a player is required to jump or fly to/from suspended platforms and over obstacles.	Little Big Planet, Ratchet & Clank Future, Super Mario Galaxy, Sonic Rush
Shooting	A main objective is to shoot opponents or enemies to complete a mission while trying to survive the scenario.	Max Payne, Resident Evil 4 & 5, Gears of War, Killzone, Call of Duty

2.3 Game Models

Research into game models is one way to understand how games are created and through this understanding help guide the creation process and consequently create better games in the future. The progression of game technology from the early 1950s to the seventh generation of current game consoles is very well documented and easily found in literature such as books, encyclopaedias and websites. However, the design and development methods of the games themselves are rarely known, nor easily become available. The complexity and nuances of designing a game is tucked away in a game designer's mind and can only be learnt through years of experiences. If one's would like to learn game designing, one has to learn from scratch, and it takes a long time to come up to par with seasoned game designers. In contrast, if a collection of works relating to game design and development were easily available, then the process of learning would be shorter because a new game designer could avoid mistakes due to his/her inexperience, easily follow tried and tested methods of game design and could concentrate on developing new creativity.

The situation began to change when in 1982 Chris Crawford published *The Art of Computer Game Design*, which outlines the common factors to consider when designing a game. In Figure 2-1 below, the diagram illustrates a timeline of game models and their first appearance for public consumption. The timeline shows an active movement and interest in game models research by both professional game designers and academic researchers making its debut during the 2000s. A total of 12 game models were found within the last decade, from 2001 to 2007. In the early stages of the movement, only two game models were available, i.e. Chris Crawford's *The Art of Computer Game Design* in 1982 and Greg Costikyan's game model in 1994, with a gap of 12 years between them.

Since 1982, many other game designers have followed suit to document and share their design methodologies (Aarseth, 2007; Barwood & Falstein, 2006; Bjork et al., 2003; Consalvo & Dutton, 2006; Costikyan, 1994; Crawford, 2003; Fullerton et al., 2004; Hunicke et al., 2001; Jarvinen, 2007; Konzack, 2002; Koster, 2005; Kreimeier, 2002; Rollings & Adams, 2003; Salen & Zimmerman, 2005). The following Figure 2-1 summarises all the game models with a brief description of what each model comprises.

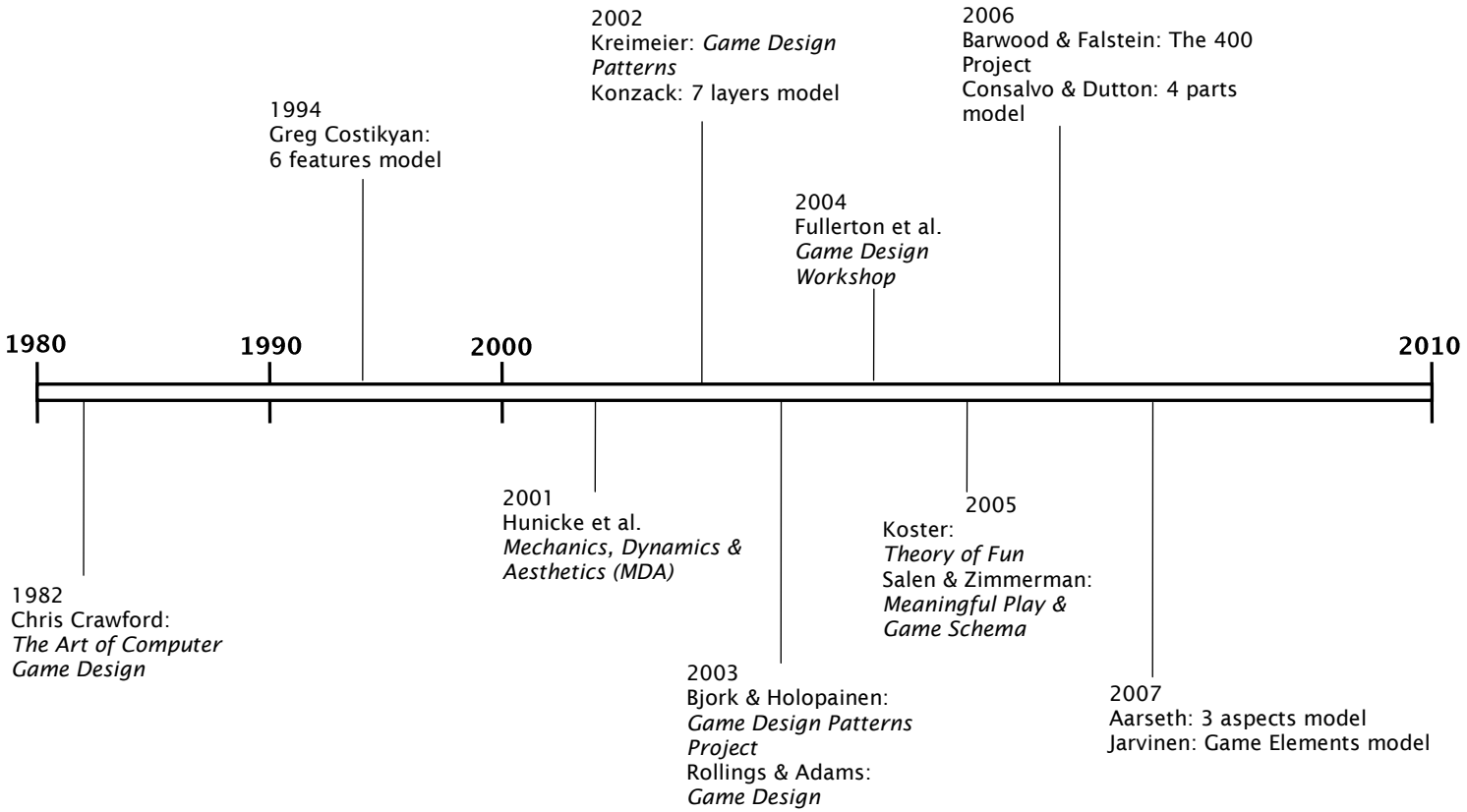


Figure 2-1 A timeline for game models since 1980, showing the publications of game design models from Crawford's onwards.

From the previous section, further analysis of the 14 game models produced a synthesised list with four themes: (a) gameplay, (b) aesthetics, (c) narrative, and (d) interaction. In each theme, components were identified and sorted into the theme that best describes them. The combination of these individual components in turn characterises the theme as a whole. Table 2-2 shows the main themes and components used to categorise the related work in game models.

Despite the focus on gameplay components, there are other components that make up a game. As can be seen in Table 2-2, the majority of components belong to the gameplay theme, with eight items, while interaction theme has four items, and aesthetics and narrative themes, consist of three components each. How each component is used during design depends on the type of game to be produced. For example, games like *Tetris* and *Pacman* would not require realistic graphics or a wide range of avatars from which to select. On the other hand, games like *Prince of Persia*, *Assassins Creed* and *Ratatouille* would require a rich game world with a variety of objects, NPCs (non-playing characters) and scenes.

Table 2-2 A synthesised list of themes and core components derived from game models research. The list consists of four themes with a total of 19 components

Themes	Components	Source
Gameplay	• Goals/Objectives • Conflict • Challenge • Fun/Play • Rules/Patterns • Winning/Outcomes • Safety • Balance	Crawford, 1982, 2003 Costikyan, 1994 Rollings & Adams, 2003 Hunicke et al., 2001 Kreimeier, 2002 Bjork, Lundgren & Holopainen, 2002 Fullerton et al., 2004 Salen & Zimmerman, 2004 Koster, 2005 Jarvinen, 2007 Fullerton, 2008
Aesthetics	• Theme • Game world • Visual stimuli • Auditory stimuli	Hunicke et al., 2001 Fullerton et al., 2004 Rollings & Morris, 2004 Jarvinen, 2007 Fullerton, 2008
Narrative	• Backstory • Plot • Storytelling	Hunicke et al., 2001 Rollings &Adams, 2003 Koster, 2005 Fullerton, 2008
Interaction	• Functionality • Interface Style • Navigation • Character Controls	Crawford, 1982, 2003 Rollings and Adams, 2003 Jarvinen, 2007
4 themes	**19 components**	

Although research into game design has attracted both academic researchers and game designers, it is still a new area and much of the process is still considered a 'black art'. Undoubtedly, a game is a product that merges many diverse disciplines including computer science, history, art, physics, economics, business, media and design, which lends a certain level of complexity to the design process. Previously, the nuances of designing successful and popular games were not truly understood and only recently have more game designers started to document and share their knowledge and experience in game design (see Figure 2-1 Game model timeline). However, how to know a particular game design model will do what it says it can do, and how to go about finding that out, are still relevant questions. There is a paucity of literature that addresses this issue and the implication is that a game model might not work and that the cause of the problem remains unidentified. Hence the need to research existing game models and understand their anatomy to make a connection between design process and games. This can help towards a better understanding of how games are made, what goes into the process and what considerations were made during design and development. A collection of game design principles can be developed and eventually used to inform game design theory development.

2.4 Gender

Gender is defined as "the physical and/or social condition of being male or female" and "all males, or all females, considered as one group", while the term *sex* as "the state of being either male or female" (*Cambridge Advanced Learner's Dictionary*, 2009). Therefore, *gender* is the generally accepted way to classify people. In addition to that, the term *gender* is also used in grammar for languages such as in French, Italian and Spanish and to refer to a traditional musical instrument (*Encyclopædia Britannica*, 2008*)*. However, in the academic realm, the term gender has had a long and varied history since the 1970s from across disciplines and even within the same beliefs, for example, gender holds different outlook for liberal feminism, Marxist feminism, radical feminism, socialist feminism and black feminism even though they are some form of feminism. One of the most prominent feminist works by Ann Oakley in her book *Sex, Gender and Society,* published in 1972, (as cited by Bradley, 2007) defines *gender* as "the socio-cultural aspects of being a man or a woman – that is how society sets the rules for masculinity and femininity – while *sex* refers to the base of biological sex differences ('male' and 'female')"(p.15). Almost more than two decades later, this view is still maintained in some works (Burr, 1998; Sprague, 2001).

An alternative view of gender was proposed by West and Zimmerman in their work *Doing Gender* (as cited by Williams & Webber, 2004). It describes gender as something people do based on the social expectations of them. It looks into the

actions and activities people take upon themselves to fit into the society's notion of their gender, e.g. Bradley (2007), Sprague (2001) and Williams & Webber (2004). This argument highlights the point that people themselves are actively involved in "doing gender" (Bradley, 2007), and that it is malleable and contextual (Crawford, 2001; Williams & Webber, 2004).

Williams & Webber (2004), in their introduction to the topic of *Sociology of Gender,* best summarise the progression of the term *gender* as:

> The concept of gender was first developed to distinguish anatomical and reproductive differences between men and women from the social meanings and cultural practices that associated with those biological differences. More recently, scholars have argued that the basic biological distinctions of 'male' and 'female' are themselves reflections of social and cultural understandings. Currently, the term gender is used to refer to any discourse, social organization or cultural practice that distinguishes men from women. (p401)

From the psychological standpoint, gender is synonymous with the study of *femininity* and *masculinity*. These concepts refer to the condition or characteristics of being a male or female based on the social and cultural definition of what and how a man or woman should be and/or behave (Burr, 1998)**.** Deaux, in her article *Psychological Constructions of Masculinity and Femininity,* (Reinisch, Rosenbaum, & Sanders, 1987), categorises the use of femininity and masculinity into three major areas of studies: "1) stereotypic views of males and females; 2) studies of sex differences and similarities in cognitive abilities, personality traits, and social behaviors; 3) gender identity and self-reported masculinity and femininity" (p. 289). When discussing the concept of gender, inevitably a number of other related terms can be found in the literature namely *sexual orientation, gender roles, gender identity* and *gender stereotypes*.

- *Sexual orientation* refers to the sexual attraction to another person i.e. homosexual, heterosexual or bisexual.
- *Gender roles* are the attitudes and behaviours deemed appropriate for a man or a woman by that particular culture. For example, gender roles might include women investing in the domestic role and men investing in the worker role (Eagly, 1995).
- *Gender identity* is the psychological belief of oneself to be male or female i.e. "I am a boy" or "I am a girl".
- *Gender stereotypes* are shared views of personality traits associated with one's gender, such as instrumentality in men and expressiveness in women.

Androgyny is a concept that emerged during the 1970s and describes a person has the possibility to express themselves in a combination of femininity and masculinity traits. Two of the most popular femininity and masculinity measurements are Bem Sex

Role Inventory (BSRI) (Bem, 1974) and the Personal Attributes Questionnaire (PAQ) (Helmreich, Spence, & Holahan, 1979).

Bem (1974) developed the measuring instrument based on two assumptions: (a) that it is possible for a person to be both masculine and feminine; and (b) if both masculine and feminine traits of a person are integrated, it will develop a more balanced person with an androgynous personality. The BSRI contains 60 items with three dimensions, i.e. masculinity, femininity and social desirability. The masculinity dimension consists of items often associated with a masculine or instrumental orientation, such as *competitive, acts as a leader, ambitious, analytical* and *independent;* while the feminine dimension has items often associated with a feminine or expressive orientation, such as *gentle, loyal, understanding, compassionate* and *sensitive to the needs of others*. Finally, the social desirability dimension contains neutral items that are neither masculine nor feminine and consists of a list of items with both negative values, i.e. conceited, jealous, inefficient and moody, and positive values, i.e. adaptable, happy, likable and reliable. A seven-point Likert style format was used as the response items and participants were asked to rate how well they identified themselves with the items. Findings from her work classified individuals as having one of the four gender role orientations:

i. *Masculine* are individuals with high masculine traits and low on feminine traits;
ii. *Feminine* are individuals with high on feminine traits and low on masculine traits;
iii. *Androgynous* are individuals with high degree of masculine and feminine traits; or
iv. *Undifferentiated* are individuals with low masculine and feminine traits.

Another notable measuring instrument was developed by Helmreich, Spence & Holahan (1979), called Personal Attributes Questionnaire (PAQ). The PAQ has 24 items with three scales, i.e. expressivity, instrumentality and androgyny. The instrumentality scale has eight items that represent masculine characteristics and the expressivity scale also has eight items that represents feminine characteristics. Generally the instrumental scale lists items ranging from masculine to not masculine, while the expressivity scale lists items ranging from feminine to not feminine. The third scale, androgyny, is made up of items that represent androgynous characteristics. A participant responds by indicating on the scale of paired items which of the five points scale in between describes him/herself best. The letters ‘A’ to ‘E’ form a scale between two extremes and each pair describes contradictory characteristics. For example a participant cannot be both ‘not at all aggressive’ and ‘very aggressive’ at the same time. If a participant thinks he/she is not aggressive, they might choose ‘A’ or if a participant thinks he/she is aggressive, a participant might choose ‘D’. If he/she thinks they are moderately aggressive, they might choose ‘C’ and so forth.

Both BSRI and PAQ listed items that represent attributes that are positively and are norms for either males or females to support, which constitute the masculine scale and feminine scale. The BSRI asks participants to rate the degree to which a series of items are true about them, while the PAQ asks participants to rate themselves on a series of bipolar items.

For many, a person's gender identity is consistent with their biological sex. For others, it is not e.g. transsexuals. Also, a person's sexual orientation does not determine their gender roles. These three aspects of biological, psychological and sociological are interrelated with each other on many levels (Tripp, 2000) and together constitute the term *gender*. Despite all the debates and problems arising from trying to define the term, a fixed explanation that conveys the meaning of *gender* is still inconclusive and may be unattainable. Tripp (2000) states "meaning is never fixed:…the term 'gender' means different things at different times and different things at the same time…thus there always exists within a culture the possibility that these things can and will be interpreted differently" (p.7). The only thing that is constant is the concept of *gender* as protean and the awareness of "variations of meanings and practices associated with gender in different historical and social contexts" (Williams & Webber, 2004).

2.5 Games and Gender

Current games are developed with a focus on gender exclusive preferences which usually results in games that exhibit gender stereotypes. On one extreme, large-scale and popular games are still being designed with the male player in mind and come with the trappings of excessive violence, bloody, gore and hypersexualized characterisations, which may not appeal to many female players. Games like *God of War* series, the *Grand Theft Auto* series and the *Silent Hill* series portray extreme violence; bloody gore and strong language with elements of drugs and sexual content (see Figure 2-2). For example, in *Grand Theft Auto 4*, see Figure 2-5b, extreme violent actions depicted include stealing cars, shooting passers-by, stabbing, running people over, punching, igniting missiles and bombs, burning pedestrians, killing cops, unlocking pornographic content, committing hate crimes, engaging in gang wars, sex with prostitutes and then killing them. Another similar example is the *God of War* game series, which according to its publisher Sony Computer Entertainment (2008) has won more than a dozen Game of the Year awards since it was released in 2005; it contains suicide, genocide, topless goddesses, violence against women and children, blood and gore, explicit decapitation and rewards the killing of innocents. Finally, in Figure 2-2c, the game *Silent Hill* is another example of games with explicit blood and

gore scenes such as having a drill forced into the hero's eye socket which cause blood to spray out.

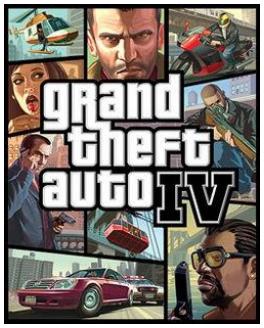
On the contrary, if a game is focused on female players, it comes with a lot of *pinkness* and a wedding, cooking or fashion theme. Figure 2-3 shows some popular female-oriented games such as *Wedding Dash, Barbie Fashion Show* and *Cooking Mama*. These games' themes are focused on stereotypical female roles and portrayal. For example, *Wedding Dash,* in Figure 2-3a, the aim is to plan for the *perfect* wedding by selecting food, honeymoon and theme for a specific couple and overcoming obstacles during the wedding to avoid the bride turning into a *bridezilla*- a mean version of a bride. In *Barbie Fashion Show,* in Figure 2-3b, a player's objective is to organise a fashion week in Paris by choosing fashion styles, fabrics, colours, stage design, music and special poses for the virtual models. While *Cooking Mama,* in Figure 2-3c, is based on a cooking theme where players simulate cooking actions and then sell the dishes in a virtual restaurant. The game associates cooking with a traditional female gender role as depicted in the avatar portrayal and game title.

These *gender-specific* games, where the main audience of the game is either male or female players, have features that focus on either gender's extreme preferences, such as *God of War* for male players in Figure 2-2 (a) and *Barbie Fashion Show* for female players in Figure 2-3 (b). These two games exemplify games with extreme focus on gender-specific stereotypes, i.e. male players like violence, blood and gore while female players like bubble gum pink, sparkle and fluff.

While these gender-specific games tend to focus on a gender's differences in game preferences, which in turn highlight gender stereotypes, games like *The Sims, Little Big Planet* and *Wii Sports* series are more *neutral* and may appeal to both male and female gamers. *The Sims* and *Little Big Planet* are the only game titles rated as suitable for 'E' or Everyone that have won a Game of the Year award from the AIAS (see Chapter 1 Table 1-1), while *Wii Sports* series is on the third rank on the Top 20 Selling Video Games of 2009 (ESA, 2010). Surprisingly, ESA also reported that *The Sims* series, including *The Sims 2: Double Deluxe, The Sims 3: World Adventures, The Sims 3: Collector's Edition* and *The Sims 2: Apartment Life On,* are all on the Top 20 Selling Computer Games in 2009. The questions that arise from this situation are what makes these kinds of games appealing and how to design games with similar appeal.

The following sections will explore current games and gender research following *gender preferences in games* theme. Although it seems that following this line of exploration would be like taking a step backward from gender inclusivity, it is important to understand the major issues that have been looked at by other researchers and see how these findings can be relevant to gender inclusivity. Works by Bryce, Rutter, & Sullivan (2006) and Ray (2004) supports similar views on how to investigate the issue of gender and games.

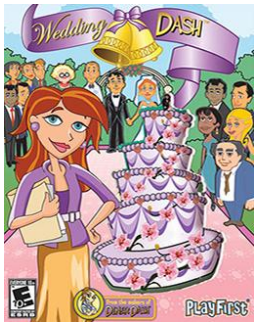
a. God of War by Sony Computer Entertainment



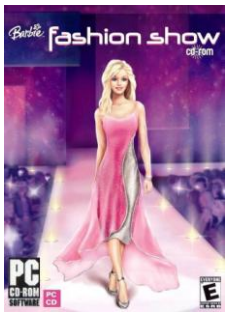
b. Grand Theft Auto (series) by Rockstar Games

c. Silent Hill (series) by Konami

Figure 2-2 Examples of gender-specific games focusing on male stereotypes



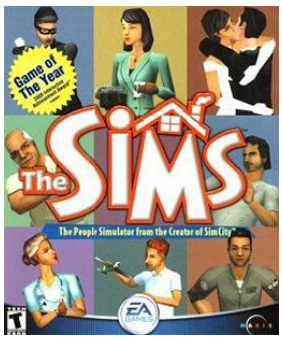
a. Wedding Dash by Playfirst



b. Barbie Fashion Show by Vivendi Universal

c. Cooking Mama by Cooking Mama Ltd.

Figure 2-3 Examples of gender-specific games focusing on female stereotypes



a. The Sims by Electronics Arts

b. Little Big Planet by Sony Computer Entertainment

c. Wii Sports Resort by

Figure 2-4 Examples of gender-unspecified games titles and usually rated as suitable for 'E' or Everyone

2.5.1 Violent actions

Lewis (1998) shows boys prefer direct or overt competition while girls prefer a more secretive or covert way. In addition, boys feel the need to 'beat' the game and win, while girls take their time going through the game exploring the story and establishing emotional attachment (Gorriz & Medina, 2000; Lewis, 1998; L. Miller et al., 1996). These findings also inform on how each gender manages conflict both in and out of a game; where the male generally resolves "a problem by direct confrontation with a decisive win-or-lose result" and females usually "choose negotiation, diplomacy and compromise" (Ray, 2004, p.43). Figure 2-5 shows two scenes portraying direct and often violent actions during gameplay. For example, Figure 2-5a depicts a scene from *Soldier of Fortune 2: Double Helix*, the game not only contains high level of violent actions, but it also make use of real world locations and 25 models of real world weapons. Another example of extreme violent action can be seen in Figure 2-5b, where *Kratos* from *God of War* is shown decapitating an opponent in moderate to high levels of graphics realism. On the contrary, Figure 2-6 shows two examples of actions alinvolving negotiations and diplomacy preferred by female gamers in games such as *Nancy Drew: The Haunting of Castle Malloy* and *Syberia*. In Figure 2-6a Nancy Drew has to interact with Kyler Mallory to find out about her mission. In Figure 2-6b Miss Walker from *Syberia* owns a notebook that contains a selection of people and items she interacts with to get more information or in determining her actions.

a. Scene from Soldier of Fortune 2 game showing direct and violent conflict resolution action

b. Scene from *God of War* game showing decapitation and bloody gore

Figure 2-5 Scenes showing direct and violent actions

a. Scene from *Nancy Drew: Haunting of Castle Malloy* showing an interaction dialogue between a player and game character

b. Scene from *Syberia* showing a notebook containing a selection of dialogue a player's avatar can choose from

Figure 2-6 Scenes showing indirect and non-violent actions

Relevance for gender inclusivity in games

- Emphasise competing action that do not directly harm another competitor, such as competing in a sprint race, finding a clue or earning money by harvesting another player's farm, versus violent action that openly harms another competitor to win or gain something, such as burning a competitor's house, fighting with a weapon or geting sliced up by a meat cutter.
- Emphasise resolving conflict through peaceful or non-violent action, such as negotiating with enemies, giving gifts to enemies, opening new trade routes or exchanging an ingredient to complete a recipe versus violent action and showing aggression, such as attacking a village to gain territory or resources, or assassinating a competitor in a political campaign.
- Allow enough time to discover the game through compelling story using plot twists, conflict and interesting characterisation.

2.5.2 Risk-taking

Research in risk assessment and decision making has demonstrated that females are more likely to engage in an activity when they perceive a positive outcome is possible and avoid risk if there they perceive a significant negative outcome is more likely (Harris et al., 2006; Hillier & Morrongiello, 1998; Johnson et al., 2004; Weber et al., 2002). At the same time, females tend to seek understanding before trying (Turkle, 1986). It is reasonable to suppose, then, that some female gamers might be put off by a 'trial and error' gameplay mechanics in games.

Relevance for gender inclusivity in games

- Provide enough information in the background story for a player to understand the context of the game, such as what events have happened and how a character's life will change as a result of the events in the game.
- Provide guided tutorials or missions for players to practice their skills before continuing with the game.
- Make in-game instructions easy to get to during play sessions by clicking an icon or pop-up display on the screen.

2.5.3 Reward and penalty system

In many games, achieving or beating a score is the most common mechanism to proceed through a game. Glos & Goldin (1998), L. Miller et al. (1996) and Ray (2004) reported similar results in the way failure or choices are dealt with during gameplay. Boys prefer more violence and 'death' as a prominent feature of punishment. Girls exhibit passive feedback with an opportunity for improvement. They like the game to continue even if a mistake was made, rather than dying and starting over. For example,

in *Prince of Persia: Sands of Time*, in the event the Prince fails to jump over a ledge and falls into a ravine, the *Sands of Time* will automatically reverse the action and allow a player to replay the scenario. In addition, L. Miller et al. (1996) discovered that girls view winning as not as important as the 'experience' of playing the game. Hoeft et al. (2008) provided an interesting insight about gender differences in motivational and reward systems. They reported these differences may be caused by biological responses during gameplay and may explain why males are more inclined to games.

Relevance for gender inclusivity in games

- Allow continuity without sudden end or a death penalty (loss of life) by saving multiple versions of a scenario, allowing a player to replay them and showing game hints.
- Allow a gamer to improve gameplay by regaining energy through rest or food or finding items that help prolong life or health.

2.5.4 Challenges and types of activity

Kafai (1998) discovered that boys tend to design games themes that allow them to 'get something' through a pursuit or adventure exploration. By contrast, girls create games that involve 'doing something' without finding objects treating the game as the activity itself. Flanagan (2005) indicated an unresolved problem concerning the small number of women working in the industry despite an increase of female characters in games. She contends the problem persists from defining and generalizing female players according to real world social constructs and suggested careful game design that affords 'multiplicity of play styles and providing diverse thematic content' (p.2).

Relevance for gender inclusivity in games

- Allow multiple ways to solve a problem, such as climbing Mount Kilimanjaro by using a rope, jumping from one ledge to another, special springy shoes, or teleportation.
- Present a variety of activities, e.g. puzzles, adventures, building, shooting in one game.
- Separate activities are related to a purpose, such as solving a mathematical puzzle to get a clue needed to build a sculpture which in turn solves a scenario.

2.5.5 Collaboration

Weber et al. (2002) and Johnson et al. (2004) reported similar results in which female are more willing to take risks in a social decision making setting. Research in computer-supported collaborative learning (CSCL) showed that a pairing of female-with-female groups performed significantly better than a mixed-group pairing or male-with-male group (Ding et al., 2011). Hence, when *The Sims* was launched in 2000, it

became one of the most successful selling games and still remains on the top selling video games lists (ESA, 2010; JKDMedia, 2002; Wakefiled, 2005; Williams & Webber, 2004). The game attracted a lot of female gamers (Carr, 2005; Hinckley, 2008; Jansz, Avis, & Vosmeer, 2010) with its wide range of social interaction as the foundation of its life simulation gameplay. This corroborates findings from Laurel (1998) that girls prefer to explore their social and emotional complexity.

Relevance for gender inclusivity in games

- Allows collaborative gameplay between two or more players including siblings, friends, and other gamers, such as by hiring another gamer or a group of gamers from the marketplace to help harvest a sunflower farm or clean an aquarium.

2.5.6 Genre

Similar findings were reported in female gamers' preference for music/dance, puzzles/board/quiz and classic games while male players prefer action-adventure, racing, sports and first person shooter genres (Bonanno & Kommers, 2005; Pratchett, 2005; Roberts et al., 1999). An interesting result is the preference for simulations and MMOGs (Massively Multi-player Online Game) genres in both genders (Krotoski, 2005; Pratchett, 2005). In an earlier study Krotoski (2004) reported that RPG, fantasy, narrative adventures, driving simulation, puzzle adventures, puzzles and life simulations as some of female gamers' favourite genres.

Relevance for gender inclusivity in games

- Presents a combination of game activities such as solving puzzles, climbing, building and finding.

2.5.7 Visual and auditory stimuli

Even though both genders do respond to visual stimuli, their reactions to the stimuli are different. Males tend to show a physiological reaction but females need an emotional or tactile stimulus to elicit the same response (Bryce & Rutter, 2005; Krotoski, 2004; Ray, 2004; Laurel, 1998). In addition, a 'rich texture phenomenon' which includes audio, expressive graphics, good plot and characters is also preferred by female gamers (Denner & Campe, 2008; Krotoski, 2004; L. Miller et al., 1996).

Relevance for gender inclusivity in games

- Provides a variety of music styles from a range of music genres such as country, classical, latin, world, rock or pop.
- Depict realistic graphics in a wide range of colour shades and scenes such as showing a shadow cast by a character or lighting in a dark cave by flickering torches.

- Develop storyline with a purpose that emerges with the game and entertaining enough to keep the player in the game using plot twists, conflict and interesting characterisation.

2.5.8 Avatar portrayal

Subrahmanyam & Greenfield (1998) described the most appealing features of *Barbie Fashion Designer* as non-violence; nurturing and helping others; role-play that reflects the real-world; self-paced play; and an intuitive interface. Their findings also suggest that games having female protagonist characters are not enough to appeal to girls. Recent studies showed that the number of female protagonists in games is increasing (Bryce et al., 2006; Jansz & Martis, 2007), but some female avatars are still being viewed as weak and hypersexualised while male avatars appear as aggressive and tough (Burgess, Stermer, & Burgess, 2007; Dill & Thill, 2007; M. K. Miller & Summers, 2007; Mitchell & Reid-Walsh, 2007; S. Ogletree & R. Drake, 2007). In Figure 2-7, all female avatars, i.e. Ivy Valentine, Lara Croft and Oerba Dia Vanille, are protagonists and playable characters; however, their portrayal is hypersexualised with exposed body, disproportionate physical appearance in barely-there clothing and provocative expression. Similarly in Figure 2-8, all male avatars i.e. Kratos, Ezia and Chris Redfield, are protagonists however they are also hypersexualised with exposed body, overly large muscles and in an aggressive stance or menacing expression. Negative representation of avatars with extreme physical proportions, hypersexualised or hypermuscularised, have been shown to have a negative effect on female gamers, self-concept (Behm-Morawitz & Mastro, 2009) and both female and male gamers, body image (Barlett & Harris, 2008).

Ivy Valentine from Soul Calibur | Lara Croft from Tomb Raiders series | Oerba Dia Vanille from Final Fantasy XIII

Figure 2-7 Examples of female avatars with extreme physical proportions and hypersexualized portrayal

Kratos from
the God of War

Ezio from
Assasins Creed II

Chris Redfield from
Resident Evil series

Figure 2-8 Examples of male avatars with hypersexualized, hypermuscularized and aggressive portrayal

Relevance for gender inclusivity in games

- Present a balanced representation of characters/avatars by providing an equal number of male and female characters/ avatars for selection.
- Allow personalisation by modifying a player's chosen avatar characteristics such as name, physical body, facial features, skin, clothing, wearable items, personality and roles.
- Provide a wide range of avatar's physical appearance in a variety of clothing style and body type, versus a hyper-sexualized portrayal showing cleavage, 'six pack' belly, exposed body, extreme proportions, provocative postures or facial expressions.
- Provide a wide range of roles versus a stereotypical female representation as damsel in distress, hostage, seductress, bystander and non-competitor while stereotypical male as hero, soldier, competitor, saviour or tyrant.
- Provide a wide range of personality traits versus stereotypical female representation as submissive, weak, most likely to use verbal ridicule and aggression while male stereotypes as physically aggressive, violent, strong and most likely to use a weapon.

From the previous sections (see Section 2.5.1 to Section 2.5.8), the eight categories of issues concerning gender and games was synthesised into four themes: (a) gameplay experience, (b) game content, (c) play environment, and (d) design choices. In each theme, a set of components was identified and sorted into the theme that best describes it. The combination of these individual components in turn characterises the theme as a whole. Table 2-3 summarises the main themes and components used to categorise the related work in games and gender research. The first theme, *gameplay experience,* consists of five components that are used to describe how a player experiences the game. Next, three components were grouped under the *game content* theme to describe the story, avatar and the game setting. Thirdly, the *play environment* theme has two components to represent the different types of game environment, such as competitive or collaborative. Finally, three components were grouped under the *design choices* theme that describe how a game manages its reward and penalty system, the level of personalisation it allows and the different types of activities available in a game. As can be seen in Table 2-3, the majority of components belong to the *gameplay experience* theme, with five items, while *game content* and *design choices* consist of three components each, and finally the *play environment* theme has two components.

Table 2-3 A synthesised list of themes and components derived from gender and games research area. The list consists of four themes with a total of 14 components

Themes	Components	Source
Gameplay experience	• Conflict resolution • Risk-taking • Stimulation • Learning/Feedback • Rewards	Lewis, 1998 Gorriz and Medina, 2000 Miller et al., 1996 Carr, 2005 Miller et al., 1996 Laurel, 1998 Hoeft et al., 2008
Game content	• Story/plot • Game world • Characters	Roberts et al., 1999 Bonanno and Kommers, 2005 Pratchett, 2005 Subrahmanyam and Greenfield, 1998 Jansz and Martis, 2007 Ogletree and Drake, 2007 Miller and Summers, 2007
Play environment	• Collaborative or competitive • Contemplative or action	Bryce and Rutter, 2005 Jenkins, 1998 Miller et al., 1996 Laurel, 1998
Design choices	• Failure management • Type of activity • Flexibility	Kafai, 1998 Miller et al., 1996 Flanagan, 2005 Laurel, 1998
4 themes	**13 components**	

2.6 Gender Inclusivity in Games Outlook

The results from previous research were relevant and yet somewhat inconclusive. Since the focus of these studies was to find gender preferences, at the same time these studies highlight gender differences which sometimes are opposites of each other. Thus, it follows that a game that has high male preferences might not appeal to female players. Although it is premature to make a conclusion that gender differences in game preferences is the only factor in game design, one of the positive implications arising from the research on gender preferences in games is the awareness to accommodate gender preferences in games. Over the years, discussion into female-focused game design has flourished with some mixed results (Carr, 2005; Denner & Campe, 2008; Heeter, Winn, & Greene, 2005), but these findings have provided interesting insights into the issues of games and gender nonetheless. The following three studies demonstrate that the issues of gender in games are still changing and worth researching.

