EMOTION-DRIVEN INTERACTIVE STORYTELLING

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ABSTRACT

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Emotion-driven Interactive storytelling

Interactive storytelling has attracted plenty of research interest in recent years. Most current interactive storytelling systems follow a goal-oriented approach to story representation, i.e. the user is engaged with the story through fulfilling a number of goals rather than empathising with the characters and experiencing an enriched emotional experience (Pizzi and Cavazza 2007). This fails to satisfy potential users who are oriented to traditional media, such as movies (Louchart et al. 2008) and demographic groups who are interested in attractive and challenging stories (Duh et al. 2010). Given this consideration, an emotion-driven interactive storytelling approach is proposed in this research.

In contrast to the goal-oriented interactive storytelling approach, emotion-driven interactive storytelling attempts to create an engaging emotional experience, and involve the user's emotion with the characters. More importantly, the user's emotions, evoked by empathising with the characters, determine the character's behaviours and therefore have an impact on the whole storyline. In this sense, emotions, as a driving force, directly and explicitly contribute to storytelling and the user experience.

An interactive video was made by re-editing existing TV material to interpret the concept of emotion-driven interactive storytelling. The examination of user experience of playing this interactive video revealed that non-gamers were more likely to be emotionally involved with the interactive video and empathise with the character. Participants in this group also exhibited higher enjoyment and engagement than gamers. In addition, females were found more likely to empathise with the character and satisfy with the storyline. However because the TV material used to make the interactive video was female-oriented, males failed to enjoy and engage themselves as much as females. But it is important to note that in comparison to males' previous experience of watching TV Ugly Betty, emotion-driven interactive storytelling increased their enjoyment and engagement. Therefore, emotion-driven interactive storytelling enriches the approach to developing interactive storytelling systems and has the potential to provide an engaging user experience to some types of users. Future research possibilities are discussed with respect to a wider population and research where materials suitable for both genders are presented.

LIST OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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CHAPTER 1

INTRODUCTION

In recent decades, the convergence of traditional and interactive media has led to a promising field in digital entertainment, which is interactive storytelling. Since the first interactive fiction *Colossal Cave Adventure* was published in 1976, researchers have been working on storytelling using the computer as a new medium, whereby the user can have an impact on the evolution of the story. Therefore, interactivity, as "the computer's ability to take in voluntary or involuntary user input and to adjust its behaviour accordingly" (Ryan 2006, p.98), opens up new horizons for storytelling. Interactive storytelling has attracted plenty of research interest in recent years (Barros and Musse 2007). However, a widely-accepted definition of interactive storytelling is still debated. Different opinions reflecting the researcher's "short-term presentation technique" or research objectives have been proposed (Arinbjarnar et al. 2009). Therefore, a simple, instinctive starting point for this study is to clarify the definition of interactive storytelling at the beginning of this chapter.

1. 1 Interactive Storytelling: a definition for this study

Interactive storytelling, as a combination of "interactive" and "storytelling", does not focus on interactivity or narrative alternately, but emphasises on the

cooperation between them. Interactive storytelling systems, on one hand, aim to create a dramatic and engaging story; on the other hand, they allow the user to intervene with ongoing plots or characters and influence the way that the story is created. In this sense, interactive storytelling is a story-centred experience. The primary goal of interactive storytelling systems is to create an engaging story experience for the user (Barros and Musse 2005, 2007; Dória et al. 2008; Crawford 2004; Thue et al. 2007). However, in contrast to the way that traditional media create stories which rely on the author's "god-like power", interactive storytelling gives the user freedom to participate in the process of storytelling and generate a specific user experience (Mitchell 2008).

In addition to "interactive storytelling", some other terms are also used in academia by different research groups to refer to this new form of storytelling (Arinbjarnar et al. 2009; Clarke and Mitchell 2001; Shaw 2004). Specifically, digital games, interactive fiction and interactive drama are often mentioned in the same breath with interactive storytelling. Crawford, one of the pioneer researchers in interactive storytelling, has claimed that interactive storytelling is not equivalent to digital games because they have different design strategies (Crawford 2004): interactive storytelling focuses on the plots and character design to represent a story, while digital games emphasise the interaction mechanism, graphic quality and sound effects to encourage the user's interaction. However, in recent years, as the quality of hardware has restricted the improvement of graphic qualities and sound effects, game designers have begun to seek other solutions to attract more users and expand the market for digital games (Ryan 2005). Story therefore is becoming a significant element in some game genres, such as adventure games, role-playing games and first-person shooter games (Arinbjarnar et al. 2009). In particular, the commercial success of the digital game *Heavy Rain* to some extent reveals that integrating interactive stories into gameplay could be an appropriate solution for future gaming design. In this sense, digital games are viewed as an important application of interactive storytelling (El-Nasr 2007; Karlsson et al. 2009).

Similarly, interactive fiction is also considered to be different from interactive storytelling because interactive fiction has tended to focus on puzzle-solving and navigating through preconceived circumstances rather than character and plots (Crawford 2004). The first interactive fiction *Colossal Cave Adventure* was a text-based cave exploration game. The user is required to solve a number of puzzles, and a story is told during his/her exploration in the cave. Therefore, interactive fiction used to be equated with adventure games (Shaw 2004).

In recent years, there has been a growing interest in studying interactive drama. However, a unified definition of interactive drama is also missing in the research field. Many researchers (Bates 1992; Rawlings and Andrieu 2003; Laurel 1986; Szilas 2005; Mateas 2004) consider interactive drama as a first-person perspective interactive entertainment (*e.g.* Façade), while others deem it can be a third-person experience (*e.g.* FearNot!; Mateas and Sengers 1999; Arinbjarnar et al. 2009). Interactive drama portrays events in real time and has an intensified unity of actions which is directly represented to the user in a visual and audio way (Laurel 1991; Szilas 1999). Accordingly, all audio-video-based interactive entertainment is classified into interactive drama, including interactive movies, interactive video, and video games (Szilas 1999). In this sense, interactive drama excludes the text-based formats of interactive storytelling, such as hypertext fictions, as hypertext fictions can extend time by describing a couple of seconds of action in a written language. Therefore, interactive drama is defined as a new "narrative genre" (Szilas 2005), and "a format of interactive storytelling" (Rawlings and Andrieu 2003).

The variety of terms used in the research field has resulted in inconsistency amongst researchers. To achieve clarity and accuracy, in this study, I propose a definition of interactive storytelling based on the investigation of previous studies.

> Interactive storytelling is a new form of storytelling,
> which allows the user to control or have an impact on the
> evolution of the story and create a unique user experience
> for each user. In a broader sense, it comprises any forms

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of storytelling which aim to create a story through the user's interaction, including: 1. text-based interactive entertainment, such as hypertext fiction; 2. audio-video based interactive entertainment, such as interactive drama; 3. digital games, which consist of different genres - some genres are text-based and some genres are audio-video based.

Given the different techniques used to create an interactive story in text-based interactive entertainment and audio-video based interactive entertainment, this study mainly focuses on an audio-video based interactive storytelling approach. To avoid repeating the term "interactive storytelling", the abbreviation 'IS' will be used for the rest of this thesis unless it is necessary to write it in full.

1. 2 Motivation of This Study

Since the term 'interactive storytelling' was introduced by Crawford (2004), a number of interactive storytelling concepts and systems have been proposed in an effort to create a dramatic and engaging narrative experience through the user's interactions. In particular, two types of approaches, plot-based interactive storytelling and character-based interactive storytelling, have been widely used in most current interactive storytelling design.

Inspired by narratology in literature and filmmaking, a plot-based approach has been deployed in a number of existing interactive storytelling systems, such as *Façade* (Mateas and Stern 2003), *Mimesis* (Young et al. 2004), and *IDA* (Magerko 2005). In particular, Grasbon and Braun (2001) proposed an interactive storytelling system based on Russian formalist Vladimir Propp's (1928) theory, which provides a typical demonstration of the plot-based approach. After investigating a sample of 100 Russian fairy tales, Propp claimed that narrative functions are the basic units of folktales. Function here is viewed as "an act of dramatis personae, which is defined from the point of view of its significance for the course of action of a tale as a whole" (Propp 1958, p.20). Propp further

confirmed that all Russian folktales are comprised of 31 narrative functions, such as *absence, interdiction, transgression* etc. More importantly, these functions are organised in a fixed chronological order. According to Propp's theory, the authors pre-set a variety of story segments as narrative functions for the story engine. A specific story segment is executed at a certain time according to the user's choices, which exerts a direct influence on the remaining plots. The plot-based approach focuses on the manipulation of the narrative structure of the overall story. All story segments are pre-authored. In this sense, the author exerts strong control on the story generation, which helps to maintain the coherence and dramatisation throughout the whole narrative. However, the author's control restrains the user's freedom of interaction. The user is not allowed to interact with the story at any time. He/she has to wait until a story segment is over and the storyline reaches a predefined point. Therefore, the opportunities for interaction and the diversity of stories are reduced (Dória et al. 2008).

Another approach applied in a number of interactive storytelling systems (*e.g. FearNot!* (Paiva et al. 2004), *MRE* (Swartout 2001), *SASO* (Traum et al. 2005), *Thespian* (Si et al. 2005) is character-based interactive storytelling. Different from a plot-based approach, character-based interactive storytelling allows the user to interact with the story through the control of a character (*i.e.* avatar). Therefore, character-based IS focuses on the design of autonomous characters' behaviours. In most existing IS systems, the character's behaviours are motivated by narrative constraints rather than emotional feelings or social reasoning (Si et al. 2007; Mateas and Sengers 1999; Szilas 1999). In order to attach narrative meanings to the character's behaviours, goals and plans are modelled as the motivation. Narrative therefore is generated from the interactions between the autonomous characters pursuing their goals. Cavazza et al. (2002) apply the character-based approach to their interactive storytelling systems. They define a superset of all possible behaviours for each character. A plan is used to make dynamic choices of the character's behaviours within this superset in accordance with the pre-authored goals. The user, as a spectator, watches and follows the story in a third-person perspective. He/she is allowed to interfere with the ongoing storyline at

anytime to influence the character's behaviours, and thereby alter the plot as it unfolds. The user's freedom of interaction is the strength of character-based interactive storytelling. However, it is likely to lead the plot to an unexpected situation or miss out essential pre-authored events, which violates the coherence and dramatisation of the story (Ciarlini et al. 2005). There is no guarantee that narrative generated from the interaction between autonomous characters will be dramatic.

To bridge the gap between plot-based IS and character-based IS, Cai et al. (2007) proposed a hybrid system by combining story authoring and character behaviour modelling together. Ciarlini et al. (2005) also developed an interactive drama system *Logtell* based on modelling and simulation. *Logtell*, on one hand, applies Propp's narrative theory as the overall narrative structure, which follows a plot-based approach. On the other hand, character-based modelling is added under some goal-inference rules, specifying which situations are applied to generate new goals for the characters (Dória et al. 2008). These hybrid systems attempt to reduce the shortcomings of character-based and plot-based IS approaches. They, to some extent, help to keep the dramatisation of story while giving greater freedom for the user interactions.

Although there have been a variety of designs and developments in IS systems, they all employ some pre-authored goals as the driving force to direct storylines and motivate user interaction (Thue et al. 2007). This can be seen in both character-based and plot-based IS approaches. In the character-based IS approach, pre-authored goals are explicitly defined as the character's goals. As El-Nasr (2007) noted, defining characters' goals is a dramatic technique in designing IS systems. In particular when the user's interactions violate the dramatisation of the story, it helps to figure out alternative solutions for the characters to achieve their goals. For example, in Cavazza et al.'s (2002) character-based IS system, the story is adapted from the US television sitcom *Friends*, and in one scenario Ross wants to take Rachel out, but before that he wants to find out something about Rachel from Phoebe, Rachel's good friend, without letting Rachel know. However, when

Ross goes to see Phoebe, Rachel happens to be with her. Therefore, an alternative solution is carried out by the system in which another character, Monica, comes to talk to Rachel and asks Rachel to leave. The implementation of the alternative solution helps Ross to achieve his goal, which makes sure the story moves forward accordingly.

In contrast with a character-based approach, pre-authored goals in plot-based IS are defined in a relatively implicit way. They are either shown as the expected dramatic level that the author defines for the user or as a "narrative meaning" which underlies the narrative structure (Szilas 1999; Tanenabaum and Tomizu 2008). For example, in a dilemma-based interactive storytelling system *GADIN*, each dilemma has a pre-defined fixed "interestingness" value, which is used to select the appropriate dilemmas to present to the user. In a scenario, the user is required to make a decision on whether or not she/he is going to cheat on his/her partner. The interestingness value is set as 7 for choosing to cheat, 4 for choosing not to cheat. The system estimates the potential user choice by evaluating the user's previous choices and then selects and presents the forthcoming dilemma (Barber and Kudenko 2007). In another IS system *Mimesis*, a story planner is used to accommodate and intervene with the user's interactions in accordance with the pre-authored "narrative meaning". In a bank robbery scenario, if the user opens a vault which is supposed to be opened by another character, the forthcoming storyline is accommodated as the character tries to open the vault but finds it opened. If the accommodation is not possible or fails to be carried out, the user's actions would be intervened, such as being prevented from opening the vault by another character. In this sense, pre-authored goals play an important role in deciding the forthcoming plots and guiding the evolution of the story. In addition, they also serve as a vital motivation for user interactions. Ryan (2008) examines the potential of three kinds of plots for IS, epic plot, epistemic plot and dramatic plot, and suggests that all the efforts the user makes in an IS system are towards the achievement of a fixed pre-authored goal in epic and epistemic plots and of a set of spontaneously adapted goals in dramatic plots.

Defining pre-authored goals has become a significant technique for moving the story forward and motivating user interactions in most existing interactive storytelling. Schell (2005) reveals that the user's interest level is high when they are focusing on achieving goals. Csikszentmihalyi (1990) also identifies clear goals as one of the major characteristics of being in "flow". Therefore, defining pre-authored goals is able to provide the user with an interesting and flow experience in IS. However, it leads to the fact that the user is engaged with the story through completing a series of tasks to achieve the pre-authored goals rather than empathising with the characters and gaining an enriched emotional experience. As a result, a number of self-directed emotions which reflect the success or interest in completing these tasks and achieving the goals are overwhelmingly evoked (Ryan 2008). In contrast, the other-directed emotions with respect to empathising with the characters and events are relatively difficult to experience. So, for example, the user could feel happy as a result of successfully saving a princess in an interactive story, but would rarely experience the romantic feeling that might motivate them to do that (Ryan 2008). This, to some extent, fails to provide the user with an enriched emotional experience. More importantly, it ignores the capacity of emotions, especially emotions evoked by empathising with the characters, in creating an engaging story to contribute to the user experience (Clarke and Mitchell 2001; Arinbjarnar et al. 2009). Therefore, it might not satisfy potential users who are oriented to traditional media, such as movies (Louchart et al. 2008) and demographic groups who are interested in attractive and challenging stories (Duh et al. 2010). However, according to Knickmeyer and Mateas (2005), interactive storytelling could provide the user with a 'pure' hedonic experience by engaging him/her in a dramatic social interaction without offering clear goals. It could also allow the user to invent goals for himself/herself as the story and user interactions unfold. A number of studies have indicated that empathy is a significant factor for the audience to enjoy a story (Hand and Varan 2009). Although Vorderer et al. (2001, p.346) believe that user interaction necessarily proscribes empathy since empathy relies on the user witnessing an event rather than participating in the event, Rockwell and Bryant

(1999) suggest that interactivity actually has the potential to *increase* the user's empathic feelings towards the character.

Given these considerations, this research examines a new approach to interactive storytelling, which is emotion-driven interactive storytelling. In this approach, an engaging emotional experience is created in an attempt to engage the user's emotion with the characters. More importantly, the user's emotions, evoked by empathising with the characters, determine the character's behaviours and therefore have an impact on the whole storyline. In this sense, the user's interaction in emotion-driven interactive storytelling is motivated by his/her emotional involvement with the characters rather than pre-authored goals. Emotions, as a driving force, directly and explicitly contribute to storytelling and the user experience. A number of studies have indicated that emotional involvement is one of the fundamental components of engagement (Peters et al. 2009), and empathy with the characters is also found to be related to the user's engagement with storytelling (Tomaszewski 2005). Therefore, emotion-driven IS has the potential to provide the users with an engaged experience.

However, the users do not comprise a group of identical individuals. On the contrary, each user is unique, and plays different roles in IS. According to Louchart et al. (2008), there are four roles that the user plays in IS, which are *Spectator* (who witnesses the story without possibilities of intervention), *Author* (who creates the story from an authorial perspective rather than from a character's point of view), *Spect-Actor* (who has limited perception of the story and limited interaction with the characters), and *Participant* (who interacts with the story from a character perspective). The role of the user determines his/her preference of the mode of interaction and overall articulation (Louchart et al. 2008). In this case, different users might have different experiences in IS, and engage in different narrative forms or genres which have different modes of narrative and interaction. For example, the *Spectator* tends to engage in branching structured interactive stories (*e.g.* stories in DVDs and CD-ROMs), while the *Participant* tends to engage in those which provide opportunities to make choices for the characters

and direct the unfolding of the story (*e.g.* RPGs) (Louchart et al. 2008). Since emotion-driven IS has different characteristics from most current IS approaches, this study also attempts to find out which user types tend to engage with emotion-driven IS.

1. 3 Aims and Key Questions

Emotion-driven IS, as a new narrative approach, can be applied to a wide range of interactive entertainment forms (*e.g.* hypertext fiction, interactive film, digital games) as a device to enrich the user experience, or can be developed as an IS system to provide the user with a different experience. The primary aim of this study is to propose the concept of emotion-driven IS, and investigate three key issues around this new approach: what is emotion-driven IS, how to implement it, and how to apply it into practice and make a prototype. In addition, another main aim of this study is to evaluate emotion-driven IS based on the prototype that has been developed and find out which types of users would engage with emotion-driven IS. In order to achieve each aim, a number of key questions are also addressed:

Aim one: Propose the concept of emotion-driven interactive storytelling

Key Questions:

1. How can emotion be used as the driving force to move the story forward and motivate the user interactions?

Aim two: Design the framework for the implementation of emotion-driven interactive storytelling

Key Questions:

1. What is the architecture of emotion-driven interactive storytelling?

2. How can emotion-driven interactive storytelling be implemented?

3. How can the conflict between narrative and interactivity be reconciled in IS?

Aim three: Make a prototype to interpret the concept of emotion-driven IS

Key Questions:

1. How is the prototype made?

2. How can the user's emotional responses be captured?

Aim four: Evaluate emotion-driven interactive storytelling and find out which types of users are engaged with it.

Key Questions:

1. Which method is used to examine user experience?

2. How can the evaluation be undertaken empirically?

3. What is the user's experience in emotion-driven interactive storytelling, and which types of users are found to be engaged with the prototype?

1. 4 Structure of this thesis

This thesis draws on a wide range of disciplines and subjects in order to achieve the above four aims, including theories of psychology, narrative, film, digital games and artificial intelligence. In particular, cognitive theories of emotion provide a theoretical foundation for understanding the role of emotions in directing stories and motivating the user interactions. To organise all the relevant knowledge in a logical and plausible way, there are seven chapters based on five basic parts: introduction, literature review (3 chapters), proposal of emotion-driven interactive storytelling, user experience evaluation and results, and conclusion and future work. In addition to this introductory chapter, the remaining chapters are structured as below:

Chapters 2, 3, and 4 are literature reviews. Chapter 2 reviews the current studies on interactive storytelling design based on a central challenge which is the conflict between narrative and interactivity. The solutions to reconcile this conflict are specified in terms of narrative and interactivity. Chapter 3 centres on the relevant theories of emotion and application of these theories to interactive storytelling. In addition to psychological theories of emotion, this chapter also provides an overview of theories which focus on empathy and emotional involvement with different entertainment forms, such as film and digital games. Chapter 4 investigates user experience in interactive storytelling. In particular, the definition of engagement and the method of evaluating engagement are drawn from a range of studies.

On the basis of the literature review in Chapter 2, 3, and 4, chapter 5 explains the concept of emotion-driven interactive storytelling. A general modular framework is also proposed for the design and implementation of emotion-driven IS. This framework can be applied to a wide range of storytelling forms, such as interactive TV, interactive film and digital games. A prototype is developed, particularly, based on this framework, and the procedure of making the prototype is described at the end of this chapter. Chapter 5 attempts to answers the key questions in aim one, two and three.

Chapter 6 focuses on the evaluation of user experience in emotion-driven IS. It starts with a specification of the method, participants, material and procedures for carrying out the empirical study. Following that, the techniques used to analyse the data and the results of the data analysis are discussed. This chapter attempts to find the answers to the key questions in aim four.

Finally, chapter 7 concludes the whole research. It draws together the findings of the research and suggests possibilities for future work to explore the emotion-driven IS approach further.

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CHAPTER 2

INTERACTIVE STORYTELLING

Interactive storytelling has been argued to have additional benefits in comparison to traditional narrative and to bring new fascination to the user since its inception. However, due to the different nature of interactivity and narrative, a "narrative paradox" has been found in interactive storytelling, which is the conflict between narrative and interactivity. It has become a central issue and major challenge in designing interactive storytelling systems (Louchart and Aylett 2003; Ciarlini et al. 2005; Swartjes and Theune 2009). This chapter provides an overview of interactive storytelling design which is centred on reconciling the conflict between interactivity and narrative. It starts from the specification of this conflict based on the understanding of what is narrative and what is interactivity. Furthermore, requirements for interactive storytelling design have been proposed. In particular, controlling narrative time is regarded as a critical task in developing interactive storytelling systems. Several techniques of time compression are introduced in order to provide the user with fast paced interactions. In addition, two types of narrative, emergent narrative and embedded narrative, work together to achieve the balance between the narrative and interactivity in interactive storytelling. These two types of narrative are organised following a number of interactive narrative structures. At the end of this chapter drama manager, which is a program

within IS systems to monitor the narrative, is also introduced. It is applied in most existing interactive storytelling systems as a coordinator to monitor narrative progress and user interactions.

2. 1 Narrative Paradox: Conflict between Narrative and Interactivity

Interactive storytelling is a convergence of interactivity and narrative. It aims to provide a dramatic and engaging narrative experience by allowing the user to intervene with the ongoing events and make a decision about the development of plots. However, rather than working cooperatively, a conflict between interactivity and narrative has emerged since the birth of interactive storytelling: high level interactivity violates the dramatisation of narrative, while too much narrative restricts the user's freedom of interaction. This conflict has led to considerable debate in digital games between two groups of scholars: ludologists suggest that digital games should focus on the study of game structure or gameplay (Juul 2003); while narratologists claim that digital games, as a new narrative medium, should be drawn into a discussion centred on narrative (Murray1997). In the early stages of game design, a common decision was made to sacrifice the dramatic narrative experience in order to exert an interaction freedom for the user (Swartjes and Theune 2009). However, since the commercial success of integrating narratives into gameplay (*e.g. Heavy Rain*), narrative has become an important inspiration for some game genres (*e.g.* adventure games, role-playing games). Therefore, the debate around the relationship between interactivity and narrative has shifted from whether or not narrative should be integrated into gameplay to how to integrate them consistently.

2. 1. 1 Understanding Narrative and Interactivity

The conflict between narrative and interactivity can be attributed to the different natures of narrative and interactivity. As Adams (1999) states "interactivity is almost the opposite of narrative".