Carr (2005) observed that girls chose games they were familiar with and had access to. She also discovered that girls' preferences for games are contextual and changeable depending on location, prior gaming knowledge and the people within the vicinity. Heeter et al. (2005) conducted a game design experiment that focused on science and girls and her study revealed insights into girls as game designers. The game was designed as an educational game that teaches about earth life's evolutionary process, called *Life Preservers.* After 50 design iterations and playtestings, results suggest that girls are more difficult to engage and motivate than boys. They also found that game design is affected by the designer's gender, age, context, content, game genre and game goals. Further research into gender and play using the game they developed previously, showed that girls tend to play slower compared to boys and make more mistakes (Heeter & Winn, 2008). Finally, Denner & Campe (2008) in Girls Creating Games (GCG) programme, comprising of 126 all-girls design and development project, found that some long-held assumptions about female preferences in games are challenged, e.g. that girls are content with explorative gameplay and winning is not important. Their findings showed that the games designed by this group of girls do have different endings and winning is important without hurting someone else while achieving some goal. On the other hand, some findings reinforced gender stereotypes such as preference.

These studies are illustrations of how complex the issues of gender in games are, and that the discussion concerning gender issues in games is still ongoing. These results are consistent with those of other studies (Beavis, 2005; Bryce & Rutter, 2002; Pelletier, 2008) and suggest that gender *is* a factor in game design, but not the only

factor. However, these studies still did not sufficiently provide guidance about how to design games with some level of gender inclusivity.

One of the earliest works in gender inclusivity was written by Sheri Graner Ray (2004), titled *Gender Inclusive Game Design: Expanding the Market*. Her work centres on how to capture the interest of female gamers by first understanding stereotypical gender differences and preferences after which gender inclusive design strategies are applied. Lazzaro (2008) suggests that a *fun* game would have gameplay that appeal to both female and male gamers. She goes on to propose that successful games such as *The Sims* and *Myst,* be used as a yardstick on how to design games that attract both female and male gamers.

Consequently, a game with *gender-inclusive* components may contain a combination of both female and male preferences. In some cases, distinctive elements of both genders will be minimised while emphasising elements that appeal to both genders, such as wide range of avatar choice. For example, a stereotypical avatar portrayal usually entails a hypersexualised appearance for female or male avatar showing exposed body parts with provocative posture or facial expressions. It may also depict a distorted body type such as extreme female proportions, such as voluptuousness, tiny waist and large buttocks while male avatar is shown with overly large muscles, *six pack* belly and bulging arm muscles. However, a gender inclusive avatar portrayal would highlight a positive representation of avatars by providing a wide range of physical appearances, such as heavy, thin, muscular, lean, rotund, athletic or flabby.

Another point worth noting is that these are two different groups of people discussing the same issue. Carr (2005), Heeter et al. (2005) and Denner, Bean, & Werner (2005) provide academic research perspectives while Ray (2004) and Lazzaro (2008) give opinions from the viewpoint of practitioners. This is a thought-provoking situation to investigate because theories form the understanding of the issues of gender in games while practices show what sells in the market. This conjecture between theory and practice is interesting in examination of where the connection and intersection between theory and practice occurs; and how to find the balance between them.

2.7 Chapter Summary

This chapter summarised related work from three main areas: (1) game genres; (2) game models; and (3) gender issues in games. Findings from these areas were analysed, categorised and synthesised into a set of lists consisting of themes and components. These lists are used as the theoretical foundation in the construction of the Gender Inclusivity Framework (GIF) described in the Chapter 3. Figure 2-9 illustrates how the results from different sections in Chapter 2 are used as the foundation for the proposed framework in Chapter 3.

With this in mind, Chapter 3 describes the development of the proposed framework, *Gender Inclusivity Framework (GIF)*. It serves as an integrative conceptual framework that aims to help understand, define and measure gender inclusivity in games. In addition, the proposed framework provides a generic structure to support gender inclusivity in games, which in turn is expected to predict the level of gender inclusivity in games.

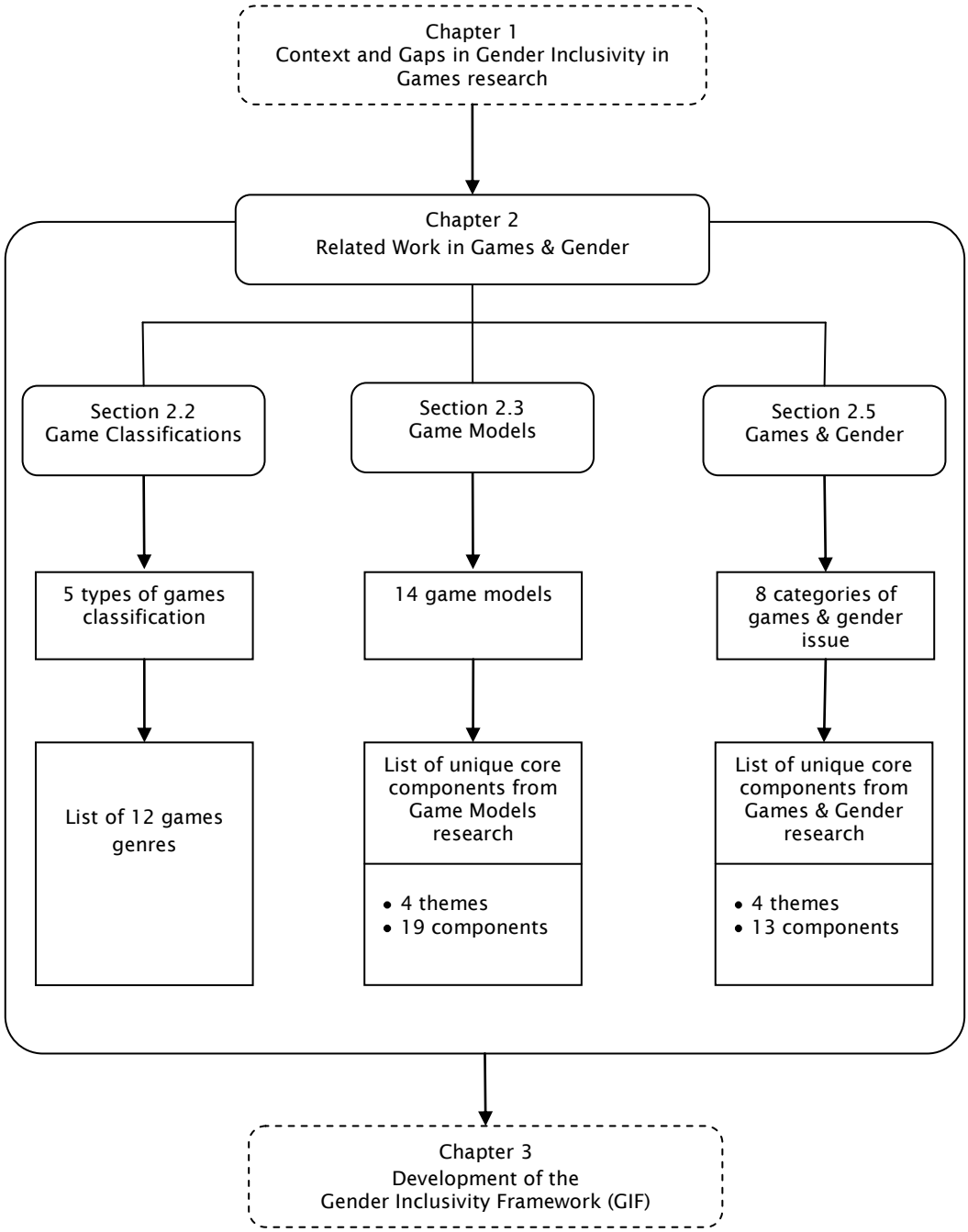


Figure 2-9 illustrates how the synthesised results from previous research in games and gender contribute to the development of the Gender Inclusivity Framework (GIF) in Chapter 3. The combination of these parts provides the theoretical foundation on which the framework is built.

3 Development of the Gender Inclusivity Framework (GIF)

The previous chapter identified the concepts and relationships that exist between two major research areas, i.e. *games models* and *gender and games* research. Analysis from these research areas produced two unique lists comprising themes and components which were used as the theoretical foundation for the framework development in this chapter.

Chapter 3 presents the development process of the Gender Inclusivity Framework (GIF), a conceptual framework aim to support gender inclusivity in games. The framework serves as an integrative structure to help understand the makeup of gender inclusivity in games, define gender inclusivity in games and measure the level of gender inclusivity in games. Section 3.1 describes the stepwise approach in the framework development. Section 3.2 describes the framework structure and Section 3.3 provides description of the framework, its dimensions and components. Finally, Section 3.4 summarises the chapter.

3.1 Framework Development Process

This section describes the stepwise approach to developing the framework and Figure 3-1 illustrates the process involved during the framework development. The diagram shows four main phases with ten steps taken in the process. The following sections will explain in detail how the gender inclusivity framework was developed.

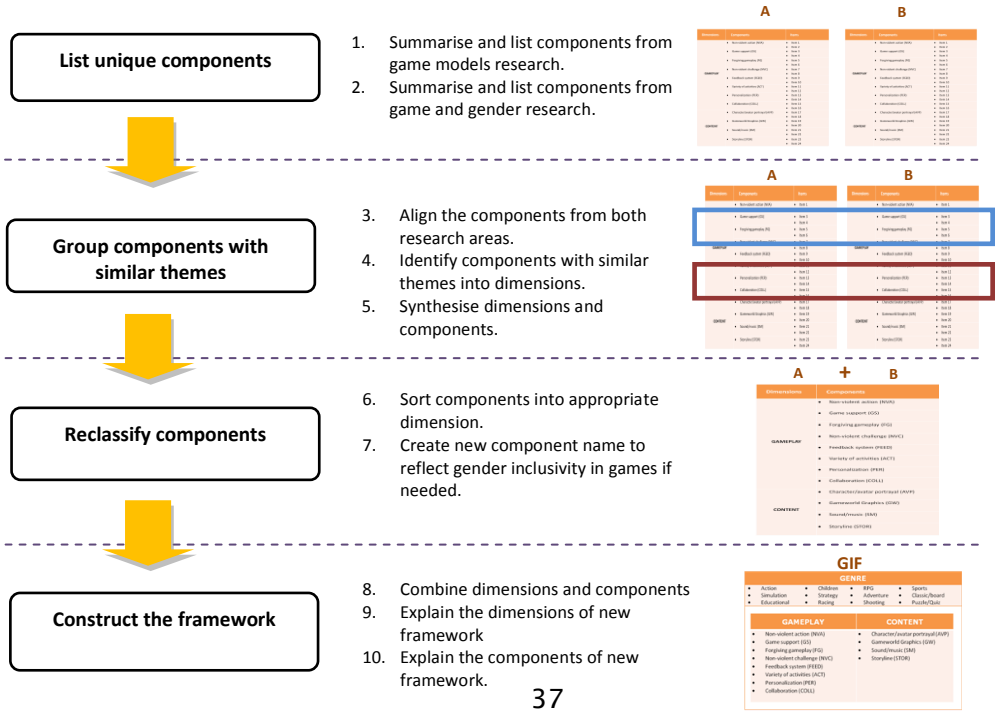


Figure 3-1 Development of the gender inclusivity framework process

3.1.1 List unique components

The first step in the framework development is to list all the unique components derived from the research findings in two areas: (1) game models, and (2) games and gender. These research findings were the results of Chapter 2's analysis of literature in games models, games and gender research. Both Table 3-1 and Table 3-2 show summarised themes, components and sources for those research findings. A total of eight themes with 33 components can be observed from the tables.

Table 3-1 depicts themes and components from game models research. There is a total of four themes and 19 components. The first theme, *gameplay experience* consists of eight components that can be used to create a play experience for game players. Next, four components were grouped under the *aesthetics* theme to describe visual and auditory stimuli in a game. Thirdly, a *narrative* theme with three components can be used to provide a story in a game. Finally, four components were grouped under the *interaction* theme that generally allows a player to interact with or *play* the game.

Table 3-1 Summary of unique components from game models research

Themes	Components	Source
Gameplay experience	• Goals/Objectives • Conflict • Challenge • Fun/Play • Rules/Patterns • Winning/Outcomes • Safety • Balance	Crawford, 1982, 2003 Costikyan, 1994 Rollings & Adams, 2003 Hunicke et al., 2001 Kreimeier, 2002 Bjork, Lundgren & Holopainen, 2002 Fullerton et al., 2004 Salen & Zimmerman, 2004 Rollings & Morris, 2004 Koster, 2005 Jarvinen, 2007 Fullerton, 2008
Aesthetics	• Theme • Game world • Visual • Auditory	Hunicke et al., 2001 Fullerton et al., 2004 Rollings & Morris, 2004 Jarvinen, 2007 Fullerton, 2008
Narrative	• Backstory • Plot • Storytelling	Hunicke et al., 2001 Rollings &Adams, 2003 Koster, 2005 Fullerton, 2008
Interaction	• Functionality • Interface Style • Navigation • Character Controls	Crawford, 1982, 2003 Rollings and Adams, 2003 Jarvinen, 2007
4 themes	**19 components**	

Table 3-2 shows themes and components from game and gender research consisting of four themes and 14 components. The first theme, gameplay, consists of five components of play. Secondly, four components were grouped under the *game content* theme to fill a game with game world objects. The p*lay environment* theme has two components that represent the overall gameplay setting. Finally, three components were grouped under the *design choices* theme that represents a player's preference for certain design in a game.

Table 3-2 Summary of unique components from gender and games research

Themes	Components	Source
Gameplay	• Conflict resolution • Risk-taking • Stimulation • Learning/Feedback • Rewards	Lewis, 1998 Gorriz and Medina, 2000 Miller et al., 1996 Carr, 2005 Turkle, 1986 Miller et al., 1996 Laurel, 1998 Hoeft et al., 2008
Game content	• Genre • Story/Plot • Game world • Characters	Roberts et al., 1999 Bonanno and Kommers, 2005 Pratchett, 2005 Subrahmanyam and Greenfield, 1998 Jansz and Martis, 2007 Ogletree and Drake, 2007; Miller and Summers, 2007
Play environment	• Collaborative or competitive • Contemplative or action	Bryce and Rutter, 2005 Jenkins, 1998 Miller et al., 1996 Laurel, 1998
Design choices	• Failure management • Type of activity • Flexibility	Kafai, 1998 Miller et al., 1996 Flanagan, 2005 Laurel, 1998
4 themes	**14 components**	

The result of step 1 produced a set of two lists containing the summary of findings from game models research and; games and gender research.

3.1.2 Group components with similar themes

This section attempts to merge two research areas using the two unique component lists from Section 3.1.1:

i. Unique component list from game models research consisting of four themes and 19 components; and
ii. Unique component list from games and gender research consisting of four themes and 13 components.

An initial alignment was conducted to discover any patterns between the eight themes. In Table 3-3, column 1 shows the list of themes and components from game

models research while column 2 shows the themes and components from game and gender research. A look at the lists shows some similarities in the meanings even though the terms used are different. In this instance, the terms *gameplay experience* (column 1) and *gameplay* (column 2) represent gameplay. Similarly, the terms *aesthetics* (column 1) and *game content* (column 2) represent content objects or artefacts. These two themes were reclassified as *gameplay dimension* and *content dimension* respectively for simplicity. *Genre* was placed into a dimension of its own, as it will be used as a categorisation of games. Next, the remaining four themes and their components will be analysed based on their relevance towards gender inclusivity in games.

Table 3-3 Initial alignment of themes and components

1	2	
Components from game models research	**Components from gender and games research**	
Gameplay experience • Goals/Objectives • Conflict • Challenge • Fun/Play • Rules/Patterns • Winning/Outcomes • Safety • Balance	**Gameplay** • Conflict resolution • Risk-taking • Stimulation • Learning/Feedback • Rewards	**Gameplay dimension**
Aesthetics • Theme • Game world • Visual • Auditory	**Game content** • Genre • Story/Plot • Game world • Characters	**Content dimension**
Interaction • Functionality • Interface style • Navigation • Character controls	**Play environment** • Collaborative or competitive • Contemplative or action	
Narrative • Backstory • Plot • Storytelling	**Design styles** • Failure management • Type of activity • Flexibility	
4 themes : 19 components	**4 themes : 14 components**	

An initial analysis identified some components that have a direct mapping between the two domain research areas. More importantly however, the inclusion or exclusion of a component depends on its *relevance to gender inclusivity*. As an example, look at the components *goals/objectives* and *challenge* in Table 3-3 column 1. Defining a *goal/objective* in any game is the first task to achieve before any development can be done. It is a neutral element which all games must have. However, the element of *challenge* has a gendered inclination which is informed by findings from research in gender and games. Male players prefer a challenge that comes from the avatar's increased physical abilities such as an increase in power to kick or punch to fight bigger and stronger opponents. On the other hand, female players prefer a

challenge that comes from solving puzzles such as reassembling an object to reveal a hidden message. Hence, the inclusion or exclusion of a potential component depends on a component's relevancy to gender inclusivity in games. Following the application of this criterion eight components were excluded:

- *goals/objectives*
- *fun/play*
- *rules/patterns*
- *balance*
- *functionality*
- *interface style*
- *navigation*
- *character controls*

Not only have these eight components shown supporting evidence towards gender inclusivity in games; but they were identified as more of a technical/programming and/or *neutral* factor, which all games must have.

The remaining 25 components were examined and synthesised by determining whether each of the components falls into any of these three categories:

i. *Unique component*, a component that can only be found either in column 1: game models components or column 2: game and gender components.
ii. *Direct mapping component*, a component that can be found in both columns 1: game models components and column 2: game and gender components.
iii. *Combination component*, two or more components were combined to best represent the meaning of the component.

Following the criteria listed above, seven components were found to be unique components as shown in Table 3-4. Two components were selected from column 1 and five components from column 2. All unique components were added to the synthesised components list in column 3.

Table 3-4 Unique components aligned

1	2	3
Components from game models research	**Components from gender and games research**	**Synthesis of components**
Gameplay experience • Challenge	Gameplay • Feedback	• **Challenge** • **Feedback**
Aesthetics • Auditory	Game content • Characters	• **Auditory** • **Characters**
	Play environment • Collaborative	• **Collaborative**
	Design styles • Flexibility	• **Flexibility**
		6 components

On further examination two components were found to have direct one-to-one mapping between them as shown in Table 3-5. Both column1 and 2 have the same two components even though the term used for *conflict* is slightly different. In column 1 the term *conflict* was used while column 2 used the term *conflict resolution,* but both components have the same underlying meaning. These two components, i.e. *conflict resolution* and *gameworld,* were added to the synthesised component list in column 3.

Table 3-5 Direct mapping components aligned

1 Components from game models research	2 Components from gender and games research	3 Synthesis of components
• Conflict	• Conflict resolution	• **Conflict resolution**
• Gameworld	• Gameworld	• **Gameworld**
		2 components

The remaining 17 components were combined to form a new component depending on whether individual components have similar meaning and/or more suitable as a part of a bigger component. In Table 3-6 *failure management* (column 3) is formed by combining three components from *winning/outcomes* (column 1), *rewards* and *failure management* (column 2). The term *failure management* was chosen to represent the game capability in dealing with a wrong choice made by the player during gameplay that may involve handling of penalty, rewards and outcomes.

Next, the component *safety* (column 3) is a combination of four components from *safety, backstory, risk taking* and *learning*. The *safety* component represents how the game supports a player's learning to lessen the risk taken during gameplay. The third component is *visual stimulation,* which is a combination of three components i.e. *theme*, *visual* (column 1) and *stimulation* (column2). These three components in combination describe the game environment and provide stimulation to the player.

Likewise the component *type of activities* (column 3) is a combination of two components, i.e. *contemplative* and *type of activity*. Finally, the component *storyline* was created by combining three components, i.e. *plot, storytelling* (column 1) and *story/plot* (column 2), where all three components are parts of or related to the story.

Table 3-6 Combination components aligned

1 Components from game models research	2 Components from gender and games research	3 Synthesis of components
• Winning/outcomes	• Rewards • Failure management	• **Failure management**
• Safety • Backstory	• Risk-taking • Learning	• **Safety**
• Theme • Visual	• Stimulation	• **Visual stimulation**
	• Contemplative • Type of activity	• **Types of activities**
	• Competitive • Action	• **Competition**
• Plot • Storytelling	• Story/Plot	• **Storyline**
		6 components

To complete step 2, all 14 synthesised components were sorted into one of the three dimensions that represent them best (see Table 3-7, column 3). *Gameplay*

dimension consists of nine components while *content* dimension has five components. Table 3-7 also shows the initial eight themes and three components (see column 1 and 2) with the synthesised components list in column 3. At this stage, the alignment process has produced a synthesised list with three dimensions and 14 components as potential dimensions and components for inclusion in the proposed framework.

Table 3-7 Alignment of the themes and components from two research areas

1 Components from game models research	2 Components from gender and games research	3 Synthesis of components
Gameplay experience • Goals/Objectives • Conflict • Challenge • Fun/Play • Rules/Patterns • Winning/Outcomes • Safety • Balance	**Gameplay** • Conflict resolution • Risk-taking • Stimulation • Learning/Feedback • Rewards	**Gameplay** • Competition • Conflict resolution • Safety • Failure management • Challenge • Feedback • Types of activities • Flexibility • Collaboration
Aesthetics • Theme • Game world • Visual • Auditory	**Game content** • Genre • Story/Plot • Game world • Characters	**Content** • Avatar • Game world • Visual stimulation • Background music • Storyline
Interaction • Functionality • Interface style • Navigation • Character controls	**Play environment** • Collaborative or competitive • Contemplative or action	
Narrative • Backstory • Plot • Storytelling	**Design styles** • Failure management • Type of activity • Flexibility	
		Genre
4 themes : 19 components	**4 themes : 14 components**	**3 dimensions : 14 components**

3.1.3 Reclassify the components

This section will attempt to reclassify the synthesised dimensions and components in light of gender inclusivity in games. The outcome of Step 2 alignment process has produced three dimensions (see Table 3-8, column 1) with 14 components (see Table 3-8, column 2). On further analysis, two components i.e. *competition* and *conflict resolution* were combined as both represent some form of *action* in a game. Similarly, *gameworld* and *visual stimulation* were combined as both of these components describe a game's graphics. Nine components were renamed and given new labels to better represent the components of gender inclusivity in games.

Table 3-8 summarises the outcome of the reclassification process for the dimensions and components to be included in the proposed framework. Column 1

shows the dimensions, column 3 shows the new component terms and finally, column 4 shows the new component labels.

Table 3-8 Reclassification of the dimensions and components for inclusion in the GIF

1	2	3	4
Dimensions	**Synthesised Components**	**New Component Term**	**New Component Label**
Gameplay	Competition	**Non-violent action**	**NVA**
	Conflict resolution		
	Safety	**Game support**	**GS**
	Failure management	**Forgiving gameplay**	**FG**
	Challenge	**Non-violent challenge**	**NVC**
	Feedback	**Feedback system**	**FS**
	Types of activities	**Variety of activities**	**ACT**
	Flexibility	**Personalisation**	**PER**
	Collaborative	**Collaboration**	**COLL**
Content	Characters	**Avatar portrayal**	**AVP**
	Game world	**Game world graphics**	**GW**
	Visual stimulation		
	Auditory	**Sound/Music**	**SM**
	Storyline	**Storyline**	**STOR**
Genre	- not applicable -	- not applicable -	- not applicable-
3 dimensions	**14 components**	**12 components**	

3.2 Construct the Gender Inclusivity Framework (GIF)

This section discusses the details of the framework for supporting gender inclusivity in games. The framework aims to help understand the makeup of gender inclusivity in games, defines gender inclusivity in games and measure the level of gender inclusivity in games. A framework such as the *Gender Inclusivity Framework (GIF)* allows the conceptualisation, development and assessment of more gender inclusive games.

Drawing upon established theories and prior research findings, the proposed framework suggests that gender inclusivity in games can be determined by three dimensions and 12 components (see Figure 3-2):

1. *gameplay,* describes the game behaviour and how a player experiences the game comprising eight components;
2. *content,* relates to the aesthetics elements of a game consisting of four components;
3. *genre,* describes the types of games and can be categorised into 12 broad genres.

Each dimension in the framework is divided into individual components that can be modified or further investigated in future studies. The underlying basis of the framework is structured from the two main research areas in Chapter 2: (1) game models; and (2) games and gender research. The components describe the dimension

in terms that can be measured and evaluated in empirical studies. Hence, the combination of dimensions and components used to construct the framework provides the description of gender inclusivity in games, which in turn is expected to predict the actual degree of gender inclusivity in games. Figure 3-2 shows a diagrammatic representation of the framework. A detailed description of the aforementioned dimensions and components is as follows.

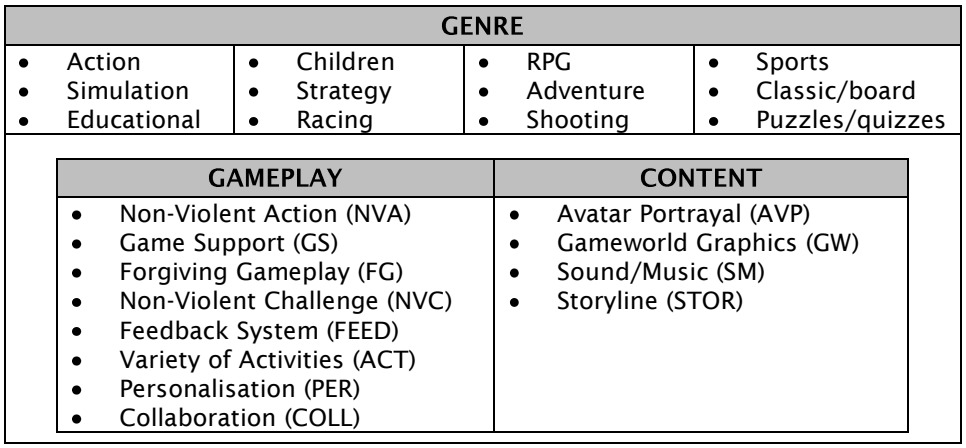


Figure 3-2 the diagram represents the structure of the framework. Each dimension is shown at the top of each box. Components related to each dimension are listed in the box.

3.3 Gameplay Components

This dimension consists of eight components describing the game behaviour and how a player experiences the game. It includes non-violent action (NVA), game support (GS), forgiving gameplay (FG), non-violent challenge (NVC), feedback system (FS), variety of activities (ACT), personalisation (PER) and collaboration (COLL).

3.3.1 Non-violent Action (NVA)

This component describes the extent of non-violent actions employed during competitive action and conflict resolution. A non-violent competitive action is an action that does not directly harm another competitor, such as competing in a sprint race, finding a clue or earning money by working in a friend's bookshop. Another common action is resolving a conflict during gameplay. A non-violent action would emphasise peaceful actions, such as negotiation, and cooperation, such as giving gifts to enemies, opening new trade routes or exchanging an ingredient to complete a recipe.

3.3.2 Game Support (GS)

This component is related to the level of support features available to players during gameplay. Many current games use a 'trial and error' mechanism that forces players to make high-risk decisions that could lead to harmful actions. A gender-

inclusive game should provide enough information in the background story for a player to understand the context of the game, such as what prior events had happened and how a character's life will change as a result of the events in the game. It also needs to provide a guided tutorial or modular missions for novice players to practise their skills before continuing with the game. In addition, an in-game instructions feature needs to be easily accessible during play sessions by clicking an icon or pop-up displays on the screen.

3.3.3 Forgiving Gameplay (FG)

This component describes how a game manages its penalty and game continuity when a wrong choice is made. It would support a more forgiving gameplay that allows continuity without sudden end or a death penalty (loss of life). These techniques include allowing saving multiple versions of a scenario, thus allowing a player to replay them, an auto-save feature and showing game hints on how to improve gameplay. For example, during the development of a village to a large city, a player can save the game at different points so a mistake can be undone by replaying the scenario multiple times. Not only will this encourage creativity and low-risk experimentation, but it allows a player to continue playing without the risk of harsh penalty.

3.3.4 Non-violent Challenge (NVC)

This component explains the different types of challenges a player has to go through in a game. Non-violent challenge presents obstacles as a form of difficulty from solving puzzles to resource management; for example, finding scattered pieces of a magical mirror from several different scenarios and putting them together to open a doorway (a puzzle) to the next level. Another example is making decisions on how to spend money (a limited resource) on either buying a larger farmland or a factory upgrade or increasing the number of sheep flocks.

3.3.5 Feedback System (FEED)

This component relates to the types of feedback delivered during gameplay. A positive feedback allows a player to improve their skills and eventually prolong gameplay sessions. Therefore, when a player is stuck and does not know how to proceed with the game, a feedback pop-up window or agent will automatically appears to show hints or provide encouragement. For example, a game may include a scenario involving jumping from one rooftop to another, and each time a player falls to the ground a genie mentor appears, showing how to achieve a goal or reversing the action. Other types of positive feedback include regaining energy through rest, or food or finding special items that help prolong life or health.

3.3.6 Variety of Activities (ACT)

This component is related to the extent of how diverse game activities are available to a player. A gender-inclusive game presents a wide range of activities in one game and several ways to solve a problem; for example, a game scenario that involves solving a mathematical puzzle to get a piece of clue needed to build a sculpture which in turn leads to a museum archive. In this one scenario, different activities, i.e. solving puzzles, building things and an adventure, work together towards one purpose, i.e. opening a museum archive. Consider a scenario where a player is presented with the problem of how to climb the peak of Mount Kilimanjaro. Climbing to the peak can be done in four ways: (1) using a rope; (2) jumping from one ledge to another; (3) using special springy shoes; and (4) using a teleportation machine. A player can choose any of the four ways to complete the mission. This illustrates how one problem, i.e. climbing Mount Kilimanjaro, can be overcome in different ways.

3.3.7 Personalisation (PER)

This component describes the degree of personalisation allowed in a game. A gender-inclusive game allows personalisation of game speed and difficulty level. For example, during early stages of city building, a player can reduce the speed of the game to different levels, e.g. 70%, 50% or 10% according to their personal preferences. When a player has become familiar with the game, they can increase the speed to see the city develops more quickly. Another personalisation technique is the ability to adjust difficulty level according to a player's skill and experience. A player can choose an 'easy' mode when starting on a new game, and choose a more challenging mode, ranging from 'hard' to 'insanely difficult' or 'suicide' mode, as they becomes more experienced with the game.

3.3.8 Collaboration (COLL)

This component relates to the level of collaborative features available during gameplay. A gender-inclusive game is expected to provide an option for a player to easily play with other players. This might be in the form of an email or instant message, a chat room, a game community, a link to a social networking website or a 'buddy list'.

3.4 Content Components

This dimension consists of four components describing the aesthetics elements of a game. It consists of avatar portrayal (AVP), game world graphics (GW), sound/music (SM) and storyline (STOR).

3.4.1 Avatar Portrayal (AVP)

This component describes the extent of avatar representation in terms of avatar personalisation, appearance and behaviour. Avatar personalisation relates to gender selection and features to modify a player's avatar. A balanced representation of avatar would provide an equal number of male and female characters/avatars for selection and a wide range of character gender, including androgynous, vampiric, asexual or multi-species. Secondly, a gender-inclusive game would offer features that allow character modification, e.g. name, body type, facial features, clothing, wearable items, personality and roles. In addition to extensive avatar modification, players can design their own avatar using graphic software and upload it into the game.

Portrayal of an avatar's appearance concerns clothing and physical appearance. A gender-inclusive game would present a positive representation of avatar by offering a wide range of clothing, such as preppy, punk, vintage, western, rocker, boho and formal. In addition to that, a gender inclusive physical appearance also provides a wide range of physical appearances, such as heavy, thin, muscular, lean, rotund, athletic or flabby.

Avatar's behaviour portrayal relates to the portrayal of an avatar's role and personality trait. A gender-inclusive game would provide a wide range of roles for both female and male avatars. For example, female characters are portrayed as functional and protagonist characters, e.g. mentor, heroes, super spies, leaders or matriarch and male characters are portrayed as giant monsters, minions, trickster or meek villains. Finally, a gender-inclusive game would provide a wide range of personality traits. For example, female characters are portrayed as strong, adventurous and assertive while male characters are portrayed as peaceful, cheerful and empathic.

3.4.2 Gameworld Graphics (GW)

This component relates to the types of graphics used in a game. Balanced graphics show a variety of colour schemes, such as a 'bright' colour scheme with cheerful and light colours. Also, the gameworld is shown in a wide range of realistic graphics and scenes, such as showing a shadow cast by a character or lighting in a dark cave by flickering torches.

3.4.3 Sound/Music (SM)

This component describes the extent of sound/music customisation. It is expected that a gender-inclusive game would allow sound/music personalisation by being able to choose different types of music styles, e.g. country, classical, latin, world or pop, an option to switch music on or off, and an option to increase or decrease volume level according to a player's preference.

3.4.4 Storyline (STOR)

This component relates to the extent to which storyline is interwoven into a game and not simply added on to the game. A gender-inclusive storyline is meaningful and adaptable. It has purpose and develops as the game progresses. For example, a bakery game with a mission to become a *Master Baker*, a player progresses by increasing sales, collecting new recipes, increasing shop size and having branches. The storyline develops through plot twists, e.g. finding rare ingredients for a recipe or building a coffee machine by sourcing materials from other players, conflicts, e.g. haggling with traders for ingredients, and interesting characterisation, e.g. customers ordering different flavoured cupcakes.

3.5 Genre Components

The genre dimension categorises games into twelve broad genres: racing, simulation, classic/board, strategy, sports, shooting, role-playing game, platform, children, puzzle/quiz, action and adventure. Depending on the genre, there is different degree of gender-inclusiveness in games. For example, a simulation game like the *SimCity* series would contain high levels of non-violent action, game support, non-violent challenge and personalisation with low levels of character modification and sound/music choices. An adventure game like the *Nancy Drew* series would have a high level of non-violent action, non-violent challenges, a variety of activities, and a forgiving gameplay, an average level of storyline and game support but low levels of character customisation, although it has a positive character role. A classic board game like *Monopoly* would have a high level of non-violent action, non-violent challenge, feedback system, with average graphics but low levels of character customisation, personalisation and collaboration. An action game like *Bioshock* would have a low level of non-violent action, forgiving gameplay, a variety of activities and character customisation but high levels of realistic and dark colour shades in the game world graphics and negative feedback. At a glance, some genres appear to be more inclined towards higher levels of gender-inclusivity, like simulation, adventure or classic board games compared to other genres, like action games.

3.6 Chapter Summary

This chapter illustrates the stepwise approach during the framework development process, after which a description of the dimensions and components of the *Gender Inclusivity Framework (GIF)* were provided. The GIF was developed to support gender inclusivity in games by providing an integrative structure to help understand the makeup of gender inclusivity in games, define gender inclusivity in games and measure the level of gender inclusivity in games. These are the GIF's intended uses and one of the key strengths in its purpose as a bridge for narrowing the gap that exists in relating gender inclusivity in games to designing a more gender inclusive game.

Results from Chapter 2 provided the theoretical foundation for GIF through two lists of unique components synthesised from existing theories and research findings in games and gender. Further analysis, synthesisation and reclassification shown in this chapter suggest that the GIF can be determined by three dimensions and 12 components. Each dimension in the framework is made up of individual components that can be modified, measured and evaluated in empirical studies. The combination of dimensions and components used to construct the framework provides the description of gender inclusivity in games, which is expected to predict the level of gender inclusivity in a game.