Interactivity is defined as "the computer's ability to take in voluntary or involuntary user input and to adjust its behaviour accordingly" (Ryan 2006, p.98). It allows the user to influence the way that the computer responds and the way that the story evolves. In this sense, interactivity emphasises the user's relation to the story world. Ryan (2006) further distinguishes four types of interactivity on the basis of two dimensions which are the internal/external dimension and the exploratory/ontological dimension. The internal/external dimension refers to the extent to which the user feels that he/she is in the story (Mitchell 2008). It is evaluated by the perspective that the user takes in a story world. Specifically, in an external mode, the user is situated outside the story world and perceives the world from a panoramic god-like perspective. In contrast, in an internal mode, the user is able to project himself/herself within the story world. She/he can identify the character from a first or third-person perspective. The second dimension is the exploratory/ontological dimension which refers to the extent to which the user's actions determine the evolution of the story (Mitchell 2008). It is evaluated by how much the user is allowed to control the storyline. In an exploratory mode, the user is not allowed to make a decision about the storyline, but can only explore the story world by navigating the displays. However, the user in an ontological mode is allowed to exert controls on the storyline and determine the development of the story. Based on these two dimensions, the four types of interactivity are: external-exploratory interactivity, internal-exploratory interactivity, external-ontological interactivity, and internal-ontological interactivity (Ryan 2006). Accordingly, external-exploratory interactivity situates the user externally to the time and space of the story world, and the user has nothing to do with the control of the story-"there are no time limit to the user's actions; these actions do not simulate the behaviour of a member of the virtual world; and interactivity is limited to the freedom to chose routes through a textual space that has nothing to do with the physical space of a narrative setting" (Ryan 2006). The external-exploratory interactivity is predominantly applied in text-based hypertext fictions (Ryan 2006). In contrast, internal-exploratory interactivity allows the user to walk into the story world from the first or third person perspective. But similar to

external-exploratory interactivity, the user's interaction is limited to exploring the story world rather than having an impact on the storyline, such as "travelling around the virtual world, looking into its nooks and crannies, picking up objects, examining them, and looking for Easter eggs"(Ryan 2006, p112). Nevertheless, internal-exploratory interactivity provides chances for the user to walk close to narratives and experience the imaginative appeal of the spatial settings. Therefore, this kind of interactivity is widely used in early digital texts since the technological support is limited (Ryan 2006, p112). Compared with the above two types of interactivity, external-ontological interactivity allows the user to make choices about the evolution of the story, but the user cannot identify with the character. This type of interactivity is preferred by simulation games, such as *The Sims*. In *The Sims,* the user can make a decision for the characters, or choose properties for them. However, he/she can only watch the story world from a panoramic perspective rather than taking the character's perspective. The last type of interactivity is internal-ontological interactivity. In this mode, the user is situated in both the time and space of the story world and plays the role of the character. Furthermore, he/she makes choices for the character to decide the character's behaviours, through which the development of the story is affected. This type of interactivity is evident in most role-playing games or interactive drama, such as *Façade* (Ryan 2006).

Each type of interactivity allows the user to take different perspectives and different levels of control on the process of storytelling. It, therefore, indicates different levels of interactivity. According to Goertz (1995 cited Vorderer 2000), the levels of interactivity are defined according to five criteria: 1. degree of selectivity; 2. degree to which a given content may be modified by the user; 3. quantity of different content that can be selected and modified; 4. degree of linearity/nonlinearity; 5. number of different senses that are activated when using the media. Applying these five criteria to evaluate Ryan (2006)'s four types of interactivity, the internal/external- ontological interactivity allows users to select and modify the storyline, therefore, they have a relatively higher level of interactivity than internal/ external - exploratory interactivity. However, no matter

which type or what level, interactivity emphasises the user's role in interactive storytelling, and depends on the user's motive power (Adam 1999). Interactivity is all about freedom, participation, and self-expression (Adam 1999).

In contrast to interactivity, narrative has different characteristics. One of the oldest definitions of narrative can be traced back to ancient Greece. Aristotle in *Poetics* (2300BC), his most important treatise on narrative and drama*,* states that narrative is an imitation of an action that has a beginning, a middle, and an ending (Meadows 2002). Since most narrative was conveyed by drama at that time, Aristotle reveals six elements that comprise a narrative drama. They are: *Action (Plot), Character, Thought, Language (Diction), Pattern,* and *Enactment*. In particular, *Action* is regarded as the objective of a narrative according to Aristotle. The characters are there only because they are required to carry out actions (Laurel 1993). Furthermore, all chosen events should be related to actions, and able to move the actions forward. In this way, the actions are connected to each other and become a unified plot (Tomaszewski 2005). A plot should be "complete and whole and of a certain magnitude", requiring a three-act structure: beginning, middle, and an end structure. In Aristotle's opinion, the six elements are linked hierarchically. Moving from *Action (Plot)* to *Enactment,* the six elements create a formal cause in narrative, *i.e.* the top element is the design purpose of the lower one. For example, *Action* is the cause of designing *Character* in a narrative. The formal cause reveals an authorial view of narrative because the author decides what *Action (Plot)* should be put in a narrative. These *Action (Plot)* further indicate what kind of *Character* is needed, which in turn decide the *Thought* or motivations that the character should have, and *Language (Diction)* and *Pattern* that are used to express them. These patterns eventually shape the spectacle that the audience perceives (Tomaszewski 2005). Therefore, narrative emphasises the author's power to complete a narrative. It flows under the direction of the author, and requires top-down planning by the author (Adam 1999). In this sense, the author leads the user into his/her imaginary world, in which the user is allowed to perceive, to understand, to engage, but not to act (Adam 1999). Therefore,

narrative assumes an intention of the author towards the user (Szilas 1999). From the user's perspective, narrative is about receiving, authorship, and passivity.

These differences between narrative and interactivity result in a conflict in interactive storytelling, which also indicates a tension between the author and the user, *i.e.* how much freedom should be given to the user, and how much power should be given to the author? Riedl and Young (2006) claim that "the standard approach to incorporating storytelling into a computer system, however, is to script a story at design time. That is, the system designers determine ahead of time what the story should be and hard-code the story into the system". Dória et al. (2008) also suggested that the development of IS should rely on the research on the authoring process of dramatic plots. However, other researchers have disagreed. Si et al. (2007) emphasise the importance of reducing "authoring effort resulting from the merge of narrative and interaction". Crawford (2004) suggests that interactive storytelling must be able to "generate stories on the fly, based on user feedback, without relying on pre-script action or hardwired series of events".

The conflict between narrative and interactivity has become a key issue in interactive storytelling design (Louchart and Aylett 2003). In order to provide the user with an engaging narrative experience, interactive storytelling design focuses on reconciling this conflict and balancing the tension between the author and the user.

2. 2 Interactive Storytelling Design: Balance between Narrative and Interactivity

Interactivity, as a strength of digital media, challenges the author's power to create a narrative in interactive storytelling. But at the same time, it opens up new potential for narratives, and new guidelines on story generation and management are required.

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2. 2. 1 Requirements for Interactive Storytelling Design

Tomin and Liu (2008) define the main characteristics of interactive storytelling in terms of four aspects: unlimited freedom, various goals, originality and variety of the storylines, and deeper immersion. In their view, providing the user unlimited freedom to explore the narrative world and make an impact on this world is very important. Therefore, the actions that are available for user participation should be diverse. Other than that, the user's interaction should be motivated by a variety of goals. In particular, it is better if these goals are set up by the user rather than pre-authored. According to the user's interaction, diverse storylines are developed. The story should avoid repetition which can make the story tedious (Ryan 2005). Tomin and Liu (2008) also argue that the main goal of an interactive narrative is to keep the user engaged with the narrative and deeply immersed in a virtual story world. These guidelines are not strictly addressed by every interactive storytelling system. As Tomin and Liu (2008) state, they are slightly diverse depending on different media, such as digital games, films or virtual realities. But even for the same media, the authors would have different foci and requirements for designing their systems.

Arinbjarnar et al. (2009) reviewed most existing interactive drama systems, and identified some essential requirements for interactive drama systems. Similarly to Tomin and Liu's guidelines, Arinbjarnar et al. (2009) also emphasised the importance of providing adequate freedom for user-friendly interaction as well as various storylines. However, regarding the interaction, they also suggested that except for interactions with objects or between character's behaviours, the interaction should also be carried out at a social level. The social interaction includes gestures, spoken and emotional communication and expression. In addition, a narrative structure is necessary to support the dramatic interest of the interactive experience. In another interactive drama system IDA (Interactive Drama Architecture), the requirements of the narrative design are defined as expressivity, coherency, variability, supports player prediction and a fully-structured story (Magerko 2005). Because the IDA follows an author-centric

approach, the requirements for storytelling are explained as guidelines for the author to communicate his/her concept. In this sense, the system should allow the author to express himself/herself along a series of dimensions, such as dialogue, character behaviour. The author should be able to keep the plot coherent within the overall narrative as well as the user's interaction. The IDA should support the user's interaction in multiple paths rather than being constrained by a single possible narrative. More importantly, providing a prediction of what the user is trying to accomplish would be very helpful in making a better-informed decision. Furthermore, narrative structure is considered important to keep the narrative dramatic.

These requirements for narrative provide the referential guidelines for interactive storytelling design. In addition, some researchers (Porteous et al. 2011; Dória et al. 2008) also suggest that controlling the narrative time is also important for interactive storytelling design.

2. 2. 2 Controlling Narrative Time

Time plays a central role in storytelling because it determines the pace and the dramatic tension as well as the aesthetic of story visualisation and staging (Porteous et al. 2011). Metz (1974 cited Juul 1998) deems that narrative is:

> …a ... double temporal sequence ... : There is the time of the thing told and the time of the narrative (the time of the signified and the time of the signifier). This duality not only renders possible all the temporal distortions that are commonplace in narratives (three years of the hero's life summed up in two sentences of a novel or in a few shots of a "frequentative" montage in film, etc.) More basically, it invites us to consider that one of the functions of narrative is to invent one time scheme in terms of another time scheme. (Metz 1974 cited Juul 1998)

20

However, in interactive storytelling, interactivity allows the user to participate in the process of narrative and invent narrative time with the author. Therefore, narrative time is not fixed. It is dynamically changed along with the user's interactions. In this sense, the narrative time in interactive storytelling includes two levels: time generating and managing a narrative, and time users spend interacting with a narrative. As the time spent interacting with a narrative depends on the user's physical and psychological state, narrative time in interactive storytelling is therefore difficult to control.

Most existing interactive storytelling systems tend to use an implicit solution to reason the temporal order of narrative events. They specify conditions for the successful execution of a narrative event. Once the conditions are fulfilled, the event will be executed and trigger another event. This underlines the temporal order of a narrative. The interactive storytelling system *Logtell* (Karlsson et al. 2006) suggests using temporal logic as a representation in authoring the narrative. It introduces IPG (Interactive Plot Generator) to help flexibly control the narrative time. The duration of an event may vary when there are user interactions or the characters' actions are nondeterministic. Meanwhile, in order to achieve good dramatisation, the narrative time of the events may be speeded up or slowed down. However, the authors do not provide a detailed explanation on how to implement it in practice (Porteous et al. 2011).

For some text or video- based interactive storytelling forms, techniques of controlling narrative time in literature and film may provide a good reference point for interactive storytelling. Genette (2002) states four fundamental techniques to compress time in linear narrative. The first is *summary*. It is used to reduce the narrative time by only allowing the main connective scenes to appear in a narrative. The second is dramatic *scene*. It is especially applied to the dialogue when narrative time is equal to the time of the real event. The third is narrative *stasis*. It is preferred when the narrative time is longer than the time of the real event, usually it appears in the form of a description. Finally, the fourth is

ellipsis, which is used to condense time. In addition, it is also possible to create a metaphorical parallel between two different events in a story.

Although these techniques are borrowed from traditional narrative, they are widely used in interactive storytelling currently. Szilas et al. (2011) distinguish three types of *ellipsis* in interactive storytelling. First, the ellipsed period[1] contains no narrative action. In this situation, the ellipsis is a way to speed up narrative and delete the redundant narrative events. Second, the ellipsed period contains non-player character (NPC) actions only. In this situation, the IS system skips some actions that are played by the NPC, and will (or will not) show them later. This is similar to the type of ellipsis used in film. Third, the ellipsed period contains the user's actions. In this sense, the user's control on the character is reduced. The character goes into an "auto-pilot" mode. The ideal solution in interactive storytelling is to allow the user to choose the type of ellipsis he/she prefers at a given moment. He/she can decide whether the NPC or the user action can be ellipsis. Furthermore, Szilas et al. (2011) argue that *ellipsis* does not fit in action-based interactive storytelling because action-based IS often requires real-time user interactions, and *ellipsis* could make the user lose control on the storyline. But *ellipsis* can be applied to other interactive entertainments as a device of creating dramatic tension, such as interactive video, interactive film and interactive TV.

In addition, Szilas et al. (2011) also suggest that a split screen can be used to control narrative time when the simultaneous visioning of different scenes is presented. However, the split screen is likely to split the user's attention as well. It is difficult for him/her to focus on several scenes at the same time. Therefore, the split screen usually is used for a short time.

2. 2. 3 Two Types of Narrative in Interactive Storytelling

Interactive storytelling is a narrative-centric interactive entertainment. The conflict between narrative and interactivity, and especially the different focus on

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[1] The ellipsed period means the time section between the ellipse-start time and the ellipse-stop time (Szilas et al. 2011).

the author's control and the user's freedom has resulted in two types of narrative in interactive storytelling: embedded narrative and emergent narrative.

Szilas (2011) uses the story *the 1001 Arabian Nights* to explain embedded narrative. The main character of *the 1001 Arabian Nights* Sheherazade constantly embeds new stories within the current narrative structure to attract the king's interest in order to avoid being killed. In this sense, embedded narrative is a pre-authored narrative. It emphasises the author's control over storytelling. The user is not able to have any impact on the evolution of an embedded story. Therefore, embedded narrative is linear, pre-authored and non-interactive. It is widely used as a narrative strategy in classic narrative (*e.g.* literature, film and TV drama).

In interactive storytelling, especially in digital games, embedded narrative often emerges via cutscene. Cutscene is a sequence inserted between gameplay. It is embedded in many forms "from text-based descriptions to comic-book style storyboards to real-time 3D cinematics or pre-rendered animated sequences" (Salen and Zimmerman 2003). In particular, cutscene is used in digital games to provide a background for the games, motivate the player's participation and develop the story arc. Therefore, it makes the game world more real by not only telling a story but also revealing the effects of a player's action (Hancock 2002 cited Salen and Zimmerman 2003). However, it is criticised by ludologists for distracting the player from the immersive state by cutting narrative into gameplay. Juul (2003) also pointed out that the cutscene disconnects the play time from event time, therefore, some players tend to skip them.

Another type of narrative is emergent narrative. Different from embedded narrative, emergent narrative relies on the user's real time interaction to generate narrative. It is considered to have the same practical basis with improvisational drama, in which "actors are briefed with a situation and roles, and then asked to interact 'in character' without any script" (Louchart and Aylett 2004). Based on the understanding of improvisational drama, emergent narrative is defined as "a narrative generated by interaction between characters in the style of improvisational drama, rather than the authored narratives in more widespread

use" (Louchart and Aylett 2004; Aylett 1999). In this sense, emergent narrative centres on the interactions between characters. The emergence of the story relies on the richness of the characters and the dramatisation of the world in which they are situated. Louchart and Aylett (2004) proposed ten rules essential for emergent narrative (Table 2.1).

Rule 1	The story must be perceived as a process, in a dynamic rather than analytical way.
Rule 2	The plot is at best hypothetical. It is composed of interrelated hypothetical plot elements.
Rule 3	Plot events are written before performance, certain types of events outcomes can be controlled.
Rule 4	Narrative authoring is done before rather than during the performance.
Rule 5	The storyline is created as the different characters interact with each other, in real-time.
Rule 6	Environments and props must be complementary to the hypothetical plot or plot elements.
Rule 7	Characters must be written for interaction, implies rich, deep and emotionally engaging traits
Rule 8	The user must be considered as a participant to the performance rather than a spectator or author
Rule 9	The user should be encourage to act in role and should be penalised for not doing so.
Rule 10	The user(s) enjoyment and interest are the only reasons for the performance to take place

Table 2.1 Rules for Emergent Narrative (Louchart and Aylett 2004)

Based on these rules, Louchart and Aylett (2004) developed an emergent narrative model which required several levels of design. Specifically, the high level is responsible for the general storyline and dramatic potential. It includes a process of drama management and story assessment. A drama manager which is a component of the system is therefore used to monitor the implementation of narrative events. An appraisal and assessment is also carried out to determine the dramatic potential of the events in order to select the appropriate actions for the characters. The low level is the implementing level which puts the orders of the high level into action. Between them, the middle level is the most complex level of the system which is responsible for the reaction of the characters. It requires consideration of the changes made at the low-level as well as the character's goals and strategies when choosing appropriate behaviours for the character. The

selected behaviours are then sent to the drama manager at the high level to be assessed.

Emergent narrative and embedded narrative co-exist in interactive storytelling. In most cases, the embedded narrative defines the general narrative framework, while emergent narrative decides the real-time narrative outcomes of the user and characters interactions. They work together within the interactive narrative structures, which help to reconcile the conflict between narrative and interactivity.

2. 2. 4 Interactive Narrative Structures

Narrative, as one of the oldest forms of entertainment, has been researched for centuries. A number of narrative theories have been proposed which focus on different aspects of narrative, such as the linguistic perspective (Wilks 1992), the semiotic perspective (Barthes 1966 cited Cavazza and Pizzi 2006), or character description (Bremond 1973 cited Cavazza and Pizzi 2006). In particular, theories focusing on narrative structure have been regarded as the "holy grail" for bestsellers and enduring masterpiece in literature, film or drama, and it is believed that "strong conceptions of narrative conform to very specific and detailed structural models" (Lindley 2005).

The most common narrative structure starts from Aristotle's three-act structure: beginning, middle and end. "A beginning is that which does not itself follow anything by causal necessity, but after which something naturally is or comes to be. An end, on the contrary, is that which itself naturally follows some other thing, either by necessity, or as a rule, but has nothing following it. A middle is that which follows something as some other thing follows it. A well-constructed plot, therefore, must neither begin nor end at haphazard, but conform to these principles." (Aristotle 2300BC).

Based on Aristotle's narrative structural model, Freytag (1863) proposed a more complex narrative structure illustrated in a graphic form, which is known as Freytag's Pyramid (Figure 4.1). Freytag's Pyramid outlines the basic rise and fall typically found in a drama (Arinbjarnar et al. 2009). It begins with an *exposition*

25

to provide the background and initiate the suspense for a narrative. After that, the complication of a narrative rises steadily, as a result of the occurrence of a series of events and actions (*rising action*) until it arrives at the *climax*. The *climax* is the highest point in the pyramid. It indicates the turning point of a narrative. Therefore, the narrative will develop in a reverse to the rising action stage, *i.e. falling action*. For example, in a comedy, things have gone badly for the protagonist up to the climax. But after the climax, everything will begin to go well for him/her. Following the falling action, the complication of the narrative is reduced and the suspense is solved; finally the narrative reaches its *denouement*.
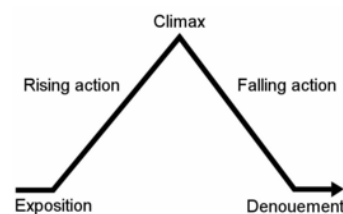
Figure 2.1 Freytag's pyramid

Narrative structure specifies the way a series of dramatic events is organised. More importantly, it also establishes and reveals conflicts in narrative. Conflict is one of the fundamental elements which moves stories forward in narrative. It occurs when "a possible action for a character is not compatible with his/her values" (Szilas 1999). The classical narrative structures – whether Aristotle's three-act structure or Freytag's Pyramid – are basically centred on conflict: revealing the conflict at the beginning, and then going through a period of developing the conflict, eventually finding the solution to reconcile the conflict. In most narratives, conflicts are not only a result of incompatible actions between characters, but also arise from the character's innate emotions and feelings. Conflict is therefore the key for the audience to identify and empathise with the characters (Szilas 1999).

The classical narrative structure plays a central role in managing linear narrative. Nevertheless, interactivity, the power of interactive media, demands new structural models to balance the user's interaction in a narrative.

In interactive storytelling, one of the most widely applied structures is the branching structure (Min et al. 2008; Nicolas 2005; Riedl and Young 2006). It also appears as a "plot graph" in some studies because the branching structure is typically illustrated as a story graph (Min et al. 2008; Riedl and Young 2006). As shown in Figure 2.2, the branching structure starts at one single node and then splits into separate links. Each node represents a series of pre-scripted scenes and each link denotes the choices that the user makes to transit from one node to another (Min et al. 2008). Usually, the previous node is the precondition of the forthcoming node, while the forthcoming node is the effect of the previous node and user interaction.

The branching structure has been recognised as an effective technique for the author to create an engaging interactive story (Min et al. 2008). It has been applied to plenty of interactive storytelling systems, such as *Oz Project* (Bates 1992), *Virtual Theatre Project* (Rousseau and Haywa-Roth 1998), *IDA* (Interactive Drama Architecture) (Magerko 2005) and *Façade* (Mateas and Stern 2003). In *Façade*, all possible actions that occur through the drama are fully pre-defined and stored in "beats". The order that "beats" occur may vary, but the occurrence of them is triggered by the precondition and results in other "beats". In this sense, the branching structure allows the author to have a control over the story management: he/she pre-scripts all the narrative scenes that are needed in the story, and defines the possible branches that the user may follow to interact with the story. However, the branching structure tends to produce a huge number of ending nodes. For example, for two splitting links and a four branch structure, 16 (2^4) ending nodes will be generated, which means there are 16 storylines to follow. However, not all storylines are explored by the user, which results in redundancy. A heavy burden is therefore placed on the author to construct the plots and consider all possible user input at the design time (Min et al. 2008). The extendibility and generality of IS systems are also restricted. Due to the author's strong control over narrative, there is little flexibility left for the user to handle his/her interaction. In particular, the branching structure is usually based on

selection rather than problem-solving or action, so it is more suitable for multimedia and video-based interaction (Lindley 2005).
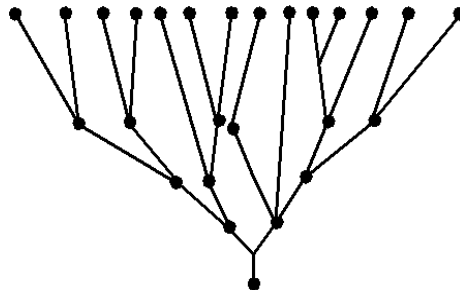
Figure 2.2 Branching structure (IGDA 2001)

Apart from the branching structure, some other interactive structures are also applied in interactive storytelling design.

Parallel structure: provides a balance between linear and branching structures (Figure 2.3). The story begins at one base node and splits into different links, which is the same as the branching structure. But before the next main story node is reached, all separate links will recombine in one node. Therefore, a main storyline runs through the whole structure. In different story nodes, the user could choose different paths to explore the story. This will reduce a great deal of redundant story writing. Besides, the user interaction is constrained within the main storyline, so the sense of connectivity to the story is strong. This structure is used in digital games, such as *Metal Gear Solid*.
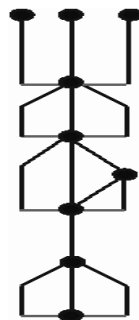
Figure 2.3 Parallel structure (IGDA 2001)

Threaded structure: involves many different threads which develop independently but connect at the same time at some points in the story(Figure 2.4). Like the frequently used method in film, several stories develop simultaneously, and weave together to produce a satisfying story. A threaded structure is also used in digital games, such as *Discworld Noir* (1999). It gives the user great freedom to explore the story, but it is difficult for the development team to understand the whole story or change part of the story. Therefore, the extendibility of the IS system is restricted.
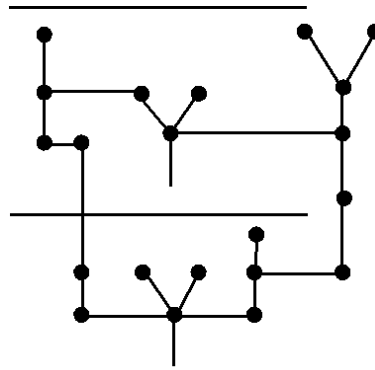
Figure 2.4 Threaded structure (IGDA 2001)

Object-oriented structure: the concept of this structure is borrowed from computer science which argues that everything in the world is object-oriented, and is made up of fundamental functional components: for example, substance is made up of molecules and a molecule is made up of atoms. Accordingly, every interactive story is considered to consist of a series of episodes, and each episode includes a number of scenes (Figure 2.5). Interaction happens between the scenes of an episode or different episodes.