The following three chapters demonstrate how this research continues with the validation, application and use of the GIF:

- Chapter 4 will demonstrate an expert evaluation study to investigate the agreement patterns among a panel of experts towards the components of the GIF.
- Chapter 5 will demonstrate an application of the GIF through the development and validation of a novel measuring instrument, called the *Gender Inclusivity Rating Scale (GIRS).*
- Chapter 6 will demonstrate the use of the GIRS in a research scenario investigating the relationship between a gamer's gender role orientation and gender inclusivity in games.

Figure 3-3 summarises the development process and outlines the next steps in GIF research.

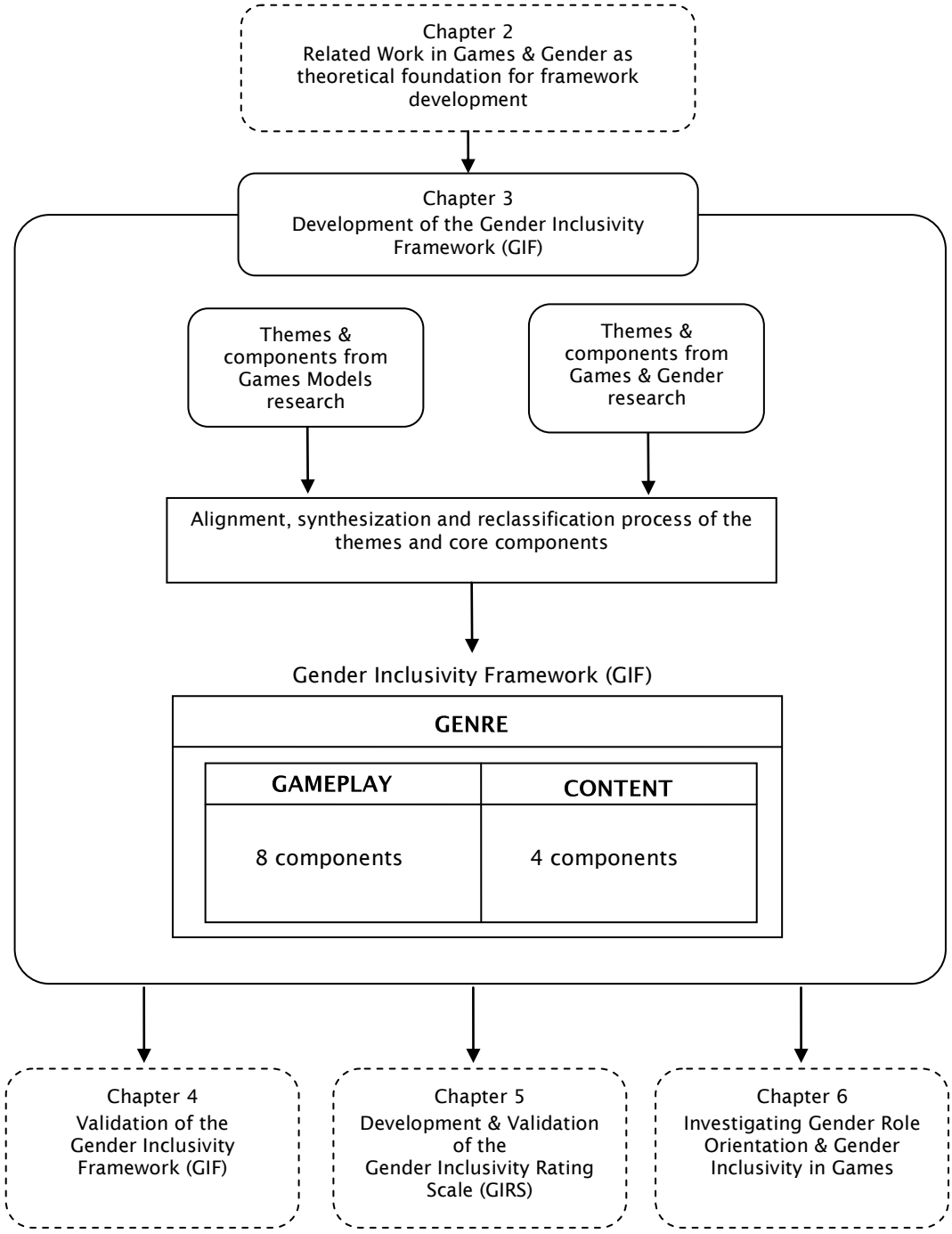


Figure 3-3 illustrates the development process of the Gender Inclusivity Framework (GIF) in Chapter 3 based on the theoretical findings in Chapter 2. It also outlines the next steps in GIF research work.

4 Evaluation of the Gender Inclusivity Framework (GIF)

From Chapter 2, the results from divergent theories and prior research findings were synthesised and used to develop an integrative framework to support gender inclusivity in games. Subsequently, Chapter 3 demonstrates the framework development process and the Gender Inclusivity Framework (GIF) suggests that gender inclusivity in games can be determined by three dimensions and 12 components. One of the key strengths of the GIF is that each individual component can be modified or combined for further investigation.

Chapter 4 demonstrates the development of an instrument used to measure experts' agreement on the components of the GIF and an expert's evaluation study. Section 4.1 follows a step-by-step approach in the development of an expert's evaluation instrument and study design. Next, Section 4.2 describes the data analysis and results of the evaluation study. Lastly, Section 4.3 summarises the chapter.

4.1 Validating Gender Inclusivity in Game Components

Validity looks at how well the items of an instrument represent a concept or domain of content (Gable & Wolf, 1993; Saw & Ng, 2001;Beck & Gable, 2001; Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). Validation becomes an important step especially when a new measure is being developed where there is no existing measure that operationalizes the concept as the researcher intended (Rubio et al 2003). For example, there are instruments measuring *fun*, *violence, presence* and *usability* in games; however a framework that defines gender inclusivity in games or an instrument that measures gender inclusivity in games is new and need to be validated.

Using a panel of experts during a validation will provide useful feedback about the quality of a newly developed measure. Without conducting a validation study, a researcher is using an untested measure to conduct their study. Data from an untested measure may indicate that the instrument needs revisions and the process would need to be redone with another pilot study for the revised instrument. Hence, more resources and effort will be spent in evaluating and recreating the instrument. For example, if the components of the gender inclusivity framework are used without validation, an instrument developed based on the framework would need to be revised and another round of pilot study must be conducted. On the other hand, if the components were validated early on, an instrument developed based on the framework would require less revision and need not be evaluated repeatedly. Figure 4-1 illustrates

an overview of the expert evaluation process for GIF. The diagram shows three main parts with seven steps involved in the process. The following sections will explain in detail how the expert evaluation instrument was developed and how the validation study was conducted.

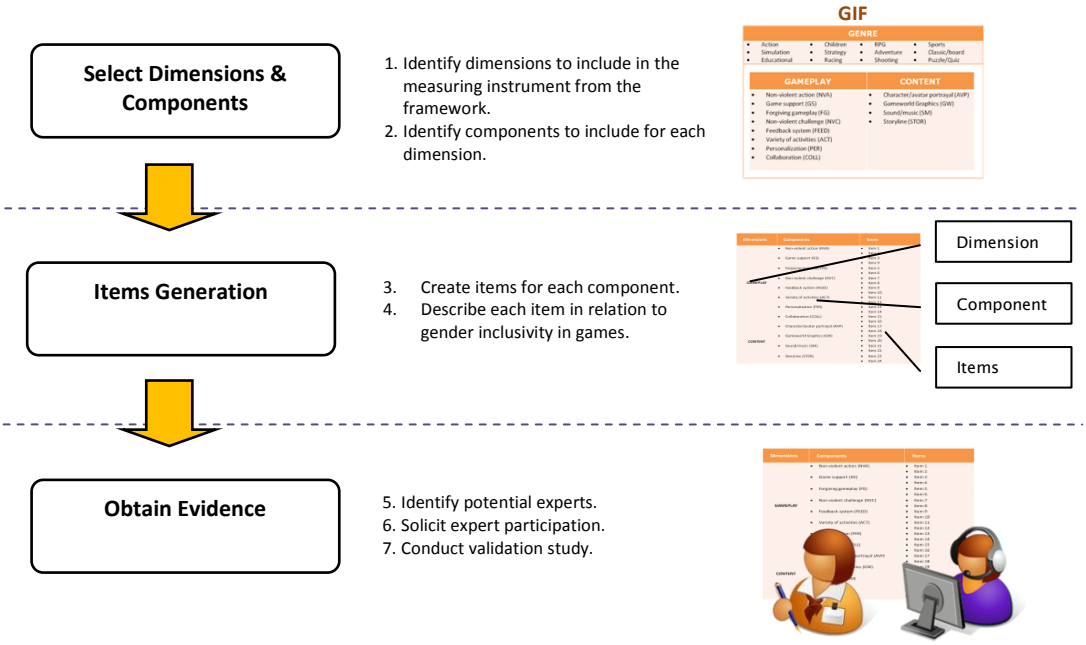


Figure 4-1 Development of the expert evaluation measuring instrument and the framework validation process

4.1.1 Selecting dimensions and components

Using our Gender Inclusivity Framework (GIF) as a source of reference and guide, two dimensions were selected for inclusion in measuring experts' agreement on the components of the gender inclusivity in games: (1) *gameplay*, and (b) *content*. *Gameplay* dimension relates to a game's behaviour and how it provides *play* experience to a gamer. *Content* dimension relates to objects or artefacts assembled into a game to provide a setting or *world* for gameplay. For each dimension selected the appropriate components were chosen to be included in the measuring instrument. A total of 12 components were selected with eight components to represent the *gameplay* dimension and four components for *content* dimension.

4.1.2 Item generation for the development of an expert evaluation instrument

After selecting the dimensions and components appropriate for the expert evaluation study, the next step is to generate items that represent those dimensions and components. The objective of the expert evaluation study was to measure experts' agreement on the components of gender inclusivity in games. In light of this objective, the items were developed according to how important each item is for gender

inclusivity in games. The following explains in detail each dimensions and components used to formulate the operational definition used in the instrument.

The ***Gameplay*** dimension investigates experts' perceptions on how important each of the eight components is for gender inclusivity in games. The description each of the components is presented as follows:

1. **Non-violent Action (NVA):** This component has two items which support the assertion that non-violent competitive and conflict resolution actions are important as one of the components of gender inclusivity in games.
2. **Game support (GS):** This component has four items and represents the assertion that in-game supporting features are important to gender inclusivity in games.
3. **Forgiving gameplay (FG):** This component is represented by an item which supports the assertion that game continuity after a wrong choice during gameplay is important to gender inclusivity in games.
4. **Non-violent challenge (NVC):** This component has two items and examines the assertion that presenting non-violent challenges during gameplay are important to gender inclusivity in games.
5. **Variety of activities (ACT):** This component is represented by three items which asserts that having many types of activities within a game is important to gender inclusivity in games.
6. **Feedback system (FEED):** This component has one item which supports the assertion that non-violent feedback is important to gender inclusivity in games.
7. **Personalization (PER):** This component is represented by two items and supports the assertion that game personalization in speed and pace is important to gender inclusivity in games.
8. **Collaboration (COLL):** This component has two items and supports the assertion that collaboration with other players during gameplay is important to gender inclusivity in games.

The ***Content*** dimension investigates experts' perceptions on how important each of the four components is for gender inclusivity in games. The description each of the components is as follows:

9. **Avatar portrayal (AVP)**: This component consists of eight items and deals with the assertion that avatar portrayal in terms of appearance, behaviour, avatar modification and gender selection is important to gender inclusivity in games.
10. **Game world graphics (GW)**: This component has two items and examines the assertion that the kind of graphics is important to gender inclusivity in games.
11. **Sound/music (SM)**: This component consists of three items and deals with the assertion that a variety of music styles and some level of customization are important to gender inclusivity in games.

12. **Storyline (STOR)**: This component has two items that support the assertion that a story that evolves and compelling is important to gender inclusivity in games.

Table 4-1 below shows the relationship between the dimensions, components and items included in the instrument. A total of 32 items were created for the instrument with 17 items for gameplay dimension and 15 items for content dimension.

Table 4-1 Summary of the expert evaluation instrument showing the relationship between dimensions, components and items

Dimension	Component	List of items
Gameplay	Nonviolent Action (NVA)	Item 1: Non-violent competitive action during play. Item 2: Non-violent action during conflict resolution.
	Game Support (GS)	Item 3: Pre-defined goals to support play progression. Item 4: A background story to support gameplay. Item 5: An in-game tutorial to help a beginner jumpstart the game. Item 6: Easy access to instructions during play session.
	Forgiving Gameplay (FG)	Item 7: Continuing a game after a wrong choice is made.
	Nonviolent challenge (NVC)	Item 8: Game challenges come from logic or puzzle activities. Item 9: Game challenges come from fighting or physical activities.
	Variety of activities (ACT)	Item 10: A variety of problem solving activities. Item 11: A variety of the game activities. Item 12: A variety of inter-related activity.
	Feedback system (FEED)	Item 13: Non-violent feedback.
	Personalization (PER)	Item 14: Personalization in play speed Item 15: Personalization in game difficulty.
	Collaboration (COLL)	Item 16: Collaborative play with other players. Item 17: Communication with other players.
Content	Avatar Portrayal (AVP)	Item 18: Equal number characters/avatars for selection. Item 19: Character/avatar modification. Item 20: A wide range of female characters/avatars' physical appearance. Item 21: A wide range of male characters/avatars' physical appearance. Item 22: A wide range of female characters/avatars' roles. Item 23: A wide range of male characters/avatars' roles. Item 24: A wide range of female characters/avatars' traits. Item 25: A wide range of male characters/avatars' traits.
	Gameworld Graphics (GW)	Item 26: Graphics realism in the game. Item 27: A 'bright' colour scheme.
	Sound/Music (SM)	Item 28: A variety of music styles. Item 29: An option to switch on or off the background music. Item 30: An option to control volume level.
	Storyline (STOR)	Item 31: A storyline that guides gameplay. Item 32: A compelling storyline to keep a player in the game.
2 dimensions	**12 components**	**32 items**

Response items

Experts were asked to rate how important each item is to gender inclusive gameplay and content. The response option uses a four-point scale format and Table 4-2 shows the condition used to rate each of the items. If an item is deemed as a "1= Not Important" then the exclusion of that item does not affect gender inclusivity in games. On the contrary, if an item was rated as a "4 = Very Important" then the exclusion of that item would be detrimental to gender inclusivity in games. An item with a rating of "2 = Somewhat Important" and "3 = Quite Important" may need a revision in terms of wording or reorganization to make it more relevant to gender inclusivity in games.

Table 4-2 Rating criteria for the expert evaluation instrument

Rating	Definition
1 = "Not Important"	The item is not important to gender inclusivity in games and can be excluded. Its absence would not affect gender inclusivity in games.
2 = "Somewhat Important"	The item is somewhat important but not critical to gender inclusivity in games. Although its absence would diminish gender inclusivity in games, the item needs major revision to be relevant.
3 = "Quite Important"	The item is quite important to gender inclusivity in games. Although its absence would diminish gender inclusivity in games, the item needs minor revision to be relevant.
4 = "Very Important"	The item is very important and essential to gender inclusivity in games. It must be included and its absence would significantly hamper gender inclusivity in games.

Item description

After generating a list of items for each component and determining the response criteria, each of the items was provided with a brief description to explain its meaning and scope in relation to gender inclusivity in games. By providing a description for each item, an expert reading the item can understand what the item represents in the context of gender inclusivity in games and may avoid any ambiguity.

An exemplar question as seen in Figure 4-2 showed an item for non-violent action (NVA) component in gameplay dimension. The item is labelled as *Item 1: Non-violent competitive action during play* and its corresponding explanation is given below. The description explains how non-violent action might look like i.e. c*ompeting action that does not directly harm another competitor*, compared to a violent action during gameplay i.e. *violent action that openly harms another competitor to win or gain something.* The description also includes some examples for each type of scenario. In this example, *competing in a sprint race, finding a clue or earning money by harvesting another player's farm* for types of non-violent competitive actions while *burning a competitor's house, fighting with a weapon or getting sliced up by a meat cutter* for types of violent competitive actions. Respondents were asked to rate how

important the item is to a gender inclusive gameplay by clicking on one of the radio button.

Item	Not Important	Somewhat Important	Quite Important	Very Important
How important is this item in describing a gameplay that appeals to both male and female gamers?				
Item 1: Non-violent competitive action during play. Competing action that does not directly harm another competitor, such as: competing in a sprint race, get a clue or money by harvesting another player's farm, versus violent action that openly harms another competitor to *win* or gain something such as burning a competitor's house, fighting with a weapon or get sliced up by a meat cutter.	o	o	o	o

Figure 4-2 an exemplar question rating non-violent action (NVA) item from the gameplay dimension.

Figure 4-3 illustrates an item to rate the avatar portrayal (AVP) component in content dimension. The general question for the content dimension section is how important the item is in describing a gender inclusive content. In this case, the item is labelled as *Item 20: A wide range of female characters/avatars' physical appearance* and a description of the item is given below. The description provides an explanation of how a gender-inclusive female avatar's physical appearance might be represented i.e. *a variety of clothing styles and body types*, compared to a stereotypical representation i.e. *hyper-sexualized portrayal showing cleavage, midriff and buttocks with voluptuousness, extreme proportions, provocative postures or facial expressions.* Then, respondents were asked to rate how important the item is to a gender inclusive content by clicking on one of the radio buttons. A sample of the expert evaluation instrument used in this study can be found in Appendix A.

Item	Not Important	Somewhat Important	Quite Important	Very Important
How important is this item in describing content that appeals to both male and female gamers?				
Item 20: A wide range of female characters/avatars' physical appearance. Female characters/avatars are shown in a variety of clothing style and body type, versus a hypersexualized portrayal showing cleavage, midriff and buttocks with voluptuousness, extreme proportions, provocative postures or facial expressions.	o	o	o	o

Figure 4-3 an exemplar question rating avatar portrayal component from the content dimension.

4.1.3 Obtain evidence

Identify potential experts as participants

A panel of experts will evaluate individual items as well as the entire framework or instrument. Grant & Davis (1997) suggests that the selection of experts depends on the expertise related to the conceptual framework. In addition to that, an expert's history of publications, presentations and research experience in the area of interest may also be used as the criteria for selection. For example, the purpose of our study was to evaluate a framework for gender inclusivity in games; panel members should be familiar with the various dimensions or factors of gender and games and/or have experience and familiarity in games development. The number of experts to use in a

content validity study ranges from three to a panel of twenty experts (Cheraghi, Hassani, Yaghmaei, & Alavi-Majed, 2009; Gable & Wolf, 1993; Lynn, 1986). The final decision on how many to invite depends on the desired range of expert representation and expertise level.

In this study, five experts, three academic game researchers and two professional game designers were selected. There were two female and three male experts ranging from 20 to 45 years of age. These experts were recruited on the basis of their experience and publications in game design through social networking group i.e. Facebook, LinkdIn and games associations i.e. Women in Games International (WIGI) and IGDA Women in Games SIG. The profile of each category of experts is as follows:

- ***Academic game researchers***
  All three experts were PhD students researching games and have had experiences in developing them. They are also avid gamers in various genres and platforms.
- ***Professional game designers***
  Both experts from this category have more than ten years experience in game design. Not only they have produced successful games, published articles and books, they are also well known in the gaming industry especially among women game designers. They were among the first to realize the need and potential for a more female-oriented games and went on to produce one of the most successful game franchises with over 20 titles on PC, Wii and Nintendo DS platforms.

An invitation email to solicit expert participation

After identifying potential experts, an invitation email soliciting their participation was sent at least a week before the actual start of the study. This allows the experts enough time to respond to the request. The invitation contained the purpose of the study, the reason for expert selection, a brief description of the instrument and how they could contribute to the study. Table 4-3 shows the email's components and sample text for the experts' invitation email**.** A sample of the invitation email can be found in Appendix B.

4.1.4 Procedure

Two weeks prior to the study, an email was sent to each expert inviting them to participate in the study. If they agreed to participate, a second email containing a link to the instrument and ethics information was sent. They were also advised that their participation was voluntary; no monetary compensation would be given and all data gathered would remain confidential. The study lasted about two weeks and the procedure was as follows:

1. Participant clicks on the instrument link.

2. Participant reads the description and instructions. If he/she agrees to participate, clicks the 'Next' button. If he/she declines, clicks the 'Back' button or simply closes the browser to exit.
3. Participant then answers by clicking on the radio buttons.
4. After completing the questions, they were instructed to click the 'Exit' button or to close the browser to exit.

Table 4-3 Components of an invitation email for content experts

Paragraph	Sample Text
State purpose of study	You are invited to serve as a content expert because of your knowledge and contribution in (*area of study*). Your participation in the review process is valuable as a preliminary step to future studies that investigate strategies to (*study objective*).
Briefly describe instrument	The survey should take about (*time to complete study)* to complete by (*response type e.g. ticking response boxes).* It consists of items related to the dimensions of (*study concept).* The items will be assessed with a four-point rating scale, with *1 = 'Not Important'; 2 = 'Somewhat Important'; 3 = 'Quite Important' and 4 = 'Very Important'*.
Describe how to contribute to study	All responses are treated as anonymous, and in no case will responses from individual participants be identified. If you decide to participate, please go to *(survey link).*
Contact information and thank you	If you have any further questions about this study or your rights, or if you wish to lodge a complaint or concern, you may contact the investigator: (*Investigator Name*) by email (xxx@email) citing Ethics Reference: (*reference number).* I hope you will participate in the survey as the data will be very helpful to my studies. The survey will run until (*study end date).*

4.2 Analysis and Results of the GIF Evaluation

This study sought to investigate the patterns of inter-rater agreement among a panel of experts on the components of gender inclusivity in games. Experts were asked to rate how important each item is for gender inclusive gameplay and content. A one-way repeated measure ANOVA was chosen to identify how the experts differ in their ratings of the components of gender inclusivity in games. In addition, a principle component factor analysis was used to explore how the experts are associated in their ratings of the components of gender inclusivity in games.

4.2.1 Data screening

Data screening was done to check for reverse coding and any missing data. Two items were reverse coded and no data was found to be missing.

4.2.2 Initial ANOVA analysis

Mauchly's test indicated that the sphericity had been violated ($\chi^2 = 35.9$, $p < .05$) (see Table 4-4), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\epsilon = .60$).

Table 4-4 Mauchly's test of sphericity

Within Subjects Effect	*Mauchly's W*	*Approx. Chi-Square*	*df*	*Sig.*	*Epsilon*[a]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Expert	.295	35.9	9	.000	.608	.663	.250

4.2.3 ANOVA analysis

A one-way repeated measure ANOVA was run to test the effects of interaction of the experts. The results in Table 4-5 shows that there was an overall statistical significant difference between five experts' responses to gender inclusivity in games, $F(2.43, 75.37) = 4.95$, $p = .006$**.** Further analysis in Table 4-6 and Table 4-7 shows that the results from post-hoc comparisons of the five experts indicate that there is a statistically significant difference between Expert 4 and Expert 1 ($M = 2.88$, 95% *CI* [2.59, 3.16]) at $p = .004$. Another statistically significant difference is between Expert 4 and Expert 5 ($M = 2.28$, 95% *CI* [2.07, 2.49]) at $p = .001$. Comparisons between other experts were not statistically significant $p > .05$.

Table 4-5 Analysis of variance for within subjects

Source	*df*	*Mean Square*	*F*	*Sig.*
Rater	2.431	4.874	4.954*	.006
Error(Rater)	75.368	.984		

Table 4-6 Descriptive statistics for five experts

Expert	*Mean*	*Std. Error*	*95% Confidence Interval*	
			Lower Bound	Upper Bound
1	2.28	.121	2.03	2.52
2	2.78	.166	2.44	3.12
3	2.84	.163	2.51	3.17
4	2.87	.140	2.58	3.16
5	2.28	.103	2.07	2.49

Table 4-7 Post-hoc comparisons for five experts

(I) Expert	*(J) Expert*	*Mean Difference (I-J)*	*Std. Error*	*Sig.*[a]	*95% Confidence Interval for Difference*[a]	
					Lower Bound	Upper Bound
1	2	-.500	.191	.133	-1.07	.076
	3	-.563	.190	.059	-1.13	.012
	4	-.594*	.148	.004	-1.04	-.147
	5	.000	.135	1.00	-.407	.407
2	3	-.063	.179	1.00	-.604	.479
	4	-.094	.251	1.00	-.854	.666
	5	.500	.206	.211	-.122	1.12
3	4	-.031	.260	1.000	-.816	.754
	5	.563	.195	.072	-.028	1.15
4	5	.594*	.134	.001	.190	.998

4.2.4 Initial Factor Analysis

Initial analysis shows that all experts correlated at least .3 with at least one other expert, suggesting reasonable factorability (see Table 4-8 Correlation matrix). Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was .53, above the recommended value of .5, and Bartlett's test of sphericity was significant $\chi^2(10) = 30.112$, $p < .001$ (see Table 4-9). Finally, the communalities were all above .3 (see Table 4-10), further confirming that each expert shared some common variance with other experts. Given these overall indicators, factor analysis was conducted with all five experts.

Table 4-8 Correlation matrix for 5 experts

		Expert 1	*Expert 2*	*Expert 3*	*Expert 4*	*Expert 5*
Correlation	Expert 1	-	.149	.124	.365	.282
	Expert 2		-	.406	-.340	-.120
	Expert 3			-	-.470	-.036
	Expert 4				-	.429
	Expert 5					-

Table 4-9 KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		*.530*
Bartlett's Test of Sphericity	Approx. Chi-Square	30.1
	df	10
	Sig.	.001

4.2.5 Main factor analysis

Principle component analysis was used because the primary purpose was to identify experts' composite scores for the factors underlying the questionnaire. Experts that load onto the same factor were identified to find common themes or cluster patterns (see Table 4-11). Two components had eigenvalues over Kaiser's criterion of 1 and in combination explained 68.16% of the variance. All experts were retained because their primary loadings were above .4 and none had a cross loading above .3. Three experts loaded onto Factor 1 and similarly three experts loaded onto a second factor. Although Expert 4 has a cross loading it is below .3 and its primary loading is well above .5.

Table 4-10 Communalities for 5 experts

	Initial	*Extraction*
Expert 1	1.00	.718
Expert 2	1.00	.632
Expert 3	1.00	.700
Expert 4	1.00	.802
Expert 5	1.00	.556

Note. Extraction Method: Principal Component Analysis.

Table 4-11 Rotated factor loadings and communalities based on a principle component analysis with varimax rotation for 5 experts

Component	*1*	*2*
Expert 3	.836	
Expert 2	.795	
Expert 1		.804
Expert 5		.736
Expert 4	-.573	.688
Eigenvalues	1.75	1.66
% of variance	34.9	33.2

Note. Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

The two factor solution was preferred because of its support to the clustering of experts on the component plot diagram (see Figure 4-4). The factor loading matrix for this final solution is presented in Table 4-11. Overall, these analyses indicated two distinct clusters underlying the experts' responses to components of gender inclusivity in games.

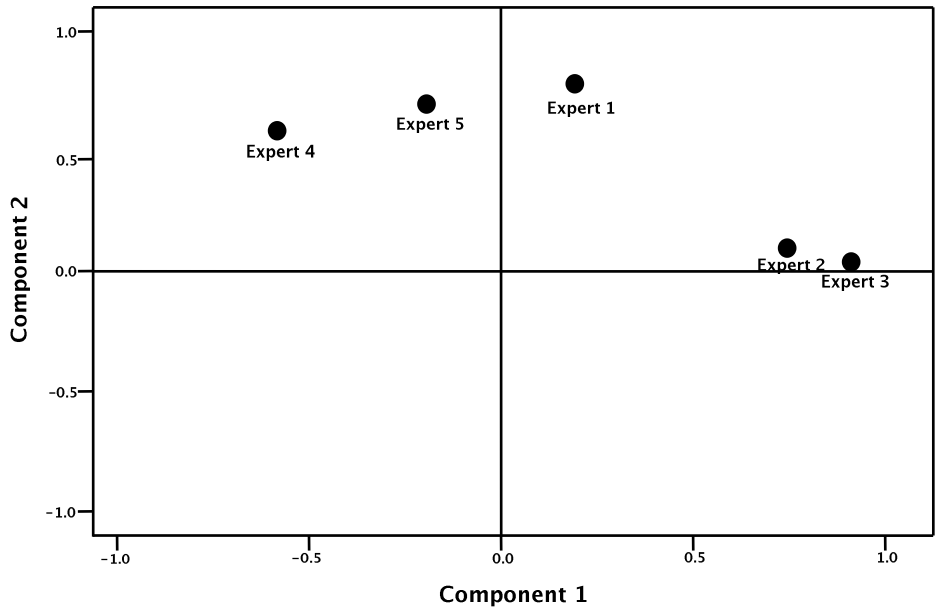


Figure 4-4 Component plot for two factors solution

4.3 Chapter Summary

This chapter presented the stepwise approach, methods and analysis for an expert evaluation towards the components of the Gender Inclusivity Framework (GIF). It involves developing an expert evaluation measuring instrument and an expert's evaluation study. The expert evaluation instrument, based on the GIF, was designed to measure experts' agreement patterns about the components of gender inclusivity in games. Two dimensions with 12 components were selected for the instrument. A total of 32 items were generated and experts were asked to rate the importance of each item towards gender inclusive gameplay and content.

Next, an expert evaluation study was conducted with five experts from both academic researchers and professional designers. Results suggest that there is a statistical significance between the experts' agreement on the components of gender inclusivity in games and two distinct clusters of experts' agreement about the components of gender inclusivity in games. These findings provided evidence that GIF is based on sound theoretical foundations from research in gender and games. This also suggests that the pattern of agreement between experts may be due to various factors such as gender, background and age.

Following the validation of the GIF, Chapter 5 will demonstrate an application of the GIF through the development and validation of a novel instrument to measure the level of gender inclusivity in games.

5 Development and Validation of the Gender Inclusivity Rating Scale (GIRS)

In the previous chapter, an expert's evaluation study was conducted to validate the components of the GIF. The results supported the components of GIF as theoretically sound and based on established research in games and gender.

Following the positive findings from the expert's evaluation study, Chapter 5 demonstrates the development and validation process of a novel measuring instrument, the Gender Inclusivity Rating Scale (GIRS), which can be used to measure the level of gender inclusiveness in games. The GIRS was developed through a stepwise approach using the GIF as a reference and guide during the development process in Section 5.1, after which a pilot study and a validation experiment were carried out to validate the instrument in Section 5.2. The aim of the experiment was to investigate the relationships between each item in a component and how they relate to the gender inclusivity rating scale as a whole. Next, Section 5.3 describes the data analysis and results. Finally, Section 5.4 summarises the chapter.

5.1 Measuring Gender Inclusivity in Games

In order to test the conceptual framework a reliable measuring instrument has yet to be developed and validated. Validating the instrument is a critical step before testing the conceptual framework (Straub, Boudreau, & Gefen, 2004). The Gender Inclusivity Rating Scale (GIRS) was developed to measure the level of gender inclusiveness in games. Although the instrument is exploratory, the methods for instrument development and validation abide by conventional methodologies for instrument development (Dwivedi, Choudri, & Brinkman, 2006;Czaja & Blair, 2005; Vaus, 2002; Litwin, 1995; Fink, 1995). Figure 5-1 illustrates an overview of the development and validation process for the measuring instrument. The following sections will explain in detail how the measuring instrument was developed and how the validation study was conducted.

5.1.1 Selecting dimensions and operational definition

Looking at our Gender Inclusivity Framework (GIF) as a source of reference and guide, three dimensions were selected for inclusion in measuring the level gender inclusivity in games: (1) *gameplay*, (b) *content,* and (c) *genre*. *Gameplay* dimension describes a game's behaviour in creating a *play* experience. *Content* dimension describes objects or artefacts that build the game world. Finally*, genre* dimension is used to identify the types of game. After determining the dimension for inclusion in

the instrument, the appropriate components were selected. A total of 12 components were selected with eight components to represent *gameplay* dimension and four components for *content* dimension.

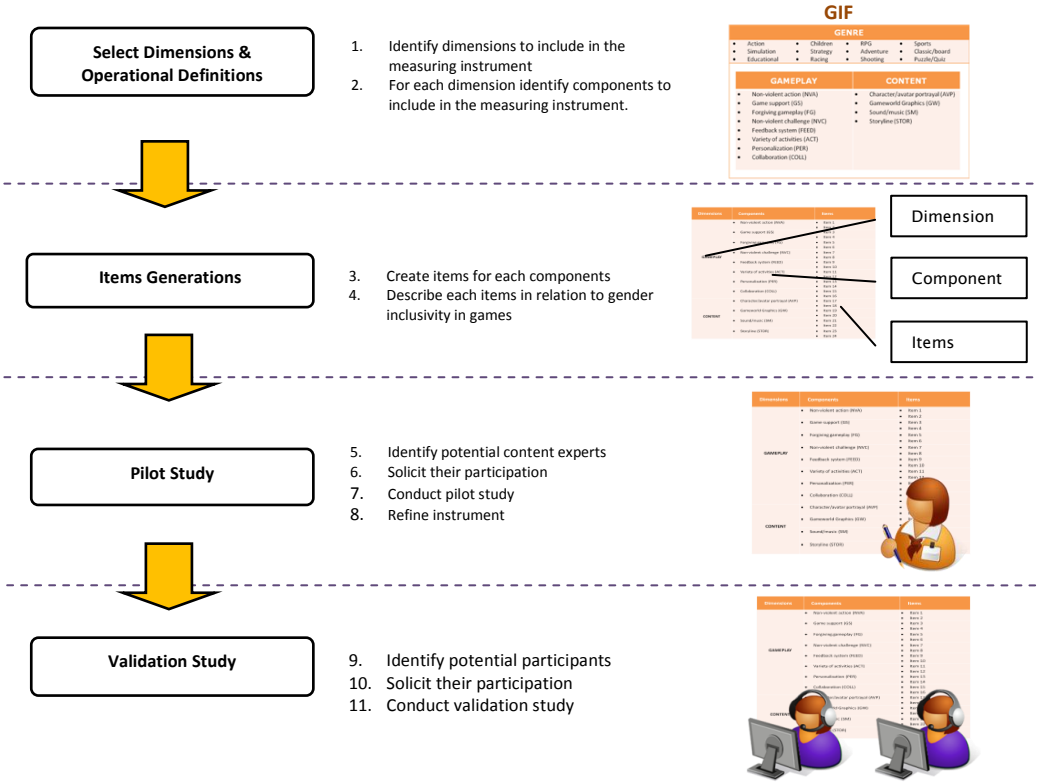


Figure 5-1 The Gender Inclusivity Rating Scale (GIRS) development and validation process

5.1.2 Generating items for the instrument

The following step is to generate items that represent those dimensions and components identified for inclusion in the instrument. The Gender inclusivity Rating Scale (GIRS) instrument was developed to measure the level of gender inclusiveness in games. The following explains each dimensions and components used to formulate the operational definition used in the instrument.