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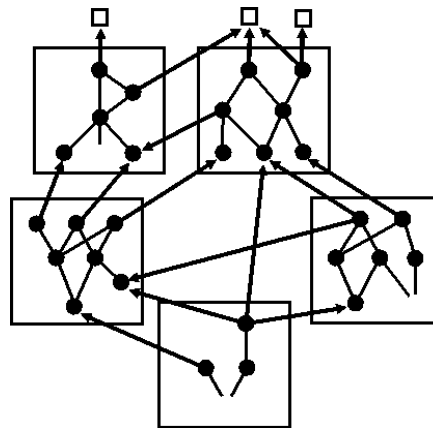
Figure 2. 5 Object-oriented structure (IGDA 2001)

As shown in Figure 2.5, there are many opportunities for interaction between scenes. They happen simultaneously and the user could not choose them all at one time. Thus, this structure produces much redundancy. In order to solve this problem, Lindley (2005) suggests that the object-oriented structure can be implemented at the level of characters or objects. For example, the personas for characters can be used as the basic repetitive story setting for every scene and episode. It reduces the work when creating characters. Lindley (2005) also thinks that the development of the character's personas produces "inner narrative" within the interactive storytelling. Object-oriented structure therefore provides considerable freedom for the user to interact at the level of the inner narrative. Meanwhile, the user's participation also has great influence on the whole narrative. Compared with other structures, the object oriented structure is feasible and tenable to implement, thus, it is regarded as a possible future structure for interactive narrative (Lindley 2005).

The interactive narrative structure provides the possibility of moving a narrative forward through the user's interaction. In order to make the interactive narrative more dramatic and engaging, the classical narrative structure also plays a role in interactive storytelling. In the interactive drama *Façade*, the system tends to choose and implement the storyline which most closely matches the Aristotelian tension arc (*i.e.* beginning- middle- ending three-act structure; Mateas and Stern

2003). Therefore, the interactive narrative structure and classical narrative structure should work together to create an engaging narrative experience. The traditional narrative structure provides guidelines for generating conflict and creating dramatic tension, while the interactive structure makes sure the user can exert an influence on the evolution of the narrative.

2. 2. 5 Drama Manager

There has been a growing interest in the use of Drama Manager to balance the tension between narrative and interactivity (Roberts and Isbell 2008; Sharma et al. 2008). Technically, Drama Manager (DM) is a program or a piece of software within an IS system. However, due to the different techniques used in creating interactive stories, Drama Manager can be understood in a broader sense as a component which can "track(s) narrative progress in the environment and directs the roles and/or responses of objects and agents to achieve a specific narrative" (Roberts and Isbell 2008). It generates a specific plot on the basis of the author's narrative requirements, and gives an overall narrative structure to the whole experience. The idea of DM was proposed by Laurel (1986). Since DM appears to be efficient in reconciling the conflict between interactivity and narrative, it has been widely used in a number of interactive storytelling systems (Roberts and Isbell 2008). Different approaches to the implementation of DM have been followed. In particular, search-based drama manager (SBDM) is used to optimise user experience by turning the drama management problem into a search problem (Nelson and Mateas 2005).

The search-based drama manager was introduced by Bates (1992) in the Oz project. Later, Weyhrauch (1997) developed it by adding some new features and applying a new search algorithm. In general, the implementation of SBDM is based on the concept that the whole interactive story comprises a number of significant story segments, and once the user triggers these story segments, the DM will take action in response (Nelson and Mateas 2005). Therefore, the first step of executing a SBDM is to abstract the story to separate several story

segments. In order for the DM to recognise and distinguish all of them, each story segment is assigned specific information, such as the location where the story segments occur, or the dramatic tension in that story segment. Furthermore, a range of actions is available for each story segment which defines the responses of the DM to a story segment. Five types of DM actions are usually applied (Nelson and Mateas 2005): *Causers* are used to make a story segment happen. *Permanent deniers* are used to prevent a particular story segment from happening for the duration of the narrative. *Temporary deniers* are used to prevent a particular story segment from happening temporarily. *Hints* are used to make a story segment more likely to happen. *Endings* are used to end an interactive story. These five types of actions are applied when a particular story segment has been chosen. However, when multiple story segments have the same chance of being triggered as the consequence of the user's interaction, an evaluation function is applied to specify the author's judgment. The evaluation function is a linear combination of story features designed to measure how dramatic and engaging a story segment is. It is usually defined from the author's perspective instead of the user's preference. In an interactive fiction *Anchorhead* (Nelson and Mateas 2005), the evaluation function include general features which specify the general properties that a story has, such as the location of events, motivation for the story segments; features for stories with multiple endings which evaluate the interaction between multiple plots in order to choose one plot; meta-features which evaluate the impact of drama management on a story rather than evaluating the story itself. Once a specific story segment is chosen, DM actions and evaluation functions are specified, the search process will be implemented and repeated until a complete narrative experience is generated.

Another widely-used DM is planning-based DM. Distinct from search-based DM, planning-based DM is based on the traditional AI planning techniques. Therefore, the author is not responsible for linking every story point. Instead, the author encodes the preconditions and postconditions for each story point, and a planning algorithm searches for the story point as a response to the user's interaction (Min et al. 2008). Usually, a goal is set as the motivation to generate a plan, and the

planning algorithm constructs the whole interactive narrative experience as a sequence of story points. For example, in an interactive drama system IDA (Magerko 2005), a story segment is labelled with a precondition which is parameterised as variable x. When the user's interaction triggers the variable x, the story segment will occur. In another interactive drama system *Mimesis,* a plan is generated in the form of a set of goals and actions in the story world. The plan is implemented at various levels of abstraction by different planners to achieve the goals (Young 2004). Therefore, compared to search-based DM, planning-based DM minimises the author's effort to keep the narrative consistent. It relies more on the DM to manage the narrative according to user interaction. In this sense, a search-based drama manager is suitable for audio-video or text based interactive entertainments in which the whole story can be divided into a number of story segments, and the user's interactions decide whether or not these story segments are implemented successfully. However, a planning-based drama manager is suitable for action-based real-time interactive storytelling forms, such as role playing games, in which AI planning techniques are needed to monitor the user's real time interactions and then change the storyline accordingly.

2. 3 Summary

This chapter gives an overview of interactive storytelling design which is centred on reconciling the conflict between narrative and interactivity. From the above discussion, several key points about approaches to balancing the tension between narrative and interactivity can be highlighted, which provide a useful reference point for emotion-driven interactive storytelling design:

• The conflict between narrative and interactivity is produced because of the different nature of narrative and interactivity. Interactivity emphasises the user's role in interactive storytelling, and relies on the user's motive power; while narrative emphasises the author's power to complete a narrative, the user is only a passive receiver in narrative. The conflict between narrative and interactivity also

exists in emotion-driven IS. Therefore, how to reconcile this conflict becomes a key question in designing emotion-driven IS.

• Controlling narrative time is important for interactive storytelling design. The narrative time in interactive storytelling includes two levels: the time generating and managing a narrative, and the time the user spends interacting with a narrative. For some text or video- based interactive storytelling, techniques of controlling narrative time in literature and film may provide a good reference point. In particular, *ellipsis* has the potential to be applied in some interactive entertainments which are not real-time action-based, such as interactive film and interactive video.

• Narrative structure specifies a way of organising a series of dramatic events. The branching structure has been recognised as an effective technique for the author to create an engaging interactive story, and has been applied to plenty of interactive storytelling systems. In addition, parallel structure, threaded structure, and object-oriented structure are also used in interactive storytelling. Furthermore, interactive narrative structure and classical narrative structure should work together to create an engaging narrative experience. The traditional narrative structure provides guidelines for generating conflict and creating dramatic tension, while the interactive structure makes sure the user can exert an influence on the evolution of the narrative.

• Drama Manager is an efficient component in reconciling the conflict between interactivity and narrative in interactive storytelling systems. There are two types of drama manager which are widely used in most existing interactive storytelling systems. Search-based drama manager is based on the concept that the whole interactive story comprises a number of significant story segments, and once the user triggers these story points, the DM will take action in response. The planning-based drama manager is based on traditional AI planning techniques. Generally speaking, a search-based drama manager is suitable for audio-video or text based interactive entertainments, while a planning-based drama manager is

suitable for action-based real-time interactive storytelling forms, such as role playing games.

This chapter has investigated interactive storytelling from a narrative perspective and specified the possibility of achieving interaction in interactive storytelling. It has inspired the design of emotion-driven IS with respect to reconciling the conflict between narrative and interactivity, controlling narrative time, designing narrative structure and applying drama manager to monitor the narrative. In the next chapter, relevant literature will be reviewed from a psychological perspective to understand the emotional experience in interactive storytelling.

CHAPTER 3

EMOTION IN INTERACTIVE

STORYTELLING

Emotion is the key focus of this research. Since emotion has been conceptualised as a psychological construct, the psychological theories of emotion offer a good starting-point for an overview of emotion related theories and applications in storytelling. In particular, a cognitive approach to studying emotions has become the mainstream of emotion research since the turn of the 20th century. Various cognitive theories of emotions have been proposed, which not only attempt to answer the question "what is emotion?" and "how is emotion generated?", but also provide a theoretical foundation for modelling emotions in computer and Artificial Intelligence (AI). Therefore, a brief introduction of salient cognitive theories of emotion is presented at the beginning of this chapter. Based on the theoretical review of emotions in storytelling, the application of emotions in the interactive storytelling will be discussed. A number of computational models of emotion designed on the basis of cognitive theories of emotions are presented, such as EMA and FearNot! In addition, some other IS systems in which the user's emotional states are related to the storytelling process are also reviewed, which provide a reference for the design and implementation of emotion-driven

interactive storytelling. Finally, an integration of the psychological theories of emotion into storytelling and an examination of audiences' emotional involvement with various storytelling forms in terms of different media, especially focusing on the traditional audio-visual media-film and the well-developed interactive media-digital game, will follow. In general, there is a difference between film and digital games in the audience's emotional responses. In addition, existing research suggests that males and females have different emotional experiences while engaging with a story (*e.g.* Thue et al. 2007; Rowe et al. 2010). This may lead to a difference between males and females in their user experience in emotion-driven interactive storytelling.

3. 1 Cognitive Theories of Emotion

Whether it is the moment that the shower curtain is slowly unveiled drawn back in Hitchcock's Psycho, or the moment the Titanic sinks into the Atlantic Ocean, the audience cannot help shouting out or weeping. This experience is usually described as "emotion".

Emotion is one of the most central experiences of a human being. Most people experience a wide range of emotions which deepen and enrich their daily life (Ortony et al. 1988). However, emotions are subtle and have many facets. As Ortony et al. (1988, p.1) claim, emotions involve "feelings and experience, they involve physiology and behaviour, and they involve cognitions and conceptualisations". Therefore, different approaches have been proposed according to the understanding of emotions. A behavioural approach views emotion as a response, or a large class of responses, basic to life and survival, rather than as a state of the organism (Strongman 1996); a physiological approach emphasises the significance of physiology in relation to emotions and suggests each discrete emotion has a specific physiological pattern (Strongman 1996); a social approach argues that emotion occurs in the company of others and therefore focuses on the study of emotional expression and emotional recognition (Strongman 1996). In particular, inspired by the shift of study focus in psychology

during the 1960s and 1970, a cognitive approach has been regarded as the central paradigm of the psychology of emotions. Most cognitive theories of emotion examine the cognitive experience of emotion with respect to two processes: appraisal and coping. Appraisal refers to the individual's interpretation of their relationship with the environment or events which is defined as *person-environment relationship* by Lazarus (1991). It is informed by the cognitive process, and can be measured through a set of appraisal variables. These variables characterise the significance of events from the individual's perspective (Gratch and Marsella 2006), such as whether or not the event is desirable or who caused it, etc. Coping refers to the individual's cognitive responses to the appraised significance of events (Gratch and Marsella 2006). It consists of cognitive and behavioural responses which can be perceived internally or externally by individuals in the form of physiological and behavioural change. In general, appraisal is considered as the central process of eliciting emotions. Most appraisal theorists converge on the idea that appraisal is the cause of emotion (Frijda 1988; Ortony et al. 1988; Smith and Lazarus 1990; Ellsworth and Scherer 2003). Early on considerable research was conducted in IS, with the focus on generating emotions for characters through the process of appraisal. However, recently research has tended to concentrate on how coping strategies direct the storyline.

Cognitive theories of emotion imply an overall process of emotion experience. However, scholars disagree on the way appraisal and coping work within the human cognitive system. Accordingly, a variety of psychological theories of emotion have been proposed. In particular, two theories have been influential in the cognitive approach: Smith and Lazarus' (1990) "adaption and emotion" theory and Ortony, Clore, and Collins' (1988) "cognitive structure of emotion" theory are widely used as the theoretical foundation for applying emotions to interactive storytelling design.

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3. 1. 1 Smith and Lazarus' Theory

Smith and Lazarus have investigated emotion since the early 1990s. They view emotion as an important solution to a series of adaptational problems in an evolutionary sense. However, in contrast to the other two adaptational subsystems, reflexes and physiological drives, emotion is considered as a reactive process which can be evoked by diverse stimuli and result in expanding flexible responses. In particular, Smith and Lazarus argue that rather than reacting to a specific stimulus, emotion is a reaction to a person-environment relationship which is the 'core relational theme' of appraisal. Therefore, it seems that emotion arises from the evaluation of the relationship between person and environment. In addition, it appears that it is a cognitive process and dependent on an individual's cognitive capability. Furthermore, the evoked emotion motivates coping activity. Specifically, if the evaluation results in an important consequence related to individual's well-being, a series of coping activities are motivated as responses to the evoked emotion. Therefore, an individual's experience of emotion is related to two aspects: cognition and motivation. Cognition determines the occurrence of some specific emotions, while motivation leads to a variety of emotional responses. In this sense, Smith and Lazarus considered emotion as a 'cognitive-motivational-emotive configuration'.

Smith and Lazarus (1990) made further efforts to identify the major dimensional components of appraisal and coping. Two distinct kinds of cognition have been found in the process of appraisal. One is a well-developed representation of the person-environment relationship. It reflects the knowledge or beliefs about what is happening, although it does not play a direct role in producing emotions. The second cognition refers to how these representations are appraised with the concern of their significance to personal harm and benefit. It directly determines the emotional state. Regarding the structural relations between appraisal and emotion, six appraisal components have been identified, which are *motivational relevance, motivational congruence or incongruence, accountability, problem-focused coping, emotion-focused coping* and *future expectancy*. Smith and

Lazarus (1990) categorise them into two groups, primary appraisal and secondary appraisal. Primary Appraisal refers to how the person-environment relationship is relevant to the person's well-being, and Secondary Appraisal is concerned with how the person's resources and options cope with the appraisal consequences. The hierarchy structure of the appraisal components are illustrated in Figure 3.1
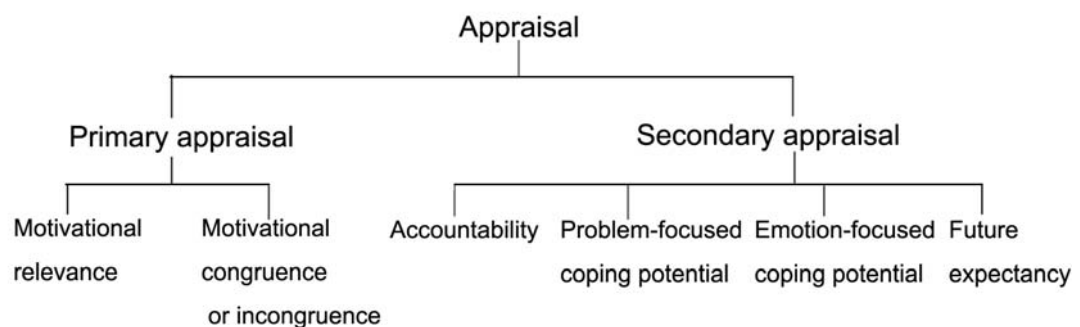
Figure 3.1 Structure of appraisal component (Smith and Lazarus 1990)

According to Smith and Lazarus, 'motivational relevance' is an evaluation of the extent to which a person-environment relationship is related to personal goals and concerns. 'Motivational congruence or incongruence' refers to the extent to which the consequence of evaluating the person-environment relationship is consistent or inconsistent with the individual's goals and concerns. 'Accountability' provides the direction of the coping efforts motivated by emotional response, such as *who* is to receive the credit or the blame according to whether or not it is motivational congruence or incongruence. The other three components of secondary appraisal are related to the evaluation of the person's coping potential. 'Problem-focused coping potential' reflects the evaluation of the individual's ability to act directly on the environment to reach their goals and concerns. 'Emotion-focused coping potential' reflects the evaluation of individual's perceived prospects of adjusting or regulating the emotional state to facilitate the generation of consequences. 'Future expectancy' reflects the perceived possibilities for changes in the psychological situation to make the environment congruent with the person's motivations. The six components provide the variables to evaluate the person-

environment relationship and generate specific appraisals for every emotion. For example, anger is motivationally relevant to the individual's goals or concerns. It is evoked when the person-environment relationship is incongruent with his/her goals or concerns because of another's fault. Therefore, anger is other-blamed emotion. It leads to the proposed adaptive coping potentials including "remove source of harm from environment and undo harm" (Smith and Lazarus 1990, p.619).

In accordance with the two coping potentials in appraisal, two types of coping mechanisms are proposed which are problem-focused coping and emotion-focused coping (Smith and Lazarus 1990). Problem-focused coping consists of active attempts to influence the person-environment relationship, while emotion-focused coping attempts to regulate the emotional response itself. Usually individuals engage in a combination of problem-focused coping and emotion-focused coping. Both of them play an important role in human adaptation.

Although Smith and Lazarus gave a relatively static description of the structural components of appraisal and coping, they did not consider emotion a static reaction. Instead, they emphasised that emotion was a dynamic process. The ultimate effect of coping is to change the individual's interpretation of their relationship with the environment, which serves as a new stimulus to influence individuals' subsequent appraisal and generate new emotions. For example, problem-based coping is likely to alleviate or remove the harm or threat from the environment, while emotion-based coping tends to alter the person's emotional response or the appraised meaning of the person-environment relationship. In this sense, coping is not the end of the individual's emotional experience. On the contrary, it leads to new appraisals and emotions which would trigger new action tendencies and coping activities. Therefore, coping, cognition, and appraisal are closely coupled, interacting and unfolding over time (Lazarus 1991).

In addition, one important focus of Smith and Lazarus' theory is the influence of personality on the occurrence of emotions, which distinguishes their theory from other previous research (*e.g.* Ekman 1984; Sarbin 1985). Personality, in Smith and

Lazarus' opinion, is defined as two distinct types of factors. One refers to the motivational characteristics including values, goals and commitments. Another one refers to the individual's knowledge base including beliefs, attitudes, expectations, and intuitive theories about the self and the world (Smith and Lazarus 1990). All these factors exert an influence over two kinds of cognitions in appraisal. First, personality contributes to knowledge about the environment because individuals might notice different aspects of the environment. Goals often play an important role in determining which aspects of the environment are noticed or ignored because humans are likely to be attracted by those motivationally relevant encounters. Second, personality contributes to the appraisal process itself. Only when an individual's relationship, to the environment is related to his/her goals, desires or what he/she cares about, can primary appraisal work properly. If there are no goals to be achieved or anything that the person cares about, little or no emotion will be elicited. In this sense, the motivational factors are necessary for "predicting and understanding individual differences in emotional response" (Smith and Lazarus 1990, p.622). Once a given appraisal has occurred, a particular emotion, action tendency and physiological response is generated. Considering the influence of personality, Smith and Lazarus demonstrate their understanding of the cognitive process of emotion in figure 3.2 – the model of the cognitive-motivational-emotive system.
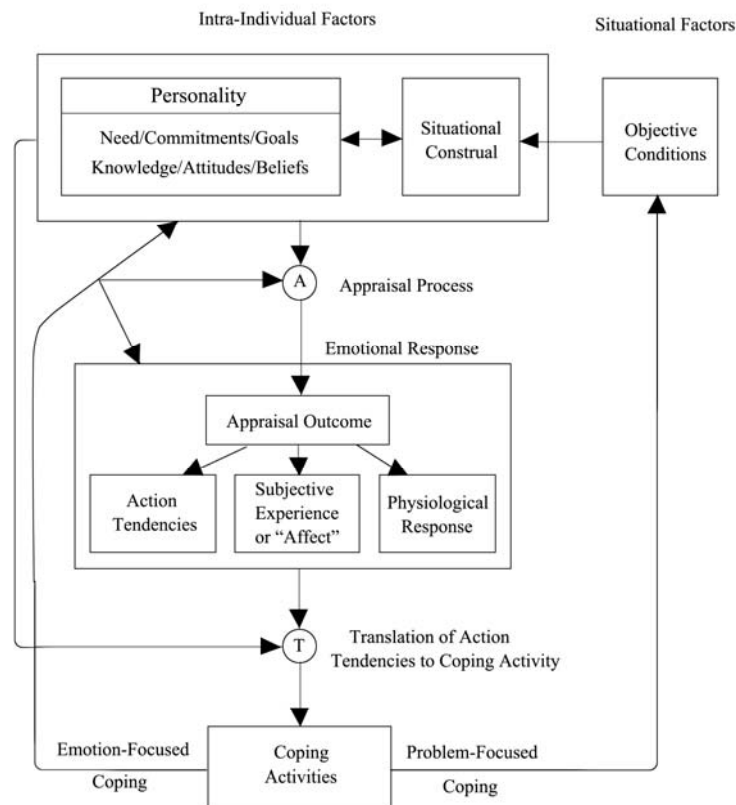
Figure 3.2 A model of the cognitive-motivational-emotive system (Smith and Lazarus 1990)

Smith and Lazarus' theory has been followed as an instructive theory to study emotions for more than 30 years (Strongman 1998, p.73). Appraisal is regarded as the core concept of their theory. The type and intensity of emotions are determined by the interaction of the primary and secondary appraisal process (Schramm and Wirth 2005). According to Lazarus (1991), 15 emotions can be evoked, which includes four positive emotions (pride, satisfaction, love and happiness), nine negative emotions (anger, anxiety, fear, guilt, shame, sadness, envy, jealousy, and disgust), and two other emotions (hope and sympathy). These emotions lead to a set of coping activities, which alter the individual's relationship with the environment and have an impact on the individual's behaviours and actions. Since action is considered as the primary element of narrative drama (Aristotle 2300BC), coping, as the consequence of emotions, exerts an influence on narrative. This also implies the possibility of emotions to determine the

evolution of a story. In this sense, Smith and Lazarus' theory provides a viewpoint to explain the concept of emotion-driven IS. However, the appraisal and coping process in Smith and Lazarus' theory are studied with regard to an individual's concerns, goals and desire. As stated in Chapter one, there are no pre-authored goals in emotion-driven IS. Therefore, how to apply Smith and Lazarus' theory to design emotion-driven IS needs further discussions which will be specified in Chapter five.

3. 1. 2 Ortony, Clore and Collins' Theory

Ortony, Clore and Collins proposed their approach to the study of emotions in 1988. In contrast to previous purely psychological perspectives, Ortony et al.'s research was oriented to provide a theoretical foundation for computational models of emotion which can be used in AI systems. To achieve that, they attempted to find out the underlying cognitive structure of emotions by specifying 'the eliciting conditions for distinct emotions' and 'the variables that influence their intensity' (Ortony et al. 1988, p.13). In particular, their theory centres on the notion that emotions are 'valenced reactions to events, agents, or objects, with their particular nature being determined by the way in which the eliciting situation is construed' (Ortony et al. 1988, p.13). Therefore, three broad classes of emotions are presumed to arise based on the way in which people perceive the world: events, agents and objects. Specifically, events are individuals' interpretation of things that happen. Objects are simply "viewed qua objects" (p.18). Agents are relatively complex; they are defined as "things considered in light of their actual or presumed instrumentality or agency in causing or contributing to events" (p.18). Therefore, not only human, but also nonhuman, animated beings, inanimate objects or abstractions, even situations are included.

The overall cognitive structure of emotions defined by Ortony, Clore and Collins (1988) is illustrated in figure 3.3.
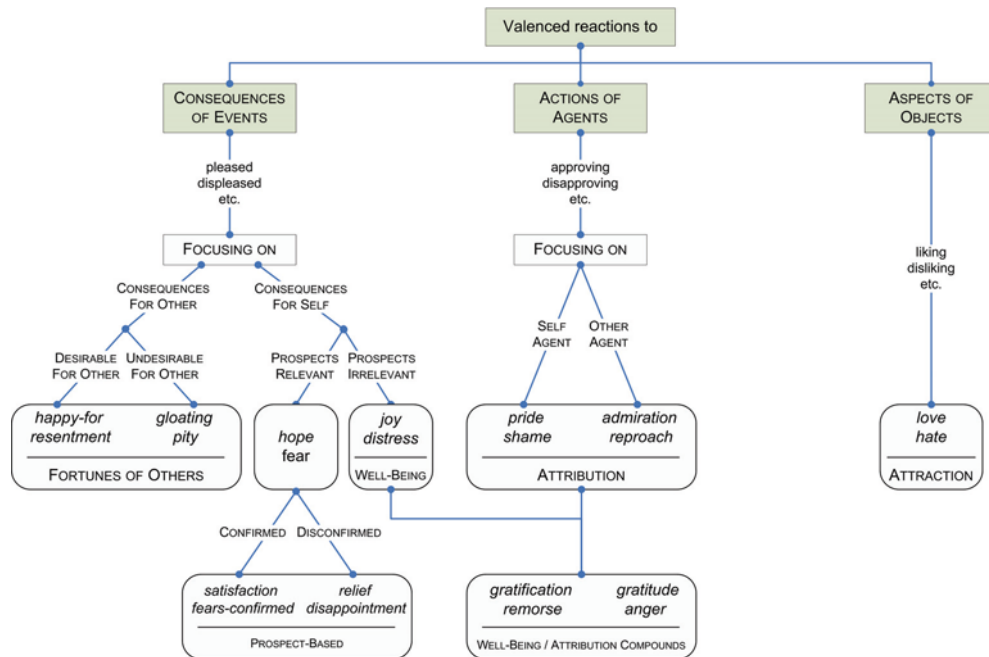
Figure 3.3 Cognitive structure of emotion (Ortony, Clore and Collins 1988)

There are three main branches in this tree structure. As indicated, the branch on the left hand side refers to emotions arising from individuals' valenced reactions to the CONSEQUENCES OF EVENTS. For easier understanding, 'pleased' and 'displeased' are chosen to represent the undifferentiated affective states in this branch. According to whether individuals react to emotion-eliciting events with respect to themselves or to others, this branch from the node of 'pleased/displeased' is split into two branches which are labelled as 'CONSEQUENCE FOR OTHER' and 'CONSEQUENCE FOR SELF'. Emotions related to 'CONSEQUENCE FOR SELF' are further divided into two categories according to whether or not the prospects of an event are relevant or irrelevant to individuals. If it is PROSPECTS-IRRELEVANT, emotions simply arise from positive or negative reactions to the events concerning individuals' WELL-BEING, such as *joy, distress*. If it is PROSPECTS-RELEVANT, emotions arise from reactions to the positive and negative prospects of events respectively. According to whether or not the current status of events is unconfirmed, confirmed or disconfirmed, the prospect-based emotions are sub-categorised into three types: *hope* and *fear* represent affective reactions to the desirable and

undesirable prospects of events when the current state of events has been UNCONFIRMED; *satisfaction* and *fears-confirmed* represent affective reactions to the desirable and undesirable prospects of events when the current state of events has been CONFIRMED; *relief* and *disappointment* represent affective reactions to the desirable and undesirable prospects of events when the current state of events has been DISCONFIRMED.

There is one other group of emotions under event-based emotions which is labelled as 'FORTUNES-OF-OTHERS'. Emotions in this group includes *happy-for, resentment, gloating* and *pity* according to whether the events are desirable or undesirable to the goals and interests of others. Therefore, FORTUNES-OF-OTHERS emotions, on one hand, depend on the 'presumed desirability of an event for another person'. On the other hand, they depend on the 'desirability from one's own perspective of the other person's experiencing that outcome' (Ortony et al. 1988, p.92). Therefore, two subclasses of emotion types are identified: Good-will or Empathetic emotions (*e.g. happy for* and *pity*) which arise when the reaction of self (*i.e.* pleased or displeased) is congruent with the presumed value for the other (*i.e.* desirable or undesirable); Ill-will emotions (*e.g.* gloating and resentment) which arise when the reaction of self (*i.e.* pleased or displeased) is not congruent with the presumed value for the other (*i.e.* desirable or undesirable).

The middle branch of the structure reveals another main type of emotions, ATTRIBUTION emotions, which refers to the individual's affective reactions of *approving* or *disapproving* of ACTIONS OF AGENT. Depending on whether SELF AGENT's actions or OTHER AGENT's actions are evaluated, the ATTRIBUTION emotions are split into two subclasses of emotions: *pride* and *shame* when the agent is self; *admiration* and *reproach* when the agent is others. Notably, SELF AGENT here has an extended concept which is viewed as a cognitive unit with some other persons. Figure3.3 also indicates that ATTRIBUTION emotions can be converged with WELL-BEING emotions, which leads to WELL-BEING/ATTRIBUTION COMPOUNDS emotions. It

reveals that compound emotions are results of the evaluation of both the actions of agent and the consequence of the events. Specifically, the positive WELL-BEING emotion (*i.e. joy*) combined with two positive ATTRBUTION emotions (*i.e. pride* and *admiration*) generates *gratification* and *gratitude* respectively, whereas the negative WELL-BEING emotion (*i.e. distress*) combined with two negative ATTRBUTION emotions *(i.e. shame* and *reproach*) generates *remorse* and *anger* respectively.

The final branch includes emotions on the right hand side. They represent the individual's affective reactions - liking or disliking- to ASPECTS OF OBJECTS. Emotions in this branch are therefore labelled as ATTRACTION emotions. Nonetheless, objects are usually closely related to agents who take actions on them. Therefore, there is a tendency that ATTRACTION emotions co-occur with compatible ATTRIBUTION emotions which leads to new emotions, such as contempt, although it is not illustrated in figure 3. 3. (Ortony et al. 1988, p.24).

After specifying the general cognitive structure of emotions, Ortony et al. (1988) identified the variables which influence the intensity of emotions. As noted earlier, desirability (*i.e.* pleased and displeased) determines the individual's affective reactions to the events and consequences, therefore it is a variable related to events-based emotions. Similarly, praiseworthiness and appealingness are variables related to agents-based emotions and objects-based emotions. However, each of them could only influence the corresponding group of emotions rather than all emotions. Therefore, they are called *local variables.* Other than desirability, praiseworthiness and appealingness, there are still some other local variables which determine the intensity of each emotion group. They are illustrated as figure 3.4.