Genre is measured by indicating the game category. A total of 12 genres were used to represent the types of games as follows:

- Racing
- Simulation
- Classic/board
- Strategy
- Sports
- Shooting
- Role playing game (RPG)
- Platform
- Children
- Puzzle/quiz
- Action
- Adventure

The ***Gameplay*** dimension investigates a player's perception of the level of gender inclusive gameplay of a game. The description for each of the eight components is presented as follows:

1. **Non-violent Action (NVA):** This component investigates the level of non-violent competitive and conflict resolution actions in a game including collaboration with an enemy by invading, exchanging gifts or doing a favour.
2. **Game support (GS):** This component represents the extent of in-game supporting features e.g. backstory, tutorial or demo in a game.
3. **Forgiving gameplay (FG):** This component represents the extent of game continuity allowed after a wrong choice during gameplay in a game such as saving multiple game scenarios or showing hints.
4. **Non-violent challenge (NVC):** This component examines the level of the non-violent challenges during gameplay such as solving puzzles or resource management.
5. **Variety of activities (ACT):** This component represents the extent of different types of activities within a game including solving a problem with a variety of solution or a combination of activities work together towards solving a bigger goal.
6. **Feedback system (FEED):** This component examines the extent of non-violent feedback in a game including using sounds and giving feedback in a positive tone.
7. **Personalization (PER):** This component investigates game personalization in terms of game speed, play pace and difficulty level in a game.
8. **Collaboration (COLL):** This component examines the level of support available for collaborative play with other players including connection to chat room, social networking websites and/or an email.

The ***Content*** dimension investigates a player's perception of the level of gender inclusive content of a game. The description for each of the four components is as follows:

9. **Avatar portrayal (AVP)**: This component deals with an avatar's portrayal in terms of appearance, behaviour, avatar modification and gender selection in a game.
10. **Gameworld graphics (GW)**: This component covers the level of graphics realism, colours shades and variability of scenes in a game.
11. **Sound/music (SM)**: This component deals with the level of customization available in terms of music styles and volume control during gameplay.
12. **Storyline (STOR)**: This component examines the extent a story is interwoven into a game through compelling plot and characterization.

With this objective in mind a total of 82 potential items were developed at this stage (see Appendix C). Table 5-1summarized the number of potentials items generated for each component subject to inclusion in the instrument.
Table 5-3 and Table 5-4 show the relationship between dimensions, components and items after the pilot study was conducted. Gameplay dimension consist of eight components with 35 items while content dimension consists of four components with 30 items.

Table 5-1 Summarizes the number of potential items generated for inclusion in the instrument

Dimension	Component	Number of potential items
Genre	-	1
Gameplay	Nonviolent Action (NVA)	12
	Game Support (GS)	6
	Forgiving Gameplay (FG)	5
	Nonviolent challenge (NVC)	8
	Variety of activities (ACT)	4
	Feedback system (FEED)	9
	Personalization (PER)	6
	Collaboration (COLL)	3
Content	Avatar Portrayal (AVP)	14
	Gameworld Graphics(GW)	5
	Sound/Music (SM)	4
	Storyline (STOR)	6
3 dimensions	**12 components**	**82 items**

Response items

The response items uses a five-point scale format i.e. 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree' and 'Strongly Agree'. A "1= Strongly Disagree" is the lowest possible score denoting an almost non-existent representation of gender inclusivity in games. On the contrary, if an item was rated as a "5=Strongly Agree" it is the highest possible score which shows an item captures the essence of gender inclusivity in games. A rating of "2=Disagree", "3=Neutral" and "4=Agree" represent varying degrees of gender-inclusive gameplay and content in a game. Table 5-2 summarizes out the scoring and its corresponding description for each response item.

Table 5-2 Summary of the rating criteria created for the GIRS measuring instrument

Rating	Definition
1 = "Strongly Disagree"	The item shows too little or almost non-existent representation of gender inclusivity in games.
2 = "Disagree"	The item shows a minor portrayal of gender inclusivity in games.
3 = "Neutral"	The item shows an acceptable level of gender inclusivity in games.
4 = "Agree"	The item shows a satisfactory level of gender inclusivity in games.
5 = "Strongly Agree"	The item shows an ideal level of gender inclusivity in games.

Questions

The GIRS instructions asked respondents to circle the appropriate score on the scale in accordance with the item's description. In this case, Figure 5-2 shows an exemplar question for non-violent action (NVA) component. The item is labelled as *Item 1: When I want to gain a limited resource, I use negotiation tactics* and it describes how a non-violent action might look during gameplay. Respondents were asked to rate the extent of a non-violent action the item represents by choosing how much they agree or disagree with the item.

Item		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5.	When I want to gain a limited resource, I use negotiation tactics.	1	2	3	4	5

Figure 5-2 An exemplar item for non-violent action (NVA) component

Figure 5-3 shows an item in the content dimension used to rate the avatar portrayal (AVP) component. The general question for this section is how important the item is in describing a gender inclusive content. In this case, the item is labelled as *Item 20: I find the female avatar is hyper-sexualized with curvaceous body or extreme body proportions.* The item describes how a stereotypical portrayal of a female avatar has an exaggerated body type. Respondents then choose one of the score depending on how much they agree or disagree with the item. A sample of the refined Gender Inclusivity Rating Scale (GIRS) instrument can be found in Appendix D.

Item		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
35.	I find the female avatar is hyper-sexualized with curvaceous body or extreme body proportions.	1	2	3	4	5

Figure 5-3 An exemplar item for avatar portrayal (AVP) component

Table 5-3 Description of the genre and gameplay dimensions

Dimension	Component	Description and list of items
Genre	-	*The type of game*
		1. Which category best describe the game?
Gameplay	Nonviolent Action (NVA) NVA 1- NVA6	*The extent of non-violent action during gameplay.*
		2. When I want to gain a limited resource, I use negotiation tactics. 3. When I want to gain allies, I use diplomacy. 4. When I want to collaborate with the enemy, I use violent threats. 5. When I want to collaborate with the enemy, I exchange gifts. 6. When I want to collaborate with the enemy, I help them out so a 'loyalty' favour is due. 7. When I want to collaborate with the enemy, I invade them.
	Game Support (GS) GS1- GS3	*The level of supportive features during gameplay.*
		8. I can set my own goals. 9. The game gives enough information in the background story for me to understand the game context. 10. The instructions are easy to get to during gameplay.
	Forgiving Gameplay (FG) FG1 – FG4	*Gameplay continuity when a wrong choice is made.*
		11. I can save any number of game scenarios. 12. I can replay a game scenario any number of times. 13. When I make a mistake, I can still play the game without a death penalty (loss of life). 14. When I make a mistake, the game shows hints on how to improve my gameplay.
	Nonviolent challenge (NVC) NVC1 – NVC4	*Different types of challenges a player has to go through in a game.*
		15. Most of the obstacles come from solving puzzles. 16. The majority of the obstacles come from resource management. 17. Most of the obstacles involve fighting through enemy lines. 18. Most of the obstacles harm or expose me to harm.
	Variety of activities (ACT) ACT1 –ACT3	*Variety of game activities and their relation to each other.*
		19. I can solve a problem in multiple ways. 20. The game is made up of a variety of activities. 21. Different types of activities work together to solve one goal.
	Feedback system (FEED) FEED1–FEED5	*Different types of feedback.*
		22. I find most feedback uses a positive tone. 23. I find most feedback shows violent bloody scenes. 24. I find the feedback uses crude language. 25. When I do not know what to do, the feedback pops-up to show hints. 26. I find the sound provides useful feedback.
	Personalization (PER) PER1-PER3	*Game personalization.*
		27. I am in a constant fast-paced intense action gameplay. 28. I can easily adjust the pace according to my preferences. 29. I can easily adjust the level of difficulty according to my preferences.
	Collaboration (COLL) COLL1-COLL6	*Collaborative features available in the game.*
		30. I can easily play with other players. 31. The game has these communication features … (2) An email or instant message, (3) A Chat Room, (4) A game Community, (5) A link to a social networking website, (6) A 'buddy list'.
	8 components	**35 items**

Table 5-4 Description of the content dimension

Dimension	Component	Description and list of items
Content	Avatar Portrayal (AVP) AVP1 – AVP20	*The extent of avatar representation in terms of modification, appearance and behaviour*
		32. I can choose my avatar's gender. 33. I can design my own avatar by using my own picture or an image I created. 34. I find the female avatar is hypersexualized with provocative dress or exposed body parts. 35. I find the female avatar is hypersexualized with curvaceous body or extreme body proportions. 36. I find the female avatar is hypersexualized with provocative facial expressions or postures. 37. I find the male avatar is hypersexualized with exposed body parts or tight clothing. 38. I find the male avatar is hyper-sexualized with provocative facial expressions or postures. 39. I find the male avatar is hypermuscularized with overly large bulging muscles. 40. I find most female avatars are portrayed in non-protagonist roles. 41. I find most male avatars are portrayed in protagonist roles. 42. I find most female avatars are shown as submissive, weak, most likely to use verbal ridicule and aggression. 43. I find most male avatars are shown as physically aggressive, violent, strong and most likely to use a weapon. 44. I can modify my avatar's … (13) Name, (14) Body Type, (15) Facial features, (16) Skin, (17) Clothing, (18) Wearable items, (19) Personality, (20) Roles
	Gameworld Graphics (GW) GW1 –GW2	*The types of graphics used in the game.*
		45. The graphics has high realism. 46. The graphics uses bright "cheerful" colour palette.
	Sound/Music (SM) SM1-SM3	*The extent of sound/music personalization.*
		47. I can easily choose a variety of music according to my preferences. 48. I can easily turn on or off the music according to my preferences. 49. I can easily adjust the level of volume according to my preferences.
	Storyline (STOR) STOR1- STOR5	*The extent a storyline is interwoven into the game.*
		50. I find the storyline has some meaning to completing the game. 51. I find the storyline develops as the game progresses. 52. I am interested in the characters because they are like me. 53. I am interested in the characters because they are interesting to me. 54. I am interested in the characters because they develop with the game.
	4 components	**30 items**

5.2 Validating the Rating Scale

The objective of this chapter is to develop and validate an instrument to measure the level of gender inclusivity in games. The accuracy of findings and interpretations are based on strong validation of the instruments that are used to collect the data (Czaja & Blair, 2005; Straub et al., 2004; Vaus, 2002). In this section, a study was designed to validate the Gender Inclusivity Rating Scale (GIRS) developed in the previous section. The validation process involves two parts: (a) a pilot study, and (b) validation experiment. The following sections describe each of the parts in detail.

5.2.1 Pilot study

The objectives of the pilot study were to evaluate whether:

1. an item is relevant and adequate in examining the concept being studied,
2. an item's wording, response format, instructions, instrument length and layout is appropriate,
3. the instrument as a whole is easy to read and understand.

A sample of five experts from the Electronics and Computer Science School, University of Southampton were invited to review the instrument. They comprised one female and four males ranging from 20 – 45 years of age. These experts were recruited on the basis of their interest in games development, their research in games and their gaming experience on various consoles. Changes made to the original instrument include selecting an adequate number of items to represent a component, adopting player appropriate terms and using a layout that would be easy to read and to distribute during the experiment. From a pool of 82 items (see Appendix C), the refined instrument now consists of 54 items. Table 5-3 and Table 5-4 show the refined list of items following the pilot study with the *gameplay* dimension consisting of 31 items and the *content* dimension consisting of 23 items.

5.2.2 Validation experiment

Next, the refined instrument was distributed to a sample of respondents and an analysis of the responses was conducted to obtain the instrument's reliability.

The objectives of this experiment are to investigate:

1. the relationship between individual items in a component.
2. the relationship between items and the component, and finally
3. the relationship between each component and the scale as a whole.

5.2.3 Participants

A sample of 31 respondents from the University of Southampton was recruited through the Electronics and Computer Science School mailing list which includes undergraduates, postgraduates and researchers groups. There were 15 females and 16 males ranging from 20 to 45 years of age. They were recruited based on their

interest in gaming with no restrictions on whether they were a novice, casual or hardcore gamers. If a potential participant is neither willing nor able to provide informed consent and has never played any games nor had any interest in games, they are excluded from the study.

5.2.4 Apparatus and materials

Table 5-5 list the consoles used in the experiment with a description of their specifications. While Figure 5-4 is a snapshot of the lab setup for the experiment. Each game console is given a dedicated game space.

Table 5-5 List of apparatus used in the experiment

Game Consoles	Specification
1. Playstation 3 	• CPU: Cell Broadband Engine GPU: RSX • Main Memory: 256MB XDR Main RAM • Embedded VRAM: 256MB GDDR3 VRAM • Hard Drive Disk: 2.5" Serial ATA (80 GB HDD) • Main Input/Output: USB 2.0 (x4), MemoryStick/SD/CompactFlash • Ethernet: 10BASE-T, 100BASE-TX, 1000BASE-T • Bluetooth: 2.0 (EDR), Wireless Controller (up to 7) • Wireless Communication: IEEE 802.11 b/g • HDMI: HDMI out – (x1/HDMI) • Digital Audio: DIGITAL OUT (OPTICAL x1) • Disc Drive: Blu-ray/DVD/CD (read-only)
2. Xbox 360 	• CPU: 3 symmetrical cores running at 3.2 Ghz each • Graphics processor: 500 Mhz, 10 MB embedded DRAM, Memory: 512 MB GDDR3 RAM, 700 Mhz DDR • Storage: Detachable and upgradeable 20 GB hard drive, 12X dual-layer DVD-ROM, • I/O: Support for up to 4 wireless game controllers, 3 USB 2.0 ports, 2 memory unit slots • Audio: Multichannel surround sound output, supports 48 khz 16-bit audio, 320 independent decompression channels, 32-bit audio processing, over 256 audio channels • System Orientation: stands vertically or horizontally
3. Wii 	• CPU: Custom-built IBM, "Broadway" • SRAM: MOSYS-developed 1T-SRAM • I/O: 2x USB 2.0 ports, 4x gamecube controller ports, 2x 512 MB Flash Memory slots (SD Card compatible) • Max resolution: 480p • Game format: 12 cm Wii Disc, 8 cm gamecube disc • GB (or 8.5 GB Dual Layer) • Controllers: Wii Remote & motionplus (supports up to 4 wireless controllers), Wii Balance Board, Nintendo gamecube controller, Nintendo DS • Wireless connectivity: Wi-Fi IEEE 802.11 b/g • Bluetooth 2.0 (EDR) • Other features: "Virtual console" for retro games
4. Dell Optiplex Desktop 	• *Chipset: Intel® Q45 Express Chipset w/ICH10DO* • Connectivity: MT/DT/SFF- Integrated Intel® 82567LM Ethernet LAN 10/100/1000; optional Broadcom® NetXtreme® 10/100/1000 PCIe card; optional Broadcom® 1505 PCIe WLAN card (802.11 Draft-N) USFF- Integrated Intel® 82567LM Ethernet LAN 10/100/1000; optional Broadcom® 1510 mini PCIe WLAN card (802.11 Draft-N) • **Ports:** 8 External USB 2.0 ports and 1 Internal USB 2.0, 1 Parallel, 1 Serial, 1 RJ-45, 1 VGA, 1 Display Port, 1 eSATA, 2 Line-in (stereo/microphone), 2 Line-out (headphone/speaker) • Dimensions(H x W x D) Inches/(cm): 15.7 x 4.5 x 13.9 / (39.9 x 11.4 x 35.3)
Accessories	

5. Headphones 	• 4 X Advent HSNC200 • With Volume Control • Cable Length: 6.56 ft.
6. Monitors 	• 3 X Samsung SyncMaster T190 19" • Device Type: LCD display/TFT active matrix • Dimensions (WxDxH): 45.4 cm x 19.5 cm x 40 cm • Max Resolution: 1440 x 900 / 75 Hz • **Interfaces:** 1 x VGA - 15 pin HD D-Sub (HD-15), 1 x DVI-D - 24 pin digital DVI
	• 1 X Hewlett Packard LA1951G 19” • Display type: TFT liquid crystal • Input terminal:1 VGA 15-pin D-type connector (analog cable included), DVI-D connector (DVI cable not included) • Dimensions (H x W x D), including base: 14 x 17.3 x 8.3 inches (35.5 x 43.9 x 21 cm) • Max Resolution: 1280 x 1024

Figure 5-4 the experiment was conducted in demo room of building 32 at the University of Southampton. Four game consoles were setup as seen in the screenshot above.

Games

A representative list of ten games were selected based on popularity ranking and/or awards for best game in various categories such as Game of The Year or Best Family Game of the Year award (see Table 5-6). These lists are usually produced by professional games organizations like International Game Developers Association (IGDA) and Academy of Interactive Arts and Sciences (AIAS). Every attempt was made to ensure that the final list included games that a substantial number of gamers and industry would agree worthy of study and covers a variety of genres. A description of the games chosen in the experiment can be found in Appendix G.

Table 5-6 List of games used in the experiment

Console	List of Games	Genre
Playstation 3	• Little Big Planet	Platform
	• Monopoly	Classic
Xbox 360	• Ratatouille	Children/adventure
	• Mirror's Edge	Action
Wii	• Mario Kart	Racing
	• Boom Blox: Bash Party	Puzzle
	• Wii Resort Sports	Sports/Family
PC	• Neverwinter's Night	Role playing
	• Chocolatier 2: Secret Ingredients	Business simulation
	• Civilization 4: Colonization	Strategy

Materials

A set of participant materials containing three types of documents were placed next to each game console prior to the experiment.

1. Consent form which the participant must fill-in and return to the researcher before starting the experiment (see Appendix E).
2. Participant information sheet which explains the purpose of the experiment, procedure, benefit and risk of the experiment and contact details (see Appendix F).
3. GIRS questionnaire contains a set of items that a participant needs to answer after the experiment (see Appendix D).

5.2.5 Procedure

Two weeks before the experiment emails soliciting participants were sent to the Electronics and Computer Science School mailing list which includes undergraduates, postgraduates and researchers groups. The email explained the purpose of the study and how the participant could contribute to the study. If a participant agreed to join the study, they could reserve a slot through an online scheduling system i.e. *Doodle.com*. All experiment sessions were conducted in the Demo room of Building 32. The experiment was divided into three sessions and the procedure for the experiment was:

Briefing session (5 minutes):

Participants were randomly assigned to play a game before responding to a number of questionnaire items. At the start of each experiment the participants were given instructions about the general nature of the experiment and were asked to fill out a written consent form. Participants were assured that their involvement was by informed consent, anonymous and would be treated with respect, consideration and concern. They were also provided with sufficient detail about the research stressing the objectives of the experiment, procedure involved, potential risks and benefits. The consent form stresses these issues:

i. that their participation is voluntary;
ii. that they can quit or stop the experiment at any time; and
iii. that their responses will be confidential.

After completing and returning the consent form, participants start playing the game they were assigned.

Play session (15 – 45 minutes):

Each play session ranged from 15 minutes to 35 minutes in length and the procedure is as follows:

1. Participant plays the game from 15 minutes to 35 minutes.
2. After they finished playing, participants answered the questionnaire which takes about 10 minutes to complete.
3. Participant returns the GIRS instrument.

Debriefing session (5 minutes):

At the end of each experiment session, participants were debriefed to ensure ethical practice has been adhered to and during that session they were:

i. given a summary of the experiment describing the research question, procedure used and why the research is important;
ii. provided with an opportunity to ask any questions they may have; and
iii. thanked for their participation.

5.3 Analysis and Results of the GIRS

This study sought to validate the reliability and internal consistency of GIRS, a novel measuring instrument designed to evaluate the level of gender inclusivity in games. The instrument was developed following a stepwise approach and a total of 31 participants were recruited to play a number of popular off-the-shelf games on various game consoles. A correlation analysis using Pearson's (*r)* was used to determine the GIRS reliability between each individual items and its components. Next, Cronbach's alpha (α) was used to determine GIRS internal consistency between each individual components and the instrument as a whole. Both tests demonstrate how strong is the association of each item in a component, between the items and its respective

component and finally between each component and the instrument as a whole. A strong association between items-to-items, items-to-components and components-to-instrument, indicates that it is a more reliable measure of the concept.

5.3.1 Data screening

The data was screened for reverse coding, missing data and new variables. Nineteen items were reverse coded and any missing data found was coded as 999. Twelve new variables were created for the standardized values of each gender inclusivity in game components as they have different numbers of items. Standardized values were created by adding all the item scores in a component and dividing the total with the number of items in that particular component. An initial correlation analysis found 6 item correlations with values more than .9 in the avatar portrayal (AVP) component and these items were removed.

5.3.2 Power analysis

A priori analysis of power calculation performed on G*Power using Cohen (1992) large effect size (*p)* = .5 and α = .05 indicated a sample size of 26 would be required to reach the power (*1 – ß*) = .80. Given the sample size of 31 for this study, a post-hoc power analysis indicated that the actual power achieved was (*1 – ß*) = .87.

5.3.3 Correlations

This section presents the overall correlation matrix for 12 gender inclusivity in games components and then proceeds with the correlation between each item within a component. Table 5-7 shows the inter-correlation results between all 12 components in varying strength.

- Non-violent action (NVA) component is significantly correlated with non-violent challenges (NVC), $r(31) = .37$, $p < .05$ and personalization (PER) component, $r(31) = .56$, $p < .01$.
- Game support scale is significantly correlated with personalization scale, $r(31) = .39$ and storyline (STOR) component, $r(31) = .40$, (all $p < .05$).
- Forgiving gameplay (FG) is significantly correlated with variety of activities (ACT) component, $r(31) = .39$, $p < .05$.
- Non-violent challenges (NVC) is significantly correlated with sound/music (SM) component, $r(31) = .36$, $p < .05$.
- Variety of activities (ACT) component is significantly correlated with personalization (PER), $r(31) = .40$ and collaboration (COLL) components, $r(31) = .43$, (all $p < .05$).
- Feedback (FEED) component is significantly correlated with personalization (PER) component, $r(31) = .36$, but negatively correlated with sound/music (SM) component , $r(31) = -.40$, (all $p < .05$).

- Collaboration (COLL) component is significantly correlated with game world graphics (GW), $r(31) = .41$, $p<.05$.
- Game world graphics (GW) has a negative significant correlation with storyline (STOR) component, $r(31) = -.52$, $p<.01$.

Table 5-7 Pearson correlations between all 12 gender inclusivity in games components

Components	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*
1. NVA	.153	.207	.367*	.143	.096	.561**	.231	.204	.039	.160	.142
2. GS	–	.354	.083	.291	.080	.389*	.158	.166	-.163	.241	.401*
3. FG		–	-.097	.390*	.233	.275	.178	.055	-.230	-.013	.304
4. NVC			–	.058	-.006	.078	-.074	-.071	.008	.357*	.184
5. ACT				–	.243	.400*	.425*	.341	.000	.055	.246
6. FEED					–	.358*	.121	-.130	.254	-.400*	-.124
7. PER						–	.194	.246	.049	.200	.228
8. COLL							–	.274	.405*	.277	-.153
9. AVP								–	-.058	.222	.088
10. GW									–	-.002	-.524**
11. SM										–	.185
12. STOR											–

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The following reports correlation results for individual items in each component of the GIRS (see Table 5-8 to 5-19).

Correlations for Non-Violent Action (NVA) Component

The results from Table 5-8 show correlations from the non-violent action (NVA) component. The first item gaining resources through negotiation is significantly correlated with gaining allies through diplomacy, $r(28) = .73$, collaboration through exchanging gifts, $r(28) = .76$, collaboration by helping enemies, $r(28) = .65$, (all $p < .01$). Another significant correlation of gaining resources through negotiation is between collaborate by invasion, $r(28) = .38$, $p<.05$. Gaining allies by diplomacy is significantly correlated with collaboration by exchanging gifts, $r(29)=.74$, collaborate by helping enemies, $r(29) = .83$,(all $p <.01$). Collaboration by threats has a significant relationship with collaborate by exchanging gifts, $r(29) = .42$, $p <.05$ and collaboration through invasion, $r(29)=.58$, $p < .01$. Collaborate by exchanging gifts has a significant correlation with collaborating by helping enemies, $r(29) = .66$, $p <.01$.

Table 5-8 Correlations for Non-Violent Action (NVA) component

Items	*2*	*3*	*4*	*5*	*6*
1. Gain Resources by Negotiation	.728**	.300	.762**	.652**	.380*
2. Gain allies by diplomacy		.314	.742**	.832**	.323
3. Collaborate by threats		-	.147	.419*	.583**
4. Collaborate by exchanging gifts			-	.656**	.239
5. Collaborate by helping enemies				-	.348
6. Collaborate by invasion					-

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Correlations for variety of activities (ACT) *Component*

The variety of activities (ACT) component (see Table 5-9) shows problems solved in multiple ways is significantly correlated with having a variety of activities, $r(31) = .50$, $p<.01$. Another significant relationship is between having a variety of activities with different activities to solve a problem, $r(31) = .41$, $p<.05$.

Table 5-9 Correlations for Variety of Activities (ACT) component

Items	*2*	*3*
1. Solve a problem multiple ways	.500**	.050
2. Has a variety of activities	-	.414*
3. Different activities to solve a problem		-

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Correlations for Feedback System (FEED) Component

Table 5-10 presents the results from the feedback system (FEED) component. Feedback showing violent bloody scenes is significantly correlated with feedback using crude language, $r(31) = .53$, $p < .01$. Feedback using crude language has significant correlation with sound as a useful feedback, $r(31) = .39$, $p < .05$.

Table 5-10 Correlations for Feedback System (FEED) component

Items	*2*	*3*	*4*	*5*
1. Use a positive tone	-.087	-.177	.224	.201
2. Shows violent bloody scenes	–	.533**	.293	.231
3. Uses crude language		–	.116	.392*
4. Shows pop-up screens			–	-.147
5. Sound is useful feedback				–

Note. **. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Correlations for Personalization (PER) Component

In the personalization (PER) component below (see Table 5-11), the feature to adjust gameplay pace is significantly correlated with the feature to adjust difficulty level, $r(31) = .64$, $p < .01$.

Table 5-11 Correlations for Personalization (PER) component

Items	*2*	*3*
1. Constant fast-paced gamplay	-.143	-.271
2. Can adjust pace	–	.644**
3. Can adjust difficulty level		–

Note. **. Correlation is significant at the 0.01 level (2-tailed)

Correlations for Sound/Music (SM) Component

Table 5-12 of the sound/music (SM) component shows the facility to easily turn on/off music is significantly correlated with the facility to easily adjust volume, $r(31) = .79$, $p<.01$.

Table 5-12 Correlations for Sound/Music (SM) component

Items	*2*	*3*
1. Can easily choose a variety of music	.175	.183
2. Can easily turn on/off music	–	.788**
3. Can easily adjust volume		–

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Correlations for Storyline (STOR) Component

Table 5-13 shows results from the storyline (STOR) component. Storyline with meaning is significantly correlated with storyline that develops as the game progresses, $r(31) = .80$, and interested because the characters develop with the game, $r(31) = .59$, (all $p < .01$). Storyline develops as the game progresses has a significant correlation with interested because the characters develop with the game, $r(31) = .65$, $p < .01$. Another significant correlation is between interested because characters are similar to oneself with interested because characters are interesting, $r(31) = .46$, and interested because characters develop with the game, $r(31) = .63$, (all $p < .01$). Finally, interested because characters are interesting is significantly correlated with characters develop with the game, $r(31) = .60$, $p < .01$.

Table 5-13 Correlations for Storyline (STOR) component

Items	*2*	*3*	*4*	*5*
1. Storyline has meaning	.798**	.256	.251	.593**
2. Storyline develops as game progresses	–	.348	.326	.648**
3. Interested because characters similar to oneself		–	.457**	.628**
4. Interested because characters are interesting			–	.595**
5. Interested because characters develop with game				–

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Correlations for Avatar Portrayal (AVP) Component

Table 5-19 shows results from the avatar/character portrayal (AVP) component. The ability to design own avatar is significantly correlated with facial features, $r(17) = .58$, $p < .05$. Hyper-sexualized male avatar is significantly correlated with male avatar in aggressive and violent personality, $r(31) = .36$, $p < .05$. Hyper-sexualized male avatar also have significant correlations with personality, $r(17) = .61$ and roles, $r(17) = .75$, (all $p < .05$). Name has a negative significant correlation with clothing, $r(17) = -.52$, $p < .05$. Body type is significantly correlated with skin $r(17) = .62$, $p < .01$. Facial features is significantly correlated with skin $r(17) = .89$, $p < .01$ and with clothing, $r(17) = .53$, wearable items, $r(17) = .55$, (all $p < .05$). Skin is significantly correlated with clothing, $r(17) = .65$, $p < .01$. Clothing is significantly correlated with wearable items, $r(17) = .79$, $p < .01$. Personality is significantly correlated with roles, $r(17) = .75$, $p < .01$.

Each of these components i.e. Game Support (GS), Forgiving Gameplay (FG), Non-violent Challenge (NVC), Collaboration (COLL) and Game world Graphics (GW), has minor statistical significant relationships between each of its items (see Table 5-14 to 5-18).

Table 5-14 Correlations for Game Support (GS)

Items	*2*	*3*
1. Can set own goal	.282	.139
2. Background info/story	–	-.042
3. In-game instructions easy to get to		–

Table 5-15 Correlations for Forgiving Gameplay (FG) component

Items	*2*	*3*	*4*
1. Save any number of scenarios/sessions	-.036	.024	.289
2. Replay scenario any number of times	–	-.190	-.094
3. Play without death penalty		–	.137
4. Show hints to improve gameplay			–

Table 5-16 Correlations for Non-Violent Challenge (NVC) component

Items	*2*	*3*	*4*
1. Obstacles from solving puzzles	-.081	-.122	-.063
2. Obstacles from resource management	–	.067	.237
3. Obstacles fighting enemy lines		–	-.097
4. Obstacles harm or expose to harm			–

Table 5-17 Correlations for Collaboration (COLL)

Items	*2*	*3*	*4*	*5*
1. Can easily play with other players	-.210	-.551	.440	.310
2. An email/instant messaging	–	.283	-.238	-.238
3. A chat room		–	-.051	-.051
4. A game community			–	.381
5. A 'buddy' list				–

Table 5-18 Correlations for Game world Graphics(GW) component

Items	*2*
1. High realism	.145
2. Uses bright 'cheerful' colour palette	–

Table 5-19 Correlations for Avatar Portrayal (AVP)

Items	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
1. Can choose avatar's gender	.362	-.129	.343	.176	.113	-.049	.438	.272	.377	.272	.165	.159	.259
2. Can design own avatar	–	-.188	.216	.257	.000	-.018	.340	.575*	.434	.143	.268	.069	.222
3. Female hyper-sexualized		–	-.161	-.169	-.050	.123	-.197	-.269	-.297	-.275	-.220	-.213	-.179
4. Male hyper-sexualized			–	-.160	.362*	.119	.227	.080	-.007	.203	.257	.614**	.751**
5. Male in protagonist roles				–	-.219	-.300	-.053	.032	.207	.357	.233	.060	-.210
6. Male aggressive, violent					–	.271	-.012	.079	-.051	-.017	-.046	.088	.291
7. Name						–	.119	.033	-.182	-.523*	-.381	.410	.308
8. Body Type							–	.450	.618**	.203	.132	-.030	.171
9. Facial features								–	.887**	.528*	.549*	.203	.245
10. Skin									–	.648**	.457	.118	.182
11. Clothing										–	.789**	.203	.245
12. Wearable items											–	.132	.099
13. Personality												–	.751**
14. Roles													–

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

5.3.4 Internal consistency reliability

This section presents the internal consistency reliability results for the 12 components. This was done in a stepwise process; with the impact on component reliability checked each time an item was removed. The correlation of items within each component (item-to-item), the corrected item-to-total correlations (item-to-scale), and the effects on Cronbach's alpha (α) if item were deleted were used to determine which item for deletion from a component. Items with low item-to-item and item-to-scale correlations, which would raise alpha if deleted, would be candidates for elimination. However, before any item was deleted, a check was made to ensure that the domain coverage would not suffer.

Internal Consistency for Non-violent Action (NVA) Component

The first component is non-violent action (NVA) with Cronbach's alpha (α) = .85 suggesting a good component internal consistency reliability (see Table 5-20). Detailed results for NVA component shown in Table 5-21 show all items have corrected item-to-total correlation above .3, indicating a good correlation with the total component score. The items' values in column *Cronbach's Alpha if Item Deleted* are all above 0.6 with item 2: a gain ally by diplomacy having the lowest *Cronbach's Alpha if Item Deleted* value at .79 but it was kept because it reflects good reliability. Although *item 3: collaborate by threats* would increase the reliability if it was deleted; it was retained because it still reflects good reliability.

Table 5-20 Total reliability for non-violent action (NVA) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.852	.846	6

Table 5-21 Items-to-total reliability for (NVA) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Gain resources by negotiation	13.2	21.2	.773	.681	.800
2. Gain allies by diplomacy	12.8	20.7	.799	.774	.794
3. Collaborate by threats	13.5	26.8	.397	.404	.867
4. Collaborate by exchanging gifts	13.3	22.9	.664	.681	.823
5. Collaborate by helping enemies	13.1	21.6	.770	.716	.801
6. Collaborate by invasion	13.4	26.3	.425	.366	.863

Internal Consistency for Forgiving Gameplay (FG) Component

Table 5-22 shows forgiving gameplay (FG) component with Cronbach's alpha (α) = .37 indicating an acceptable level of reliability. In Table 5-23 *item 4: showing hints to improve gameplay* is an essential item in the component because deleting it would reduce the Cronbach's alpha (α) to .18 well below the current total Cronbach's alpha (α) = .37. None of the other items in *Cronbach's Alpha if Item Deleted* column would increase the reliability if they are deleted because all values are less than the total Cronbach's alpha (α) = .37.

Table 5-22 Total reliability for forgiving gameplay (FG) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.372	.370	4

Table 5-23 Items-to-total reliability for forgiving gameplay (FG) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Save any number of scenarios/sessions	8.48	5.25	.182	.085	.329
2. Replay game scenario any number of times	9.93	6.20	.141	.028	.364
3. Play without death penalty	8.13	5.19	.175	.052	.339
4. Show hints to improve gameplay	8.82	4.79	.308	.114	.178

Internal Consistency for Non-violent Challenge (NVC) Component

Table 5-24 shows non-violent challenge (NVC) component with Cronbach's alpha (α) = .46 indicating an acceptable level of reliability. As can be seen in Table 5-25, the removal of *item 1: Obstacles from solving puzzles* and *item 2: Obstacles from resource management* would increase Cronbach's alpha (α) to more than .46 but doing so will reduce the domain coverage. Next, *item 3: Obstacle from fighting* and *item 4: Obstacles expose player to harm* seem to be essential items in the component because deleting them would reduce the total Cronbach's alpha (α) to .31 and .22 respectively which are well below the current Cronbach's alpha (α)= .46.

Table 5-24 Total reliability for Non-Violent Challenges (NVC) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.464	.479	4

Table 5-25 Items-to-total reliability for or non-violent challenges (NVC) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Obstacles from solving puzzles	9.03	7.6	.137	.025	.512
2. Obstacles from resource management	8.33	6.92	.174	.075	.492
3. Obstacle from fighting	9.40	6.59	.349	.297	.315
4. Obstacles expose player to harm	8.73	6.13	.445	.328	.221

Internal Consistency for Variety of Activities (ACT) Component

Results shown in Table 5-26 presents variety of activities (ACT) component with a total Cronbach's alpha (α) = .60 indicating a good level of reliability. Table 5-27shows *item 2: has a variety of activities* is an essential item in the component because deleting it would reduce the total Cronbach's alpha (α) to .09 well below the current Cronbach's alpha (α) = .59. Although deleting *item 3: Different activities to solve a problem* in the *Cronbach's Alpha if Item Deleted* column would increase the Cronbach's alpha (α) to .66, removing it would reduce the domain coverage. *Item 1: Solve a problem multiple ways* is also kept because deleting it would not increase the total reliability substantially.

Table 5-26 Total reliability for variety of activities (ACT) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.590	.587	3

Table 5-27 Items-to-total reliability for variety of activities (ACT) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Solve a problem multiple ways	7.35	3.10	.340	.279	.584
2. Has a variety of activities	7.10	2.42	.633	.401	.094
3. Different activities to solve a problem	7.42	3.78	.263	.204	.666

Internal Consistency for Feedback System (FEED) Component

Table 5-28 shows the results for feedback system (FEED) component with a total Cronbach's alpha (α) =.47 indicating an acceptable good level of reliability. Table 5-29 shows that deleting any items in the *Cronbach's Alpha if Item Deleted* column would not increase the total reliability substantially except for *item 1: use a positive tone*. Deleting item 1 would increase the total reliability value to .55 but removing it would reduce the content validity.

Table 5-28 Total reliability for feedback (FEED) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.473	.484	5

Table 5-29 Items-to-total reliability for feedback (FEED) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Use a positive tone	10.42	6.05	.059	.226	.545
2. Shows violent bloody scenes	12.48	4.59	.424	.352	.290
3. Uses crude language	12.61	4.97	.343	.409	.355
4. Shows pop-up screens	11.26	4.99	.225	.242	.443
5. Sound is useful feedback	10.52	5.79	.261	.313	.419

Internal Consistency for Personalization (PER) Component

Results shown in Table 5-30 shows personalization (PER) component with a total Cronbach's alpha (α) = .60 indicating a good level of reliability. Table 5-31 shows *item 1: constant fast-paced intense action* has a *Corrected Item-Total Correlation* lower than .3 and in the *Cronbach's Alpha if Item Deleted* column indicate that deleting the item would increase the total reliability to .78. For *item 2: Can adjust pace* and *item 3: Can adjust difficulty level*, they have *Corrected Item-Total Correlation* values of more than .3 and as shown in the *Cronbach's Alpha if Item Deleted* column deleting these two items would not increase the total reliability values instead reducing it to much lower that the total Cronbach's alpha (α) = .60.

Table 5-30 Total reliability for personalization (PER) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.601	.621	3

Table 5-31 Items-to-total reliability for personalization (PER) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Constant fast-paced intense action	6.81	4.76	.227	.075	.783
2. Can adjust pace	6.35	4.23	.465	.416	.421
3. Can adjust difficulty level	6.39	3.97	.589	.448	.249

Internal Consistency for Avatar Portrayal (AVP) Component

Table 5-32 shows avatar portrayal (AVP) component with a total Cronbach's alpha (α) = .72 indicating a good level of reliability. Although Table 5-33 shows six items had a *Corrected Item-Total Correlation* lower than .3 its corresponding value in the *Cronbach's Alpha if Item Deleted* column indicate that deleting items 6, 7, 11 and 12 would decrease the total reliability to below the total Cronbach's alpha (α) = .72. On the other hand, deleting item 1 and 2 would increase the total reliability but deleting them would have a negative effect on the content coverage. Seven other items i.e. 3, 4, 5, 8, 9, 10, 13 and 14 have *Corrected Item-Total Correlation* more than .3 thus reflect that these items correlate well with the component total score. Further inspection shows that if these items were deleted the total Cronbach's alpha (α) will be decreased.

Table 5-32 Total reliability for avatar/character portrayal (AVP) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.722	.784	14

Table 5-33 Items-to-total reliability for avatar/character portrayal (AVP) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Can choose avatar's gender	15.50	28.4	.247	.674	.727
2. Can design own avatar	16.69	30.2	.097	.978	.755
3. Female avatar is hyper-sexualized	17.38	23.7	.677	.870	.650
4. Male avatar is hyper-sexualized	17.75	26.2	.625	.989	.667
5. Male avatar in protagonist roles	17.00	27.7	.404	.923	.698
6. Male avatar shown as physically aggressive, violent & likely use a weapon	17.13	27.8	.292	.774	.720
7. Name	18.75	32.3	.210	.994	.719
8. Body type	19.13	31.0	.413	.996	.706
9. Facial features	18.94	30.5	.484	.999	.701
10. Skin	18.88	31.4	.339	.999	.711
11. Clothing	18.94	31.9	.243	.955	.717
12. Wearable items	19.06	31.7	.267	.979	.715
13. Personality	19.13	31.0	.413	.982	.706
14. Roles	19.25	29.9	.708	.970	.690

Internal Consistency for Sound/Music (SM) Component

Table 5-34 shows the reliability result of sound/music (SM) component with a total Cronbach's alpha (α) = .65 indicating a good level of reliability. In Table 5-35 item 1 has a *Corrected Item-Total Correlation* lower than .3 and its corresponding value in the *Cronbach's Alpha if Item Deleted* column indicates that deleting it would substantially increase the total reliability to Cronbach's alpha (α) = .92. Items 2 and 3 have *Corrected Item-Total Correlation* values more than .3 thus reflecting that these items correlate well with the component total score. Further inspection shows that if these items are deleted the total alpha will be decreased significantly lower than Cronbach's alpha (α) = .65.

Table 5-34 Total reliability for sound/music (SM) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.650	.671	3

Table 5-35 Items-to-total reliability for sound/music (SM) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Can easily choose a variety of music	7.86	2.76	.185	.035	.923
2. Can easily turn on/off music	6.07	1.99	.633	.735	.306
3. Can easily adjust volume	6.07	2.067	.653	.736	.296

Internal Consistency for Storyline (STOR) Component

Results in Table 5-36 show the storyline (STOR) component with a total Cronbach's alpha (α) = .83 indicating a good level of reliability. Table 5-37 shows all five items have a *Corrected Item-Total Correlation* more than .3 thus reflecting all items had a good correlation to the total reliability. On further analysis each item *Cronbach's Alpha if Item Deleted* value indicate that deleting any of the items would any substantially increase the total reliability.

Table 5-36 Total reliability for Storyline (STOR) component

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.831	.828	5

Table 5-37 Items-to-total reliability for Storyline (STOR) component

Items	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
1. Storyline has meaning	11.32	16.69	.613	.660	.801
2. Storyline develops as game progresses	11.10	15.55	.692	.684	.778
3. Interested because characters similar to oneself	12.06	17.99	.523	.422	.825
4. Interested because characters are interesting	11.39	18.04	.500	.377	.831
5. Interested because characters develop with game	11.42	14.51	.824	.692	.736

Overall internal consistency reliability

Table 5-38 shows the Cronbach's alpha (α) values for the internal consistency of the 12 components of GIRS. Cronbach's alpha (α) varied between the lowest .036 for the collaboration (COLL) component to the highest 0.85 for non-violent action (NVA) component. The high Cronbach's alpha (α) values imply that they are internally consistent and each component is measuring the same content i.e. gender inclusivity in games. Although reduction of components and items may threaten both validity and reliability of the scale, an initial run of the reliability analysis identified 2 components with Cronbach's alpha (α) values of less than .3 i.e. collaboration (COLL) component with Cronbach's alpha (α)= .03 and gameworld graphics (GW) component with Cronbach's alpha (α) = .25. Since these two components' Cronbach's alpha (α) are < .3, deleting them would not have a significant negative effect on Cronbach's alpha (α) and should not affect the content validity of the scale as a whole. All ten components have good reliability, with Cronbach's alphas (α) of more than .3. The revised GIRS as a whole has good internal consistency reliability with Cronbach's alpha (α) =.67 (see Table 5-39).

Table 5-38 Summary of reliability measurements for GIRS

Dimension	Components	Number of Items	Cronbach's Alpha α
Gameplay	Nonviolent Action (NVA)	6	.852
	Game Support (GS)	3	.326
	Forgiving Gameplay (FG)	4	.372
	Nonviolent Challenge (NVC)	4	.464
	Variety Of Activities (ACT)	3	.590
	Feedback System (FEED)	5	.473
	Personalization (PER)	3	.601
	Collaboration (COLL)	6	.036 [a]
Content	Avatar/Character Portrayal (AVP)	20	.722
	Gameworld Graphics (GW)	2	.248 [a]
	Sound/Music (SM)	3	.650
	Storyline (STOR)	5	.831
	12 components	**64 items**	

Note. a Cronbach's alpha (α) value less than .3

Table 5-39 Total reliability for GIRS

Cronbach's Alpha	*Cronbach's Alpha Based on Standardized Items*	*N of Items*
.672	.707	10

Table 5-40 shows forgiving gameplay (FG), non-violent challenges (NVC), variety of activities (ACT) and sound/music (SM) as four components with corrected item-to-total correlation below .3. Although these components are identified as potential problems but the values in column *Cronbach's Alpha if Item Deleted* for these components are above 0.6 and none of the items here would increase the total reliability substantially if they were deleted because all alphas (α) are less than the overall reliability Cronbach's alpha (α) = .67. Subsequently, the refined GIRS consists of ten components with 50 items. The refined GIRS with its list of dimensions, components and items is summarised in Table 5-41and a sample of the GIRS can be referred in Appendix I.

Table 5-40 Items-to-total reliability for GIRS

Components	*Scale Mean if Item Deleted*	*Scale Variance if Item Deleted*	*Corrected Item-Total Correlation*	*Squared Multiple Correlation*	*Cronbach's Alpha if Item Deleted*
NVA	109.6	275.1	.361	.479	.652
GS	114.4	330.6	.509	.496	.632
FG	113.5	339.9	.278	.339	.658
NVC	113.5	340.2	.245	.573	.663
ACT	114.2	356.4	.218	.327	.666
FEED	110.8	330.3	.421	.523	.639
PER	115.3	321.0	.503	.578	.626
AVP	109.4	275.8	.322	.336	.668
SM	115.2	355.9	.250	.281	.663
STOR	110.6	270.8	.508	.608	.605

Table 5-41 Refined components and items for the GIRS with their respective Cronbach's alphas (α)

Dimension	Components	Number of Items	Cronbach's α
Gameplay	Nonviolent Action (NVA)	6	.852
	Game Support (GS)	3	.326
	Forgiving Gameplay (FG)	4	.372
	Nonviolent Challenge (NVC)	4	.464
	Variety Of Activities (ACT)	3	.590
	Feedback System (FEED)	5	.473
	Personalization (PER)	3	.601
Content	Avatar/Character Portrayal (AVP)	14	.722
	Sound/Music (SM)	3	.650
	Storyline (STOR)	5	.831
	10 components	**50 items**	

5.4 Chapter Summary

This chapter followed the development and validation of a novel measuring instrument called the Gender Inclusivity Rating Scale (GIRS). The aim of the instrument is to measure the level of gender inclusivity in games. The rating scale was developed through the application of the dimensions and components from the Gender Inclusivity Framework (GIF) (see Chapter 3). Based on the GIF, three dimensions with 12 components were selected and 80 items were generated for further consideration. Next, a pilot study was conducted with five experts to refine the instrument after which only 65 items remained in the revised instrument. Following the pilot study, a game experiment was conducted with a sample of 31 gamers using the revised GIRS to evaluate a number of popular mainstream games on various consoles.

Data analysis was conducted using correlation analysis to examine the relationship between each item in a component and the relationship between the components and the scale as a whole. Results suggest that the GIRS has statistically significant correlations between its items and components and towards the scale as a whole. Reliability analysis showed that GIRS has good internal consistency reliability. The refined GIRS consists of three dimensions and ten components with 50 items. These results suggest that GIRS has the required level of reliability and may be used in a research scenario. Information gathered using the GIRS can be useful and insightful to inform the design of a more gender inclusive game.

Next, Chapter 6 will demonstrate a study to investigate the relationship between a player's gender role orientation scores and their gender inclusivity in games scores. This study makes use of the validated GIRS in a research scenario.

6 Investigating Gender Role Orientation and Gender Inclusivity in Games

In the previous chapter, an application of the GIF was demonstrated through the development of a measuring instrument called Gender Inclusivity Rating Scale (GIRS) which can be used to measure the level of gender inclusivity in games. A validation study was conducted on the GIRS instrument and results showed that GIRS has statistically significant correlations between its items, components and towards the scale as whole with good internal consistency reliability.

Chapter 6 presents a study to investigate the relationship between a gamer's gender role orientation and their gender inclusivity in games scores. The main objective is to find out whether there are any differences in gender inclusivity in games components' scores between a gamer's gender role orientation categories. Section 6.2 outlines how to measure gender role orientation and Section 6.3 outlines how to measure gender inclusivity in games. Next, Section 6.4 outlines the experiment methods and Section 6.5 describes the data analysis and results. Finally, Section 6.6 summarises the chapter.

6.1 Introduction

The research question this study attempt to answer is:

Are there any differences in gender inclusivity in game components' scores between gender role orientations of gamers?

The purpose of this study is to investigate whether there are any significant differences in gender inclusivity in game scores between a gamer's femininity and masculinity scales. In particular, whether:

i. there are any interaction effects between gamers' femininity and masculinity scale on the gender inclusivity in game component scores?
ii. gamers' gender inclusivity in game component scores will be different if they scored high on the femininity and masculinity scale?
iii. gamers' gender inclusivity in game component scores will be different if they scored low on the femininity and masculinity scale?

6.2 Measuring Gender Role Orientation

A player's gender role orientation scores were measured using the Bem Sex Role Inventory (BSRI) instrument (Bem, 1974). It has a total of 60 items consisting of 20 items associated with the femininity dimension, 20 items associated with masculinity dimension while another 20 items categorized as neutral items. Some items associated with the feminine dimension include 'affectionate', 'cheerful', 'childlike', 'loves children' and 'yielding' while some items associated with the masculine dimension are 'aggressive', 'assertive', 'athletic', 'forceful' and 'willing to take risks'. A player was asked to rate how well each items describes him/her using a seven-point Likert style format ranging from '*1=Never or almost never true','2=Usually not true', '3=Sometimes but infrequently true', '4=Occasionally', '5=Often true'. '6=Usually true'* and *'7=Always or almost always true'* to calculate the femininity and masculinity scores, see Table 6-1.

Table 6-1 Lists the items used to calculate the femininity and masculinity score for Bem Sex Role Inventory (BSRI).

Femininity Score	**Masculinity Score**
2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44, 47, 50, 53, 56, and 59	1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 55, and 58,
Add all 20 feminine items and divide by 20	Add all 20 masculine items and divide by 20

To calculate the femininity score, all 20 items associated with the feminine dimension are added together and divided the total by 20. Similarly, the masculinity score is calculated by adding all 20 items associated with the masculine dimension and dividing by 20. The scores are interpreted as follows:

- Male sex-typed has a masculine score greater than 4.9 and femininity score less than 4.9.
- Female sex-typed has a masculine score less than 4.9 and a femininity score greater than 4.9.
- Androgynous type has both masculine and femininity scores greater than 4.9.
- Undifferentiated type has both masculine and femininity scores less than 4.0.

Bem (1974) reported high internal consistency and test-retest reliability for the BSRI. Internal consistency scores range from good .75 to extremely high .94 with coefficient alpha (α) scores for the masculinity scale α = .86, femininity scale between α = .80 to α = .82 and finally the social desirability scale between α = .70 to α = .75. The test-retest reliability showed correlations scores for both masculinity and femininity scales as r = .90 and social desirability r = .89. In addition BSRI has been cited 3950[1] times in studies relating to gender role orientations.

6.3 Measuring Gender Inclusivity in Games

A player's gender inclusivity in games scores was measured using the Gender Inclusivity Rating Scale (GIRS). It consists of 52 items with 28 items measuring gameplay dimension, 22 items measuring content dimension and two items measuring demography (see Table 6-2). Gamers were asked to rate the extent an item represents gender inclusive gameplay or content in a game by choosing how much they agree or disagree with the item. Response items were presented in a five-point Likert style format ranging from *'1=Strongly Disagree', '2=Disagree', '3=Neutral', '4=Agree' and '5=Strongly Agree'*. A *'1= Strongly Disagree'* denotes the lowest possible scoring of an almost non-existent representation of gender inclusivity in games. On the other end of the scaling, a *'5=Strongly Agree'* denotes the highest possible score and shows an item representing gender inclusivity in games. A rating of *'2=Disagree', '3=Neutral'* and *'4=Agree'* represent varying degrees of gender inclusive gameplay and content in a game.

The overall Cronbach's alpha (α) coefficient for GIRS was .67 and the Cronbach's alpha (α) for each of the components are shown in Table 6-2. The Cronbach's alpha (α) reliability coefficients showed that the GIRS instrument was satisfactorily reliable. A sample of the GIRS measuring instrument can be found in Appendix I.

Table 6-2 Summarizes the dimensions, components, Cronbach's alpha (α) reliability coefficients and number of items for the GIRS measuring instrument

Dimension	Components	Cronbach's α	Number of Items
Gameplay	Non-violent Action (NVA)	.852	6
	Game Support (GS)	.326	3
	Forgiving Gameplay (FG)	.372	4
	Non-violent Challenge (NVC)	.464	4
	Variety Of Activities (ACT)	.590	3
	Feedback System (FEED)	.473	5
	Personalization (PER)	.601	3
Content	Avatar/Character Portrayal (AVP)	.722	14
	Sound/Music (SM)	.650	3
	Storyline (STOR)	.831	5
Demography	Gender	-	1
	Age	-	1
			52 items

6.4 Methods

The objective of this chapter is to demonstrate the use of GIRS in a research scenario. The following sections describe how the study was conducted.

6.4.1 Participants

A sample of 24 participants was recruited through the Electronics and Computer Science School and Computer Games Society mailing lists which include

undergraduates, postgraduates and researchers groups. In addition to the mailing lists, posters about the experiment were posted in the public area of the university including the university library and bus stop's noticeboards. There were eight females and 16 males ranging from 20 to 45 years of age. They were recruited based on their interest in gaming with no restrictions on whether they were a novice, casual or hardcore gamer. If a potential participant was neither willing nor able to provide informed consent and had never played any games nor have any interest in games, they are excluded from the study.

6.4.2 Apparatus and materials

This section outlines the apparatus and materials used in the study. Table 6-3 list the consoles used in the experiment with a description of their specifications.

Table 6-3 List of apparatus used in the experiment

Game Consoles	Specification
Dell Optiplex Desktop 	• *Chipset: Intel® Q45 Express Chipset w/ICH10DO* • Connectivity: MT/DT/SFF- Integrated Intel® 82567LM Ethernet LAN 10/100/1000; optional Broadcom® NetXtreme® 10/100/1000 PCIe card; optional Broadcom® 1505 PCIe WLAN card (802.11 Draft-N) USFF- Integrated Intel® 82567LM Ethernet LAN 10/100/1000; optional Broadcom® 1510 mini PCIe WLAN card (802.11 Draft-N) • Ports: 8 External USB 2.0 ports and 1 Internal USB 2.0, 1 Parallel, 1 Serial, 1 RJ-45, 1 VGA, 1 Display Port, 1 eSATA, 2 Line-in (stereo/microphone), 2 Line-out (headphone/speaker) • Dimensions(H x W x D) Inches/(cm): 15.7 x 4.5 x 13.9 / (39.9 x 11.4 x 35.3)
Accessories	
Headphones 	• 4 X Advent HSNC200 • With Volume Control • Cable Length: 6.56 ft.

Game:

The game chosen for this study is *Sid Meier's Civilization 4: Colonization*. It is a turn-based strategy game set during the 15th to 18th centuries. The goal of the game is to successfully set up a colony, develop it into a thriving city through good resource management and trade with other colonies and the native tribes, build an army and declare independence from parent country. There are four European nations to choose from i.e. Spain, England, France and the Netherlands and a player can choose an avatar from one of the notable figures such as the New England settlers John Adams or George Washington with New France settlers Samuel de Champlain and Louis de Buade

de Frontenac as a governor. Each governor has their own advantages and shortcomings. Economics and trade with Europe or the natives will generate income which in turn allows a colony to expand. In order to produce finished goods for trade such as *Cigars*, a colony needs to plant *Tobacco* (a resource type) on *Grassland* (a terrain type), harvest *Tobacco* using a *Tobacco Planter* (a worker) and process them in a *Tobacco Shop* (a building type).

The game was chosen for its popularity, extensive gameplay and rich content. The game provides access to in-game help, tutorial, pop-ups dialogues and detailed information for a particular object or character by clicking on it. The game setting is based on a historical period which is reflected in the game world graphics, objects and characters.

Materials

A set of participant materials containing four types of documents was placed next to the game console prior to the experiment.

i. Consent form which the participant must fill-in and return to the researcher before starting the experiment (see Appendix E).
ii. Participant information sheet which explains the purpose of the experiment, procedure, benefit and risk of the experiment and contact details (see Appendix F).
iii. BSRI questionnaire contains a set of items that a participant responds before the experiment (see Appendix H).
iv. GIRS questionnaire contains a set of items that a participant needs to answer after the experiment (see Appendix I).

6.4.3 Procedure

Two weeks before the experiment an email soliciting participants was sent and posters were posted. Both email and posters contain the purpose of the study and how the participant could contribute to the study. If a participant agreed to join the study, they could reserve a slot through an online scheduling system i.e. *Doodle.com*. All experiment sessions were conducted in the Room 3049 of Building 32. The experiment was divided into three sessions and the procedure for the experiment can be seen as follows:

Briefing session (2 minutes):

At the start of each experiment the participants were given instructions about the general nature of the experiment and were asked to fill out a written consent form. Participants were assured that their involvement was by informed consent, anonymous and would be treated with respect, consideration and concern. They were also provided with sufficient detail about the research stressing the objectives of the experiment,

procedure involved, potential risks and benefits. The consent form stressed these issues:

i. that their participation is voluntary;
ii. that they can quit or stop the experiment at any time; and
iii. that their responses will be confidential.

After completing and returning the consent form, participants can start playing the game they were assigned.

Experiment session (15 – 45 minutes):

Each play session ranged from 15 minutes to 45 minutes in length and the procedure was:

1. Participants filled in the BSRI questionnaire and returned it.
2. Participants played the game for 15 to 30 minutes.
3. After they finished playing, participants answered the GIRS which took about 10 minutes to complete.
4. Participants returned the GIRS instrument.

Debriefing session (3 minutes):

At the end of each experiment session, participants were debriefed to ensure ethical practice had been adhered to and during that session they were:

i. given a summary of the experiment describing the research question, procedure used and why the research is important;
ii. provided with an opportunity to ask any questions they may have; and
iii. thanked for their participation.

6.5 Analysis and Results

This study sought to investigate any significant differences in gender inclusivity in game scores between a gamer's femininity and masculinity scales. Participants were asked to rate their gender role orientation using BSRI and gender inclusivity in games using GIRS. A two-way multivariate analysis of variance (MANOVA) was chosen to explore the interaction effects between BSRI and GIRS scores.

6.5.1 Power analysis

A priori analysis of power calculation performed on G*Power using Cohen 1992) large effect size (*d)* = .8 and α = .05 indicated a sample size of 15 would be required to reach the power (*1 – ß*) = .80. Given the sample size of 24 for this study, a post-hoc power analysis indicated that the actual power achieved was (*1 – ß*) = .96.

6.5.2 Setting up the model

The study had an independent two-way (2 x 2) design. The independent variables were femininity and masculinity scales, with two levels each (high or low).

The femininity scale represents a gamer's feminine gender role orientation and can be categorized into high femininity or low femininity. Similarly, a gamer's masculinity scale represents a gamer's masculine gender role orientation and can be categorized as either high masculinity or low masculinity. Since each independent variable has two levels, the total combinations produced four combinations that can be applied to the responses (2 IVs x 2 levels = 4 combinations). Each combination is called a *gender role orientation combination (GROC)* in the model. The primary dependent variables were the gender inclusivity in game component scores with a total of 10 dependent variables. Table 6-4 shows the independent and dependent variables in this study while Table 6-5 summarizes the study design. The potential main effects and interactions for FEM and MASC are as follows:

1. Are there any interaction effects of FEM and MASC on gender inclusivity in game component scores?
2. Are there any main effects of FEM scores on gender inclusivity in game component scores?
3. Are there any main effects of MASC scores on gender inclusivity in game component scores?

Table 6-4 Summarizes the variables used in the MANOVA analysis

Instrument	Variable Name	Variable Code	Type
BSRI	Femininity scale	FEM	Independent variable
	Masculinity scale	MASC	Independent variable
GIRS	Non-violent Action	SS_NVA	Dependent variable
	Game Support	SS_GS	Dependent variable
	Forgiving Gameplay	SS_FG	Dependent variable
	Non-violent Challenges	SS_NVC	Dependent variable
	Types of Activities	SS_ACT	Dependent variable
	Feedback System	SS_FEED	Dependent variable
	Personalization	SS_PER	Dependent variable
	Avatar Portrayal	SS_AVP	Dependent variable
	Sound/Music	SS_SM	Dependent variable
	Storyline	SS_STOR	Dependent variable

Table 6-5 Study design with 2 independent variables with 2 levels each (2 x 2 design)

	IV: Masculinity Scale (MASC)	
IV: Femininity Scale (FEM)	**Level 1: MHI**	**Level 2: MLO**
Level 1: FHI	GROC 1	GROC 2
Level 2: FLO	GROC 3	GROC 4

Note.
FHI : High on the femininity scale
FLO : Low on the femininity scale
MHI : High on the masculinity scale
MLO : Low on the masculinity scale
GROC : Gender role orientation combination

6.5.3 Data screening

The data was screened for reverse coding, missing data and new variables. Eleven items were reverse coded and any missing data found was coded as 999. Ten

new variables were created for the standardized values of each gender inclusivity in games components as they have different number of items. Standardized values were created by adding all the items scores in a component and dividing the total with the number of items in that particular component.

6.5.4 Initial analysis

MANOVA approach assumes that the variance matrices across cells are the same. Levene's test of equality was used to test data for homogeneity of variance in each sample data and was found to be statistically non-significant in nine dependent variables. The variables are as follows:

- Non-violent action (NVA), $F(3,20)= .21$, $p = .90$;
- Game support (GS), $F(3,20) = .86$, $p=.48$;
- Forgiving gameplay (FG), $F(3,20) = .14$, $p = .94$;
- Non-violent challenges (NVC), $F(3, 20) = .56$, $p = .65$;
- Feedback system (FEED), $F(3,20) = 1.88$, $p = .17$;
- Personalization (PER), $F(3,20) = 1.37$, $p = .28$;
- Avatar Portrayal (AVP), $F(3,20) = .16$, $p = .96$;
- Sound/Music (SM), $F(3,20) = .98$, $p = .42$;
- Storyline (STOR), $F(3,20) = .15$, $p = .93$.

This indicates that these nine dependent variables have roughly equal variances and the assumption of homogeneity of variances has been met. However, the variable variety of activities (ACT) was found to be statistically significant, $F(3, 20) = 4.34$, $p = .02$ and in this case it has violated the homogeneity of variances assumption.

6.5.5 Main MANOVA analysis

Data analysis was conducted using a two-way multivariate analysis of variance (MANOVA). Results showed that there was no statistically significant interaction effect of femininity and masculinity scales (FEM*MASC) on the gender inclusivity in games component scores, Wilk's lambda, $\Lambda = .36$, $F(10, 11) = 1.93$, $p = .15$. Since the interaction effect of femininity and masculinity scale (FEM*MASC) is not statistically significant on gender inclusivity in game components, further analysis was done on the main effects of femininity scale (FEM) and masculinity scale (MASC) individually. The main effect of femininity scale (FEM) is not statistically significant on the gender inclusivity in game components, Wilk's lambda, $\Lambda = .44$, $F(10, 11) = 1.42$, $p = .29$. A similar result was found for the masculinity scale (MASC), where MASC has no statistically significant effect on gender inclusivity in games components, Wilk's lambda, $\Lambda = .33$, $F(10, 11) = 2.28$, $p = .10$. Further analysis of individual components in FEM and MASC scales is not necessary because their main effects are statistically non-significant. A summary of the multivariate tests using Wilk's lambda (Λ) can be seen in Table 6-6.

Table 6-6 Wilk's lambda (Λ) statistic test for FEM, MASC and FEM*MASC on gender inclusivity in games components

Effect	Value	F	df1	df2	Sig.
FEM*MASC	.36	1.93	10	11	.15
FEM	.44	1.42	10	11	.29
MASC	.33	2.28	10	11	.10

6.6 Chapter Summary

This chapter followed the development and validation of a novel instrument, the Gender Inclusivity Rating Scale (GIRS) aimed to measure the level of gender inclusivity in games. The rating scale was developed through the application of the dimensions and components from the Gender Inclusivity Framework (GIF) (see Chapter 3) and was validated in two steps: (a) a pilot study, and (b) a validation study (see Chapter 5).

A study was designed to demonstrate the GIRS in a research scenario with the objective to investigate whether there are differences in gender inclusivity in games component scores between a gamer's femininity and masculinity scale. A sample of 24 players with various level of gaming experience was recruited to take part in this study. Two instruments were used: (1) Bem Sex Role Inventory (BSRI) and (2) Gender Inclusivity Rating Scale (GIRS) to collect a player's gender role orientation scores, i.e. femininity and masculinity scales scores and gender inclusivity in game component scores respectively.

An independent two-way MANOVA analysis was conducted, and results reported statistically non-significant interaction effects of femininity and masculinity scales (FEM*MASC) on gender inclusivity in game component scores. Further analysis on the main effects of femininity scale (FEM) and the main effects of masculinity (MASC) scale on gender inclusivity in games components were found to be not statistically significant. These results suggest that there may be other factors influencing a gamer's gender inclusivity in games scores.

Next, Chapter 7 will discuss the findings of this research based on the four main research questions outlined in Chapter 1 Section 1.2.

7 Discussion

This research investigated the issue of how to support gender inclusivity in games by examining relevant existing games and gender research; synthesising these findings into its constituents, i.e. themes and components; and then using these components to construct a conceptual framework, *Gender Inclusivity Framework (GIF).* In addition to understanding the components and defining gender inclusivity in games, emphasis was placed on how to measure the level of gender inclusivity in games. A measuring instrument was developed, validated and used in a study to investigate the relationship between a player's gender sex role orientation and their gender inclusivity in games scores. This research aims to answer four main questions:

RQ1. What are the dimensions and components of gender inclusivity in games?
RQ2. How can gender inclusivity in games be defined?
RQ3. How can gender inclusivity in games be measured?
RQ4. Are there differences in gender inclusivity in games components' scores between gender role orientations of gamers?

This chapter summarises and discusses the findings of this research, offers practical suggestions for applying gender inclusivity in games and makes recommendations for potential directions related to gender inclusivity in games.

RQ 1: What are the dimensions and components of gender inclusivity in games?

The purpose of this research question was to identify the constituents of gender inclusivity in games and is supported by the literature analysis in Chapter 2 and framework construction in Chapter 3. Results identified: (1) dimensions; (2) components; and (3) relationship between dimensions and components. Data was collected from theories and practices in games and gender research then later synthesised into themes and components in two unique lists with a total of eight themes and 32 components. Further analyses using a set of criteria consolidated these lists into three dimensions and 12 components.

The *Gender Inclusivity Framework (GIF)* therefore consists of a number of complex interrelated dimensions, components and relationships between them informed by games and gender theories and practices. The framework can be used to describe gender inclusivity in games in three main dimensions with 12 components:

i. *Gameplay dimension,* which describes the game behaviour and how a player experiences or plays a game. This dimension constitutes of eight components as follows: non-violent action (NVA), game support (GS), forgiving gameplay (FG), non-violent challenges (NVC), personalisation (PER), variety of activities (ACT), feedback system (FEED) and collaboration (COLL);

ii. *Content dimension,* which describes the aesthetics elements of a game and how a gamer *sees* the game. This dimension consists of four components as follows: avatar portrayal (AVP), game world graphics (GW), sound/music (SM) and storyline (STOR);

iii. *Genre dimension,* which identifies the types of games into 12 broad genres i.e. action, simulation, educational, children, strategy, racing, role-playing game (RPG), adventure, shooting, sports, classic/board and puzzles/quizzes.

Each dimension in the framework is divided into components, which represent the individual variables that can be modified or manipulated in a design or future studies. Components are the lowest level in this framework and are presented for each of the dimensions within the framework. The components are viewed in this framework as manipulatable variables that categorise that dimension and for which empirical evaluations can be performed. The relationships provide a way of building connections between the components, and applying these relationships can create more meaningful analysis. The relationship can support researchers and designers in better understanding the game characteristics under study. Consequently, the GIF is an integrative structure in which the concept of gender inclusivity in games can be understood, supported by its dimensions, components and relationships that connect them together.

RQ 2: How can gender inclusivity in games be defined?

Following the framework development, the next objective is to provide the description for the dimensions and components of the GIF, as can be seen in Chapter 3 Section 3.2. Results provided the explanation of how a gender inclusive dimension and component in the framework would look. Data was collected from theories and practices in games and gender research then analysed for its relevance to gender inclusivity in games.

The GIF provided a description that explains what each dimension and components means and how it can be operationalised in relation to gender inclusivity in games. With a structure and description, design decisions can easily be made during design and therefore be expected to produce more accurate depictions of gender-inclusive components in games. In addition, through the operationalisation of the dimensions and components, results from research can be situated within context for interpretation and help plan for further studies. Future research should investigate the GIF as an accepted reference point and guideline by the research and design communities.

So far, the GIF framework represents one way of looking at gender inclusivity in games. The use of a framework such as the GIF allows for conceptualisation and evaluation of gender inclusivity in games based on established theories and practices.

Examples of the dimension and component operationalisation are shown in the following chapters and studies (see also Figure 3-3, which illustrates the directions taken following the framework development).

- Chapter 4: during the expert evaluation study through the construction of an instrument to measure experts' agreement about the components of gender inclusivity in games.
- Chapter 5: during the development and validation of a novel instrument to measure the level of gender inclusivity in games.

RQ 3: How can gender inclusivity in games be measured?

The objective of this investigation was to develop and validate new measurement instruments for the components of gender inclusivity in games. The instruments measured gender inclusivity in games in two aspects:

(1) Through an expert evaluation study (see Chapter 4); and

(2) Through current games evaluation study by gamers (see Chapter 5).