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                          VALENCED REACTION
                                  |
          ┌───────────────────────┼───────────────┐
      EVENT-BASED              ATTRIBUTION      ATTRACTION
       EMOTIONS                 EMOTIONS         EMOTIONS
          |                        |                |
      desirability            praiseworthiness   appealingness
   (pleased/displeased)    (approving/disapproving) (liking/disliking)
          |
   ┌──────────────┬──────────────┐
 FORTUNES OF OTHERS   FORTUNES OF SELF
    EMOTIONS             EMOTIONS
       |                    |
  desirability for other ┌────────┴────────┐   strength of unit   familiarity
     deservingness   PROSPECT BASED  WELL-BEING  expectation deviation    |
        liking         EMOTIONS      EMOTIONS          |              (love/hate)
        |                 |             |         (pride/shame          etc
   (happy for/pity    likelihood    (joy/distress)  admiration/reproach)
   gloating/resentment     |           etc            etc
        etc)                |          └──────────┬──────────┘
                        (hope/fear)        (gratification/remorse
                           etc              gratitude/anger)
                            |                      etc
                         effort
                       realization
                            |
                  (relief/disappointment
                  satisfaction/tears-confirmed)
                            etc
```

Figure 3.4 Structure of local intensity variables (Ortony, Clore and Collins 1988)

Events- based emotions:

Desirability: the degree to which the consequence of an event is desirable in terms of achieving a set of goals. Three kinds of goals are identified. They are active-pursuit goals (A-goals), interest goals (I-goals) and replenishment goals (R-goals). A-goals are goals an individual attempts to achieve, such as getting a PhD degree. I-goals are goals an individual wants to happen, however, he/she has little control over the achievement of these goals. For example, the favourite football team should win. R-goals are goals representing an individual's interest in preserving certain valued states of affairs, for example, getting food to eat because of hunger. Desirability is the central variable to event-based emotions.

Likelihood: the degree to which an anticipated consequence of the event is supposed to occur

Effort: the degree to which resources are used to obtain or avoid an anticipated event

Realisation: the degree to which an anticipated consequence of the event actually occurs

Desirability-for-other: the degree to which the individual evaluates desirability for others' goals

Liking: the degree to which others' goals are attractive to the individual

Deservingness: the degree to which the individual believes the other person deserves what happens

Agents-based emotions:

Praiseworthiness: the degree to which the actions of the agent is praiseworthy or blameworthy in terms of valued standards. Standards could be 'various moral, legal, and conventional laws, rules, regulations, norms and codes of conduct and performance' (Ortony et al. 1988, p.55). They are usually abstract and general, for example, PEOPLE OUGHT TO STRIVE FOR EXCELLENCE which is a standard used to evaluate an agent's actions. It can acquire value through its connection to the goal of events. Praiseworthiness is the central variable for agents-based emotions.

Strength of cognitive unit: the degree to which the individual identifies with the agent of the emotion-eliciting event

Expectation-deviation: the degree to which the agent's action deviates from expected standards

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Objects-based emotions:

Appealingness: the degree to which aspects of the object are liked or disliked in terms of an individual's attitudes. Attitudes are dispositions of liking or disliking an object. It is determined by the conceptual representations of the objects themselves to some extent. Appealingness is the central variable for objects-based emotions.

Familiarity: the degree to which the individual is familiar with the object.

In addition to local variables which are oriented to a particular group of emotions, there are four global variables which influence the intensity of all emotions. They are:

Sense of reality: the degree to which the individual believes the emotion-eliciting events or situations are real

Proximity: the degree to which the individual imagines himself in the situation. In computational terms, it can be understood as 'presence in the situation'

Unexpectedness: the degree to which the individual feels surprised by the situation

Arousal: the degree to which the individual is aroused by the situation.

Ortony et al. (1988) specified 16 variables in total to evaluate the intensity of experienced emotions. Each of these variables is assigned a value. Increasing the value of these variables can intensify the emotions. However, not all variables work together to evoke all emotions in a given situation. Some of the global or local variables are not activated by assigning a threshold value. But the values for the central variables in each particular emotion group must be specified. In other words, no matter whether or not global variable values or non-central local variable values are specified, desirability values must be specified to evoke events-based emotions, praiseworthiness values must be specified to evoke

agents-based emotions, and appealingness values must be specified to evoke objects-based emotions.

Ortony, Clore and Collins (1988) provide a systematic, comprehensive and computational account of the cognitive structure underlying the experience of emotions. They focus on specifying a set of variables to distinguish emotions on the basis of different evaluation dimensions. Broader than Smith and Lazarus' approach, 22 emotions are identified according to Ortony et al.'s (1988) cognitive structure of emotion. Although Ortony et al. (1988) provide a detailed explanation of how specific emotions are elicited, they do not pay much attention to specifying what action tendencies and behaviours are triggered as the responses to those elicited emotions, and how these action tendencies and behaviours lead to new emotions in a given situation. Therefore, in comparison with Smith and Lazarus' cognitive-motivational-emotive theory which investigates emotions as a cyclic and dynamic process, Ortony et al.'s (1988) theory is proposed from a relatively static perspective, and fails to consider the influence of emotions on the individual's behaviours and actions. In this sense, Ortony et al.'s (1988) theory is suitable for generating emotions for autonomous characters rather than creating engaged storylines for IS. Nevertheless, Ortony et al.'s theory helps to understand the cognitive structure of emotions, and how this structure is applied to modelling emotions in interactive storytelling.

3. 2 Applications of Emotions in Interactive Storytelling

In recent years there has been significant expansion in research which applies psychological theories of emotion to developing interactive storytelling systems, driven by the potential of modelling believable virtual characters to build empathic interactions and generate emotional coping strategies to create coherent and dramatic interactive stories (Hall et al. 2005; Paiva et al. 2004, 2005). Therefore, a number of computational models of emotion have been proposed, among which EMA and FearNot! are well developed on the cognitive theories of emotion discussed previously as a basis.

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3. 2. 1 Computational Models of Emotion

1. EMA

Based on Smith and Lazarus' theory, Marsella and Gratch (2009) and Gratch and Marsella (2005) designed a computational model of emotion-EMA (EMotion and Adaptation), with their focus on the dynamics of emotion across a range of eliciting situations. In order to simulate the naturalistic emotional experience in a computational environment, Marsella and Gratch (2009) developed EMA on the basis of Smith and Lazarus' cognitive – motivational –emotive model (Figure 3.5).
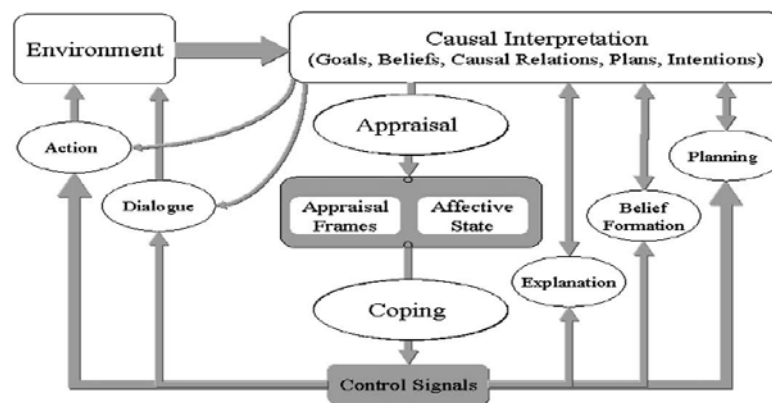
Figure 3.5 Modular structure of EMA (Marsella and Gratch 2009)

In the structure of EMA, Marsella and Gratch (2009) used 'causal interpretation' to represent the character's interpretation of a character-environment relationship on the basis of his/her personality, *i.e.* goals, beliefs, causal relations, plans and intentions. The causal interpretation consists of a conjunction of propositions to represent the state of the world. Each proposition is expressed in a mixture of symbolic and numeric representations. For example, the situation is a person standing in an empty room holding an umbrella. Suddenly a bird flies towards him. He raises the umbrella to hit the bird when the bird is within striking distance. This proposition can be represented as:

Umbrella-Hold^ Umbrella-Raised^Bird-Approach^Striking-Distance

In order to appraise each proposition, EMA maps the features of causal interpretation into a number of appraisal variables. Eight appraisal variables have been identified in EMA:

Relevance: assess if a proposition is relevant to the agent;

Perspective: examine from whose viewpoint the proposition is evaluated;

Desirability: characterise the value of the proposition to the character whose perspective is being considered

Likelihood: measure the probability of the outcome happening;

Expectedness: check if what actually happens is the same as predicted from the causal interpretation, *i.e.* if it is expected;

Causal attribution: define who deserves the credit or blame

Controllability: check whether or not the outcome can be altered by the character whose perspective is taken;

Changeability: check whether or not the outcome can be altered by some other causal character.

All appraisal variables are maintained in a data structure which is called the *appraisal frame*. There are multiple appraisal frames in EMA, and each appraisal frame is responsible for evaluating one proposition in the causal interpretation, which leads to multiple emotion labels (*e.g.* hope, fear, joy, surprise etc) and intensities. In order to select one as the individual's explicit *affective state*, a higher-level notion *mood* is introduced as the aggregation of all emotional intensities with the same emotion label across various appraised events. For example, if several appraisal frames are labelled with the same emotion X, the mood X can be represented by the sum of the intensities of all appraisal frames labelled with X. Therefore, the final affective state is determined by the most recently accessed appraisal frame with the highest mood intensity.

Appraisal is a fast, parallel and automatic process. The appraised significance of events leads to a series of coping behaviours. A computational model of coping integrated into the appraisal process is included in EMA. In order to implement emotion-focused and problem-focused coping activities, a series of coping strategies are employed. They serve as the *control signals* to maintain desirable or overturn undesirable causal interpretations. In this sense, coping strategies 'work in the reverse direction of the appraisal that motivates them, by identifying features of the causal interpretation that produced the appraisal and that should be maintained or altered (*e.g.* beliefs, desires, intentions and expectations; Marsella and gratch 2009). The coping strategies within EMA are categorised as attention-related coping, belief-related coping, desire-related coping and intention-related coping in terms of their impact on the individual's focus on attention, beliefs, desires or intentions:

Attention-related coping:

Seek information: it is selected when the truth value of the state is uncertain, the situation is changed unexpectedly, and the appraised controllability is high.

Suppress information: it is selected when the truth value of the state is unambiguous, or the appraised controllability is low.

Belief-related coping:

Shift responsibility: it is selected when the consequence of the event has low appraised controllability, therefore, the attribution of blame or credit is shifted from (towards) the self towards (from) some other agent.

Wishful thinking: it is selected when the appraised controllability of the outcome is low, therefore, the individual increases the probability of a pending desirable outcome or lowers the probability of a pending undesirable outcome.

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Desire-related coping:

Distance/mental disengagement: it is selected when the appraised controllability of the appraised outcome is low and the desirability is low, therefore, the individual comes to care less about the outcome.

Positive reinterpretation/silver lining: it is selected when the appraised controllability of the appraised outcome is low and the desirability is high. Therefore, the individual increases the utility of a positive side-effect of some action.

Intention-related coping:

Planning/action selection: it is executed when the individual has some control over the appraised outcome, *i.e.* controllability is medium or high.

Seek instrumental support: it is selected when the action in question is unlikely to succeed. Therefore, the agent intends to get help from someone else to perform some actions or plans.

Make amends: it is executed when the action in question is unlikely to succeed. Therefore, the agent intends to make amends to his actions.

Procrastination: it is executed when the situation is appraised as having moderate or low controllability but high changeability. Therefore, the agent intends to wait some time for an external event to change the current circumstances.

Resignation: it is executed when the agent has little appraised control over the state. Therefore, the agent may abandon the current goal.

Avoidance: it is executed when the threat is appraised as uncontrollable. Therefore, the agent intends to have a reflexive reaction to certain situations and attempts to avoid the threat. It is different from the *Planning/action selection* coping strategy because *Avoidance* is not an action that explicitly addresses the threat.

Not all strategies are applied at each time. However, multiple coping strategies can be applied towards a given circumstance. EMA proposes multiple strategies in parallel but adopts them in sequence. In a broad sense, all coping strategies are conducted from two distinct categories which are problem-focused and emotion-focused strategies. Problem-focused strategies are concerned with attention-related or intention-related coping strategies, such as taking action or seeking information. Their execution is preferable when the controllability of the situation is high and sometimes the changeability is high. However, emotion-focused coping strategies are more likely to influence the agent's psychological state. Their execution is preferable when the controllability and changeability are low. The consequences of coping also exert an influence on the environment, and alter the causal interpretation with the evolution of the environment, which leads the agent's emotional experience through a dynamic and cyclic process.

Gratch and Marsella (2006) evaluated EMA by comparing the emotions generated by EMA with human emotional experience using a standard clinical instrument-Stress and Coping Process Questionnaire (SCPQ). Previous psychological studies have obtained plenty of data on human emotional experiences in two prototypical stressful scenarios using SCPQ. EMA encodes these two scenarios and generates possible emotional responses accordingly. The emotional responses generated by EMA are compared with human emotional experience. The results confirmed that EMA is capable of capturing the unfolding dynamics of appraisal and coping. However, EMA is designed purely on the basis of psychological theories of emotion, without considering the narrative requirement of generating engaging stories in terms of dramatic flow. Therefore, although the virtual characters are designed to be believable and autonomous, the user probably still finds it difficult to empathise with them because the plots are lack of dramatic effect.

2. FearNot!

FearNot! (Fun with Empathic Agents Reaching Novel outcomes in Teaching) is a narrative based interactive storytelling system which is designed for anti-bullying education. It allows the user (children aged 8-12) to explore what happens in

situations without placing themselves personally in a threatening environment. In FearNot!, the user plays the role of an 'invisible friend' who gives advice to the victim (non-player character) in order to influence the victim's behaviours. This creates an empathic relationship between the user and the victim, which is significant in getting the user involved. To achieve this, it requires the victim to act as a real person with independent and believable life. Therefore, the victim should be affected by the event happening to him/her and react to the event in terms of his/her emotional state and personality automatically.

The architecture of FearNot! is demonstrated in Figure 3.6. Basically, there are five modules to work through: sensors, appraisal, emotional state, coping and effectors. *Sensors* are used to perceive the environment, including events, objects etc in the world. After receiving the perceived information, the character *appraises* its significance according to the goals, intentions and plan. The consequence of appraisal triggers the appropriate *emotional state* which leads to a set of *coping* strategies. The coping strategies are turned into voluntary behaviours and carried out through *effectors*. The central part of the architecture is appraisal and coping. In particular, there are two distinct levels of both appraisal and coping in FearNot!: the reactive level provides a fast mechanism to appraise and react to a given event. It generates most types of OCC emotions (*e.g.* Fortune of Others emotions, Well-being emotions, Attribution emotions, Attraction emotions), and is responsible for the character's action tendencies; the deliberative level allows much more complex and rich behaviours and reaction takes longer. It often generates prospect-based emotions (*e.g.* hope, fear, satisfaction), and selects the most adequate coping strategies based on the agent's plans and goals (Dias and Paiva 2005).
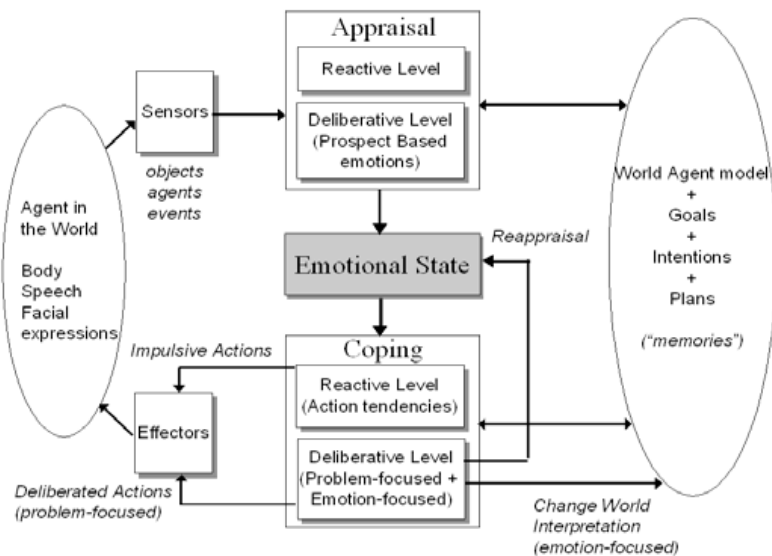
Figure 3.6 Architecture of FearNot (Aylett 2006)

The emotion theory adopted in FearNot! is that of Ortony, Clore and Collins (OCC) (Ortony et al. 1988). Accordingly, appraisal at the reactive level is implemented by a set of emotional reaction rules which consist of values for appraisal variables triggered by the event, agency and object. At the deliberate level, goals are introduced to appraise events together with those appraisal variables. Therefore, prospect-based emotions like fear and hope tend to be generated at the deliberate level. Two types of goals are included in FearNot!: active-pursuit goals which are goals that the character actively attempts to pursue, and interest goals which are those that the character wants to happen but have not happened yet. In addition, five emotion attributes are assigned for each emotion type: *valence* defines whether the emotional response is positive or negative; *target* denotes the name of the agent or object to which the emotion is directed; *cause* states the event or action which caused the emotion; *intensity* is the intensity of emotions; and *time-stamp* records the moment in time when the emotion is evoked.

The emotional state, resulting from the appraisal process, leads into coping. At the reactive level, action tendency is triggered as an impulsive reaction to a particular emotional state without considering any oriented goals, such as crying when the

victim is bullied. Therefore, a set of action rules are used for action selection. These rules consist of preconditions and elicited emotions to execute the particular actions. At the deliberate level, two kinds of coping, which are borrowed from EMA are defined: problem-focused coping and emotion-focused coping. Problem-focused coping involves actions and plans to achieve goals, while emotion-focused coping alters the character's interpretation of the environment. Emotion-focused coping usually happens when the problem-focused coping has a low chance of success, and is used to lower strong negative emotions. Three strategies borrowed from Marsella and Gratch (2009) are used for emotion-focused coping: acceptance, denial and mental disengagement. Acceptance is selected when the current plan fails to achieve the goal and the character does not attempt to improve it. Denial is selected when the chance of experiencing a threat is very low and the character ignores its effect. Mental disengagement is selected when the acceptance strategy is applied and the character lowers the importance of goals. The action selection and coping mechanism are implemented in a planner in FearNot!.

Since FearNot! is narrative based, keeping the story episode dramatic and coherent with the user's interaction is very important. To achieve that, a Stage Manager agent is included in FearNot! which determines every character's actions, sets up scenes and characters, and monitors what happens. To evaluate the efficacy of FearNot!, a story is created with several physical bullying episodes. The user can talk to the character victim and advise him/her on what to do next by typing whatever the user wants in a text box. Results of evaluation indicated that the user felt empathy for the character and thought the character was believable. Therefore, FearNot! provides a well-reasoned demonstration for creating believable characters and empathic relationships in interactive storytelling systems by applying a cognitive theory of emotion to generate emotions and coping behaviours for the characters. However, emotions in FearNot! are generated with respect to the character's goals and intentions, in a narrative sense, without considering the influence of user interaction on the character's emotional responses and the evolution of the story. For example, if the victim is unhappy

about physical bullying and the user advises him/her to tell a teacher, how would the victim respond emotionally? Would the victim be happy to find a solution, or would he/she still be unhappy, or would he/she worry about what would happen if the bully knew he/she had told the teacher? Therefore, a more complex architecture is required to manage the character's emotional response considering both the cognitive structure of emotion and the user's interaction.

This section has introduced two computational models of emotion- EMA and FearNot!. The implementation of these two computational models is based on different cognitive theories of emotion- EMA is based on Smith and Lazarus' theory while FearNot! is based on Ortony et al.'s theory. These two models provide a good reference point of applying the cognitive theories of emotion to interactive storytelling. However, emotions in these two models are generated for non-player characters without considering the user's emotional responses and the story's narrative meaning. Since emotion-driven IS takes the user's emotion as a driving force to move the story forward, a new approach to the application of cognitive theories of emotion is demanded for designing emotion-driven IS.

3. 2. 2 Other Applications of Emotion in Interactive Storytelling Systems

EMA and FearNot! are the computational instantiations of cognitive theories of emotion. They are used to model emotions for virtual characters in intelligent storytelling systems. However, when they are applied to an interactive storytelling system, emotions modelled by EMA and FearNot! only consider the character's pre-authored personality, including his/her goals and desires, but fail to consider the influence of the user's interaction on the character's emotional states and the development of the story. In order to increase the user's level of enjoyment and engagement, it is necessary to allow the user to express his/her emotional states and dynamically adapt the character's actions and storylines along with the user's emotional states. Given this consideration, a number of attempts have been made to incorporate the user's emotional state into interactive storytelling systems.

Cavazza and colleagues (Cavazza et al. 2002) proposed a character-based interactive storytelling approach in which the generation of the plots arises from the interaction between characters and the user. However, they found their original approach failed to consider the character's psychological state. Therefore, Cavazza et al. (2009) introduced an emotional planner to improve their original character-based interactive storytelling model by allowing the user to take part in a dialogue with the main character and mapping the recognised emotional categories to narrative situations and virtual characters' feelings. However, instead of describing the emotions of a character at a cognitive level, they preferred them to be intertwined with the literary presentation of the text. The novel *Madame Bovary* is well suited to formalisation in terms of characters' feelings because the author Gustave Flaubert has included a detailed account of characters' desires and emotions. Therefore, Cavazza et al. preserved a number of descriptions of the character's psychological states and connected them directly to actions according to Gustave Flaubert's accounts, such as *pride-of-having-a-lover; emboldened-by-love* and *feels-hatred-for-Charles*. The user could interact with the character using natural language. The emotional content of the user's utterance influences the character's emotional states and behaviours. However, the authors do not explain how this can be implemented. In addition, emotions in this approach are based on narrative description rather than cognitive appraisal, which cannot reflect the user's real-time emotional responses.

Blom and Beckhaus (2005) presented an 'emotional storytelling' model as an extension of current interactive storytelling systems. It parameterised the user's emotions and compared them with the author's ideal emotional value; the outcome was used to guide the story development. Therefore, two core components were introduced into interactive storytelling systems. One was the Emotion Tracking Engine (ETE) which was used to keep track of the user's expected emotional state. Another one was the Emotional Path Graph (EPG) which was a time dependent graph showing the ideal emotional experience for the user from the author's perspective. Blom and Beckhaus applied these two components in order to improve the interactive drama *Facade*. The story of

Facade centres on the relationship of one couple. The user plays the role of the couple's friend and is invited to the couple's house for dinner. However, when the user arrives at their house, the couple are quarrelling about something. Through the user's interaction, the relationship between the couple changes. Therefore, tension is chosen as the core emotional state of the drama and is experienced by the user. In addition, the whole storyline is divided into a set of story segments. Each story segment is given an expected tension value. By tracking the difference between EPG and ETE, the story engine selects the best story segment to play to enhance or impair the player's current tension level. This emotional storytelling model takes emotion as an explicit guide for narrative development. But as the author said "this parameterization represents only the author's expectation of the user's emotional reaction. In other words, the parameterization represents an idealised view and not reflect the user's true experience" (Blom and Beckhaus 2005).

A similar attempt to make storytelling driven by the user's emotions was made by Roberts et al. (2009). They inserted several questions into the course of storytelling and authored the story based on the user's emotional responses. At first, the user is presented with text and videos to get information about the story, then at several specific decision-making points, questions are asked such as "How do you feel about…?" or "what would you like to do in response…?" When selecting a video to present to the user, if the system has a goal of eliciting emotion e_i, two kinds of user emotional states are tracked: the average emotional response of the users who have already seen the video (V_i), and the emotional response of a particular user (P_i). The system reasons how the user's emotional reactions are likely to be different from those expected. Therefore, if $V_i \approx P_i$, the video elicited emotion e_i would be presented, if $V_i \neq P_i$, the system will search and determine if there is another video that may be better at evoking emotion e_i. This approach integrates the user's emotional response to guide the development of a story. One disadvantage is that it uses questions to ascertain the player's emotion, which interrupts the story flow and is likely to negatively influence the user's experience (Cavazza et al. 2009).

These approaches attempt to use emotion as a narrative element to move story forward, which gives a good reference point to design emotion-driven IS. However, emotion in them is pre-described by the author instead of capturing from the user in a real time. Therefore, the user's actual emotional states are not reflected in these interactive storytelling approaches. In addition, although emotion plays a role in storytelling, emotion here serves as an "assistant" to help the author manage the story rather than serving as a driving force to move the story forward and motivate the user' interactions. For example, in "emotional storytelling", creating the author's expected emotional experience is the motivation of the story's evolution. In Cavazza's character-based interactive storytelling system, the character's long-term motivations, such as happiness and welfare, are the driving force for the user's interactions. Nevertheless, the actual relationship between emotion and narrative is of much greater sophistication. The user's emotional involvement with storytelling and the cognitive experience of emotion provide a chance for emotion to serve as a driving force to move the story forward and motivate the user's interactions.

3. 3 Emotional Involvement with Storytelling

Storytelling, as one of the oldest forms of entertainment, is full of magical fascinations. It transports the audience to an imaginary world, and provides extraordinary enjoyment for them. In particular, since the 19th century when various media were developed, storytelling is no longer restricted to oral or written forms only. Instead, it can be told using images, audio, video, and even multimedia tools. At the same time, stories have become important media content which attracts the audience in various ways. Therefore, a key question concerning the fascination of a story is, "why do we enjoy the story?" Researchers have come up with different viewpoints. In particular, affective disposition theories give a reasonable explanation that the enjoyment of a story comes from the audience's affective disposition towards characters and the outcome experienced by those characters in the unfolding narrative (Raney 2006). In other words, it is the audience's emotional involvement which determines the enjoyment of a story.

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3. 3. 1 Affective Disposition Theory and Empathy

Affective disposition theory is not a single theory, but a title given to a set of propositions which agree on the enjoyment of a story resulting from the audience's emotional involvement with characters and the storyline associated with the characters. The first affective disposition theory was proposed by Zillmann and Cantor (1972) to describe how people appreciate humour involving disparagement. Later, the principles of the resulting 'disposition theory of humour' were applied to the appreciation of drama and sports which yielded the 'disposition theory of drama' (Zillmann and Cantor 1976) and 'disposition theory of sports spectatorship' (Zillmann et al. 1989). After reviewing a variety of disposition-based theories, Raney (2006) offered six principles that are shared among all applications of disposition-based theories in terms of media environment: (i)"Disposition-based theories are concerned with the enjoyment or appreciation of media content" (p.144); (ii)"Disposition-based theories are concerned with emotional responses to media content" (p.145); (iii)"Disposition-based theories contend that media enjoyment starts with and is driven by the viewer's feelings about the character" (p.145); (iv)"Disposition-based theories contend that affiliations towards characters are formed and maintained on a continuum from extreme positive through indifference to extreme negative affect" (p.146); (v)"Because disposition-based theories rely upon the evaluation of conflict outcomes between characters, justice consideration are a necessary component of the theories" (p.147); (vi)"Disposition-based theories further acknowledge and rely upon the differences between individuals in terms of emotional responsiveness, personal experiences, basal morality, and countless other psychological and social-psychological factors" (p.147). In this sense, affective disposition theory takes a character-based perspective to explain the enjoyment of a story. It argues that the enjoyment increases when the characters least liked by the audience suffer and the most liked characters succeed, while the enjoyment decreases when the most liked characters suffer and the least liked characters succeed. In order to justify the enjoyment of the character's suffering or success, moral judgement is required to determine the emotional stance the

audience takes. Therefore, the audience acts as "untiring moral monitors" to justify their judgement about the right or wrong of a character's action (Zillmann 2000). In particular, the audiences tend to morally judge the action of the characters in light of the audience's own experiences. As a result, the audiences tend to like the characters whose action is judged as morally correct, and dislike the characters whose action is judged as morally incorrect (Raney 2003). Furthermore, moral judgement is carried out all the time and the consequences updated constantly as the dramatic accounts progress, which results in a continuum of affective disposition towards the characters in the story. In this sense, the intertwining of affective dispositions and moral judgement eventually leads to the audience's emotional involvement with the stories.