Measuring gender inclusivity in games through an expert evaluation study

The study was designed to investigate patterns of agreement among a panel of experts about the components of gender inclusivity in games. Five experts were recruited based on their experience and publications in the game industry and academia. The experts were asked to rate how important each item is for gender inclusive gameplay and content. Results from one-way ANOVA suggest that there is a statistical significance between the experts' agreement about the components of gender inclusivity in games and revealed two distinct clusters of experts' agreement towards the components of gender inclusivity in games. Further analysis using principal component analysis revealed the two clusters of agreement pattern between the experts.

- Cluster 1: Experts 1, Expert 4 and Expert 5
- Cluster 2: Expert 2 and Expert 3

There are several possible explanations for these results. It seems possible that these clusterings are due to each expert's gender. Expert 4 and Expert 5 are both females while Expert 1, Expert 2 and Expert 3 are males. Although Expert 1 is within the same cluster as Expert 4 and Expert 5, he has a negative relationship with Expert 4 and is positioned in the same matrix as cluster 2. This rather contradictory result may be due to Expert 1's age, which made the expert more receptive to the components of gender inclusivity in games. Another possible explanation for this pattern is that Expert 4 and Expert 5 are both game designers from the game industry, while Expert 1, Expert 2 and Expert 3 are game designers from academia.

These results corroborate the findings from (Bryce & Rutter, 2002; Carrie Heeter, Egidio, Mishra, Winn, & Caywood, 2009), which showed that a game designer's gender and age do have an effect on gaming and game design. In this case, although the experts are not producing game designs per se, the description in the expert evaluation instrument are detailed enough to show how gender inclusive gameplay and content might look in a game.

Measuring gender inclusivity through evaluating current games by gamers

The purpose of this study was to demonstrate an application of the GIF through the development and validation of a measuring instrument for 12 gender inclusivity in games. Results of this study identified: (1) content domain through literature analysis; (2) the validity between the items, components and the scale as a whole; and (3) the reliability between the items, components and the scale a whole. Data was collected from a sample of 31 gamers recruited and randomly assigned to play 10 games of various genres on different consoles using the *Gender inclusivity Rating Scale (GIRS)* (Appendix D).

The domain of the content was identified through established theories in games and gender. Through this approach, the GIF structure at some level was validated by the games and gender theories used as the dimensions, components and the relationships that connect them together. The relationship that connects these games and gender theories was constructed through analysis and synthesisation of related literature. The approach of developing and validating the instrument follows widely accepted methodologies for instrument development (Czaja & Blair, 2005; Dwivedi et al., 2006; Fink, 1995; Litwin, 1995; Vaus, 2002).

Based on the results of the correlational analysis using the Pearson product-moment coefficient (r) showed that eight components have good inter-correlations with each other. Further analysis revealed that seven components have good inter-correlations between items while the remaining five components have minor inter-correlations between items. These results imply that the components provide an overall measure of gender inclusivity in games.

Finally, the reliability analysis was conducted to examine the instrument's internal consistency using Cronbach's alpha (α) and results revealed that GIRS has an overall reliability of Cronbach's Alpha (α) of .67 as a whole and ten of the GIRS components have varying degrees of reliability ranging from the highest Cronbach's Alpha (α) of .85 and the lowest Cronbach's Alpha (α) of .33. This suggests that the measures demonstrate an appropriate level of internal consistency (Straub et al., 2004; Vaus, 2002).

These findings mutually confirm the strength of the new measurement instrument. Further research will shed more light on the possible general applications

of these findings. The results represent a promising step toward the establishment of improved measures for gender inclusivity in game components.

RQ 4: Are there any differences in gender inclusivity in game component scores between gender role orientations of gamers?

This study demonstrated the use of the GIRS in a research scenario (see Chapter 6) following the GIRS instrument validation in Chapter 5. The study sets out to examine the relationship between gamers' gender role orientation scores and their gender inclusivity in games scores. Specifically, the study was designed to explore whether there are any differences in gender inclusivity component scores based on a gamer's gender role orientations.

Data was collected using two measuring instruments: (1) Bem Sex Role Inventory (BSRI) was used to measure gender role orientation (Appendix H); and (2) Gender Inclusivity Rating Scale (GIRS) was used to measure gender inclusivity in games (Appendix I). A total of 24 gamers with varying degrees of interests were recruited as participants. An independent two-way MANOVA was conducted on the data with a 2X2 design. Contrary to expectations, however, the results did not detect evidence for a statistically significant difference of interaction effects for femininity and masculinity scale (FEM*MASC) on the gender inclusivity components' score. Further analyses on the main effects of femininity scale (FEM) and masculinity scale (MASC) showed that there were no statistically significant effects on gender inclusivity in games component scores.

This study has been unable to demonstrate that there are differences in gender inclusivity in game components between different femininity and masculinity categories. The reason for this is not clear, but this finding, while preliminary, suggests that neither gamers' femininity nor masculinity orientations, separately or in combination have an effect on gender inclusivity in games. So whether a gamer is categorised as high or low on their femininity and masculinity scale, it does not have an effect on their gender inclusivity scores. Further work should attempt to replicate the current findings with more game titles in the same genre.

7.2 Implications

This section outlines the implications that can be considered based on the findings of this research in gender inclusivity in games.

7.2.1 For the field of gender inclusivity in games

While this research grew out of the need to understand the issues of gender in games, the results of this research present a structured perspective through which gender inclusivity in games can be understood. The GIF provides one shared

framework with a set of dimensions, components and relationships which can be used to facilitate operationalisation of gender inclusivity in game variables for studies. The study has shown that a structure like the GIF can be used to demonstrate a certain level of generalisation where individual components of the framework can be selected and combined for use depending on the objective of the study under consideration. In addition the validated instrument can be used to investigate the level of gender inclusivity in games.

The field of gender inclusivity in games could be improved by highlighting how the framework was developed based on sound theoretical and practical foundations. In terms of understanding gender inclusivity in games, it seems a good opportunity for a more gender inclusive game design by demonstrating what gender inclusive gameplay and content are.

7.2.2 For game researchers

This research has shown that the GIF can be useful as a shared framework in which game researchers can conceptualise their research. The results demonstrate a number of ways in which the GIF can be customised and operationalised to study gender inclusivity in games. Another implication of this is the possibility for research findings to be interpreted for positioning individual components of gender inclusivity in games into context. This in turn is expected to assist in identifying research gaps and guiding further research in the area of gender inclusivity in games.

In addition, a validated measuring instrument like the GIRS can be a useful analysis tool in evaluating current games. Results produced using GIRS can inform researchers about the desirable or undesirable features and content of a more gender inclusive game. In the long run, findings from these studies will add to the field of gender inclusivity in games theory.

7.2.3 For game designers

These results provide game designers with new ideas on how to integrate gender inclusivity into games. Game designers can use these findings to explore new audiences and combinations of designs through a combination of dimensions and components. The GIF allows game designers to think systematically about the various aspects of gender inclusivity that need to be supported in a game and thus help make informed decisions about gender inclusive designs in games.

This research also validated a measuring instrument, GIRS, which can be a useful tool during the conceptualisation and testing phases of a game development process. Using the GIRS in the early phases can help discover features that make a game successful or unsuccessful in the market. Information gathered by GIRS can help in conceptualising a more gender inclusive game early on, where changes can be made

more easily. This in turn will help avoid unnecessary wastage of resources such as funding, time and people, when compared to making changes in the later phases of development. During the beta testing phase, the GIRS can be used to see how well a game is received by a gamer. Feedback gathered from the GIRS can help inform designers' decisions on what features or content actually work which in turn improve the design of more gender inclusive games.

7.3 Limitations of the Study

This study sought to investigate ways to support gender inclusivity in games. One of the limitations is the number of games used in the study. The number of games was limited to ten. Although the games chosen consist of a variety of genres, the number of games in each genre was limited. Replicating the study with more games would enable a more informed view as to how generalisable these findings are.

Another limitation is the number of hardware resources available for the studies. There were only four consoles for each gameplay session, and hence only four participants could take part at any one time. Nevertheless, power analysis indicates that the study has the required power, and further studies would be beneficial to identify possible recommendations.

In the expert's evaluation study, a panel of experts was solicited to participate in the study. The number was limited to five experts, and might not be representative of the game designer's population. Nonetheless, all experts had the necessary research background and have had experience in designing games. Two of the experts are industry professionals with extensive game design experience and have produced successful game titles.

Finally, the study is limited in terms of comparisons due to the lack of similar previous frameworks in gender inclusivity in games. Therefore, it would be difficult to analyse the impact of different frameworks on the dimensions and components of gender inclusivity in games. More importantly, given the potential of a generic framework like the GIF, this study forms the groundwork for better understanding of gender inclusivity in games.

7.4 Chapter Summary

This chapter drew results and implications from both qualitative and quantitative research data. Although the present study is exploratory, the results have provided interesting insights into gender inclusivity in games and how it can be supported. This research sets out to find the answers to four main questions:

RQ1. What are the dimensions and components of gender inclusivity in games?
Results from this section identified the appropriate content domain, themes and components as the foundation for the Gender Inclusivity Framework (GIF) development. This is supported by the analysis and synthesised theoretical findings in Chapter 2 and the framework construction in Chapter 3.

RQ2. How can gender inclusivity in games be defined?
Results from this section extend the theoretical analysis from related literature in games and gender by providing a description of each of the dimensions and components in the GIF. This is supported by theoretical findings relevant to gender inclusivity in games in Chapter 2 and the GIF's detailed description in Chapter 3.

RQ3. How can gender inclusivity in games be measured?
Results from this section demonstrate how the GIF was applied to measure gender inclusivity in games. Two ways of measuring gender inclusivity in games were presented: (1) through an expert evaluation study (see Chapter 4); and (2) through current games evaluation study by gamers (see Chapter 5).

RQ4. Are there any differences in gender inclusivity in game component scores between gender role orientations of gamers?

The main objective of this section is to demonstrate the usage of the validated measuring instrument, Gender Inclusivity Rating Scale (GIRS) from Chapter 5, in a research scenario. Findings from this section are supported by the experiment protocol and analysis in Chapter 6.

Three implications are described in this chapter as follows:

- For the field of gender inclusivity in games, the GIF provides a shared framework, some level of generalisation and a validated instrument to measure gender inclusivity in games.
- For researchers, the GIF provides a common framework in which to conceptualise their research and gap identification in the field of gender inclusivity in games.
- For game designers, it assists in deconstructing the concept of gender inclusivity in games and helps in guiding the design of gender inclusivity in games.

8 Conclusion and Future Work

Gender inclusivity is still a new concept in the games industry and existing assumptions about games and gamers usually associate gaming and electronic gadgets with the male gender and as masculine activities. However, recent market studies have shown that women have a large share of the games and consumer electronics market (ESA, 2010; Mazel, 2011). Although market data showed there is a dramatic change in gamers demography, whereby female gamers represent 33% of the gamer's population and 40% are female gamers over the age of 18, large commercial and popular games are still designed and marketed for the male gamers as the main audience. A survey of games winning Game of the Year awards from AIAS within a 10-year period (from 2000 to 2011) showed that a majority of games that won the award were from action-thriller-shooting genres, i.e. *Diablo 2, Halo: Combat Evolved, Half-Life 2, God of War, Gears of War, Call of Duty 4: Modern Warfare* and *Mass Effect 2* and a similar trend can be seen in this year's BAFTA award winners, *Mass Effect 2* and *Call of Duty: Black Ops.*

While the girl games movement seems to present an answer to the male-focused games with the emergence of *pink* games such as *Barbie Fashion Designer, Wedding Dash* and *Disney Princess*, these games portrayed a stereotypical female sex role and their focus on female-pinkness has created a niche market which may have exclude gamers that do not identify with a particular sex role or simply dislike the colour pink. The implications from these situations highlight the need to consider gender nuances during games design; specifically, what female gamers really want from their games.

As discussed in Chapter 2, there is existing research on the game models, (Aarseth, 2007; Barwood & Falstein, 2006; Bjork et al., 2003; Consalvo & Dutton, 2006; Costikyan, 1994; Fullerton et al., 2004; Hunicke et al., 2001; Jarvinen, 2007; Konzack, 2002; Koster, 2005; Kreimeier, 2002; Rollings & Adams, 2003; Salen & Zimmerman, 2005) however, these game models rarely show how gender preferences can be accommodated during a game design process. On a similar note, there are relevant findings concerning gender in games (Bonanno & Kommers, 2005; Bryce & Rutter, 2005; Carr, 2005; Flanagan, 2005; Gorriz & Medina, 2000; Hoeft et al., 2008; Jansz et al., 2010; Jenkins, 1998; Kafai, 1998; Laurel, 1998; Lewis, 1998; L. Miller et al., 1996; M. K. Miller & Summers, 2007; S. M. Ogletree & R. Drake, 2007; Pratchett, 2005; Roberts et al., 1999; Subrahmanyam & Greenfield, 1998; Turkle, 1986), but they are somewhat inconclusive. Most previous research in games and gender highlights gender differences in games preferences focusing on a specific content, specific player and specific conditions which lacked structure to how gender inclusivity in games can

be interpreted or applied. Consequently, the aim of this research is to construct a conceptual framework to support gender inclusivity in games.

The *Gender Inclusivity Framework (GIF)*, provides a conceptual structure so gender inclusivity in games can be studied and applied. The GIF was developed as a mechanism that can be used to identify the components of gender inclusivity in games, define how these components behave and provide the measures to evaluate how gender inclusive a game is. So far, this work has explored, developed, validated and used the GIF in a research scenario. This chapter begins by summarising the work completed during the doctoral research before discussing the contributions made by this work and finally outlining the potential directions for continuing research into gender inclusivity in games.

8.1 Gender Inclusivity Framework (GIF): A Summary

The research described in this thesis covers three main phases: (1) development; (2) validation; and (3) application. Following a review of relevant work in games and gender research in Chapter 2, a set of synthesised themes and components was produced as the foundation of the proposed framework. Chapter 3 then discussed the development process and components of the newly-developed *Gender Inclusivity Framework (GIF)*. Next, Chapter 4 then validated the GIF's components suitability within the framework structure. Positive results from this study demonstrate that components of the GIF are theoretically sound and that further applications of the GIF can be explored. Chapter 5 demonstrated an application of the GIF through the development and validation of a novel measuring instrument called *Gender Inclusivity Rating Scale (GIRS)*. Positive results from the validation of the GIRS supports the GIRS as a reliable measuring tool that can be used in a research scenario and suggest that findings from the GIRS can be used to inform research and design. Finally, Chapter 6 demonstrated the use of the GIRS in a research scenario. Results from this study highlights that gender role orientation may not be the only factor influencing gender inclusivity in games scores. Figure 8-1 shows how each chapter in this thesis contributes and relates to the others.

8.1.1 Development of the framework

The GIF described in Chapter 3 has been designed to support gender inclusivity in games in three ways. Firstly, the GIF can assist in identifying the dimensions and components of gender inclusivity in games. Secondly, the definitions of the components can be used to describe a range of gender inclusive behaviours for application in games. Next, the mapping of relationships within the framework links the dimensions, components and definitions of gender inclusivity in games. This relationship mapping, which has enabled the integration of themes and core

components from games and gender research represents one of the key contributions of this research.

As a conceptual framework grounded in games and gender theories, the GIF has three main advantages. First, the framework can be used to help design gender inclusivity in games, and guide design decisions before implementation begins. Next, the GIF focuses only on the core dimensions and components of gender inclusivity in games and is not bound to any implementation or dataset. Finally, the GIF provides a more holistic view of gender inclusivity in games through a combined structure that showed the dimensions, components and the relationships that exists between them.

The GIF provided five contributions to the research into gender inclusivity in games. First, the framework integrates relevant games and gender research to enhance the knowledge of gender inclusivity in games. In addition to looking at gender inclusivity in games from a different perspective, the GIF serves as a guideline for future research. Secondly, the GIF was built based on the analysis and synthesisation from different fields of games and gender including existing game models and their core components. Therefore, the GIF is the culmination of established games and gender theories, and practices relevant to gender inclusivity in games. Thirdly, the GIF provides a new list of dimensions and components for gender inclusivity in games. These dimensions and components are combined into a single framework entity so that it can be investigated, refined or extended in the future. Next, the GIF serves as a shared reference point with a set of vocabulary to describe the features and functionality of gender inclusivity in games. A list of dimensions and components, with their corresponding descriptions on how a dimension or component would look and behave in a game, is really helpful in making design decisions concerning gender inclusivity in games. Finally, the combination of dimensions, components and descriptions of the GIF helps in manipulating the components into measurable parameters.

8.1.2 Validation of the GIF

The GIF was validated from two angles: (a) through established theories in games and gender; and (b) through a panel of experts' evaluation. Although Chapter 4 showed an empirical study involving the expert's evaluation of the GIF in great detail, the validation of the GIF begins as early as Chapter 2, where established theories in games and gender were used as the foundation for GIF development. Through this approach, the GIF structure was validated by the games and gender theories used as the building blocks and the relationships that mapped them together. The related literature chosen was sourced from established and notable researchers in the field of games and gender, while the relationship mapping used to combine these games and gender theories was built through careful analysis and synthesisation of related literature. Results from Chapter 2 produced an initial structure consisting of themes

and core components which was used as the basis of the framework. Further analysis in Chapter 3 showed the mapping process and the decisions made during the framework construction process. Following the framework construction process, a description for each component was provided based on how each component is relevant to gender inclusivity in games.

The second validation was conducted through a panel of experts comprising academic researchers and industry practitioners in Chapter 4. A novel measuring instrument was designed to find out how important an item is to gender inclusive gameplay and content. The expert evaluation study employed an exploratory approach while at the same time following accepted conventions for an instrument development process. The results suggest that there was a pattern of agreement between the experts towards the gender inclusivity in games components. Thus, it provides a sufficient level of accuracy to be considered for use in a research scenario.

There are three contributions from the validation process of the GIF. Firstly, the GIF was developed based on established theories in games and gender which on some level validated the structure and relationship mapping between its dimensions and components. Next, during the instrument development process, the operationalisation of the gender inclusivity in games dimensions and components was made based on established theories in games and gender. Findings in the area of games and gender helped in understanding the scope and breadth of gender inclusivity in games. Lastly, although the measuring instrument employed an exploratory approach, at the same time it followed widely accepted methodologies for instrument development. This approach provided insights into the process itself, decisions made during the development process and how the GIF fit into working practices.

8.1.3 Application of the GIF

The application of the GIF showed that it can be used to develop customised measuring instruments by selecting different combinations of dimensions and components. This thesis showed the development of two measuring instruments using different combinations of dimensions and components from the GIF. Each instrument was customised to meet the different focus and different audiences depending on the study objectives.

Chapter 4 showed how the GIF was used to develop an instrument for measuring expert's agreement about gender inclusivity in games components. With this objective in mind, two dimensions and 12 components were selected and, for each component, the operationalisation focused on the importance of each item for gender inclusive gameplay and content. Each item in a component reflects this objective by providing a description of how each gender inclusive item would look versus a non-gender inclusive item, while in Chapter 5, the measuring instrument was designed to evaluate the level of gender inclusivity in games by gamers themselves. With this objective, the

measuring instrument was developed with three dimensions and 12 components. To operationalise these components, each item in a component was focused on finding out how strongly agreeable or disagreeable a gamer felt towards an item after playing the game. Results suggest that the GIRS instrument provides a sufficient level of accuracy to be considered for use in a research scenario.

GIF's generic framework structure provided some level of generalisation to support customised forms of measurement for gender inclusivity in games. The combination of the GIF dimensions and components demonstrates initial steps towards showing that the GIF can be generalise for alternative uses. GIF may also be generalized for use beyond games applications into other technology-enhanced applications such as interactive multimedia, e-learning and web-based courseware applications where gender inclusivity might be an issue.

Another application of the GIF was shown in Chapter 6. Here, the validated GIRS instrument from Chapter 5 was used in a research scenario. The objective of the study was to investigate the differences in gender inclusivity in game component scores between gender role orientation categories. The GIRS was used in combination with Bem Sex Role Inventory (BSRI) instrument to measure the gender inclusivity in games component scores and gamers' femininity and masculinity scores respectively. This section of work demonstrated how the framework would be used realistically and decisions made during the study.

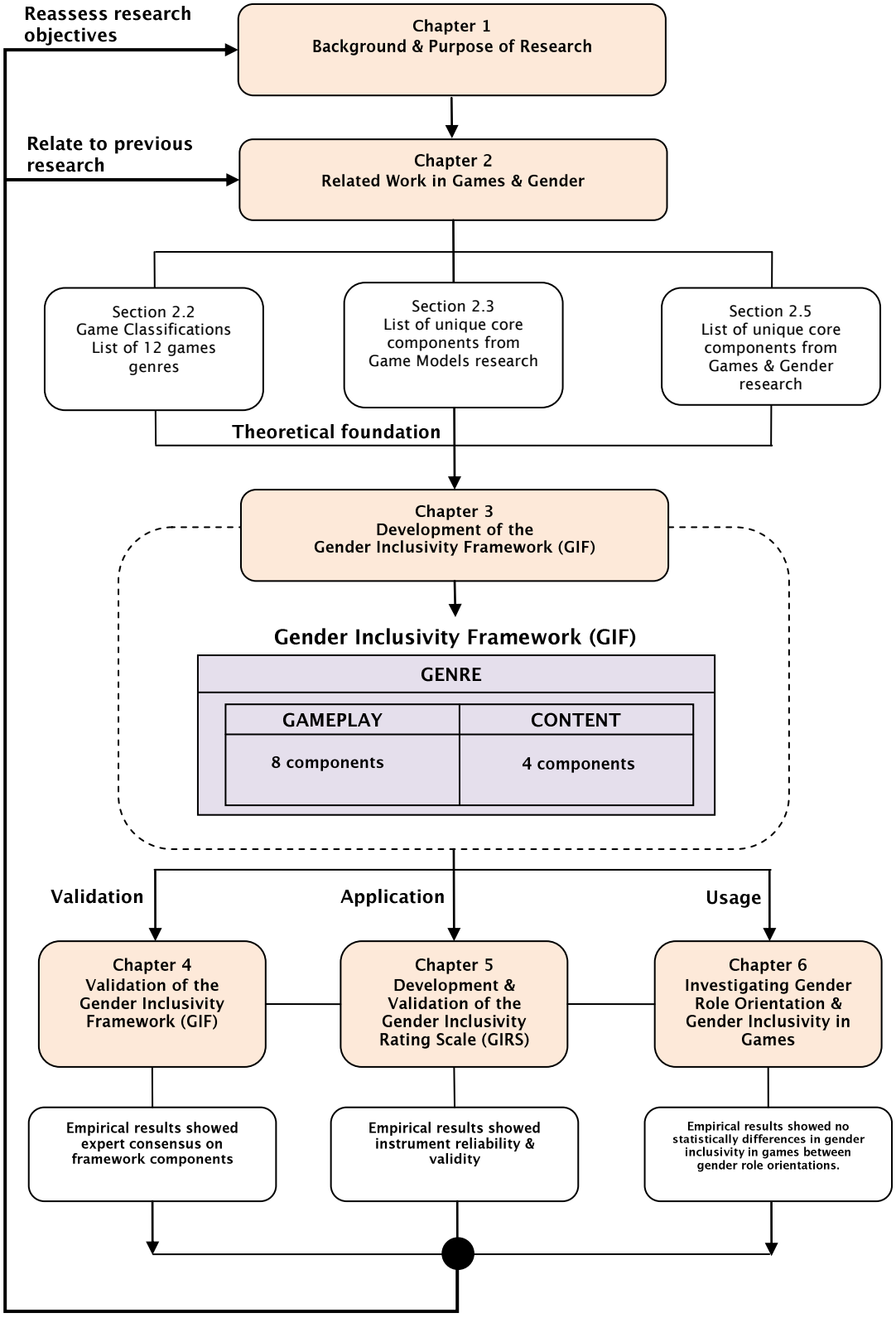


Figure 8-1 summarises the work completed by this research into gender inclusivity in games. It shows the main parts of the research (shaded boxes) and their relationship as a whole. The major contribution of this research is the Gender Inclusivity Framework (GIF), indicated by the dashed box in the middle of the diagram.

8.2 Contributions of this Research

There are three key contributions made by this research as a result of the development, validation and application of the GIF. These contributions and their parts are as follows:

8.2.1 The Gender Inclusivity Framework (GIF)

A main contribution by this research is the Gender Inclusivity Framework (GIF) and during the development of the GIF, these related contributions were made:

a) Integration of the appropriate games and gender literature in order to enhance knowledge of gender inclusivity in games and consequently serves as a guideline for future research.
b) An analysis of the crossover between the different fields of games and gender, including a critical analysis of game models.
c) A list of dimensions and components for gender inclusivity that includes, but does not limit itself to applications of games systems.
d) A shared reference point with a set of vocabulary to describe the features and functionality of gender inclusivity in games.
e) Introduction to potentially measurable dimensions and components of gender inclusivity in games.

8.2.2 Validation of the GIF

The combination and variation of studies used to validate the GIF provided new insights into the validity, reliability and practicality of using the GIF. During the validation process, related contributions were made as follows:

a) Integration of established theories in games and gender to validate the structure and relationship mapping between GIF's dimensions and components.
b) Customisation of operationalisation of the gender inclusivity in games dimensions and components.
c) Application of an exploratory approach while following widely accepted methodologies for instrument development.

8.2.3 Application of the GIF

The combination and variation of studies in demonstrating the GIF's applicability provided some insights into its first generalisation. Apart from developing measuring instruments with different objectives and usages, more importantly this research demonstrated that the GIF has the potential to be generalised in developing other tools or across related domains where gender inclusivity is a challenge. In addition, further study revealed early indications into consistency of use and challenges of the GIF.

8.3 Future work

While the framework provides new features and benefits to gender inclusivity in games, this section presents a research and development plan designed to improve understanding of gender inclusivity in games. The overarching goal is to help ensure that gender inclusivity in game solutions is developed systematically with scientific validation principles. The result of this plan will be a set of tools to improve approaches to gender inclusivity in games. Continuing research is aimed at developing and maturing the GIF. The planned future work is summarised in Table 8-1. The plan is divided into three milestones, i.e. 3-, 5- and 10-years milestones with specific research tasks to be achieved. Based upon the typical maturation span, the aim for a long-term goal therefore, is roughly 10 years, including the doctoral research period. The research tasks for the first 3 years (Table 8-1, Column 1) have been completed during the doctoral period. The work done during this doctoral period has provided the foundation for further research into the GIF and gender inclusivity in games in general.

Table 8-1 Research tasks and milestones for continuing research into GIF

	Milestones		
Research Tasks	**3 years**	**5 years**	**10 years**
Conceptual Framework	✓ Synthesis of existing literature regarding gender inclusivity in games. ✓ Develop taxonomy of gender inclusivity in games. ✓ Empirical results show experts consensus.	• Vocabulary issues identified • Framework agreed upon by community.	• Impact analysis shows improved exchange of research results.
Measuring tool	✓ Develop measuring instrument. ✓ Empirical results show preliminary evidence of validity and reliability.	• Further validation of measuring tool. • Initial prototype tool. • Refine measuring tool. • Empirical results show measuring tool can be modified to support multiple domain.	• Automated and fully adaptable measuring tools.
Designing tool	✓ Synthesis of existing game design models. ✓ Synthesis of existing technology enhanced application design models.	• Set of requirements. • Prototype tool. • Validate designing tool. • Refine designing tool. • Empirical results show design tool reduces time to design.	• Guidelines for designing gender inclusivity in games. • Libraries of design strategies for multiple domains.

8.3.1 A framework to enable generalisation and integration of gender inclusivity in game research

Most current research in games and gender is conducted on specific content, with specific gamers and under specific conditions. Although the findings from these

studies are pertinent to gender inclusivity in games, there is no evidence of a mechanism or a common structure that can help organise how these findings might fit together and how these findings might be applied. This lack of coherence is a challenge to researchers because these research findings need to be interpreted or applied and some level of generalisability needs to be achieved. Consequently, the aim of this research is to develop a framework that organises all of the relevant variables and their relationships. The result of this research would produce a shared framework where researchers will be able to conceptualise their studies and make it easier to see how individual findings fit into context. In addition, a shared framework will allow research results to be more effectively integrated across factors, and gaps in understanding to be identified. From Table 8-1, work in developing a conceptual framework has been completed during the doctoral period resulting in the Gender Inclusivity Framework (GIF). The next steps involve identifying issues regarding the framework vocabularies and finding ways for the framework to be widely used and accepted by the community. The long-term (10-year) goal is to demonstrate the shared use of the framework helped in the exchange of research findings within the community.

8.3.2 Measuring tools to enable evaluation of gameplay and content

The first step in the measurement development process is to specify the constructs i.e. dimensions and components to be measured. This requires analysis of the content domain into its constituent dimensions and components, and results in lists, clusters, and hierarchies of components. The long-term goal is to develop an automated measuring tool, available to a wider community of academics and practitioners, and, in addition, for the measuring tool to be adaptable to different domains. Table 8-1 outlines the research task and steps to achieve this goal. Currently, work planned for the first three years has been completed and produced the Gender Inclusivity Rating Scale (GIRS). A series of experiments was conducted to validate and demonstrate the first use of the GIRS in a research scenario. Further work is needed to prototype the measuring tool based on the GIRS, then conduct experiments to refine and validate the measuring tool across different domains.

8.3.3 Designing tools to enable integration of gender inclusivity components in games

A focus of this research task is to develop designing processes, methodologies and tools to enable the integration of gender inclusivity in game components. A key goal is to simplify the steps in designing gender inclusivity in game components. Designing tools are needed to simplify the design processes with few intermediate steps and the ability to hide the underlying complexity of the design work. Existing and emerging game design models need to be re-examined, while experiments that demonstrate the use of these designing tools are needed. Table 8-1 outlines the short-, medium- and long-term goals for developing a designing tool. At present, synthesis of the relevant literature in game design models and technology-enhanced applications, such as interactive multimedia, e-learning and mobile applications, has been completed. Further work in this area is needed to produce a set of requirements so that a designing tool prototype can be developed. Then a series of experiments needs to be conducted to validate, refine and demonstrate the use of the designing tool. The long-term results of this research would produce design guidelines and libraries of strategies for gender inclusivity that can be applied to different domains.

8.4 Final Remarks

The GIF described in this thesis has been designed to provide a structured way of supporting gender inclusivity in games through:

a) functional support in choosing a combination of dimensions and components associated with gender inclusivity in games;
b) functional support in defining the components of gender inclusivity in games; and subsequently
c) functional support in measuring the level of gender inclusivity in games.

The framework provides an integrative view of gender inclusivity in games by identifying the dimensions, components and the relationships among them. Each dimension in the framework consists of smaller individual components and each component in combination describes the dimension as a whole. Hence, the relationship between these dimensions and components used to construct the framework provides the description of gender inclusivity in games, which in turn is expected to predict the degree of gender inclusivity in games.

The aim of the research has been to provide a shared framework where gender inclusivity in games can be discussed or applied. For researchers, the GIF provides a shared terminology and definitions in which to conceptualise their research and make it easier to see how variables can be operationalized, individually or in combination. For game designers, the GIF enables the abstraction of gender inclusivity in games into distinct and manageable components to guide the design of gender inclusivity in games. For educators, the GIF allows the identification of gender inclusivity components in games to help evaluate and choose appropriate games for classroom activities.

The results produced so far are promising and demonstrate that GIF can produce insightful and rich analysis of gender inclusivity in games. Research into the framework is ongoing, and the next stages involve refinement of the framework and its applications. Such work will continue to investigate the usefulness of the GIF. The framework has the potential to enable researchers, game designers and educators make informed decisions that will help them to design and develop more gender inclusive games.

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Footnote

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Appendix A

Sample invitation email for experts

We would like to invite you to participate in the survey to assess the Gender-Inclusive Rating Scale (GIRS) instrument. The aim of the instrument is to gain a better understanding of the factors that influence the degree of gender-inclusiveness in a game. Results from this survey will be used to refine the content, wordings and gaps in the instrument.

The survey should take approximately 20 minutes or less to complete. We will also ask you for some basic demographic information. You will not be asked to disclose any identifying information (name, location, etc) and your answers will remain completely anonymous. All responses are treated as anonymous, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only so that no individual will be identifiable.

Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits and you may withdraw from the study at any time without penalty or loss of benefits to which you are otherwise entitled.

Clicking the “next” button below indicates that you have read the above statements and agree to participate in this research study. You may decline participation by clicking the “back” button or closing your browser.

If you have any further questions about this study or your rights, or if you wish to lodge a complaint or concern, you may contact the Principal Investigator: Roziana Ibrahim by email (ri07r@ecs.soton.ac.uk). This study is supervised by Dr Gary B. Wills (gbw@ecs.soton.ac.uk). You may also contact the Chair of the Ethics committee by email (ethics-chair@ecs.soton.ac.uk) or by mail (Chair of Ethics Committee, Electronics & Computer Science (ECS), University of Southampton, SO17 1BJ, UK) citing **Ethics Reference: E/09/09/003**.

Appendix B

Sample Expert Evaluation Instrument

Instructions

Please rate each item on an importance scale of 1 to 4, repeated at the top of each page.

Criteria:

Rating	Definition
1 = "Not Important"	The item is not important to gender inclusivity in games and can be excluded. Its absence would not affect gender inclusivity in games.
2 = "Somewhat Important"	The item is somewhat important but not critical to gender inclusivity in games. Although its absence would diminish gender inclusivity in games, the item needs major revision to be relevant.
3 = "Quite Important"	The item is quite important to gender inclusivity in games. Although its absence would diminish gender inclusivity in games, the item minor needs revision to be relevant.
4 = "Very Important"	The item is very important and essential to gender inclusivity in games. It must be included and its absence would significantly hamper gender inclusivity in games.

How important is each item in describing a *gameplay* that appeals to both male and female gamers?

Potential items	Not Important	Somewhat Important	Quite Important	Very Important
Item 1: Non-violent competitive action during play. Competing action that does not directly harm another competitor, such as: competing in a sprint race, get a clue or money by harvesting another player's farm, versus violent action that openly harms another competitor to *win* or gain something such as burning a competitor's house, fighting with a weapon or get sliced up by a meat cutter.	**1**	**2**	**3**	**4**
Item 2: Non-violent action during conflict resolution. Resolving conflict through peaceful or non-violent action such as negotiation with enemies, giving gifts to enemies, opening new trade routes or exchanging an ingredient to complete a recipe versus violent action and showing aggression such as attacking a village to gain territory or resources, or assassinating a competitor in a political campaign.	**1**	**2**	**3**	**4**
Item 3: Pre-defined goals to support play progression. The game shows clear pre-defined goals for a player to understand his/her tasks and complete the game such as achieving social status by upgrading 10 shanty houses, making 5000 coins and build 1 school versus a player defined goal, open-play or 'sandbox'.	**1**	**2**	**3**	**4**
Item 4: A background story to support gameplay. The game provides enough information in the background story for a player to understand the game context, such as what events have happened and how a character's life will change as a result of the events in the game.	**1**	**2**	**3**	**4**
Item 5: An in-game tutorial to help a beginner jumpstart the game. The game has a guided tutorial or missions for players to practice their skills before continuing with the game.	**1**	**2**	**3**	**4**
Item 6: Easy access to instructions during play session. The instructions are easy to get to during play sessions by clicking an icon or pop-up displays on the screen.	**1**	**2**	**3**	**4**
Item 7: Continuing a game after a wrong choice is made. A forgiving gameplay allows improvement without sudden end or a death penalty (loss of life) by saving multiple versions of a scenario and allowing a player to replay them.	**1**	**2**	**3**	**4**
Item 8: Game challenges come from logic or puzzle activities. The majority of the obstacles come from solving puzzles such as finding pieces of a magical mirror and putting them together.	**1**	**2**	**3**	**4**
Item 9: Game challenges come from fighting or physical activities. The majority of the obstacles come from physical strength/power such as faster kicks, stronger punches or fighting stronger opponents.	**1**	**2**	**3**	**4**
Item 10: A variety of problem solving activities. The game allow multiple ways to solve a problem such as climbing Mount Kilimanjaro by using a rope, jumping from one ledge to another, special springy shoes, or teleportation.	**1**	**2**	**3**	**4**
Item 11: Non-violent feedback. Allowing the player to improve during play sessions such as regaining energy through rest or food or finding items that help prolong life or health, versus a violent feedback that shows loss of limbs, swearing or clenched teeth.	**1**	**2**	**3**	**4**
Item 12: A variety of the game activities. The game combines a variety of activities such as solving puzzles, shooting, building and finding.	**1**	**2**	**3**	**4**

Item 13: A variety of inter-related activity. The game activities work together to achieve one goal such as solving a mathematical puzzle to get a clue needed to build a sculpture which in turn solves a scenario.	**1**	**2**	**3**	**4**
Item 14: Personalization in play speed. The game has an option to increase or reduce speed such as a player can reduce the simulation of a village development by 10% during novice level and increase the speed when familiar with the gameplay.	**1**	**2**	**3**	**4**
Item 15: Personalization in game difficulty. The game has an option for different levels of gamers such as easy, normal, difficult, or insanely difficult mode.	**1**	**2**	**3**	**4**
Item 16: Collaborative play with other players. The game can be played with siblings, friends, and other gamers such as hiring another gamer or a group of gamers from the marketplace to help harvest a sunflower farm or clean an aquarium.	**1**	**2**	**3**	**4**
Item 17: Communication with other players. The game provides a chat room, game community, email/messaging, 'buddy list' or link to a social networking website.	**1**	**2**	**3**	**4**

How important is each item in describing *content* that appeals to both male and female gamers?

Potential items	Not Important	Somewhat Important	Quite Important	Very Important
Item 18: An equal number characters/avatars for selection. The game provides an equal number of male and female characters/ avatars for selection.	**1**	**2**	**3**	**4**
Item 19: Character/avatar modification. Gamers can modify their chosen avatar's name, physical body, facial features, skin, clothing, wearable items, personality and roles.	**1**	**2**	**3**	**4**
Item 20: A wide range of female characters/avatars' physical appearance. Female characters/avatars are shown in a variety of clothing style and body type, versus a hyper-sexualized portrayal showing cleavage, midriff and buttocks with voluptuousness, extreme proportions, provocative postures or facial expressions.	**1**	**2**	**3**	**4**
Item 21: A wide range of male characters/avatars' physical appearance. Male characters/avatars are shown in a variety of clothing style and body type, versus a hyper-sexualized portrayal showing a 'six pack' belly, shirtless, provocative postures or facial expressions.	**1**	**2**	**3**	**4**
Item 22: A wide range of female characters/avatars' roles. Female characters/avatars are portrayed in a variety of roles, versus a stereotypical representation as damsel in distress, hostage, seductress, bystander and non-competitor.	**1**	**2**	**3**	**4**
Item 23: A wide range of male characters/avatars' roles. Male characters/avatars are portrayed in a variety of roles, versus a stereotypical representation as hero, soldier, competitor, saviour or tyrant.	**1**	**2**	**3**	**4**
Item 24: A wide range of female characters/avatars' traits. Female characters/avatars are portrayed in a wide range of personality traits, versus stereotypical representation as submissive, weak, most likely to use verbal ridicule and aggression.	**1**	**2**	**3**	**4**
Item 25: A wide range of male characters/avatars' traits. Male characters/avatars are portrayed in a wide range of personality traits, versus stereotypical representation as physically aggressive, violent, strong and most likely to use a weapon.	**1**	**2**	**3**	**4**
Item 26: Graphics realism in the game. Graphics realism is accentuated by applying colours, shadows, shading and lighting such as showing a shadow cast by a character or lighting in a dark cave by flickering torches, versus cartoon-like and caricature graphics.	**1**	**2**	**3**	**4**
Item 27: A 'bright' colour scheme. The graphic uses 'bright' colour scheme with cheerful and light colours, versus a 'dark' colour scheme with penumbra (cloudiness) and surreal colours.	**1**	**2**	**3**	**4**
Item 28: A variety of music styles. An option to choose from a range of music genres such as country, classical, Latin, world, rock or pop.	**1**	**2**	**3**	**4**
Item 29: An option to switch on or off the background music. For example by clicking an icon to switch the background music on or off.	**1**	**2**	**3**	**4**
Item 30: An option to control volume level. For example by using a slider to adjust the level of volume from loud to soft or vice versa.	**1**	**2**	**3**	**4**
Item 31: A storyline that guides gameplay. The storyline gives a purpose to the game progression and not simply added-on to the game.	**1**	**2**	**3**	**4**
Item 32: A compelling storyline to keep a player in the game. The storyline is entertaining enough to keep the player in the game using plot twists, conflict and interesting characterization.	**1**	**2**	**3**	**4**

Appendix C

Initial Gender Inclusivity Rating Scale (GIRS) Items Pool

Instructions:
Read the following statement about the game you just played and choose how much you agree/disagree with each of the item.

Dimension	: Gameplay
Scale	**: Non-violent Action (NVA)**
Scale description	: The extent of non-violent action during a competition and conflict resolution.
Items	: 12

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1.	Most of my actions involve violence.	**1**	**2**	**3**	**4**	**5**
2.	Most of my actions involve negotiation.	**1**	**2**	**3**	**4**	**5**
3.	Most of my actions involve diplomacy.	**1**	**2**	**3**	**4**	**5**
4.	When I want to gain a limited resource, I use negotiation tactics.	**1**	**2**	**3**	**4**	**5**
5.	When I want to gain allies, I use diplomacy.	**1**	**2**	**3**	**4**	**5**
6.	When I want to make an area safe, I attack with superior numbers or weapons.	**1**	**2**	**3**	**4**	**5**
7.	When I want to make an area safe, I use non-violent actions.	**1**	**2**	**3**	**4**	**5**
8.	When I want to collaborate with the enemy, I use violent threats.	**1**	**2**	**3**	**4**	**5**
9.	When I want to collaborate with the enemy, I exchange gifts.	**1**	**2**	**3**	**4**	**5**
10.	When I want to collaborate with the enemy, I help them out so a 'loyalty' favour is due.	**1**	**2**	**3**	**4**	**5**
11.	When I want to collaborate with the enemy, I pay them off.	**1**	**2**	**3**	**4**	**5**
12.	When I want to collaborate with the enemy, I invade them.	**1**	**2**	**3**	**4**	**5**

Dimension	: Gameplay
Scale	**: Game support (GS)**
Scale description	: The extent of in-game supporting features
Items	: 6

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
13.	The game shows clear goals for me to understand my tasks.	**1**	**2**	**3**	**4**	**5**
14.	I can set my own goals.	**1**	**2**	**3**	**4**	**5**
15.	The game gives enough information in the background story for me to understand the game context.	**1**	**2**	**3**	**4**	**5**
16.	The game has a tutorial for me to practise my skills before playing the game.	**1**	**2**	**3**	**4**	**5**
17.	The instructions on how to play the game are clear.	**1**	**2**	**3**	**4**	**5**
18.	The instructions are easy to get to during gameplay.	**1**	**2**	**3**	**4**	**5**

Dimension	:Gameplay
Scale	**: Forgiving Gameplay (FG)**
Scale description	: The extent of how the game manages/support failure during a gameplay.
Items	: 5

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
19.	I can save any number of game scenarios.	**1**	**2**	**3**	**4**	**5**
20.	I can replay a game scenario any number of times.	**1**	**2**	**3**	**4**	**5**
21.	When I make a mistake, I can still play the game without a death penalty (loss of life).	**1**	**2**	**3**	**4**	**5**
22.	When I make a mistake, the game shows hints on how to improve my gameplay.	**1**	**2**	**3**	**4**	**5**
23.	The game automatically saves the game scenario.	**1**	**2**	**3**	**4**	**5**

Dimension	: Gameplay

Scale	**: Non-violent Challenge (NVC)**
Scale description	: The extent of different types of challenges presented during gameplay.
Items	: 8

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
24.	Most of the obstacles come from solving puzzles.	**1**	**2**	**3**	**4**	**5**
25.	The challenge comes from increasingly difficult puzzles.	**1**	**2**	**3**	**4**	**5**
26.	The majority of the obstacles come from increasing physical strength/power.	**1**	**2**	**3**	**4**	**5**
27.	The majority of the obstacles come from resource management.	**1**	**2**	**3**	**4**	**5**
28.	The majority of the obstacles come from time management.	**1**	**2**	**3**	**4**	**5**
29.	Most of the obstacles involve fighting through enemy lines.	**1**	**2**	**3**	**4**	**5**
30.	Most of the obstacles involve moving through mazes or puzzles.	**1**	**2**	**3**	**4**	**5**
31.	Most of the obstacles harm or expose me to harm.	**1**	**2**	**3**	**4**	**5**

Dimension	: Gameplay
Scale	**: Variety of activities (ACT)**
Scale description	: The extent of different types of game activities and how they relate to each other.
Items	: 4

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
32.	I can solve a problem in multiple ways.	**1**	**2**	**3**	**4**	**5**
33.	I can only solve a problem in a linear way.	**1**	**2**	**3**	**4**	**5**
34.	The game is made up of a variety of activities.	**1**	**2**	**3**	**4**	**5**
35.	Different types of activities work together to solve one goal.	**1**	**2**	**3**	**4**	**5**

Dimension	: Gameplay
Scale	**: Feedback Systems (FEED)**
Scale description	: The extent of different types of feedback presented during gameplay.
Items	: 9

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
36.	I find most feedback uses a positive tone.	**1**	**2**	**3**	**4**	**5**
37.	I find most feedback helps me improve my gameplay.	**1**	**2**	**3**	**4**	**5**
38.	I find most feedback shows violent bloody scenes.	**1**	**2**	**3**	**4**	**5**
39.	I find the feedback uses crude language.	**1**	**2**	**3**	**4**	**5**
40.	I find most feedback helps me find the enemy or threat.	**1**	**2**	**3**	**4**	**5**
41.	I find most feedback helps me find items to prolong gameplay.	**1**	**2**	**3**	**4**	**5**
42.	I find the feedback useful to monitor my current status.	**1**	**2**	**3**	**4**	**5**
43.	When I do not know what to do, the feedback pops-up to show hints.	**1**	**2**	**3**	**4**	**5**
44.	I find the sound provide useful feedback.	**1**	**2**	**3**	**4**	**5**

Dimension	: Gameplay
Scale	**: Personalization (PER)**
Scale description	: The extent of personalization in terms of speed, difficulty and time.
Items	: 6

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
45.	I am in a constant fast-paced intense action gameplay.	**1**	**2**	**3**	**4**	**5**
46.	I am in constant pressure until the level is complete.	**1**	**2**	**3**	**4**	**5**
47.	I am constantly playing against the clock.	**1**	**2**	**3**	**4**	**5**
48.	I have enough time to explore the game.	**1**	**2**	**3**	**4**	**5**
49.	I can easily adjust the pace according to my preferences.	**1**	**2**	**3**	**4**	**5**
50.	I can easily adjust the level of difficulty according to my preferences.	**1**	**2**	**3**	**4**	**5**

Dimension	: Gameplay
Scale	**: Collaboration (COLL)**
Scale description	: The extent of collaborative features.
Items	: 3

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
51.	I can easily play with other players.	**1**	**2**	**3**	**4**	**5**
52.	I can easily communicate with other players during gameplay.	**1**	**2**	**3**	**4**	**5**
53.	The game has these communication features … (√) Tick all that apply. □ A game community, □ A chat room, □ An email or instant message, □ A 'buddy list' □ A link to a social networking website.					

Dimension	: Content
Scale	**: Avatar Potrayal (AVP)**
Scale description	: Extent of character/avatar selection and modification. Extent to which character/avatar are portrayed in terms of physical appearance, roles and traits.
Items	: 14

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
54.	I can choose my avatar's gender.	**1**	**2**	**3**	**4**	**5**
55.	The game has a wide range of avatar selection.	**1**	**2**	**3**	**4**	**5**
56.	I can modify my avatar's … (√) Tick all that apply. □ name, □ body type, □ facial features, □ skin, □ clothing, □ wearable items, □ personality, □ roles.					
57.	I can design my own avatar by using my own picture or an image I created.	**1**	**2**	**3**	**4**	**5**
58.	I find the female avatar is hyper-sexualized with provocative dress or exposed body parts.	**1**	**2**	**3**	**4**	**5**
59.	I find the female avatar is hyper-sexualized with curvaceous body or extreme body proportions.	**1**	**2**	**3**	**4**	**5**
60.	I find the female avatar is hyper-sexualized with provocative facial expressions or postures.	**1**	**2**	**3**	**4**	**5**
61.	I find the male avatar is hyper-sexualized with exposed body parts or tight clothing.	**1**	**2**	**3**	**4**	**5**
62.	I find the male avatar is hyper-sexualized with provocative facial expressions or postures.	**1**	**2**	**3**	**4**	**5**
63.	I find the male avatar is hyper-muscularized with overly large bulging muscles.	**1**	**2**	**3**	**4**	**5**
64.	I find the female avatar is portrayed as damsel in distress, hostage, seductress, bystanders or non-competitors.	**1**	**2**	**3**	**4**	**5**
65.	I find the male avatar is portrayed as heroes, soldiers, competitors, saviour or tyrant.	**1**	**2**	**3**	**4**	**5**
66.	I find most female avatars are shown as submissive, weak, most likely to use verbal ridicule and aggression.	**1**	**2**	**3**	**4**	**5**
67.	I find most male avatars are shown as physically aggressive, violent, strong and most likely to use a weapon.	**1**	**2**	**3**	**4**	**5**

Dimension	: Content
Scale	**: Game world graphics (GW)**
Scale description	: Extent to which the game world is portrayed in terms of colour, graphics realism and scenes variety.
Items	: 5

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
68.	The graphics has high realism.	**1**	**2**	**3**	**4**	**5**

69.	The graphics has cartoony quality.	**1**	**2**	**3**	**4**	**5**
70.	The graphics uses bright "cheerful" colour palette.	**1**	**2**	**3**	**4**	**5**
71.	The graphics uses dark "shadowy/cloudy" colour palette.	**1**	**2**	**3**	**4**	**5**
72.	The game has a large variety of scenes.	**1**	**2**	**3**	**4**	**5**

Dimension	: Content
Scale	**: Sound/Music (SM)**
Scale description	: Extent to which sound/music can be personalized in terms of style, switching on/off and volume control.
Items	: 4

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
73.	I can easily choose a variety of music according to my preferences.	**1**	**2**	**3**	**4**	**5**
74.	I can easily turn on or off the music according to my preferences.	**1**	**2**	**3**	**4**	**5**
75.	I can easily adjust the level of volume according to my preferences.	**1**	**2**	**3**	**4**	**5**
76.	I find the music helps to set the mood.	**1**	**2**	**3**	**4**	**5**

Dimension	: Content
Scale	**: Storyline (STOR)**
Scale description	: Extent to which the storyline influences the game progression
Items	: 6

Potential items		**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
77.	I find the storyline has some meaning to completing the game.	**1**	**2**	**3**	**4**	**5**
78.	I find the storyline entertaining enough to keep me in the game.	**1**	**2**	**3**	**4**	**5**
79.	I find the storyline develops as the game progresses.	**1**	**2**	**3**	**4**	**5**
80.	I am interested in the characters because they are like me.	**1**	**2**	**3**	**4**	**5**
81.	I am interested in the characters because they are interesting to me.	**1**	**2**	**3**	**4**	**5**
82.	I am interested in the characters because they develop with the game.	**1**	**2**	**3**	**4**	**5**

Appendix D

Sample of the Revised Gender Inclusivity Rating Scale (GIRS) Instrument

The revised GIRS consists of 3 dimensions, 12 components and 57 items.

How to complete this questionnaire

For each question please **CIRCLE** your answer. Sometimes you may need to tick more than one box or may be asked to write in your answer. If you change your mind about one of your answers, or you have ticked the wrong box by mistake, simply shade in the old box completely and then put a circle in the box that you want, as shown in the example below.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I think computer games very entertaining.	1	2	●	4	5

PLEASE TELL US A LITTLE ABOUT THE GAME

1. Game Title: _____

2. Which category best describe the game?
   Tick (✓) only **ONE** box.

Racing game	☐	Role-playing game	☐
Simulation game	☐	Platform game	☐
Classic/Board game	☐	Children game	☐
Strategy game	☐	Puzzle/Quiz game	☐
Sports game	☐	Action game	☐
Shooting game	☐	Adventure game	☐

Instructions:

Read the following statement about the game you just played and rate how much you agree/disagree with each of them.

Items		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.	When I want to gain a limited resource, I use negotiation tactics.	1	2	3	4	5
4.	When I want to gain allies, I use diplomacy.	1	2	3	4	5
5.	When I want to collaborate with the enemy, I use violent threats.	1	2	3	4	5
6.	When I want to collaborate with the enemy, I exchange gifts.	1	2	3	4	5
7.	When I want to collaborate with the enemy, I help them out so a 'loyalty' favour is due.	1	2	3	4	5
8.	When I want to collaborate with the enemy, I invade them.	1	2	3	4	5
9.	I can set my own goals.	1	2	3	4	5
10.	The game gives enough information in the background story for me to understand the game context.	1	2	3	4	5
11.	The instructions are easy to get to during gameplay.	1	2	3	4	5
12.	I can save any number of game scenarios.	1	2	3	4	5
13.	I can replay a game scenario any number of times.	1	2	3	4	5
14.	When I make a mistake, I can still play the game without a death penalty (loss of life).	1	2	3	4	5
15.	When I make a mistake, the game shows hints on how to improve my gameplay.	1	2	3	4	5
16.	Most of the obstacles come from solving puzzles.	1	2	3	4	5
17.	The majority of the obstacles come from resource management.	1	2	3	4	5
18.	Most of the obstacles involve fighting through enemy lines.	1	2	3	4	5
19.	Most of the obstacles harm or expose me to harm.	1	2	3	4	5
20.	I can solve a problem in multiple ways.	1	2	3	4	5
21.	The game is made up of a variety of activities.	1	2	3	4	5
22.	Different types of activities work together to solve one goal.	1	2	3	4	5
23.	I find most feedback uses a positive tone.	1	2	3	4	5
24.	I find most feedback shows violent bloody scenes.	1	2	3	4	5

25.	I find the feedback uses crude language.	**1**	**2**	**3**	**4**	**5**
26.	When I do not know what to do, the feedback pops-up to show hints.	**1**	**2**	**3**	**4**	**5**
27.	I find the sound provide useful feedback.	**1**	**2**	**3**	**4**	**5**
28.	I am in a constant fast-paced intense action gameplay.	**1**	**2**	**3**	**4**	**5**
29.	I can easily adjust the pace according to my preferences.	**1**	**2**	**3**	**4**	**5**
30.	I can easily adjust the level of difficulty according to my preferences.	**1**	**2**	**3**	**4**	**5**
31.	I can easily play with other players.	**1**	**2**	**3**	**4**	**5**
32.	I can choose my avatar's gender.	**1**	**2**	**3**	**4**	**5**
33.	I can design my own avatar by using my own picture or an image I created.	**1**	**2**	**3**	**4**	**5**
34.	I find the female avatar is hyper-sexualized with provocative dress or exposed body parts.	**1**	**2**	**3**	**4**	**5**
35.	I find the female avatar is hyper-sexualized with curvaceous body or extreme body proportions.	**1**	**2**	**3**	**4**	**5**
36.	I find the female avatar is hyper-sexualized with provocative facial expressions or postures.	**1**	**2**	**3**	**4**	**5**
37.	I find the male avatar is hyper-sexualized with exposed body parts or tight clothing.	**1**	**2**	**3**	**4**	**5**
38.	I find the male avatar is hyper-sexualized with provocative facial expressions or postures.	**1**	**2**	**3**	**4**	**5**
39.	I find the male avatar is hyper-muscularized with overly large bulging muscles.	**1**	**2**	**3**	**4**	**5**
40.	I find most female avatar is portrayed in non-protagonist roles.	**1**	**2**	**3**	**4**	**5**
41.	I find most male avatar is portrayed in protagonist roles.	**1**	**2**	**3**	**4**	**5**
42.	I find most female avatars are shown as submissive, weak, most likely to use verbal ridicule and aggression.	**1**	**2**	**3**	**4**	**5**
43.	I find most male avatars are shown as physically aggressive, violent, strong and most likely to use a weapon.	**1**	**2**	**3**	**4**	**5**
44.	The graphics has high realism.	**1**	**2**	**3**	**4**	**5**
45.	The graphics uses bright "cheerful" colour palette.	**1**	**2**	**3**	**4**	**5**
46.	I can easily choose a variety of music according to my preferences.	**1**	**2**	**3**	**4**	**5**
47.	I can easily turn on or off the music according to my preferences.	**1**	**2**	**3**	**4**	**5**
48.	I can easily adjust the level of volume according to my preferences.	**1**	**2**	**3**	**4**	**5**
49.	I find the storyline has some meaning to completing the game.	**1**	**2**	**3**	**4**	**5**
50.	I find the storyline develops as the game progresses.	**1**	**2**	**3**	**4**	**5**
51.	I am interested in the characters because they are like me.	**1**	**2**	**3**	**4**	**5**
52.	I am interested in the characters because they are interesting to me.	**1**	**2**	**3**	**4**	**5**
53.	I am interested in the characters because they develop with the game.	**1**	**2**	**3**	**4**	**5**

54. I can modify my avatar's … (√) Tick all that apply.

Name	☐	Clothing	☐
Body type	☐	Wearable items	☐
Facial features	☐	Personality	☐
Skin	☐	Roles	☐

55. The game has these communication features … (√) Tick all that apply.

An email or instant message.	☐	A link to a social networking website.	☐
A chat room.	☐	A 'buddy list'.	☐
A game community.	☐		

PLEASE TELL US A LITTLE ABOUT YOURSELF

56.	What is your gender?	Female	☐	Male	☐
57.	What is your age?	15- 25	☐	36 - 45	☐
		26 -35	☐	46 – 55	☐

Thank you very much for completing this questionnaire, your answers will be useful to our research.

Appendix E

Sample Consent Form for the GIRS Validation Study

CONSENT FORM

Study title: **Analysis of Gender Inclusive Features in Games**
Researcher name: **Roziana Ibrahim**
Study reference: -
Ethics reference: **E/09/09/003**
Please initial the box(es) if you agree with the statement(s):

I have read and understood the information sheet (Date: 31-08- 09/ Version No.1) and have had the opportunity to ask questions about the study. ☐

I agree to take part in this research project and agree for my data to be used for the purpose of this study. ☐

I understand my participation is voluntary and I may withdraw at any time without my legal rights being affected. ☐

Name of participant (print name)……
Signature of participant……
Name of Researcher (print name): ***ROZIANA IBRAHIM***
Signature of Researcher……

Date: ***15th March 2010***

Appendix F

Sample Participant Information Sheet (PIS)

Participant Information Sheet
Study Title: **Analysis of Gender Inclusive Features in Games**
Researcher: **Roziana Ibrahim**
Ethics number: **E/09/09/003**

Please read this information carefully before deciding to take part in this research. If you are happy to participate you will be asked to sign a consent form.

What is the research about?
This survey is about gender issues in current computer games. We believe that gender issues in games influence how games are designed. The aim is to find out which gender issue has the most influence in games.

Why have I been chosen?
Individuals are invited to participate in this survey if they are students (undergraduate and postgraduate) interested in computer games.

What will happen to me if I take part?

1.	You will be given instructions about the general nature of the experiment and asked to fill out a written consent form, if you agree to participate.	5 mins.
2.	After submitting the consent form, you will randomly choose a game and play the game from fifteen to thirty-five minutes.	15 – 35 mins.
3.	After the play sessions, you will be given a questionnaire to answer. Answer and return the questionnaire.	10 mins.
4.	At the end of each experiment session, you will be debriefed to answer any follow-up questions.	5 mins.
	Total Time Commitment	**35 – 55 minutes**

Are there any benefits in my taking part?
There is no direct benefit to you for participating in this survey. We cannot and do not guarantee or promise that you will receive any benefits from this study. However, we hope to gain information about gender issues in computer games that will be beneficial to game designers, gamers, and game communities.

Are there any risks involved?
Confidentiality will be secured in a variety of ways: participants' true names in the data will only exist on the signed informed consent materials; data will be kept in the researcher's office in a secure file cabinet; researcher alone will have full access to the data.

Will my participation be confidential?
All responses are treated as confidential, and in no case will responses from individual participants be identified. Rather, all data will be pooled and published in aggregate form only so that no individual will be identifiable. Participants should be aware, however, that the experiment is not being run from a 'secure' https server of the kind typically used to handle credit card transactions, so there is a small possibility that responses could be viewed by unauthorised third parties (e.g., computer hackers), however your responses would appear only as a series of numbers.

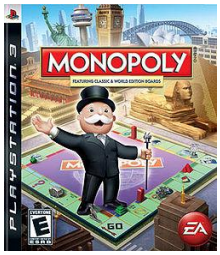
What happens if I change my mind?
Participation is voluntary, refusal to take part in the study involves no penalty or loss of benefits to which participants are otherwise entitled, and participants may withdraw from the study at any time without penalty or loss of benefits to which they are otherwise entitled.

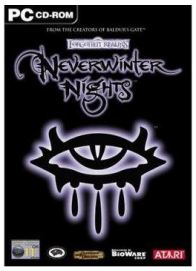
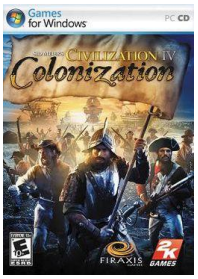
What happens if something goes wrong?
If you have any further questions about this study or your rights, or if you wish to lodge a complaint or concern, you may contact the research supervisor: Dr. Gary B. Wills (gbw@ecs.soton.ac.uk). You may also contact the Chair of the Ethics committee by email (ethics-chair@ecs.soton.ac.uk) or by mail (Chair of Ethics Committee, Electronics & Computer Science (ECS), University of Southampton, SO17 1BJ, UK) citing reference: **E/09/09/003.**

Where can I get more information?
If you have any further questions about this study or your rights, or if you wish to lodge a complaint or concern, you may contact the Principal investigator: **Roziana Ibrahim** by email (ri07r@ecs.soton.ac.uk).

Appendix G

List of Games

Game	Description
Little Big Planet 	Genre: Platformer - Puzzle Console: Playstation 3 Award(s): BAFTA Award for Artistic Achievement (2009), Game Developers Choice Awards for Best Game Design, Best Game Technology, Innovation Award and Best New Debut (2009), AIAS Overall Game of The Year, Outstanding Achievement on Art Direction, Visual Engineering and Innovation in Gaming (2008) A puzzle platformer game based on user generated content and a player controls a Sackboy, Sackgirl or Sackperson and goes through a range of platforming scenarios. Although there are pre-built levels and game content, a player has the freedom to customize their character, personal space, objects and levels, which then can be played in the or shared with other LBP community gamers.
Monopoly 	Genre: Classic- Board Console: Playstation 3 An adaptation of the classic board game Monopoly. It follows the same rules as the standard board game but can be play either in single-player or multi-player mode.
Ratatouille 	Genre: Action Console: Xbox360 Award (s): 35th Annie Annual Award Best Animated Video Game (2009) Based on the animation film of the same name and tells the story of a rat called Remy. A player takes the role of Remy and progresses through the game by learning many skills needed to complete Remy's mission i.e. cook a group of people including the food critic, Anton Ego. In order to progress through the game Remy must have the skills to sniff to find directions, climb up ropes, run on a beam, swing a pole. Like many action – adventure game, Remy will meet with many obstacles such as shotgun-wielding lady, old lady in a farm, rapids sewers, a ghost and a food critic.
Mirror's Edge 	Genre: First-person Action-Adventure Console: Xbox360 A player controls Faith, a runner or courier for communiques around a utopian city during a mayoral election campaign when her sister Kate is accused of murdering of a candidate, Robert Pope. The game can be played in two modes: campaign or attack mode and the Faith must navigate through the city. Mirror's Edge is also unique in which the gameworld graphics make use of brightly coloured themes and allows a wide range of actions including sliding under barriers, tumbling, wall-running, and shimmying across ledges
Mario Kart 	Genre: Racing Console: Nintendo Wii Award(s): IGN Best Racing Game (2008) and Best Online Multiplayer Game A racing game and 6th instalment of the popular Mario Kart series. A player can choose a character from a selection of 24 avatars and 36 vehicles. The performance of a vehicle i.e. speed, acceleration, handling and drift will be depend on the avatar's weight. There are 32 different tracks and a maximum of 12 avatars can compete simultaneously. The game comes with a Wii Wheel, a peripheral that is used as the controlling device and interestingly looks like a car's steering wheel.

Boom Blox: Bash Party 	Genre: Puzzle Console: Nintendo Wii Award: IGN Editors' Choice Award (2009) A sequel to the Boom Blox and a physics-based puzzle game. It has 400 levels and gamers can download and upload new levels to share with an online community. It features a slingshot as the shooting mechanism.
Wii Resort Sports 	Genre: Sports Console: Nintendo Wii A sequel to the Wii Sports game and requires a Wii Motion Plus nunchuk peripheral to play. The game is set on a beach archipelago called Wuhu Island. Twelve the sports are featured in the games including swordplay, wakeboarding, Frisbee, bowling, golf, canoeing, archery, basketball, bowling, power cruising, cycling, table tennis and air sports.
Neverwinter Nights 	Genre: 3rd person RPG Console: PC The game is based on the 3rd edition of Dungeon&Dragons and Forgotten Realms. A player progresses through the game by completing quests such as defeating a cult, collecting four reagents. The games starts by creating an avatar and a player has the freedom to choose the gender, race, class, alignment, abilities, appearance and name. The game can be played as a single-player or multi-player mode.
Chocolatier 2: Secret Ingredients 	Genre: Business Simulation Console: PC Award: Gamezebo Zeeby's Best Strategy Game (2007) A player takes up the role of an amateur chocolatier and progresses through the game by expanding the chocolatier business. To expand the chocolatier business, a player has to balance between supply, demand, resources and money. There will be special quests such as delivering crates of chocolates to specific people and in return will receive a special chocolate recipe or a deed to a factory. There are 14 cities across the world, 64 recipes to collect and 6 factories to buy. The game can be played in free or story mode.
Civilization 4: Colonization 	Genre: Strategy – turn-based Console: PC The game is set in the time period between 14492-1792 and a player can choose between any of the four European nations i.e. Spain. England, France and the Netherlands. The mission is to colonize the New World by amassing your own army, declare independence from your mother country. As the game progress, a player must balance between negotiations with the natives and other colonists; manage economy by producing good and trading them, build settlement by hiring craftsmen or train a specialist.

Appendix H

Bem Sex Role Inventory (BSRI) Questionnaire

Instruction:
Read the following phrases, rate yourself and **CIRCLE** your answer on the following scale:

1	2	3	4	5	6	7
never or almost never true	usually not true	sometimes but infrequently true	occasionally true	often true	usually true	always or almost always true

Items		1	2	3	4	5	6	7
1.	self-reliant	1	2	3	4	5	6	7
2.	yielding	1	2	3	4	5	6	7
3.	helpful	1	2	3	4	5	6	7
4.	defends own beliefs	1	2	3	4	5	6	7
5.	cheerful	1	2	3	4	5	6	7
6.	moody	1	2	3	4	5	6	7
7.	independent	1	2	3	4	5	6	7
8.	shy	1	2	3	4	5	6	7
9.	conscientious	1	2	3	4	5	6	7
10.	athletic	1	2	3	4	5	6	7
11.	affectionate	1	2	3	4	5	6	7
12.	theatrical	1	2	3	4	5	6	7
13.	assertive	1	2	3	4	5	6	7
14.	flatterable	1	2	3	4	5	6	7
15.	happy	1	2	3	4	5	6	7
16.	strong personality	1	2	3	4	5	6	7
17.	loyal	1	2	3	4	5	6	7
18.	unpredictable	1	2	3	4	5	6	7
19.	forceful	1	2	3	4	5	6	7
20.	feminine	1	2	3	4	5	6	7
21.	reliable	1	2	3	4	5	6	7
22.	analytical	1	2	3	4	5	6	7
23.	sympathetic	1	2	3	4	5	6	7
24.	jealous	1	2	3	4	5	6	7
25.	has leadership abilities	1	2	3	4	5	6	7
26.	sensitive to the needs of others	1	2	3	4	5	6	7
27.	truthful	1	2	3	4	5	6	7
28.	willing to take risks	1	2	3	4	5	6	7
29.	understanding	1	2	3	4	5	6	7
30.	secretive	1	2	3	4	5	6	7
31.	makes decisions easily	1	2	3	4	5	6	7
32.	compassionate	1	2	3	4	5	6	7
33.	sincere	1	2	3	4	5	6	7
34.	self-sufficient	1	2	3	4	5	6	7
35.	eager to soothe hurt feelings	1	2	3	4	5	6	7
36.	conceited	1	2	3	4	5	6	7
37.	dominant	1	2	3	4	5	6	7
38.	soft-spoken	1	2	3	4	5	6	7
39.	likable	1	2	3	4	5	6	7
40.	masculine	1	2	3	4	5	6	7
41.	warm	1	2	3	4	5	6	7
42.	solemn	1	2	3	4	5	6	7
43.	willing to take a stand	1	2	3	4	5	6	7
44.	tender	1	2	3	4	5	6	7
45.	friendly	1	2	3	4	5	6	7

46.	aggressive	**1**	**2**	**3**	**4**	**5**	**6**	**7**
47.	gullible	**1**	**2**	**3**	**4**	**5**	**6**	**7**
48.	inefficient	**1**	**2**	**3**	**4**	**5**	**6**	**7**
49.	acts as a leader	**1**	**2**	**3**	**4**	**5**	**6**	**7**
50.	childlike	**1**	**2**	**3**	**4**	**5**	**6**	**7**
51.	adaptable	**1**	**2**	**3**	**4**	**5**	**6**	**7**
52.	individualistic	**1**	**2**	**3**	**4**	**5**	**6**	**7**
53.	does not use harsh language	**1**	**2**	**3**	**4**	**5**	**6**	**7**
54.	unsystematic	**1**	**2**	**3**	**4**	**5**	**6**	**7**
55.	competitive	**1**	**2**	**3**	**4**	**5**	**6**	**7**
56.	loves children	**1**	**2**	**3**	**4**	**5**	**6**	**7**
57.	tactful	**1**	**2**	**3**	**4**	**5**	**6**	**7**
58.	ambitious	**1**	**2**	**3**	**4**	**5**	**6**	**7**
59.	gentle	**1**	**2**	**3**	**4**	**5**	**6**	**7**
60.	conventional	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Thank you and if you have any further questions about this study or your rights, or if you wish to lodge a complaint or concern, you may contact the Principal investigator: Roziana Ibrahim by email (ri07r@ecs.soton.ac.uk). This study is supervised by Dr. Gary B. Wills (gbw@ecs.soton.ac.uk). You may also contact the Chair of the Ethics committee by email (ethics-chair@ecs.soton.ac.uk) or by mail (Chair of Ethics Committee, Electronics & Computer Science (ECS), University of Southampton, SO17 1BJ, UK) citing **Ethics Reference: E/11/02/001**.