Empathy is considered a significant mechanism governing the process of emotional involvement in affective disposition theory (Hoffmann 1987; Zillmann 1991, 1994, 2000). It allows the audience to emotionally connect with a character and feel the same emotions as though the audience was inhabiting the character (Louchart 2006). Therefore, Coplan (2004) argues empathy is an important dimension of the audience's engagement with fictional characters. It has been widely used to explain the audience reactions to film and the attraction of TV programmes in previous studies. Moreover, empathy is also an essential factor in building relations between a user and a synthetic character in interactive storytelling. Empathising with characters permits a deeper exploration and understanding of sensitive social and personal issues (Louchart 2006), which motivates an affective interaction and emotional engagement for the user. Therefore, a number of strategies have been proposed to evoke empathy and empathic engagement in interactive storytelling.

The concept of empathy derives from German aesthetics at the beginning of the 20th century. It was originally translated as 'feeling into another entity' (Zillmann 1994). Since empathy has been applied to different areas, its definition has become diverse, due to the varying attention to different facets of empathy. Nevertheless, most definitions agree that empathy is an affective reaction

produced by what happens to others or the emotional expression and behavioural responses of others (Zillmann 1991). In this sense, empathy is primarily understood as an affective process. Wirth and Schramm (2005) named the affective process of empathy as 'affective empathy'. However, an affective response is not the only dimension of empathy. That is because, in some circumstances, for example, crying does not mean a person is sad, it can also indicate a happy reunion. Therefore, empathy requires knowing about the causal circumstances, which relies on the individual's cognitive process. Wirth and Schramm (2005) name the cognitive process of empathy as 'cognitive empathy'. In this sense, empathy 'integrates cognitive and affective processes, creating a complex and dynamic psychological experience that draws in different capacities we have for connecting and responding to the world and those in it' (Coplan 2004).

One approach to achieving empathy requires the individual to put him/herself in the other's place and attempt to understand as much of the other's experience as possible. This process refers to 'perspective-taking' in psychology. For example, if person A empathises with person B, A therefore imaginatively experience B's emotional state and B' cognitive state. However, it does not mean person A fails to simultaneously experience his/her own emotions or cognitions. On the contrary, person A has his/her own separate experience while she/he is empathising with others. This, to some extent, weakens the intensity of A's empathetic emotions. In addition, learned affective reactivity has also been identified as an approach to achieving empathy. The theory of learned affective reactivity explains that if a person learns that an eliciting situation can result in some emotions (*e.g.* pain or pleasure) through witnessing another's experience, he/she would empathise with others when the same situation happens next time. Therefore, the situation that is consistently paired with or followed by affective reactions would assume the power of eliciting empathy (Zillmann 1994). As an alternative to the previous two approaches, empathy can also be achieved by the innate and reflexive process rather than deliberate cognitive efforts. The capability of emotional expression, especially facial expression, contributes to the reflexive process of empathy. For

example, infants cry reflexively to hear the cries of other infants. Empathy, in this sense, is a result of motor mimicry which is an immediate reaction to the perception of others' overt behaviours.

These three approaches to empathy in daily life are also widely used in film and television as useful techniques to get the audience emotionally involved. Plantinga (1999) proposed several cinematic techniques to encourage the viewer to empathise with the film. One important strategy is to focus the audience attention on characters' facial expressions. This can be done by using close-up, shallow focus, various point-of-view structures, and closer shots of a character's face and expressions. Plantinga also points out that the close-up or shots of a character's face should last for a while- approximately 10 seconds - in order to get enough time for the activation of mimicry and feedback mechanisms. In addition, flashback is often used to remind the viewer of previous critical emotional experiences and help him/her empathise with the character.

Therefore, in film and other traditional narrative media, empathy has been identified as a significant mechanism for getting the audience emotionally involved and enjoying the fascination of stories (Hand and Varan 2009). Empathy builds an emotional bond between audience and characters, which helps the audience feel the character's emotions vicariously. When the audience is empathising with the character, they do not only hope to see a positive outcome for the protagonist and fear for a negative one, they also consequently share all their emotions with the character (Vorderer et al. 2001). However, the significance of empathy for interactive storytelling is doubted by Vorderer et al. (2001). They argued that allowing the audience to interact with the story changes the audience from a witness to a participant. In this sense, the audience has to struggle with new technology and make decisions about the ongoing narrative, which distracts them from developing empathic feelings toward the characters. In order to test the effect of interactivity on empathy, Vorderer et al. (2001) carried out an audience research experiment and found that only participants with higher cognitive capacities felt more empathic with the protagonist by interacting with

the story. This conclusion is opposite to the findings drawn from using film as the test material. However, other researchers (Louchart 2006; Zillman 2006) have disagreed. In their opinion, the user's interaction helps him/her to empathise with the character, and in turn, empathy motivates the user to interact with the character. This can be explained from two perspectives. First, empathy helps the user to identify with the agent, and experience a feeling of "agency". Agency is defined as "the satisfying power to take meaningful action and see the results of our decisions and choices" (Murray 1997, p.126), via which the user could exert his/her influence on the virtual world. Thus, empathy is important to build a connection between the agent and the user, especially an emotional connection. Secondly, empathy is important for the user to build an emotional bond with non-player characters. It is like the social interactions in daily life, empathising with others makes the individual care about them and promotes a tendency to interact with them. Similarly, empathising with non-player characters permits a deeper exploration and understanding of sensitive social and personal issues in interactive storytelling, which promotes an affective interaction and emotional engagement for the user (Louchart 2006). Therefore, as Zillman (2006, p.14) concluded "the crux is that storytelling of any kind is a principal forum of empathic reactivity".

The concept of empathy is sometimes conflated with another concept - sympathy. Tan (1994) has argued that most empathic emotions are sympathetic, and then identifies sympathy as one of the major empathic emotions. In this sense, empathy is the same as sympathy. However, most researchers deem that empathy and sympathy are two distinct concepts.

Similar to empathy, sympathy is also an important mechanism to engage the audience's emotions which will be shared with other audience members. Therefore, sympathy also involves a 'self-other differentiation' (Coplan 2004). However, the different ways that the self is related to others determines the difference between empathy and sympathy. Scheler (1913 cited Oatley 1994) distinguishes sympathy as a fellow feeling in response to a state that an individual recognises in another person, while empathy is defined as an inner imitation of the

mental state of others, or projecting ourselves into the other's position. Coplan (2004) uses an easier way to explain the difference: empathy arises from imagining the world from another's point of view, therefore, an individual shares another's experience, whereas sympathy is concern for others without sharing their experiences. Simply, empathy means to 'feel into' others, while sympathy means to 'feel for' others. Feeling for others requires a concern for others' well-being. Therefore, sympathy is believed to involve other-oriented and altruistic motivations (Eisenberg 1989). Contrarily, empathy can coexist with indifference as Goldie (1999, p.215) explains, "you can imagine the other's suffering, yet simply disregard it, or you might empathise with a person who has committed a terrible crime, yet feel no sympathy for you think he thoroughly deserves his punishment". On most occasions, empathy and sympathy occur simultaneously during the audience's emotional involvement with a story.

3. 3. 2 Emotional Involvement with Film and Digital Games

As already discussed, emotion is one of the most important inspirations to get the audience involved in a story. Therefore, storytellers try their best to exert the strongest emotional impact on the audience. In ancient Greece, the bard modified some small parts of a story according to the audience's emotional reactions without changing the overall storyline (Blom and Beckhaus 2005). In contemporary times, storytelling has evolved with the development of various media, which leads to various storytelling forms, such as literature, film, TV drama and soap opera. Nevertheless, emotions are still the central gratifications in each kind of storytelling and contribute to the audience's engagement and emotional experience. Oatley and Duncan (1992) argued that 7% of everyday emotions arise from reading, watching television or film. However in the 21st century, although the fascination of traditional media has not faded, 'being digital' has become a way of life and has brought a new form of storytelling – interactive storytelling. In interactive storytelling, the audience is not only the passive acceptor, but also the active creator. He/she participates in the process of storytelling and creates a completed story along with the author. The changed role

of the audience, however, does not change the role of emotions in digital storytelling, but inspires new ways to get the user emotionally involved with storytelling.

Emotional Involvement with Film

Tan (1994) studied the viewer's emotional experience in film viewing, and categorised film-induced emotions into artefact-based emotions and fiction-based emotions. Artefact-based emotions (A-emotion) are related to aspects of the artefact of film, including enjoyment, admiration, wonder etc. Fiction- based emotions (F-emotion) are related to elements of the fictional world, such as joy, humiliation, embarrassment etc. In particular, Tan (1994) believed that interest is the basic and central emotion in film viewing which accompanies any other type of emotion in film viewing. That is because interest motivates the viewer to pay attention to the film and engages them in processing different expectations about the outcome of the story. However, due to the fact that film does not allow the audience to participate in the development of the story, the viewer acts as an 'invisible witness' in film viewing, and the film-induced emotion is also viewed as 'witness emotion'. Therefore, the narration of a film, and especially the way the fictional events are presented, decides what the viewers see, how they see it and when. The perceived scenes create a set of embedded illusions in the audience's brain. On the one hand, the viewer realises there is a space between the fictional world and real world. On the other hand, the viewer experiences the fictional world as if that world is real. The dualism of these illusions leads the viewer to invest sympathies and antipathies towards the character and gives rise to empathic and non-empathic emotions, such as pity, schadenfreude and fear. In this sense, emotions in response to film are often, though not always, focused on empathising with the characters. The viewers respond to the film because they imagine the characters' experiences and because they come to care about what happens to the characters (Harold 2010). In addition, empathic emotions trigger a series of action tendencies by means of altruistic responses and verbal intervention. However, due to the witness role the viewer adopts when watching a film, action tendencies are

difficult to turn into actual actions influencing the character and the storyline. The viewers could neither call upon the character to intervene nor physically react. In this sense, action tendencies evoked by empathic emotions are similar to 'virtual tendencies', for example, 'I would like to help you'. In addition, the witness role also limits the variety of film-induced emotions. However, not all emotions in the real word can be evoked by film. In an experiment carried out by Philippot (1993), film was found to successfully elicit emotions of amusement, sadness and a neutral state. Later, Gross and Levensor (1995) re-conducted Philippot's experiment and added anger, contentment, disgust, surprise and fear to the list of emotions that film can elicit.

Although film cannot wholly recreate the real life situations in which emotions occur, film is one of the most typical and efficient elicitors to evoke emotions (Levenson 2003). Bavels (1987) also found that in addition to film, videotaped episodes, documentary film clips and television clips are also an efficient way to elicit emotions in the audience. Tan (1994) further compares the capability of different genres in eliciting emotions. He finds comedy is the best choice to evoke "a mixture of empathic emotions, such as pity, 'schadenfreude' and various embarrassment and humiliation, yet offers viewers the enjoyment of observing the characters and events from a distance". Psychological dramas also tend to evoke empathic emotions. However, in some genres, such as science fiction, disaster films, fantastic films, musicals, horror films, action films and erotic films, the spectacle created by cinematography and the settings are more important than understanding characters and the significance of events (Tan 1994). Therefore, emotions evoked by these genres tend to be artefact-based emotions rather than fiction-based emotions. For example, when watching a horror film, the terror usually comes from the hideous disfigurations in close-up rather than the concern for the character's fate.

Emotional Involvement with Digital Games

As an efficient emotion elicitor, film engages the viewers in a variety of emotional experiences, all of which share a common characteristic that is film-eliciting

emotional experiences are vicarious. That is to say, emotions in films are experienced through the audience empathising with a series of pre-authored and fixed plots and characters. Because of the non-interactivity of linear media, the audience cannot interact with the film and enjoy the pleasure of controlling the development of the storyline as they wish. On the contrary, digital media provide the audience with the opportunity to participate in the process of storytelling. However this results in a conflict between storytelling and interaction, as discussed in the previous chapter. Therefore, the user's emotional experience in interactive storytelling is more complicated. On one hand, it stems from the pre-authored story world as in traditional media. On the other hand, it is determined by the consequences of the user's interactions. As a relatively mature industry in interactive entertainment, digital games have set a good example for investigating the user's emotional involvement with interactive media.

Ryan (2008) categorised the player's emotions in digital games as self-directed emotions and other-directed emotions. Other-directed emotions refer to emotions directed towards others through a vicarious experience. In this sense, the traditional media (*e.g.* film, TV and books) have a unique power to generate other-directed emotions. By contrast, self-directed emotions concern the player's own desires and success in completing a set of goals and tasks. Ryan argued that the emotions evoked through playing digital games are overwhelmingly self-directed emotions, including excitement, triumph, dejection, relief, frustration, relaxation, curiosity and amusement. The dominance of self-directed emotions in digital games means the player is motivated to rescue a princess by being rewarded with more energy or an update to the next game level, rather than by romantic feelings as in love stories.

Perron (2005) studied emotions arising in digital games from a cognitive psychological perspective. He revisited Tan (1994)'s emotional theory in film as noted earlier, and agreed that digital games resonate with the same emotional power as film in fiction emotion (F-emotions) and artefact emotions (A-emotions). In digital games, F-emotions are principally empathetic emotions via the power of

the player's vicarious experience towards non-player characters. Therefore, F-emotions are other-directed emotions in nature and primarily evoked by the story. The story unfolds beyond the control of the player in a form of cut-scenes in most digital games. A-emotions concern the artefacts of digital games. They are usually created by the fast-developing computer technology and groundbreaking computer-generated imagery. The player may feel wonder when walking through dazzling 3D landscapes or enjoyment when moving along a tunnel with the real-time lighting. Therefore, making both in-game and pre-rendered cinematic techniques more artful helps to generate more complex and powerful emotions (Freeman 2004, p.389). In addition, Perron (2005) also proposes another kind of emotion: gameplay emotions (G-emotions), and claims that G-emotions are the primary emotional experience in digital games. In contrast to story-elicited emotions (*i.e.* A-emotions and F-emotions), G-emotions are related to gameplay. In particular, they arise from the player's appraisal of his/her capability to complete a challenging task. Therefore, as Grodal (2003, p.150) concluded, "it is the player's evaluation of his own coping potential that determines whether a confrontation with a monster will be experienced as fear (if the evaluation of his coping potential is moderate), despair (if he feels that he has no coping potential), or triumphant aggression (if he feels that he is amply equipped for the challenge). This entails that the emotional experience varies over time, due to the learning processes leading to a change in coping potentials". In this sense, G-emotions are the same as the self-directed emotions which proposed by Ryan.

Frome (2007) agreed with Perron's three categories of emotions in digital games, but he uses more straightforward terms. 'Fiction emotions' and 'gameplay emotions' become 'narrative emotions' and 'game emotions'. In addition, he adds "ecological emotions" as a fourth type of emotion elicited by digital games, and argues that ecological emotions are generated when a player responds to a digital game in the same way as he/she responds to the real world. Frome provides an example to explain ecological emotions. When playing the survival-horror game *Fatal Frame*, although the player consciously knows the ghost on the screen would not harm him/her, he/she still jumps with surprise or fear when the ghost

suddenly appears. In this sense, ecological emotions represent the player's emotional responses to the 'virtual tendencies' as noted by Tan (1994). Surprise and fear are therefore classified as ecological emotions. In essence, ecological emotions are different to the other three types of emotions (*i.e.* narrative emotions, game emotions, and artefact emotions) in that: those three types of emotions are the player's affective responses to the real happening, while ecological emotions are the player's affective responses to what digital games represent as if these representations were real.

In addition to studies on the classification of emotional responses in digital games, Zagalo et al. (2005) imitated Gross and Levenson's (1995) experiment by testing digital games rather than film clips to find out what types of emotions digital games can evoke. They found that digital games could elicit 75% of the emotions that films elicit. These emotions include surprise, anger, disgust and fear etc. Other emotions like happiness and tranquillity are rarely experienced although it is technically possible to elicit them in digital games. However, Gross and Levenson (1995) argued that it is not possible to elicit sadness in digital games through the player's interaction. In this sense, sadness is a "narrative emotion" rather than "gameplay emotion".

The sense of narrative is diluted by the player's participation in digital games. Jarvimen (2009) argues that one of the key enjoyments in digital games originates from the way games impose goals on the player. Lazzaro (2004) also presents four key ways to generate emotions in digital games irrespective of the story. They are: providing meaningful challenges, strategies and puzzles; grabbing attention with ambiguity, incompleteness and detail; combining perception, behaviour and thought in a social context; creating opportunities for player competition, cooperation, performance and spectacle. Due to the different means of engaging a person in film and digital games, the emotional experience of a given situation varies according to whether the person is watching a film or playing a digital game (Grodal 2000, p.189):

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…when viewing a film the labelling of the emotions felt is determined by the viewer's passive appreciation of the film character's coping potentials. But when the situation is part of a video game, it is the player's assessment of his own coping potentials that determines the emotional experience. The unskilled player may feel despair when confronted with the lion, but the skilled player will fuel the arousal into a series of courageous actions. Video games therefore simulate emotions in a form that is closer to typical real life experiences: emotions are motivators for actions and are labelled according to the player's active coping potentials.

3. 3. 3 Gender Differences in Emotional Involvement

Differences among individuals in emotion, as a personal psychological state, have been found. In particular, males and females differ considerably in their emotional experiences, which further influence their emotional responses to storytelling in different media as well as their enjoyment of storytelling.

Studies demonstrating how males and females differ emotionally abound in the psychological literature. In general, females are deemed to experience emotions more intensely and more frequently than males (LaFrance and Banaji 1991; Shields 1991; Niedenthal et al. 2006). This is particularly true when different types of emotions are examined. Timmers et al. (2003) suggest that females tend to experience powerless emotions, such as sadness, fear, shame, and guilt, while males tend to experience more powerful emotions, such as anger, contempt, disgust, and pride. Similar conclusions have been drawn with respect to positive emotions and negative emotions. Numerous studies have shown that females experience more positive emotions (*e.g.* happiness and feelings of love) than males (Garner and Estep 2001). In addition, Johnson and Shulman (1988) suggest that females are more likely to experience other-directed emotions and less likely to experience self-directed emotions. In contrast, males are more likely to

experience self-directed emotions and less likely to experience other-directed emotions than females. This finding is consistent with the conclusions drawn from most studies on gender differences in empathy. Hoffman (1977) found that females are more empathic than males in terms of emotional response to the other's affective condition and perspective-taking. This is also confirmed by Davis' (1983) multidimensional approach to empathy measurement and Mestre et al.'s (2009) longitudinal study of empathy in adolescence. However, not all previous studies draw this conclusion. Block (1976) found that gender differences in 23% of previous studies on empathy favoured females while 10% favoured males. Eisenberg and Lennon (1983) attribute the inconsistency to different research methods used to assess empathy. Therefore, they provide a comprehensive review of previous studies based on different empathy assessment methods. They found that gender differences in empathy favoured females when self-report scales, reflexive crying and self-reports were used, no apparent gender differences were found when either physiological or unobtrusive observations were used. In this sense, Eisenberg and Lennon (1983) concluded that "to date, the only thing that can be concluded with confidence is that many important issues concerning sex differences in emotional empathy are, as yet, unresolved". Nevertheless, empathy has typically been regarded as a feminine strength (Garner and Estep 2001).

Furthermore, males and females were also found to express emotions in different ways. Females are more emotionally expressive. They tend to express emotions through facial expressions and interpersonal communication in an interpersonal, relationship-related situation (Brody and Hall 1993; Strayer 1986; Brody 1997; Kelly and Hutson-Comeaux 1999). In comparison with females, males are better at concealing their emotions. But once they start to express their emotions, they tend to express them through actions, especially reacting to negative emotions with aggressive, dangerous, or distracting behaviours (Brody 1993; Strayer 1986). In addition, males' expressivity is associated with achievement situations, *e.g.* achieving their self-defined goals (Brody 1997; Kelly and Hutson-Comeaux 1999).

Gender differences in the way males and females experience emotions influences their emotional involvement with different narrative media. Gross and Levenson (1995) used film clips as stimuli to elicit viewers' emotions, and found that women experienced higher levels of target emotions than men when viewing films. Later, Zagalo et al. (2005) carried out a similar experiment but used digital games as stimuli. However, surprisingly their finding was opposite to Gross and Levenson's conclusion, which is that males tend to experience a greater level of emotion than females in digital games. In addition, Thue et al. (2007) found that females experienced more fun than males in an interactive digital storytelling system, *PaSSAGE*, in which the content of an interactive story could be dynamically adapted according to the player's preferred style. Rowe et al. (2010) stated that boys felt significantly greater presence in virtual environments than girls in a narrative-centred interactive learning environment. In another experiment to explore gender difference in an interactive virtual environment, Nicovich et al. (2005) found that men appeared to empathise and engage in virtual environments via interactions, whereas women appeared to empathise and engage in virtual environments via watching the environment. Gender differences are found particularly in playing digital games. A number of studies have reported that females display less interest in digital games than males (*e.g.* Lucas and Sherry 2004; Brown et al. 1997; Hartmann and Klimmt 2006). Much effort has therefore been made to unveil the reasons contributing to female indifference toward digital games. Reasons have included: stereotypical role models portraying female characters either as the weak victim or in an exaggerated sexual role, an abundance of violent content, limited social interaction, and many competitive activities and rules (Hartmann and Klimmt 2006; Jansz and Martis 2003; Smith et al. 2003; Bryce and Rutter 2002; Vorderer et al. 2006). Although these findings provide some inspiration for improving the design of digital games in order to attract females, fundamentally gender differences in digital games can be attributed to the discrepancy between male and female's enjoyment of playing digital games. According to affective disposition theory, enjoyment is determined by the audience's emotional experience of storytelling. As indicated previously,

females are more likely to be concerned with other's emotions and express emotions in relationship-based situations. They tend to involve their emotions in the storytelling by empathising with the characters and experiencing the protagonist's emotional states vicariously. In contrast, males focus more on their own emotions and experience emotions by engaging in activities to achieve goals. They tend to involve their emotions via competitive interactions with others to achieve well-defined goals. In this sense, Stredder (2001) claims that women are looking for a compelling and emotionally engaging narrative in interactive entertainment through which they can find entertainment, accomplishment, and resolution. Since emotion-driven IS aims to create an engaged emotional experience for the user without following a goal-oriented narrative approach, it appears that males and females might have different user experience in emotion-driven IS.

3. 4 Summary

This chapter focuses on the study of emotions in interactive storytelling and the user's emotional involvement with storytelling. It starts from an introduction of cognitive theories of emotion, and follows by the applications of these theories in constructing computational models of emotions in interactive storytelling. Several key points are highlighted as follow:

• Smith and Lazarus deem that emotion is a reaction to a person-environment relationship, the evoked emotion results in a series of coping activities. These coping activities change the individual's interpretation of their relationship with the environment, which serve as new stimuli to influence the individual's subsequent appraisal and generate new emotions. Therefore, the experience of emotion is a dynamic process rather than a static reaction. In addition, the individual's personality exerts an important influence on the emotion occurrence.

• Empathy is a significant mechanism of the individual's emotional involvement with storytelling. It allows the audience to emotionally connect with a character and feel the same emotions as though the audience was inhabiting the character. It

is argued that the user's interaction helps him/her to empathise with the character in interactive storytelling, in terms of two aspects: empathy helps the user to identify with the agent, and empathy is important to build an emotional bond between the user and other non-agent characters.

• Ryan (2008) categorised the player's emotions in digital games as self-directed emotions and other-directed emotions. Johnson and Shulman (1988) suggest that females have a higher likelihood to experience other-directed emotions than males. Some studies (*e.g.* Hoffman 1977) also find that females are more empathic than males. In this sense, females are more likely to involve their emotions with storytelling via empathising with the characters and experience the protagonist's emotional states vicariously than males. They are looking for a compelling and emotionally engaging narrative in interactive entertainment.

Emotion has been argued to help the user empathise with the character thereby leading the user to engage in the story world. In order to evaluate user experience in interactive storytelling, engagement is considered as an important metric, and approaches to evaluating user experience are investigated in next chapter.

CHAPTER 4

ENGAGEMENT AND EVALUATION OF

USER EXPERIENCE

User experience, one of the vital criteria used to evaluate interactive entertainment, has become a common research topic in recent years (Komulainen et al. 2008). The most up-to-date definition of user experience (UX) according to the ISO 9241-210:2010 standard is: "A person's perceptions and responses that result from the use or anticipated use of a product, system or service." However, user experience does not refer to one particular experience, but covers a wide range of aspects of the user's experience in interactive entertainment, such as sensations, thoughts, feelings and actions (IJsselsteijn et al. 2007). A number of attempts have been made to define user experience by splitting it up into smaller measurable parts (Larsen 2008). Murray (2000) defined these "measurable parts" in terms of three subjective feelings in an interactive narrative environment: immersion, agency, and transformation. Immersion refers to the experience of "being transported to an elaborately simulated place" (Murray 2000, p.98). When the user is in an immersive state, his/her sensations are surrounded by a completely different reality and his/her attention and perceptions are also occupied by this reality (Murray 2000, p.98). Agency refers to "the satisfying power to take meaningful action and see the results of our (the user's) decisions and choices" (Murray 2000, p.126). According to Murray (2000), agency is not a frequent