Appendix I

Sample of the Refined Gender Inclusivity Rating Scale (GIRS)

How to complete this questionnaire

For each question please **CIRCLE** your answer. Sometimes you may need to tick more than one box or may be asked to write in your answer. If you change your mind about one of your answers, or you have ticked the wrong box by mistake, simply shade in the old box completely and then put a circle in the box that you want, as shown in the example below.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I think computer games very entertaining.	1	2	●	4	5

Instructions:

Read the following statement about the game you just played and rate how much you agree/disagree with each of them.

Items		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	When I want to gain a limited resource, I use negotiation tactics.	**1**	**2**	**3**	**4**	**5**
2.	When I want to gain allies, I use diplomacy.	**1**	**2**	**3**	**4**	**5**
3.	When I want to collaborate with the enemy, I use violent threats.	**1**	**2**	**3**	**4**	**5**
4.	When I want to collaborate with the enemy, I exchange gifts.	**1**	**2**	**3**	**4**	**5**
5.	When I want to collaborate with the enemy, I help them out so a 'loyalty' favour is due.	**1**	**2**	**3**	**4**	**5**
6.	When I want to collaborate with the enemy, I invade them.	**1**	**2**	**3**	**4**	**5**
7.	I can set my own goals.	**1**	**2**	**3**	**4**	**5**
8.	The game gives enough information in the background story for me to understand the game context.	**1**	**2**	**3**	**4**	**5**
9.	The instructions are easy to get to during gameplay.	**1**	**2**	**3**	**4**	**5**
10.	I can save any number of game scenarios.	**1**	**2**	**3**	**4**	**5**
11.	I can replay a game scenario any number of times.	**1**	**2**	**3**	**4**	**5**
12.	When I make a mistake, I can still play the game without a death penalty (loss of life).	**1**	**2**	**3**	**4**	**5**
13.	When I make a mistake, the game shows hints on how to improve my gameplay.	**1**	**2**	**3**	**4**	**5**
14.	Most of the obstacles come from solving puzzles.	**1**	**2**	**3**	**4**	**5**
15.	The majority of the obstacles come from resource management.	**1**	**2**	**3**	**4**	**5**
16.	Most of the obstacles involve fighting through enemy lines.	**1**	**2**	**3**	**4**	**5**
17.	Most of the obstacles harm or expose me to harm.	**1**	**2**	**3**	**4**	**5**
18.	I can solve a problem in multiple ways.	**1**	**2**	**3**	**4**	**5**
19.	The game is made up of a variety of activities.	**1**	**2**	**3**	**4**	**5**
20.	Different types of activities work together to solve one goal.	**1**	**2**	**3**	**4**	**5**
21.	I find most feedback uses a positive tone.	**1**	**2**	**3**	**4**	**5**
22.	I find most feedback shows violent bloody scenes.	**1**	**2**	**3**	**4**	**5**
23.	I find the feedback uses crude language.	**1**	**2**	**3**	**4**	**5**
24.	When I do not know what to do, the feedback pops-up to show hints.	**1**	**2**	**3**	**4**	**5**
25.	I find the sound provide useful feedback.	**1**	**2**	**3**	**4**	**5**

26.	I am in a constant fast-paced intense action gameplay.	**1**	**2**	**3**	**4**	**5**
27.	I can easily adjust the pace according to my preferences.	**1**	**2**	**3**	**4**	**5**
28.	I can easily adjust the level of difficulty according to my preferences.	**1**	**2**	**3**	**4**	**5**
29.	I can choose my avatar's gender.	**1**	**2**	**3**	**4**	**5**
30.	I can design my own avatar by using my own picture or an image I created.	**1**	**2**	**3**	**4**	**5**
31.	I find the female avatar is hyper-sexualized with provocative dress or exposed body parts.	**1**	**2**	**3**	**4**	**5**
32.	I find the male avatar is hyper-sexualized with exposed body parts or tight clothing.	**1**	**2**	**3**	**4**	**5**
33.	I find most male avatar is portrayed in protagonist roles.	**1**	**2**	**3**	**4**	**5**
34.	I find most male avatars are shown as physically aggressive, violent, strong and most likely to use a weapon.	**1**	**2**	**3**	**4**	**5**
35.	I can easily choose a variety of music according to my preferences.	**1**	**2**	**3**	**4**	**5**
36.	I can easily turn on or off the music according to my preferences.	**1**	**2**	**3**	**4**	**5**
37.	I can easily adjust the level of volume according to my preferences.	**1**	**2**	**3**	**4**	**5**
38.	I find the storyline has some meaning to completing the game.	**1**	**2**	**3**	**4**	**5**
39.	I find the storyline develops as the game progresses.	**1**	**2**	**3**	**4**	**5**
40.	I am interested in the characters because they are like me.	**1**	**2**	**3**	**4**	**5**
41.	I am interested in the characters because they are interesting to me.	**1**	**2**	**3**	**4**	**5**
42.	I am interested in the characters because they develop with the game.	**1**	**2**	**3**	**4**	**5**

43. I can modify my avatar's … (√) Tick all that apply.

Name	☐	Clothing	☐
Body type	☐	Wearable items	☐
Facial features	☐	Personality	☐
Skin	☐	Roles	☐

PLEASE TELL US A LITTLE ABOUT YOURSELF

44.	What is your gender?	Female	☐	Male	☐
45.	What is your age?	16 - 25	☐	36 - 45	☐
		26 - 35	☐	46 – 55	☐

Thank you very much for completing this questionnaire, your answers will be useful to our research. If you have any further questions about this study or your rights, or if you wish to lodge a complaint or concern, you may contact the Principal investigator: Roziana Ibrahim by email (ri07r@ecs.soton.ac.uk). This study is supervised by Dr. Gary B. Wills (gbw@ecs.soton.ac.uk). You may also contact the Chair of the Ethics committee by email (ethics-chair@ecs.soton.ac.uk) or by mail (Chair of Ethics Committee, Electronics & Computer Science (ECS), University of Southampton, SO17 1BJ, UK) citing **Ethics Reference: E/11/02/001**.

Appendix J

Raw Data for Expert Evaluation Study

CASE	NVA1	NVA2	GS1	GS2	GS3	GS4	FG1	NVC1	NVC2	ACT1	ACT2	ACT3	FEED1		PER1	PER2	COLL1		COLL2		AVP1	AVP2	AVP3	
	AVP4	AVP5	AVP6	AVP7	AVP8	GW1	GW2	SM1	SM2	SM3	STOR1		STOR2											
1	2	2	3	3	3	4	3	2	2	2	2	2	2	2	2	2	2	3	3	2	2	2	2	2
	2	2	2	1	1	1	3	3																
2	2	2	3	2	4	3	3	2	2	3	3	2	2	2	2	2	3	4	3	4	4	4	4	4
	4	2	1	1	2	4	2	2																
3	3	3	2	2	2	2	4	1	1	3	3	3	4	2	3	3	3	4	4	3	3	4	4	4
	4	2	2	2	2	1	2	2																
4	3	3	3	4	4	4	4	4	1	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2
	2	3	2	3	3	3	4	4																
5	2	2	2	4	2	2	2	2	2	3	3	3	2	2	3	2	2	2	2	2	2	2	2	2
	2	2	1	2	2	2	3	3																

Appendix K

Raw Data for GIRS Validation Study

TITLE	GEN1	GEN2	GEN3	GEN4	GEN5	GEN6	GEN7	GEN8	GEN9	GEN10		GEN11		GEN12		NVA1	NVA2	NVA3	NVA4	NVA5	NVA6	GS1	GS2
	GS3	FG1	FG2	FG3	FG4	NVC1	NVC2	NVC3	NVC4	ACT1	ACT2	ACT3	FEED1		FEED2		FEED3		FEED4		FEED5		PER1	
	PER2	PER3	COLL1		AVP1	AVP2	AVP3	AVP4	AVP5	AVP6	AVP7	AVP8	AVP9	AVP10		AVP11		AVP12		GW1	GW2	SM1	SM2	SM3
	STOR1		STOR2		STOR3		STOR4		STOR5		AVP13		AVP14		AVP15		AVP16		AVP17		AVP18		AVP19	
	AVP20		COLL2		COLL3		COLL4		COLL5		COLL6		GENDER		AGE									
37	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	5	5	3	5	5
	5	1	1	1	1	5	5	3	5	1	3	2	5	2	3	4	5	2	3	2	2	2	2	2
	2	2	2	1	2	5	5	1	2	2	3	3	4	3	5	1	0	0	0	0	0	1	0	99
	99	99	99	99	1	2																		
19	0	0	0	1	0	0	0	0	0	0	0	0	3	3	3	3	2	2	4	4	4	4	4	4
	3	2	3	3	2	3	4	4	4	4	3	4	4	4	4	4	2	2	2	1	1	1	1	1
	1	1	3	3	2	4	3	2	2	3	3	3	4	3	4	1	0	0	0	0	0	0	0	99
	99	99	99	99	1	1																		
47	0	0	0	0	0	0	0	0	1	0	0	0	99	99	99	99	99	99	1	3	4	1	5	4
	4	3	1	2	3	1	3	3	4	1	1	4	4	2	2	2	1	1	1	1	1	1	1	1
	1	4	5	1	1	1	4	1	3	3	3	4	1	1	1	99	99	99	99	99	99	99	99	99
	99	99	99	99	2	1																		
39	0	0	0	1	0	0	0	0	0	0	0	0	4	4	3	3	4	3	4	4	4	5	5	2
	2	1	4	2	2	5	5	5	3	2	2	4	4	2	5	5	4	2	1	99	99	99	1	1
	1	99	4	99	2	3	4	2	5	5	4	4	3	3	3	1	0	0	0	0	0	0	0	1
	1	0	0	0	2	1																		
44	1	0	0	0	0	0	0	0	0	0	0	0	1	4	3	1	3	1	2	2	3	2	4	5
	2	2	3	99	4	3	3	4	3	1	1	2	4	5	3	3	5	4	4	2	2	2	1	2
	1	2	2	2	4	1	5	2	4	4	1	1	1	4	2	1	1	1	1	1	1	0	0	0
	0	0	0	1	2	1																		
36	0	0	0	0	0	0	1	0	0	0	0	0	2	2	1	1	2	4	2	2	5	5	1	5
	4	4	3	4	2	4	5	4	4	2	1	4	3	4	2	2	3	5	2	3	3	3	3	3

	3	3	3	2	2	4	2	2	5	5	2	5	3	4	4	0	0	0	0	1	1	0	0	1
	0	0	0	0	1	3																		
50	0	0	1	0	0	0	0	0	0	0	0	0	4	4	2	3	4	2	2	2	5	3	3	5
	4	4	2	1	2	4	2	2	5	1	1	4	4	5	5	5	3	99	3	3	1	1	1	1
	1	1	3	3	1	5	5	2	4	4	2	2	3	3	3	99	99	99	99	99	99	99	99	99
	99	99	99	99	1	3																		
43	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	3	1	5	3	5	5
	2	5	5	1	1	5	5	4	5	1	1	5	3	2	1	2	5	3	3	1	1	1	1	1
	1	1	1	1	1	1	5	3	3	3	1	1	1	1	1	99	99	99	99	99	99	99	99	99
	99	99	99	99	2	2																		
19	0	0	0	1	0	0	0	0	0	0	0	0	4	4	2	4	4	2	4	4	4	4	4	4
	4	3	3	2	2	3	3	4	5	2	2	4	5	4	4	4	1	1	1	1	1	1	1	1
	99	2	2	3	4	4	5	1	3	3	4	5	4	3	4	99	99	99	99	99	99	99	99	1
	1	0	0	0	1	2																		
20	0	0	0	0	0	0	0	0	0	0	1	0	4	3	4	2	2	4	2	2	3	4	3	4
	2	2	2	4	4	2	3	3	2	2	2	2	3	4	2	3	2	2	2	2	3	3	3	3
	3	3	3	2	4	4	4	2	3	3	2	3	2	2	2	99	99	99	99	99	99	99	99	99
	99	99	99	99	2	1																		
36	0	0	0	0	0	0	1	0	0	0	0	0	3	4	4	2	3	4	5	5	5	4	5	2
	4	4	3	3	4	3	2	2	4	3	4	4	4	2	4	4	4	4	3	3	2	2	2	3
	3	4	3	4	4	3	4	4	4	4	4	4	2	2	4	1	0	1	1	1	0	1	1	99
	99	99	99	99	1	1																		
37	0	0	0	0	1	0	0	0	0	0	0	0	3	3	3	3	3	3	5	5	5	5	5	5
	4	1	1	1	3	5	5	2	4	3	1	4	4	5	5	5	3	5	3	2	2	2	2	2
	2	2	4	2	2	5	5	3	4	4	3	3	4	3	3	1	1	1	1	0	0	0	0	99
	99	99	99	99	1	2																		
37	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	2	4	4	3	4	4
	2	1	3	1	1	4	5	2	4	1	1	3	3	2	2	2	5	4	2	1	1	1	1	1
	1	1	1	1	1	3	3	1	4	4	2	2	1	1	1	1	0	0	0	0	0	0	0	0
	0	1	0	0	2	1																		
20	0	0	0	0	0	0	0	0	0	0	1	0	2	2	3	2	2	4	3	4	4	2	3	4
	2	2	1	3	4	4	3	4	3	3	3	4	4	5	3	4	1	1	1	3	2	2	99	99
	99	1	2	1	2	3	4	2	3	3	4	4	3	3	3	99	99	99	99	99	99	99	99	99
	99	99	99	99	2	2																		

36	0	0	0	0	0	0	1	0	0	0	0	0	2	3	2	4	4	3	4	4	4	5	4	2
	5	3	4	4	3	5	4	3	4	2	2	3	4	1	3	2	3	5	2	4	2	2	4	2
	4	1	4	1	4	2	2	1	4	4	3	3	1	2	3	1	1	1	1	1	1	1	1	99
	99	99	99	99	2	2																		
40	0	0	0	0	0	0	0	1	0	0	0	0	99	2	1	1	1	1	2	4	5	1	5	2
	2	2	1	1	3	2	3	3	2	1	1	2	3	3	1	1	5	5	1	1	1	1	1	1
	1	1	1	1	1	3	5	2	3	3	3	4	1	1	1	1	0	1	1	1	1	1	0	0
	0	1	0	0	2	2																		
39	0	0	0	1	0	0	0	0	0	0	0	0	2	5	2	4	4	2	3	5	1	4	4	3
	4	1	4	2	3	4	3	5	3	1	1	3	2	2	4	4	3	3	1	3	3	3	1	1
	1	4	4	3	5	1	4	1	5	5	5	3	1	1	3	1	0	0	0	0	0	0	0	0
	1	1	0	1	2	1																		
44	1	0	0	0	0	0	0	0	0	0	0	0	3	4	2	4	3	3	4	3	4	4	4	3
	4	2	4	3	5	3	3	4	5	2	1	2	4	4	4	4	4	2	2	3	3	3	3	3
	3	3	3	3	3	2	5	2	4	4	2	2	2	4	3	99	99	99	99	99	99	99	99	99
	99	99	99	99	1	1																		
44	1	0	0	0	0	0	0	0	0	0	0	0	99	99	99	99	99	99	4	4	5	99	4	5
	1	2	2	3	4	4	5	5	3	1	3	2	4	2	4	4	4	99	99	2	2	2	2	2
	2	4	4	4	4	2	5	99	4	4	2	3	2	2	2	99	99	99	99	99	99	99	99	99
	99	99	99	99	2	1																		
44	1	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	4	5	5	2	5	5
	1	3	1	1	4	4	4	3	3	1	1	3	4	5	4	4	5	5	5	1	1	1	1	1
	1	3	3	1	2	3	5	2	4	4	3	3	4	4	4	1	1	1	1	0	0	0	0	0
	0	1	0	1	2	1																		
50	0	0	1	0	0	0	0	0	0	0	0	0	4	3	1	5	1	1	3	5	4	3	3	4
	2	2	5	1	4	4	2	2	4	1	1	2	4	1	2	4	5	1	1	1	1	1	1	1
	1	1	5	1	1	1	5	3	4	4	1	1	1	3	1	99	99	99	99	99	99	99	99	1
	0	0	0	0	2	1																		
40	0	0	0	0	0	0	0	1	0	0	0	0	4	4	4	3	4	2	5	2	4	4	5	4
	2	5	1	3	5	4	5	4	5	1	1	2	4	4	4	2	5	5	3	1	1	1	1	1
	1	3	3	3	3	1	5	2	5	3	4	5	1	4	5	0	0	1	1	1	1	0	0	1
	0	1	0	1	2	1																		
47	0	0	0	0	0	0	0	0	1	0	0	0	1	2	1	1	1	1	1	4	4	2	4	5
	3	4	1	2	2	3	3	3	4	1	1	4	4	1	2	2	1	1	1	1	1	1	1	1

```
     1   3   4   1   1   2   5   1   5   5   4   3   3   3   2  99  99  99  99  99  99  99  99  99
    99  99  99  99   1   1
20   0   0   0   0   0   0   0   0   0   0   1   0   1   3   2   2   2   2   1   4   2   2   5   1
     2   2   1   4   5   2   2   3   2   3   2   1   4   4   2   4   2   1   1   1   1   1   1   1
     1   1   3   1   3   5   4   2   5   5   4   3   2   4   3  99  99  99  99  99  99  99  99  99
    99  99  99  99   1   1
39   0   0   0   1   0   0   0   0   0   0   0   0   5   5   2   4   5   2   5   5   2   4   5   4
     5   2   5   2   3   5   5   5   5   1   1   4   2   1   5   5   4   2   1   3   3   3   1   1
     1   3   5   1   1   3   3   2   4   4   5   5   2   4   5  99  99  99  99  99  99  99  99   0
     0   0   0   1   2   1
39   0   0   0   1   0   0   0   0   0   0   0   0   4   5   4   4   4   4   4   4   3   4   5   5
     3   2   4   4   3   4   5   5   4   3   2   4   3   4   5   5   5   5   3   3   3   3   3   3
     3   3   3   3   3   3   4   4   4   4   4   5   3   4   4   1   0   0   0   0   0   1   1   1
     1   1   0   1   2   1
43   0   0   0   0   0   0   0   0   0   1   0   0   5   5   2   4   4   4   2   2   2  99   5   2
     2   5   4   1   2   5   4   2   5   1   2   1   4   1   5   2   4   5   1   1   1   1   1   1
     1   1   1   1   1   1   5  99   2   4   1   1   1   1   1   0   1   0   1   1   0   0   0  99
    99  99  99  99   2   2
20   0   0   0   0   0   0   0   0   0   0   1   0   1   1   4   1   1   4   1   4   4   1   3   1
     2   4   1   3   3   1   4   4   4   2   1   2   4   4   4   4   2   2   2   4   4   4   1   1
     1   3   1   2   2   4   5   2   5   5   5   5   2   4   4  99  99  99  99  99  99  99  99  99
    99  99  99  99   2   1
40   0   0   0   0   0   0   0   1   0   0   0   0   3   5   2   3   4   3   5   3   5   5   5   2
     1   4   1   2   4   3   5   4   5   2   1   2   5   2   4   4   5   1   5   1   1   1   1   1
     1   1   1   1   1   1   5   5   5   5   1   1   1   4   1   0   0   1   1   1   1   0   0   1
     0   1   0   1   2   1
47   0   0   0   0   0   0   0   0   1   0   0   0   1   1   1   1   1   1   4   5   4   3   3   4
     4   4   2   4   4   4   5   4   5   4   2   4   4   2   4   3   3   3   1   1   1   1   1   1
     1   1   1   1   1   3   5   3   4   4   3   4   5   5   5  99  99  99  99  99  99  99  99  99
    99  99  99  99   1   1
36   0   0   0   0   0   0   1   0   0   0   0   0   2   2   4   2   4   2   5   5   4   4   4   3
     2   4   2   5   5   3   4   4   3   3   4   4   5   3   4   2   1   4   5   5   5   5   3   2
     4   1   2   1   1   3   1   2   4   5   5   5   2   5   3   1   1   1   1   1   1   1   1  99
    99  99  99  99   1   1
```

Appendix L

Raw Data for Bem Sex Role Inventory (BSRI)

VAR01	VAR02	VAR03	VAR04	VAR05	VAR06	VAR07	VAR08	VAR09	VAR10	VAR11	VAR12		
VAR13	VAR14	VAR15	VAR16	VAR17	VAR18	VAR19	VAR20	VAR21	VAR22	VAR23	VAR24		
VAR25	VAR26	VAR27	VAR28	VAR29	VAR30	VAR31	VAR32	VAR33	VAR34	VAR35	VAR36		
VAR37	VAR38	VAR39	VAR40	VAR41	VAR42	VAR43	VAR44	VAR45	VAR46	VAR47	VAR48		
VAR49	VAR50	VAR51	VAR52	VAR53	VAR54	VAR55	VAR56	VAR57	VAR58	VAR59	VAR60		
FScore	MScore												
5	3	6	6	4	5	6	2	4	3	5	3	5	2	7	7	7	4	5	4	6	7	3	3	6
	4	6	4	5	2	6	4	6	6	4	3	5	3	5	5	4	3	6	4	5	3	3	2	6
	2	4	5	2	2	5	5	4	6	4	5	3.7	5.1											
3	6	5	6	4	4	5	7	3	7	6	5	5	6	5	3	5	6	6	1	4	7	6	6	4
	7	6	4	5	4	6	6	7	3	7	4	4	5	5	6	7	6	6	7	4	5	5	6	4
	6	7	6	6	5	4	4	4	7	3	1	5.45	4.75											
6	4	7	7	4	4	6	7	6	3	5	1	4	3	5	6	7	4	3	3	5	6	6	5	2
	5	5	5	6	6	4	5	5	6	6	3	2	7	4	3	5	4	6	5	5	3	2	4	2
	3	6	6	5	1	4	2	5	3	5	4	4.75	4.05											
6	5	6	3	4	5	7	6	5	3	3	1	4	3	4	3	5	2	2	1	3	4	3	5	4
	4	5	3	5	3	3	4	5	5	5	2	4	5	5	5	4	3	4	3	6	3	5	5	4
	6	6	6	3	2	5	4	5	6	4	3	4.1	3.9											
5	5	5	6	6	4	6	6	5	6	6	5	6	5	6	5	5	3	3	4	6	6	6	3	3
	6	6	6	5	6	6	5	6	5	6	5	4	4	5	4	6	4	6	5	6	3	3	3	3
	6	5	5	6	3	3	6	5	6	5	5	5.3	4.6											
5	5	6	6	6	3	6	3	4	5	6	6	5	5	6	5	7	3	5	4	7	6	6	2	6
	5	7	4	6	5	6	5	6	6	4	4	5	6	5	5	6	5	6	3	7	2	3	4	4
	1	6	4	5	4	3	7	5	5	6	5	4.95	4.75											
6	3	6	7	6	2	6	3	5	3	5	2	6	4	6	6	6	3	2	2	6	5	6	4	6
	5	6	5	6	5	5	5	5	6	4	2	4	4	5	6	5	5	6	5	6	3	4	4	5
	3	6	6	3	2	5	3	2	6	6	5	4.4	4.9											

5	4	5	6	5	3	6	3	4	3	5	2	5	3	6	5	6	2	4	2	6	5	5	3	4
	4	5	5	4	3	5	5	5	5	5	4	5	3	4	5	4	3	5	4	6	3	2	2	3
	3	4	4	3	2	5	4	4	5	5	4	3.95	4.45											
6	5	5	5	6	3	6	6	6	5	5	4	3	3	5	4	5	4	4	3	5	5	4	3	4
	4	4	3	5	5	2	5	5	5	2	3	3	2	5	5	3	4	4	3	5	3	4	4	3
	4	4	5	5	4	6	5	5	4	4	5	4.15	4											
2	5	6	4	5	3	2	6	4	1	5	2	2	6	5	3	4	3	3	2	5	5	4	5	4
	4	4	4	5	6	4	5	6	3	6	3	3	6	5	5	5	4	4	5	5	3	2	2	2
	2	4	4	2	5	6	6	5	4	5	4	4.5	3.2											
7	3	6	7	6	5	6	3	6	4	6	5	6	4	6	7	7	6	1	3	5	6	7	1	5
	7	5	5	6	6	6	6	7	7	7	4	6	5	5	4	6	4	6	6	6	1	2	4	5
	7	7	7	5	5	3	7	7	7	7	2	5.5	4.95											
6	6	5	5	5	4	5	5	4	2	5	3	4	6	5	5	5	3	2	3	4	4	6	4	6
	6	5	3	5	4	2	5	5	3	7	2	3	2	6	3	5	3	2	5	6	4	7	6	5
	5	6	3	3	2	4	5	3	3	5	4	5.05	3.55											
5	5	5	6	4	4	5	3	4	2	3	3	5	3	4	5	5	7	4	1	4	5	6	4	3
	4	4	6	4	6	2	4	3	5	5	4	5	4	3	7	4	2	3	2	6	4	5	5	3
	2	5	4	6	6	6	2	3	4	4	4	3.8	4.25											
5	4	6	6	6	5	6	3	4	2	6	3	6	6	6	6	6	3	6	5	6	6	6	4	6
	5	6	6	6	4	5	6	6	6	6	3	6	6	6	4	6	3	6	6	6	4	3	4	6
	3	6	5	6	3	6	7	6	6	6	5	5.4	5.2											
5	4	5	5	3	5	6	5	3	4	2	4	3	5	3	2	5	5	3	2	5	7	5	4	3
	3	4	3	5	6	4	5	3	5	6	4	5	3	1	5	3	3	4	2	3	5	6	3	5
	5	6	5	2	2	4	5	2	5	5	1	4.05	4.15											
6	6	7	6	4	4	7	3	5	3	2	2	6	2	6	7	7	3	5	4	5	6	6	6	5
	7	6	6	6	6	5	5	6	6	6	6	5	4	4	2	4	4	4	4	5	5	2	3	5
	1	5	4	6	2	6	4	4	5	5	5	4.4	5											
4	5	5	5	4	4	4	3	4	2	3	2	4	4	5	5	6	2	3	1	5	4	5	3	4
	5	5	4	4	1	4	5	5	3	6	2	4	5	5	6	6	3	5	6	6	2	3	4	3
	4	4	4	6	3	4	7	5	4	6	4	4.7	3.7											
7	3	6	7	6	2	7	2	5	5	2	7	7	3	6	7	7	5	5	3	7	5	5	3	7
	4	5	6	4	5	6	5	5	7	6	2	5	5	5	5	3	6	7	4	4	4	3	3	6
	5	7	7	2	2	6	6	2	7	4	3	4.1	5.8											

4	5	6	6	6	5	4	6	6	3	6	3	4	4	5	5	6	6	5	3	5	5	6	6	4
	5	6	4	4	6	4	5	6	4	6	5	4	4	5	4	5	4	5	6	6	3	4	3	3
	4	5	4	6	5	6	6	5	5	6	5	5.15	4.1											
4	3	2	4	2	5	3	4	5	6	5	4	4	4	6	5	7	6	5	4	7	6	5	2	6
	6	7	5	7	6	6	5	7	4	4	5	6	6	6	4	5	5	6	3	7	2	4	4	6
	2	6	6	7	6	4	7	6	7	7	5	4.85	4.65											
2	4	7	7	5	4	6	5	7	4	6	1	6	4	5	6	7	1	4	1	7	6	6	3	6
	6	7	5	5	6	5	7	6	2	6	5	6	5	6	4	7	5	5	4	6	5	4	1	6
	4	6	6	4	1	6	4	7	6	4	3	4.9	4.85											
6	3	6	7	7	2	6	2	6	7	6	6	6	5	6	5	7	5	5	5	7	5	5	5	6
	6	6	6	5	7	5	6	7	6	6	5	5	4	6	6	5	4	6	6	7	5	6	4	4
	4	6	5	7	3	6	5	7	6	6	5	5.3	5.4											
7	5	7	5	7	3	7	3	3	5	5	2	4	3	5	6	6	3	4	3	6	7	4	3	5
	4	6	5	6	4	2	6	7	5	3	3	3	3	6	3	6	2	7	7	7	4	3	2	4
	1	6	5	7	4	6	6	7	7	5	4	4.65	4.8											
5	7	7	4	7	4	5	6	5	7	6	5	5	1	7	6	7	4	3	4	6	6	7	3	6
	7	5	5	6	6	5	7	6	5	5	2	4	5	7	4	4	3	4	5	7	4	2	3	4
	5	6	3	6	3	6	6	5	7	6	4	5.45	4.75											

Appendix M

Raw Data for Gender Inclusivity Rating Scale (GIRS)

NVA1	NVA2	NVA3	NVA4	NVA5	NVA6	GS1	GS2	GS3	FG1	FG2	FG3	FG4	NVC1	NVC2	NVC3	NVC4	ACT1	ACT2	ACT3	FEED1	FEED2
	FEED3		FEED4		FEED5		PER1	PER2	PER3	AVP1	AVP2	AVP3	AVP4	AVP5	AVP6	AVP7	AVP8	AVP9	AVP10	AVP11	AVP12
	AVP13		AVP14		SM1	SM2	SM3	STOR1		STOR2		STOR3		STOR4		STOR5		REV_NVA3	REV_NVA6	REV_NVC3	
	REV_NVC4		REV_FEED2			REV_FEED3			REV_PER1		REV_AVP3		REV_AVP4		REV_AVP5		REV_AVP6	SS_NVA	SS_GS	SS_FG	
	SS_NVC		SS_ACT		SS_FEED		SS_PER		SS_AVP		SS_SM		SS_STOR		GENDER		AGE				
3	4	4	2	3	4	4	4	3	3	4	2	4	2	4	4	3	5	3	5	3	2	1	2	4
	1	5	4	4	2	4	2	4	3	1	0	0	0	0	0	0	0	3	5	5	2	2	1	2
	2	2	2	2	3	4	5	5	2	4	2	3	3.33	3.67	3.25	3.25	4.33	2.4	3.33	1.43	4.33	1.8	2	1
4	4	1	5	4	1	5	4	3	5	5	4	4	2	3	4	4	5	5	5	4	1	1	4	2
	1	3	5	2	2	1	1	2	4	1	0	0	0	0	0	1	1	3	5	5	4	4	2	2
	3	5	5	2	2	5	5	5	5	5	4	2	3.17	4	4.5	3.25	5	2.4	3	1.07	4.33	3	2	1
4	5	1	4	4	1	5	3	4	3	3	4	5	3	5	2	2	4	5	4	4	1	1	3	3
	2	5	5	2	1	1	1	3	4	1	0	0	0	0	0	0	0	3	5	4	5	4	2	2
	2	5	5	4	4	5	5	4	5	5	3	2	3.17	4	3.75	3	4.33	2.4	4	0.93	4	3	1	1
2	4	2	4	3	2	2	1	1	3	2	2	3	1	4	2	3	2	1	3	3	1	1	3	1
	1	4	4	1	1	1	1	4	3	1	0	0	0	0	0	1	0	2	5	5	3	2	1	1
	1	4	4	4	3	5	5	5	5	5	2	3	2.83	1.33	2.5	2.5	2	1.8	3	0.93	4	1.6	2	2
4	3	3	4	4	4	4	3	2	3	4	4	4	4	3	4	3	4	4	4	3	2	2	3	4
	4	4	3	2	2	2	2	4	3	1	0	0	0	0	0	0	1	3	4	4	3	4	3	3
	4	3	2	2	3	4	4	2	4	4	2	3	3.67	3	3.75	3.5	4	2.8	3.67	1.21	3.67	3.4	1	1
4	3	2	3	4	3	5	2	2	3	4	4	2	3	4	4	2	4	3	4	4	2	1	1	1
	3	3	4	5	4	1	1	4	3	1	1	1	0	0	0	0	0	4	4	4	4	4	3	4
	3	4	3	2	4	4	5	3	5	5	2	3	3.17	3	3.25	3.25	3.67	1.8	3.33	1.5	4	3.6	1	3
2	4	3	4	3	3	4	2	4	3	3	4	4	2	2	3	3	4	4	4	4	2	2	4	2
	1	4	4	3	1	1	1	3	1	0	0	0	0	0	0	0	0	1	5	5	4	3	1	3
	2	3	3	3	3	4	4	5	5	5	3	5	3.17	3.33	3.5	2.5	4	2.8	3	0.71	3.67	2.6	2	1

4	4	2	3	3	4	4	3	2	2	3	3	4	3	4	2	3	3	2	3	4	2	1	4	4
	2	3	4	3	3	3	3	3	4	1	0	0	0	0	0	0	0	3	4	4	4	3	3	3
	3	4	2	4	3	4	5	4	3	3	3	2	3.33	3	3	3	2.67	3	3	1.43	3.67	3.2	2	1
3	4	2	4	4	2	4	3	3	4	3	4	3	4	4	2	3	4	3	4	4	2	2	3	4
	1	2	4	3	3	3	3	3	2	1	0	0	0	0	0	0	0	2	4	4	3	3	2	3
	2	4	4	4	3	4	4	5	3	3	3	4	3.17	3.33	3.5	3.25	3.67	3	2.33	1.29	3.33	2.6	2	1
2	4	4	2	4	5	4	4	3	4	4	4	5	2	5	4	3	5	5	5	5	1	1	5	2
	2	3	4	2	1	3	3	4	4	1	0	0	0	0	0	1	1	3	4	5	4	2	2	4
	3	2	1	2	3	5	5	4	3	3	2	2	3.5	3.67	4.25	3.5	5	2.8	3	1.43	4	3	2	1
5	5	2	4	4	2	4	4	4	4	3	4	4	2	4	2	2	4	3	3	5	1	1	4	5
	3	5	4	3	1	2	2	2	2	1	0	0	0	0	0	0	1	3	5	5	4	4	2	3
	4	4	4	4	4	5	5	3	4	4	4	4	3.67	4	3.75	2.5	3.33	3.2	4	1	4.33	3.4	2	1
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