experience for the user within a narrative environment. Transformation refers to a feeling of enacting stories rather than merely witnessing stories in an interactive narrative (Murray 2000, p.170). It takes advantage of digital media in which the user is invited to construct his/her own stories out of a set of formulaic elements. In addition to Murray's three categories of user experience, presence is also used as a dimension of user experience to assess virtual-realistic systems, such as VR and AR in which the user interacts with systems using natural body movements rather than an interface (Patrick et al. 2000). Another concept, flow, is also widely used to evaluate digital games, in which clear goals and the balance between the user's skills and the game's challenges are required (Csikszentmihalyi 1990; Sweetser and Wyeth 2005; Knickmeyer and Mateas 2005). Other than that, engagement is also an important component of user experience (O'Brien and MacLean 2009). It stems from "the sense of relating to a character or being intrigued about the plot" (Dow et al. 2007). Therefore, compared with other concepts (*e.g.* presence and flow), engagement is more appropriate for evaluating narrative experience in an interactive environment.

4. 1 Understanding Engagement

Engagement is an important psychological concept and has been widely used to evaluate users' subjective experience. However, due to the absence of a unified definition, a number of related but different understandings have been proposed. Generally speaking, engagement refers to "a person's involvement or interest in the content or the activity of any experience, regardless of medium" (Dow 2008, Dow et al. 2007). In traditional media, Boorstin (1990 cited El-Nasr 2007) identified the viewer's engagement with a film in three perspectives: joy of discovery and learning, empathy with the character and enjoyment of the audio-visual stimuli. In interactive media, engagement is also a quality which facilitates the user's interaction. O'Brien and Toms (2005) defined engagement as "the holistic interaction of user, system and the task that combine to create an emotional, cognitive, and behavioural experience for the user". They further investigated engagement as a process rather than a static outcome, and suggested

that engagement comprises four phases: a point of engagement, a period of sustained engagement, disengagement, and re-engagement (O'Brien and Toms 2005, 2008). Point of engagement refers to the initial stage of an engaging experience. It is often triggered by something which resonates with the user's interest, captures the user's attention and moves the user forward into engagement (O'Brien and Toms 2008). A period of sustained engagement indicates the user's attention and interest are maintained in the interaction. Disengagement occurs when the user is no longer paying attention and loses interest in the activity or events due to internal or external factors. But disengagement is not the end of the user's engagement process. He/she can still reengage with the activity and event in the long or short term (O'Brien and Toms 2008). Peter et al. (2009) also consider engagement in terms of two senses: sense of starting and sense of long-term, which are similar to the "point of engagement" and "period of sustained engagement" in O'Brien and Toms' (2008) study. Brown and Cairns (2004) suggested that the sense of starting could only occur when users want to invest time, effort and attention in IS. Peter et al. (2009) refer engagement in the long-term sense to "being occupied with".

With the exception of the above studies on the process of engagement, research on the components of engagement is also conducted in a variety of domains, which provides a theoretical foundation for measuring engagement. Webster and Ho (1997) studied engagement in multimedia presentations by analysing user attention, curiosity and intrinsic interest. They suggested that engagement could increase through more challenge, feedback, control, and variety. This conclusion has been confirmed by Dickey's (2005) nine elements of engagement in virtual learning environments: focused goals, challenging tasks, clear and compelling standards, protection from adverse consequences for initial failures, affirmation of performance, affiliation with others, novelty and variety, choice and authenticity. Chen et al. (2011) developed a model of engagement in digital games with three factors: interest, attention and immersion. O'Brien (2010) investigated engagement with respect to online shopping and identified focused attention, perceived usability, aesthetics, endurability, novelty and involvement as the

attributes of the user's engagement. Although these studies have made great efforts to investigate the possible components of engagement, they focus more on the role of the user's *interaction* rather than the user's *enjoyment* in narrative to achieve engagement. In order to understand how narrative contributes to the user's engagement in storytelling, narrative engagement has been proposed.

Narrative engagement is used to describe different aspects of being engaged in a narrative in any media. Ryan (2008) explained it in three forms: spatial, temporal and emotional. They respectively represent: a sense of place and pleasure while exploring the story world, a desire to know the forthcoming events and the emotional response to the story and characters. This understanding implies the attributes of narrative engagement, but it is very general and implicit. Busselle and Bilandzic (2009) investigated narrative engagement in the context of film and TV drama, and distinguished four dimensions of narrative engagement which are narrative understanding, attentional focus, emotional engagement and narrative presence.

Narrative understanding indicates "how viewers make sense of or understand the narrative" (Busselle and Bilandzic 2009). It requires the viewers' ability to perceive media content, and more importantly, the ability to switch into the time and location of narrative context and identify with the character and events. Busselle and Bilandzic further considered narrative realism and cognitive perspective taking as two sub-dimensions of narrative understanding. In perspective taking, an alternative story world is constructed which elicits a sense of presence. This sense is important to increase the engaging quality of narrative (Rowe et al. 2010). To distinguish presence in narrative from presence in non-narrative activities, Busselle and Bilandzic added narrative presence as one dimension of narrative engagement. The third dimension they chose was emotional engagement which concerns the viewer's emotional involvement. It contains two factors: one is empathy which is to feel the character's emotion as they are mirrored to you; another is sympathy which is to feel for the character's emotion in your own position. Attentional focus is also considered as one

dimension used to measure narrative engagement from two perspectives: loss of awareness of oneself and loss of awareness of time passage. In addition, Busselle and Bilandzic also confirmed the ability of these four dimensions to predict enjoyment which is considered an outcome of engagement.

Diverse understandings have been proposed to specify the concept of engagement. In particular, two fundamental elements are widely accepted: attention and emotional involvement (Peters et al. 2009). Attention is viewed as the basic element of engagement. It builds a connection between the user and media content. However, in comparison with flow and aesthetic theories, O'Brien and Toms (2008) pointed out that engagement did not require fully focused attention because the user might not lose his/her awareness of physical reality when he/she was in engagement. Although attention plays an important role in initiating the user's engaged state, engagement is "primarily understood as an emotion" (Laurel 1993, p.112-113). The user's emotional involvement engages him/her with various forms of interactive entertainment and distinguishes the concept of engagement from other subjective experiences (*e.g.* flow) (Hall et al. 2005; Busselle and Bilandzic 2009; O'Brien 2010).

4. 2 Approaches to Evaluate User experience

The traditional approach to evaluate user experience in human-computer interactions is to measure usability by using some productivity metrics, such as effectiveness, efficiency, learnability or memorability (IJsselsteijn et al. 2007). Although these metrics can be applied to evaluate IS as well, they do not address all relevant aspects of user experience in IS (IJsselsteijn et al. 2007). In particular, engagement, as a subjective feeling, cannot be measured by outcome-based productivity. Therefore, other approaches to measure engagement are required. In particular, qualitative methods and quantitative methods are frequently used.

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4. 2. 1 Qualitative Approach

There are three main methods for collecting data in qualitative research, interviews, focus groups and observation (Hansen et al. 1998; Gunter 2000). Knichmeyer and Mateas (2005) used interviews to investigate the user's aesthetic satisfaction of the interactive drama *Façade*. Poels et al. (2007) employed focus groups to explore the dimensions of user experience in digital games. Milam et al. (2008) conducted a mixed method approach, interviews and observation together, to understand the user's interactive narrative experience. One major advantage of qualitative methods is they follow a relatively open structure which allows the user to express himself /herself freely (Gunter 2000). The user can choose his/her own answers, language and terminology to express his/her experiences, which helps "capture and understand individual definitions, descriptions and meanings of events" (Burns 2000). In addition, qualitative methods provide deep contextual and motivational insights into the specific experiences of different users. They are ideal for exploring new ideas (Poels et al. 2007).

4. 2. 2 Quantitative Approach

In addition to qualitative methods, plenty of studies use questionnaires as a way of gathering data to evaluate user experience. In order to measure different dimensions of user experience, various questionnaires have been designed according to different metrics. Witmer and Singer (1998)'s Presence Questionnaire is used to measure presence in virtual environments; Brockmyer et al. (2009)'s Game Engagement Questionnaire was developed to assess engagement while playing violent video games. Even when measuring the same metric, different questionnaires have been designed with different foci. The Witmer-Singer (1998) Presence Questionnaire examines factors that influence the user's presence, while the ITC presence questionnaire (Lessiter 2000) compares presence between different media. In addition, questionnaires can also be used with qualitative methods. For example, Pope (2007) applied the think aloud

method together with questionnaires to investigate how readers interacted with hypertext fictions.

Compared with qualitative methods, questionnaires are preferred when testing a clear and well defined hypothesis by collecting standardised quantitative data. Therefore, a questionnaire "standardizes and organises the collection and processing of information" (Hansen et al. 1998). Pope (2007) has argued that the point of a questionnaire is not to provide large-scale quantitative data, but to provide quickly visible trends within the participants' responses. Since "the more structured a question, the easier it will be to analyse" (Bell 1999, p.119), close-ended questions, which limit the user's answers to a fixed set of responses such as yes/no or a Likert scale, are relatively easy to analyse. One of the major advantages of questionnaires is that they do not interfere with the user's experience while the user is interacting with the systems. This, on one hand, helps the user to concentrate and experience the interactions completely. On the other hand, this leads to the major disadvantage of questionnaires which is that they have to rely on the user's retrospective responses. In this sense, Korsgaard et al. (2008) doubt the accuracy of questionnaires because memory could be incorrect and undesirably impacted by the user's feelings, prejudices or personal impressions. Insko (2003) further pointed out that, because the user's experience varied according to time, the experience near the time of filling out the questionnaire was more influential. However, Knickmeyer and Mateas (2005) have verified the effectiveness of retrospective analysis for investigating users' subjective feelings.

The implementation of questionnaires varies according to the need of the empirical study. In most studies, participants are required to play a piece of a digital game or watch an interactive film before they complete the questionnaire. Therefore, in previous research participants were often invited into to a laboratory environment (Rowe et al. 2010; Hall et al. 2005, Jennett et al. 2008). However, because of growing interest in research in online media entertainment (*e.g.* digital games, online shopping, interactive fiction, website usability etc), studies of user

experience have led to an increase in the use of online surveys in recent years. O'Brien (2010) received more than 800 sets of feedback data investigating users' online shopping experiences by sending surveys through an online book retailer. Griffiths et al. (2003) used an online survey to compare the difference between adolescent and adult game players. Some researchers also combined these two ways to collect data (Takatalo et al. 2006). One of the limitations of inviting people to a laboratory environment is that it may be different from the participant's preferred or accustomed physical setting (*e.g.* sitting room, internet café shop; Kort et al. 2007). This may potentially influence participants' subjective feelings. In contrast, online surveys allow the user to participate in IS and complete the survey in a familiar environment. Furthermore, online surveys save time distributing the questionnaire to users and the time needed to return the responses. The responses can be collected immediately in a database which allows researchers to conduct preliminary analyses on these data while waiting for more data (Llieva et al. 2002). Therefore, online surveys have become more popular in recent years, and many online survey softwares or websites (*e.g Survey Monkey*) promote the convenience of conducting online surveys.

However, there are also some disadvantages when using online surveys. One of them is the sample bias which is created. Since online surveys rely on access to the internet, they exclude those potential users who cannot access the internet and those who are not receptive to online surveys (Wiki-online questionnaire). In addition, in an online survey, it is relatively difficult to know about the characteristics of the user aside from some basic demographic information (Wright 2005). Dillman (2000) even questioned the accuracy of this demographic information if it is given based on self-report. But this problem is also unavoidable in other methods, such as focus groups, interview, since they are subjective approaches to measuring user experience, and rely on the user's introspection which has a time difference to the original experience (Haringer and Beckhaus 2008).

In addition, physiological methods are also considered to measure the user's response, such as galvanic skin response (GSR), eye movement (EOG), muscle movement (EMG) and heart rate variability (HRV) (Haringer et al. 2008). Physiological methods are relatively objective. They are not influenced by respondents' prejudice and personal preferences. However, one disadvantage of physiological methods is that different measuring objectives could yield the same changes in physiological response. In addition, physiological methods have high requirements to ensure a similar experimental environment is maintained (Insko 2003).

4. 3 Summary

Engagement has been used as a metric to evaluate user experience in interactive storytelling. This chapter has provided an overview of a number of conceptualisations of engagement in current studies and investigates different approaches to evaluating user experience in interactive storytelling. Several key points are highlighted which provide a reference point for evaluating emotion-driven IS:

• Engagement is a process that the user experiences in interactive storytelling. It comprises different components according to a number of studies in different areas. In particular, narrative engagement is used to describe different aspects of being engaged in a narrative in any media.

• According to Busselle and Bilandzic (2009), there are four dimensions of narrative engagement: narrative understanding, attentional focus, emotional engagement and narrative presence. In particular, attention and emotional involvement are considered as two fundamental elements of engagement.

• Qualitative methods and quantitative methods are frequently used to evaluate user experience. Interviews, focus groups and observation are three main methods for collecting data in qualitative research. They are ideal for exploring new ideas. In contrast, the questionnaire is used to quantify user experience by coding the

user's answers into numbers. It is preferred when a clear and well defined hypothesis is being tested. In particular, the online survey has been widely used recently because of its advantages in collecting a large amount of feedback and allowing the user to participate in IS in his/her familiar environment.

Chapters 2 to 4 are literature reviews of current studies about designing and evaluating interactive storytelling systems. In the next chapter, the concept and implementation of emotion-driven interactive storytelling is specified.

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CHAPTER 5

EMOTION-DRIVEN INTERACTIVE STORYTELLING

Chapter two and chapter three provided an overview of IS design in terms of two questions: how to reconcile the conflict between narrative and interactivity and how to apply emotions to IS design. In this chapter, the concept and implementation of emotion-driven IS are specified. In contrast to most existing IS approaches relying on author-defined goals to move the story forward and motivate user interactions, emotion-driven IS has some different characteristics. These characteristics help to reconcile the tension between narrative and interactivity, and make an effort to involve the user emotionally with the characters and stories. The implementation of emotion-driven IS is based on Smith and Lazarus' (1990) "adaption and emotion" theory. Compared with other cognitive theories of emotion (*e.g.* Ortony, Clore, and Collins 1988), Smith and Lazarus' (1990) theory provides a plausible way of taking emotion as a driving force to move stories forward. A modular framework is proposed for emotion-driven interactive storytelling. To illustrate how this framework might work, an interactive video was made as a prototype by re-editing existing materials rather than shooting every scene from scratch. In so doing a number of challenges emerged, such as what is the appropriate material for re-editing; what is the

interactive narrative structure for the story; how to avoid the visual and sound discontinuities when re-editing? The final section of this chapter will answer these questions.

5. 1 Concept and Framework of Emotion-driven Interactive Storytelling

5. 1. 1 Concept of Emotion-driven Interactive Storytelling

In contrast to most current goal-oriented IS design approaches, emotion-driven IS centres on emotions, and primarily the user's emotions. This can be seen from two aspects. Firstly, emotion-driven IS attempts to provide the user with an enriched emotional experience, in which she/he can empathise with the characters and become emotionally involved with the story. Secondly, the user's emotions, as a driving force, exert an influence on the process of storytelling and then move the story forward. In this sense, emotion-driven interactive storytelling demonstrates two characteristics:

First, it is a convergence of character-based and plot-based interactive storytelling. The user participates in the story via the agent who is usually the main character in the story. The character-based approach enables the user to empathise with the character by understanding the situations the character is in. However, different from most existing character-based interactive storytelling systems, the user does not control the agent's explicit actions but his/her implicit emotions. That is to say, the user's emotions, which are spontaneously evoked from their empathy with the character, determine the character's emotions. According to cognitive theory of emotion (*e.g.* Smith and Lazarus 1990), emotions lead to a variety of action tendencies which trigger a series of actions for the character. These actions with respect to a narrative could also work as the stimuli to evoke new emotions and trigger new actions. Therefore, the user's emotions towards the storyline in interactive storytelling can result in a particular series of events being shown which, in turn, evoke new emotions and trigger new actions. The series of the

user's emotional responses direct the narrative and determine the final 'story' he/she experiences. Emotions become a powerful tool for narrative configuration in interactive storytelling. In this sense, emotion-driven interactive storytelling follows a character-based approach, but there are no pre-authored goals to motivate the narrative forward as in most current interactive storytelling systems.

In addition, although the user's emotions can decide the character's emotions in real time, and they are presented to the character via a variety of means, such as facial expression, gesture or verbal statements, the user's emotions can only have an impact on the storyline at some points in the story when there is an emotional conflict. In other words, the user's interactions cannot alter the storyline in real time. They have to wait until an emotional conflict occurs. It is the author who decides when the emotional conflict should occur according to his/her judgment on the dramatisation of the narrative. In this sense, emotion-driven interactive storytelling follows a plot-based approach - the user's real time interaction can only exert an influence on the storyline at some points in the story. The combination of character-based and plot-based interactive storytelling helps to balance the tension between narrative and interactivity in interactive storytelling. It, on one hand, provides freedom for the user to participate in the story. On the other hand, it allows the author's control over guiding and managing the narrative to guarantee the dramatisation of the story.

Second, the user empathises with the characters through a third-person perspective. Since empathy relies on the user witnessing characters or events, the third-person perspective is helpful to evoke the user's empathic emotions. Therefore, the user watches the story, and attaches his/her emotions to the character. With the story moving forward, the user experiences a series of events from the character's point of view, and empathises with the character emotionally. The techniques which are used in traditional media (*e.g.* film and TV) to provoke the user's empathy can also be applied to emotion-driven IS. At certain points in the story, the user makes a choice for the character, and his/her choice directs the narrative and determines the final story as stated previously. However, there is

another possibility: the user is unable to empathise with the character. In this sense, the choices he/she makes are not based on their emotional feelings towards the character, but some other motivations, such as "a self-invented goal"[2]. Emotion-driven interactive storytelling also gives users freedom to interact with the story in a way they prefer.

5. 1. 2 Framework of Emotion-driven Interactive Storytelling

Cognitive theories of emotion have provided a solid theoretical foundation for the implementation of a number of interactive storytelling systems (*e.g.* EMA, FearNot!). In particular, the framework of emotion-driven IS is designed on the basis of Smith and Lazarus' (1990) theory. The reasons for choosing Smith and Lazarus' theory include:

First, Smith and Lazarus' theory focuses on the influence of personality on an individual's emotional experience. As stated in chapter 3.1.1, Smith and Lazarus distinguish personality into two types: one is intention-related personality which includes goals, values and commitments. The other one is knowledge-based personality which includes attitude, beliefs and expectations. In particular, Smith and Lazarus (1990) emphasise the importance of goals in eliciting emotions. They argue that if there are no goals to be achieved, little or no emotion will be evoked. In this sense, each emotion is related to some specific goals. The goals in interactive storytelling could be user-defined goals which are invented by the user as part of his/her personality, or author-defined goals which are pre-set by the author without considering the user's personality. Most existing IS systems use author-defined goals as the motivation for eliciting self-directed emotions. But in emotion-driven interactive storytelling, user-defined goals play an important role in evoking emotions. For example, if the user cannot emotionally connect to a character or dislike a character, he/she can invent a goal to make the character suffer emotionally or eventually lose everything. In addition, knowledge-based personality also contributes to the user's emotional experience in emotion-driven

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[2] Cited from the interview with the interviewee SB in the empirical study. See chapter 6 for details.

IS. As Smith and Lazarus argue, knowledge-based personality decides what the user perceives in the story world and how the user understands the character's situations, which determines the cognitive process of empathy (Wirth and Schramm 2005). Therefore, knowledge-based personality is important for the user's empathy.

Second, Smith and Lazarus' theory provides a comprehensive interpretation of an individual's emotional experience. This experience does not only include how emotions arise in a particular situation (*i.e.* appraisal), but also includes how individuals are likely to respond given their personality (*i.e.* coping). Smith and Lazarus (1990) also identify six appraisal components and two coping types to demonstrate the individual's emotional experience. In emotion-driven IS, the character's emotions are not generated autonomously, but captured from the user as inputs. Therefore, the appraisal process is carried out by the user rather than the IS system. IS system is responsible for regulating how the character behaviours respond to the user's appraisal. In Figure 3.2, it can be seen that Smith and Lazarus distinguish the outcome of appraisal into three categories: action tendencies, subjective experience or "affect" and physiological responses. In particular, action tendencies can be translated into coping behaviours via emotion-focused coping and problem-focused coping. Frijda (1990, p.96) argues that "to consider emotional behaviours as modes of coping give these behaviours a functional interpretation". However, for much of the behaviour elicited by emotional events, the functional interpretation is not so obvious (Frijda 1990). Therefore, in Frijda's opinion, coping is not the only way of translating action tendencies into behaviour. Instead, he deems that action tendencies indicate the states of readiness to execute a given kind of action (Frijda 1990, p.70). In this sense, action tendencies can be translated into behaviours directly rather than requiring functional interpretation. Frijda studied 21 emotions and discovered their corresponding action tendencies (Table 5.1). This finding also provides a good reference point for the current research, which suggests the possible action tendency for a specific user's emotional response.

Emotion	Action Tendency	Function	End state
Desire	Approach	Producing situation permitting consummatory activity	Access
Fear	Avoidance	Protection	Own inaccessibility
Enjoyment, confidence	Being-with	Permitting consummatory activity	Contact, interaction
Interest	Attending(opening)	Orientation	Identification
Disgust	Rejecting(closing)	Protection	Removal of object
Indifference	Nonattending	Selection	No information or contact
Anger	Agnostic	Regaining control	Removal of obstruction
Shock; Surprise	Interrupting	Reorientation	Reorientation
Arrogance	Dominating	Generalized control	Removal of obstruction
Humility, resignation	Submitting	Secondary control	Deflected pressure
Sorrow	Deactivation	Recuperation	
Effort	Bound activation	Aim achievement	Action tendency's end state
Excitement	Excitement	Readiness	
Joy	Free activation	Generalized	
Contentment	Inactivity	Recuperation	
Anxiety	Inhibition	Caution	Absence of response
Laughter, weeping	Surrender	Activation decrease or social cohesion	Activation decrease

Table 5.1 Emotions and their corresponding action tendencies

Third, Smith and Lazarus argue that emotion is a dynamic process rather than a static reaction. The emotional behaviours resulting from emotions serve as new stimuli to provoke the subsequent appraisal and lead to new emotions. When Smith and Lazarus' theory is applied to storytelling, it helps to move the story and the user's interaction forward to generate a complete interactive story.

In summary, according to the influence of personality, two individuals can react with quite similar or entirely different emotions towards the same situation via the appraisal process. The emotions that individuals experience result in action tendencies which are regarded as urges to respond to the situation in a particular way. The nature of the emotions individuals experience determine the nature of action tendencies, for example, to attack in anger, flee or avoid in anxiety. These action tendencies are explicitly translated into a wide range of behavioural responses or actions. Individuals' experience of emotions and their responses to those emotions change dynamically with the situations they are in. Furthermore, the behavioural responses would not stop the individuals' emotional experience, but continuously influence the subsequent appraisals and emotions leading to new actions.

Applying Smith and Lazarus' theory into emotion-driven interactive storytelling, the working flow of emotion-driven IS can be illustrated in Figure 5.1.
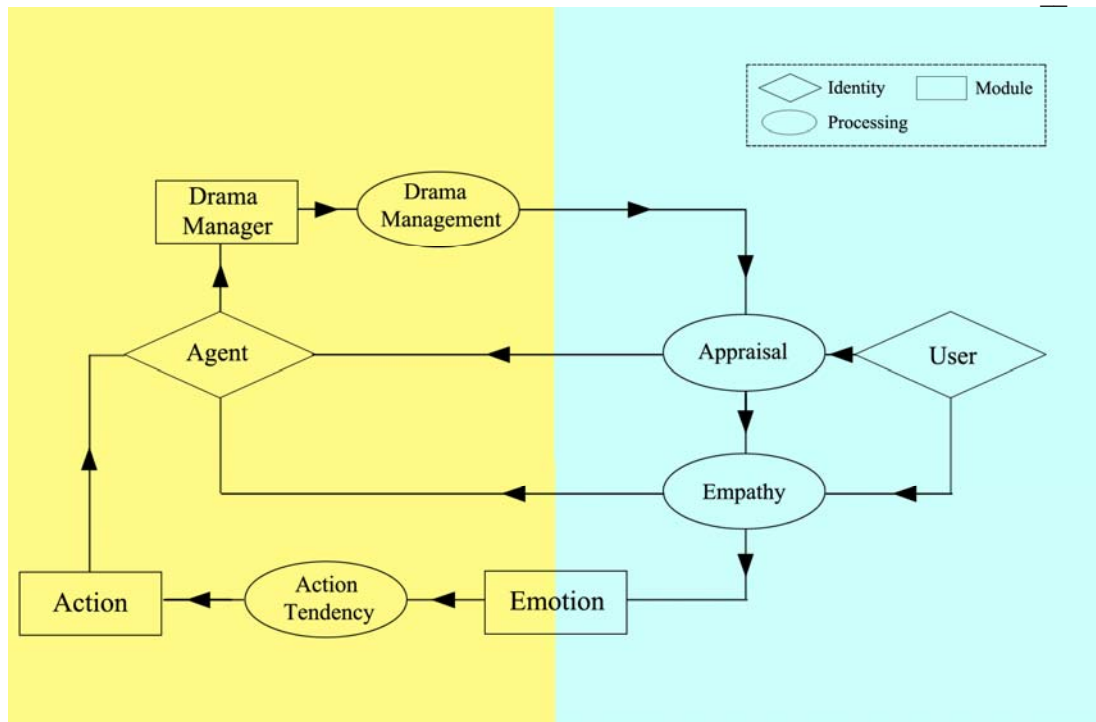
Figure 5.1 Working flow of emotion-driven IS

In this flow chart, three groups of components are shown respectively in three shapes: rhombus, oval and rectangle. They represent *Identity, Processing* and *Module* accordingly. Specifically, *Identity* refers to the person or object who takes part in the interaction; *Processing* is the process of reaching the subsequent *Module*. *Module* is the component of the system which can be a piece of a program or software package. It is used to store the content of a story and monitor the implementation of *Processing*. In emotion-driven interactive storytelling, there are two identities which are user and agent, four types of processing which are appraisal, empathy, action tendency and drama management, three modules which are emotion, action and drama manager. Each of them plays a role in the emotion-driven interactive storytelling.

Identity:

User: the person who participates in emotion-driven interactive storytelling

Agent: the main character in the story whose emotions are attached to the user

Processing:

Appraisal: the same understanding as it is in Smith and Lazarus' theory. It is the process of evaluating the relationship between the character and the situation.

Empathy: the process whereby the user empathises with the agent

Action Tendency: the process whereby emotions are turned into actions

Drama Management: the process whereby the narrative is unfolded and dramatised

Module:

Emotion: stores the user's emotional responses and regulates how emotions are turned into actions

Action: stores all possible actions for the character. When a specific emotion is captured from the user, the corresponding action would be chosen

Drama manager: stores all scenes and events and makes a decision on the evolution of the story

In Figure 5.1, the working flow of emotion-driven interactive storytelling is divided into two parts by two background colours. The blue part indicates the processing which is executed by the user, while the yellow part refers to other processing and modules that are implemented by the emotion-driven interactive storytelling system. The module *Emotion* is the connection between these two parts. Therefore, the user's emotional responses, on one hand, are outcomes of the user's appraisal and empathy, but on the other hand, are the inputs of the emotion-driven interactive storytelling system. Removing the user's part, the framework of emotion-driven interactive storytelling system can be demonstrated as Figure 5. 2.

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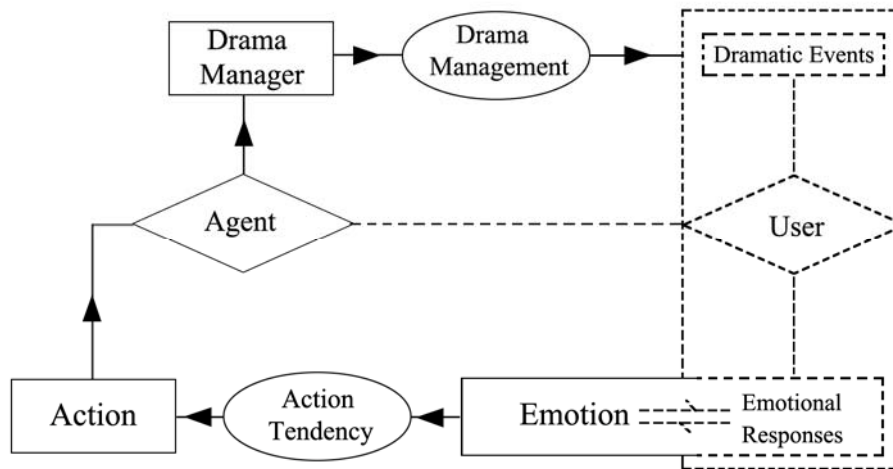
Figure 5.2 Framework of emotion-drive IS system

In emotion-driven interactive storytelling, the user's emotions can be captured in different ways according to the media and technology used. Ideally, the user's emotions are captured in real time, which results in the real-time control over the character's emotions. In particular, facial expression is regarded as an effective way to recognise real-time emotions (Frijda 1988; Cerezo et al. 2007). In addition, gesture and speech are also used in some IS systems (*e.g.* Camurri et al. 2000; Cavazza et al. 2009). But special techniques and devices (*e.g.* sensors) are usually needed to capture and analyse the user's facial expression, gesture and speech (Cohen et al. 2000). Roberts et al. (2009) used the relatively easier way. As stated in Chapter 3. 3. 2, they captured the user's emotional responses by asking the user questions directly.

According to the user's emotional response, the *Action Tendency* processing chooses the appropriate action tendency. Frijda's research outcomes in table 5.1 are applied as the criterion to make a decision on which action tendency should be selected. The selected action tendency is turned into the corresponding action directly, and carried out by the agent. For example, according to table 5.1, fear leads to avoidance. If a character is fear for something in one scene, he/she will take action to avoid it. Consequently, the relationship between the agent and the

environment or other characters is changed accordingly, which leads to a new event. *Drama Manager* evaluates the new event to assess whether or not it can create an emotional conflict to motivate the user's interaction. If so, the system will repeat the work that has been done, from capturing the user's emotional responses to assess the dramatisation of the event. Otherwise, *Drama Manager* will dramatise the plot by adding some new events until an emotional conflict emerges to allow the user to make a choice. This, however, leads to a challenge in controlling narrative time: how long the narrative takes to accumulate enough emotion and create emotional conflicts? If the narrative time is too short, the user's emotion may be not enough to motivate him/her to make a choice. But if the narrative time is too long, which means the user needs to wait for a long time until he/she is allowed to make a choice, the user would get bored and feel like he/she is watching a linear story. Therefore, choosing the best timing for the user's interaction is an important job for *Drama Manager*.

Two types of *Drama Manager* which are widely used in current IS design have been introduced in Chapter 2. 2. 1: *Search-based Drama Manager* and *Planning-based Drama Manager*. However, because there are no pre-authored goals in emotion-driven IS, *Search-based Drama Manager*, instead of *Planning-based Drama Manager* which relies on pre-authored goals to generate plans, is preferred in emotion-driven IS. In order to determine whether or not there is an emotional conflict, each story segment is assigned with several emotional values which define the possible emotions evoked by this story segment (*Ve*) and the intensities of these emotions (*Vi*). Only when the intensities of these emotions are equal, an emotional conflict is produced. For example, a story segment is about the protagonist intending to secretly meet his/her lover. Two main emotions are possibly experienced by the protagonist: one is happy for meeting his/her lover; another is guilty for cheating his/her partner. Therefore, *Ve=Happy & Guilty*. If the value of the intensity for happiness is 10 (*Vi-happy=10*), and the value of intensity for guilty is 3 (*Vi-guilty=3*), because *Vi-happy＞Vi-guilty*, there is no emotional conflict. Therefore, other story segments, which can increase the

protagonist's guilt, should be presented until *Vi-happy* $=$ *Vi-guilty*. In order to control the narrative time, *Drama Manager* should always choose the story segment which can produce emotional conflict in the shortest time. To demonstrate how emotion-driven interactive storytelling works, a prototype which is an emotion-driven interactive video has been made.

5. 2 A Prototype: Emotion-driven Interactive Video

Emotion-driven interactive storytelling, as a new approach for interactive storytelling design, can work in different media in different forms to provide the user with a new experience. In particular, an interactive video has been made for this research as a prototype for two reasons: first, compared with other interactive entertainment, interactive video is relatively easy to make. It can take advantage of the skills of actors by filming them rather than generating all the characters by computer program (*e.g.* digital games, 3d animation) or pure hand drawing (*e.g.* cartoon; Mateas 1997). Furthermore, making a video appears to need less investment (*e.g.* money and time) than making a full-feature film or TV drama. Due to the limited time and resources for a PhD study, making an interactive video is advantageous. Second, as stated in chapter 3.2.2, video is an ideal medium to elicit emotions in the audience, especially through the user's empathy with characters. Since emotion-driven interactive storytelling relies on the user's emotional involvement, the user's emotions, particularly the empathic emotions, have to be elicited to the maximum. Given these considerations, interactive video is the best choice for making a prototype of emotion-driven interactive storytelling.

In addition, Ryan (2006) points out that interactive storytelling "does not have to be built entirely from scratch, since it involves the same building blocks as the traditional brand: time, space, characters, and events." Therefore, rather than making an interactive video from scratch, using existing materials provides a good option to make an interactive video. One advantage of using existing materials is that it avoids the negative influence of amateur actors eliciting user emotions

during storytelling. As suggested in chapter 3. 2. 1, the performance of the actors, especially their facial expressions, plays an important role in eliciting emotions in the user. Therefore, professional performances are required. However, it is difficult to find professional actors and finish shooting in a short time. Re-editing the existing video materials provides an alternative solution.

The feasibility of generating an interactive story via video content recombination has been confirmed by previous studies (Porteous et al. 2010; Piacenza et al. 2011). However, making an emotion-driven interactive video requires more than simply combining video segments together. The first challenge is to choose appropriate existing video material. Szilas et al. (2011) reviewed the various types of stories implemented in current IS systems and found that TV drama, such as sitcom (Cavazza and Charles 2005), soap opera (Barber and Kudenko 2007) provide good options to adapt for interactive stories. In particular, the American TV comedy *Ugly Betty* was chosen as the re-editing materials for this research. *Ugly Betty* tells the story of an awkward, fashion-clueless young woman who stumbles into a job at a fashion magazine and manages to survive her many pitfalls through decency, luck and folk wisdom. There are two main reasons for choosing *Ugly Betty*. First, *Ugly Betty* is a comedy. As Tan (1994) has noted, comedy is able to elicit a wide range of empathic emotions. Furthermore, as the winner of the best television series in the 2007 Golden Globe Awards, *Ugly Betty* offers a good story script which creates complex emotional conflicts to attract the audience. Second, *Ugly Betty* has been broadcast for four years. Although it ended last year, *Ugly Betty* has accumulated abundant visual materials that can be re-edited to multiple storylines. However, instead of providing the user with an episodic endless story, an experience that provides the user with 10 to 30 minutes of emotionally intense, tightly unified dramatic events is preferred in this research. The adapted story script for the interactive video is attached in Appendix A.

The footage of *Ugly Betty* was recorded from Box of Broadcast (BoB) National[3] which is an off-air recording and media archive service. It is available to staff and students of member institutions of the British Universities Film & Video Council that hold an ERA+ license. But to protect the copyright of the TV footage, the interactive video can only be broadcast in UK's higher education environment.

5. 2. 1 Implementation of Emotion-driven Interactive Video

The interactive video was made based on the framework of emotion-driven interactive storytelling illustrated in Figure 5.1. The framework gives plenty of freedom to decide on the approach to implement emotion-driven interactive storytelling. In particular, the interactive video in this research follows an author-centric approach, which means the author controls every aspect of creating the interactive video, including pre-scripting multiple storylines, pre-designing every video segment, and predicting all possible users' emotional choices. In this sense, the *Processing* of *Drama Management* has been implemented at the design time before user interaction, which includes dramatising the storyline, controlling narrative time and reconciling the conflict between narrative and interactivity in this study. When users interact with the story, *Drama Manager* selects the video segment to play according to users' choices. In this study, a piece of program which is written in Flash Action Script plays the role of *Drama Manager*. In addition, branching structure is employed to structure all video segments. However, as reviewed before, in a branching structure it is easy to produce redundant storylines, which compels the author to construct a number of story segments and consider all possible user input at the design time (Min et al. 2008). To avoid this problem and reduce the work of scriptwriting, some storylines are forced into a convergent path, *i.e.* they share the same story segments or ending.

The whole structure of the emotion-driven interactive video can be simply described as follows: At the beginning of the interactive video, a video segment is played to introduce the background of the story. The end of this video segment

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[3] http://bobnational.net/index.php

leads to an emotional conflict and provides the chance for the user to participate. Rather than capturing the user's emotional response spontaneously, a clear set of possible emotional options are provided to allow the user to make a decision. Although this method has been criticised, as it interrupts the user's immersion in the narrative, it might be more user friendly and supplement the user's imagination if options that the user may not consider are presented (Arinbjarnar 2009). However, the options that the author provides should cover all suitable representations of the user's desired emotional states. Otherwise, it would result in the user's confusion (Arinbjarnar 2009). An interface with the choices is shown as Figure 5.3.

Figure 5.3 Interface for the user's interaction

The decision the user makes leads to a particular action tendency according to Frijda (1990). However, Frijda only gives 21 emotions and their corresponding action tendencies. Many emotions are therefore not considered. Therefore, an alternative rule is defined as a criterion for those emotions not considered by Frijda, which is: if the emotion is positive, it usually leads to an action tendency of approach or acceptance, while if the emotion is negative, it usually leads to an action tendency of aggressive behaviour or avoidance. The action tendency is directly turned into corresponding action, and the action triggers a corresponding video segment. Subsequently, this video segment is played to the user. However,

if this video segment cannot lead to an emotional conflict, other video segments will be presented until next emotional conflict appears. The whole process is repeated until one of the storylines comes to an ending. In summary, the architecture of this interactive video is as follows:

1. A video segment is presented;

2. An interface with multiple choices is shown to ask about the user's emotional response to the segment;

3. The next segment shown is determined by the user's response to the multiple choice question;

4. This process is repeated until the end of the storyline.

The whole structure of the interactive video is illustrated in Figure 5.4.

(VS stands for *Video Segment*)
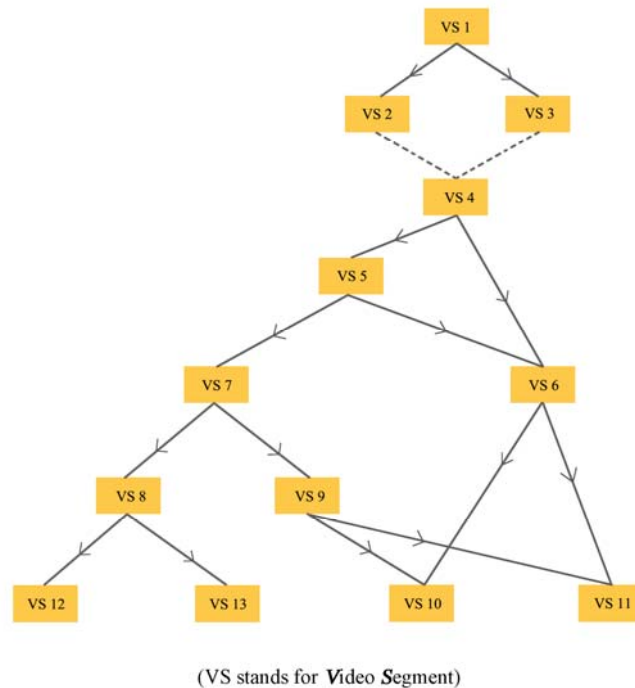
Figure 5.4 The structure of emotion-driven interactive video

5. 2. 2 Challenge of Re-editing the Existing Materials

Re-editing is challenging work. The storyboard used for re-editing is illustrated in Appendix B. The footage used in re-editing is mainly from two Seasons' four Episodes: Season one Episode one, Season one Episode two, Season one Episode three, and Season three Episode one. Each episode tells a different story. The storyline, character, scene, settings, costumes, and even makeup are different from one episode to another. However, the four episodes have to be combined to make new multiple storylines, and each storyline should keep visual and sound continuity to guarantee the story makes sense. Therefore, the first challenge is how to make sure there are no visual or sound discontinuities created by re-editing. Four skills have been used:

1. Applying *Cut-away* to the transition between two different shots and scenes from two different episodes or the same episode (Figure 5.5). Usually, there is a temporal or spatial difference between these two shots and scenes.

Figure 5.5 Cutaway as the transition between two scenes

2. Applying *Fade-in* and *Fade-out* to the transition between two different shots and scenes from two different episodes or the same episode (Figure 5.6). In addition, Fade-in and Fade-out can also be applied to avoid sound discontinuity. Extra music or a recorded voice can also be added to make the

transition of the sound seamless.

Figure 5.6 Fade-in and Fade-out as the transition between two scenes

3. Applying *Subtitles* to the transition between two scenes with a temporal or spatial difference, or when there are no shots or scenes found in the original footage, subtitles are a good option to explain the occurrence (Figure 5.7).
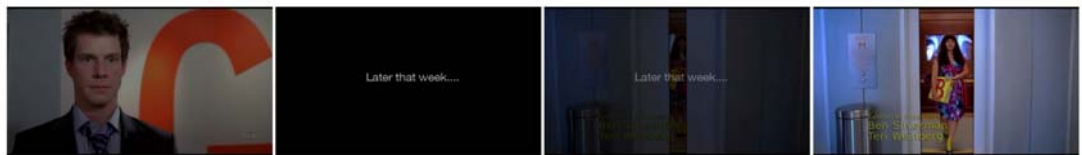
Figure 5.7 Subtitle as the transition between two scenes

4. Applying *Flashback* to connect two scenes with temporal or spatial differences from two different episodes. Usually flashback is applied with a visual effect to emphasise, or a subtitle as the transition between two scenes (Figure 5.8).

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Figure 5.8 Flashback to connect two scenes from different episodes

Another difficulty with re-editing appears to be the control of narrative time. As indicated previously, controlling narrative time, especially choosing the appropriate timing for the user's interaction is very important for emotion-driven interactive storytelling. In particular, re-editing the existing material is even more difficult to control. This is because the original footage has its own narrative pace and dramatic tension. Re-editing is needed to break them and create new narrative pace and dramatic tension. This inevitably leads to a disorganisation when controlling narrative time. Therefore, three rules are followed:

1. Cutting off all unnecessary shots or scenes on condition that it would not violate the completeness of the story.

2. If a scene has a narrative meaning in the emotion-driven interactive video, it at least keeps three continuous shots of the original scene in order to keep visual and sound continuity.

3. Using split screen to compile several shots in order to save narrative time (Figure 5.9).

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Figure 5.9 Composition

After finishing re-editing all video segments, Adobe Flash was used to connect them together, and insert the interfaces which provide the emotional choices between two video segments to allow user interaction. The interactive video lasts between 15 to 30 minutes depending on the user's choices, and 3 to 5 choices are expected to make by the user.

5. 3 Summary

This chapter has specified the concept and implementation of emotion-driven IS. To move the study into next chapter, the evaluation of emotion-driven IS, the following points summarise how the key questions in aims one, two and three have been answered.

Aim one: Propose the concept of emotion-driven interactive storytelling

Key Questions:

1. How can emotion be used as the driving force to move the story forward and motivate the user interactions?

Smith and Lazarus' theory explains why and how emotions can serve as the driving force to create an interactive story. Firstly, personality allows different users to react with quite similar or entirely different emotions towards the same situation. Secondly, the user's emotions can be translated into the character's behaviours through action tendencies. Thirdly, the character's behaviours have an impact on the plot, which leads to new events and evokes new emotions. The dynamic experiences of emotions result in a particular series of events being shown and eventually create a complete IS experience.

Aim two: Design the framework for the implementation of emotion-driven interactive storytelling

Key Questions:

1. What is the architecture of emotion-driven interactive storytelling?

    A modular architecture is proposed for the design of emotion-driven IS. Three types of component are included: *Identity* refers to the person or object who takes part in the interaction; *Processing* is the process of reaching the subsequent *Module*. *Module* is the component of the system which can be a program or software package. It is used to store the content of a story as well as carry out and monitor the forthcoming *Processing*.

2. How can emotion-driven interactive storytelling be implemented?

    Firstly, the user's emotional response to the story is captured. At a point in the story when there is an emotional conflict, the *Action Tendency* processing chooses the appropriate action tendency according to the user's emotional response. The selected action tendency is turned into the corresponding action directly, and carried out by the agent. Consequently, the relationship between the agent and the environment or other characters is changed accordingly, which leads to a new event. *Drama Manager* evaluates the new event to

assess whether or not it can create an emotional conflict to motivate the user's interaction. If so, the system will repeat the work that has been done, from capturing the user's emotional responses to assess the dramatisation of the event. Otherwise, *Drama Manager* will dramatise the plot by adding some new events until an emotional conflict emerges to allow the user's emotional response to influence the storyline.

3. How can the conflict between narrative and interactivity be reconciled in IS?

Emotion-driven IS is a convergence of character-based and plot-based interactive storytelling, which helps to balance the tension between narrative and interactivity in interactive storytelling. The user participates in an interactive story via his/her control over the character. This indicates emotion-driven IS follows a character-based IS approach. Ideally, the user's participation is real time. This gives the user much freedom to interact with the story and influence the way that the story evolves. However, different from other character-based IS, the user does not control the agent's explicit actions but his/her implicit emotions. Although the user's emotions can decide the character's emotions in real time, the user's emotions can only have an impact on the storyline at some points in the story when there is an emotional conflict. This reveals that emotion-driven IS follows a plot-based IS approach, which maintains the author's power on the control of multiple storylines. Therefore, emotion-driven IS helps to reconcile the conflict between narrative and interactivity.

Aim three: Make a prototype to interpret the concept of emotion-driven IS

Key Questions:

1. How is the prototype made?

Given the consideration of limited time and resources for a PhD study, an interactive video was made by re-editing existing materials from the American TV comedy *Ugly Betty*.

2. How can the user's emotional responses be captured?

According to the media and technology used, the user's emotions can be captured in different ways. The method used to capture the user's emotions in current research is similar to that employed by Roberts et al. (2009), which directly asks users questions to get their emotional responses to the plots.

CHAPTER 6

EXAMINATION OF USERS' EXPERIENCE OF EMOTION-DRIVEN INTERACTIVE STORYTELLING

Chapter 5 specified the concept of emotion-driven interactive storytelling and its implementation based on a modular architecture. One important characteristic of emotion-driven interactive storytelling is that the user's emotional responses to the story have an impact on the storyline. In other words, the user's emotion is not only a hedonic effect of enjoying a story, but also a driving force to determine the storyline and motivate user interactions. Therefore, emotion-driven interactive storytelling explores a new narrative mode in contrast to most existing interactive storytelling systems. As indicated previously, users play different roles in interactive storytelling - some act as spectators, while some act as participants (Louchart et al. 2008). The role of the user determines his/her experience in interactive storytelling and preferences for the mode of narrative and interactions. Usually, spectators tend to engage with dramatic and complex plots without any possibility of interaction, while participants tend to engage with real-time interaction to influence the evolution of the story. In the case of emotion-driven IS the aim is to create a dramatic and emotional

experience for the users. It follows a combination of character-based and plot-based design approaches. On one hand, the user can control the character by attaching his/her emotions to the character. On the other hand, the user's emotion can only have an impact on the storylines at some points in the story. Creating a dramatic narrative experience and allowing the user's interaction to influence the storyline at some points in the story might engage some types of users more than others with emotion-driven IS. In order to find the user types that tend to be engaged with emotion-driven interactive storytelling, an empirical study was carried out. Two methods were used to collect data: interview and online survey.

6. 1 Method of Empirical Study

User experience has become an important criterion to evaluate human and computer interactions (Hassenzahl and Tractinsky 2006). Different methods have been applied to achieve different research aims and objectives. The widely used methods include qualitative methods (*e.g.* interviews, focus groups and observation) and quantitative methods (*e.g.* questionnaire). As reviewed in chapter 4, qualitative methods are preferred for exploring new ideas as they allow users to freely express their opinions in their own language. For example, Brown and Cairns (2004) interviewed seven game players and encouraged them to talk about their experiences while playing digital games. They analysed the player's feedback and specified the concept of game immersion. In comparison with qualitative methods, quantitative methods are often used for gathering standardised data to test a theory or make a comparison between two or more variables. For example, Hu et al. (2005) collected data from nine participants using the Appealing questionnaire and the ITC-SOPI presence questionnaire in order to compare the participants' fun and presence experience at different levels of control over a distributed interactive movie. In particular, in recent years online questionnaires have been preferred when collecting large amounts of data, especially to evaluate online interactive entertainment, such as online shopping.

Online questionnaires allow the user to experience interactions in his/her familiar environment, which avoids the influence of a laboratory environment on user experience. For researchers, online questionnaires save time distributing questionnaires to users and time needed to gather the responses.

One important aim of this study is to explore the user experience of watching the emotion-driven interactive video, especially to identify the user types which tend to feel engaged with the emotion-driven interactive video. In order to gain insights into the user's experience in emotion-driven interactive storytelling, especially to investigate the differences among different types of users, interviews were carried out at the beginning of the study. In addition, as the interactive video was made by re-editing existing material, another aim of the interviews was to discover the technical problems of re-editing existing material that influenced user experience, such as visual or sound discontinuity, in order to improve the interactive video. To achieve these two aims, semi-structured interviews were designed. The questions included "Tell me your experience while watching this interactive video." "What motivated you to make the choices?" "Did you feel the emotional connection with Betty?" "Did you feel there was any problem with the representation of the interactive video?" According to the user's responses, the order of the questions was flexible, and further questions were asked in order to let the interviewee develop ideas and speak more widely about their experience. Due to the copyright concerns of using existing material, the empirical study could only be conducted among UK university staff and students. In order to get 'maximum variation' in data from the target users, interviewees were selected carefully to make sure a suitable balance of males and females, age bands, ethnic groups, traditional media and digital media preferences, and whether or not they had watched the TV comedy *Ugly Betty* before. In addition, given the considerations of time and cost for conducting face-to-face interviews, all interviewees were selected from Bournemouth University.

The interviews obtained the preliminary opinions on user experience in emotion-driven interactive video. However, in order to test the findings of the interviews, especially to identify the user types that tend to feel engaged with the emotion-driven interactive video, questionnaires were also distributed to collect standardised data from a large amount of target users. Importantly, questionnaires can only be completed after playing the interactive video, *i.e.* the participants should interact with the interactive video first and then complete the questionnaire on the basis of their feelings towards the interactive video. Considering the limited budget and resources for PhD research, an online survey was carried out to gather data. However, as reviewed in chapter 4. 2. 2, the online survey has some shortcomings. Firstly, it excludes potential users who do not have access to the internet. However, academic staff and students in the UK have plenty of opportunity to access the internet. Secondly, online surveys allow the user to complete it in his/her preferred way. Although it can avoid the influence of the laboratory environment on the user's experience of watching interactive video, the conditions in this study for playing the interactive video and filling in the questionnaire are uncontrollable. Ideally, the questionnaire should be filled out immediately after the user has finished playing the interactive video and there are no interruptions to distract them from playing and affect their experience of playing. However, the instability of internet connection, phone calls or friends talking could all be potential influences. Designing appropriate questions in the questionnaire attempts to solve these problems. The sample size for the online survey was largely determined by the results of the interviews, *i.e.* the numbers of potential user types that might engage or not engage with emotion-driven IS. That is because comparative analyses were conducted among these user types; therefore, in order to guarantee the statistical meaning of the comparative analyses, each user group should include no less than 20 participants. Furthermore, considering the feasibility of PhD research, Hansen et al. (1998) suggest that a sample of between 100 and 300 respondents is enough.

6. 2 Interview

6. 2. 1 Procedure

Ten students and staff (five male and five female) from Bournemouth University participated in this study. All of them were English speakers. The interviews were conducted individually with each interview taking place at the interviewee's preferred time and place. At the beginning of the interview, the aim and procedure of the study was briefly explaining along with how interviewees might interact with the video. After that, every interviewee was required to play the interactive video. He/ she was also asked to complete a demographic questionnaire which aimed to obtain the interviewee's background information, such as gender, age, nationality, their favourite entertainment and whether they had watched *Ugly Betty* before (Appendix C). Following the demographic questionnaire, the interviews were conducted. All interviews were recorded and transcribed (Appendix D). The interviews were analysed using Grounded Theory (Glaser and Strauss 1967), and the analysis was primarily completed through open coding and categories of concepts.

6. 2. 2 Findings

The interviewees were encouraged to talk about their experience of playing the interactive video in terms of emotional involvement and engagement. Interestingly, an important finding was revealed: the interviewees' user experience was largely influenced by gender, favourite media entertainment, and whether or not they had watched *Ugly Betty* before. In general, females felt more engaged than males with the emotional involvement and emotional interaction. All females felt empathy for, and built an emotional bond with, the character. They perceived the emotions from the character's standpoint while at the same time combining this with their own experience and concerns. They made choices based on the blend of these two

emotions. Interviewee ST commented her experience while playing the interactive video:

"Sometimes it was my own emotional sort of connection to the story, sometimes sort of putting (myself) in her issues. You know if I was in that position, how would I react?" (ST)

In contrast, male interviewees found it relatively difficult to empathise with Betty. Although they enjoyed this interactive experience, their motivations in making choices were made more on the basis of their own feelings or self-set goals rather than emotional empathy with the character. Interviewee SB commented:

"I have a goal of bringing this guy down … I invented this goal and gave it to myself. My personal emotion was affected both by what I was looking at and by whether I've achieved my goal or not." (SB)

Two other factors which determined the interviewees' user experience were their previous interactive storytelling experience and their favourite media entertainment. Interviewees, who had interactive storytelling experience before, especially those who preferred digital games, felt the interaction in this video was "slow". They expected more choices and shorter video segments. Influenced by his mode of interaction with digital games, interviewee SB said:

"I was expecting like in games that I would have choices very early on and much more often...I thought I might need to click on the screen to make something happen. I haven't been given any choice yet. I did (click on the screen) until I got the choice." (SB)

One interviewee LL attributed this to the fact that she did not previously know the pace of interaction. She thought it would be better to tell people how many choices there were expected to make.

"If I am going to change anything, it would be telling people how many choices they are expected to make in the initial introduction, so they know they are doing the right thing." (LL)

Another interviewee SB agreed with LL and deemed that:

"Once I knew how it happened, I don't think I wish I had more choices."

For others who liked watching TV or film, the number of choices was not a problem. They enjoyed playing the interactive video in the same way as watching a TV programme or film while also enjoying the feeling of influencing how the story evolved. Interviewee JK said:

"I think it (the length of the video segments) is alright, because you tell a story. For me, it is like a movie story."

Because existing TV footage was used, the interviewee's experience is also affected by whether or not they had watched *Ugly Betty* before. Depending on how much they had watched, this factor influenced the interviewee's feeling of control over the storylines and the endings. Two interviewees who had seen *Ugly Betty* before felt that, no matter what decision they made, things would happen in a pre-ordered manner and that they would not influence the storyline. A typical comment from interviewee SA was:

"It was not so obvious to me the choice I was making was determined anything. It did not seem to me that the choice I made determined any outcome."

In contrast, those who had never seen *Ugly Betty* or watched very little, felt much more in control of their choices.

"I quite like this way of presenting a story, because I can feel my choice does affect the ending of the story." (YJ)

"I watched one episode here and one episode there. I've really never sat down and seen the entire season, so I don't think I am really affected."(LL)

In addition, the potential problems resulting from re-editing existing materials, such as visual and sound discontinuities, were not reflected in the interviewees' reports. Only one interviewee JN pointed out that one transition between two video segments was not smooth, but it did not affect his understanding of the whole story. Almost all interviewees expressed their interest in watching other storylines, even those who have watched the original *Ugly Betty* before.

6. 2. 3 Discussion

User experience as a subjective feeling has shown enormous variance among different user groups in many previous studies (Rowe et al. 2010; Nicovich et al. 2005). The interviews conducted in this study also indicated that user experience varied from one user to another in emotion-driven interactive storytelling. Three decisive factors have been found which influence user experience. They are (1) gender (2) whether users like playing digital games or not and (3) whether they had watched the original TV comedy *Ugly Betty* before or not. The three factors primarily influence the interviewee's experience in terms of his/her emotional involvement (*e.g.* empathy and sympathy) and emotional interactions (*e.g.* the motivation of making a choice and the control of the story). As emotional involvement and emotional interactions are considered to be related to the user's engagement (Peters et al. 2009; Laurel 1993), the three factors potentially categorise all users into six types, *i.e.* males and females, gamers and non-gamers, those who had watched *Ugly Betty* and those who had not, and influence their engagement with the interactive video. In addition, the interview findings also revealed that re-editing the existing video materials did not make the narrative difficult to understand by raising technical problems, such as visual and sound discontinuities. On the contrary, it appeared to be a feasible way to

make an interactive story. In order to test the interview findings, online surveys were also carried out to collect a large amount of standardised data. In the next two sections, the method and results of the online survey are presented.

6. 3 Method of Online Survey

6. 3. 1 Materials

A questionnaire and a website, containing the interactive video and questionnaire, were needed to conduct the online survey.

Questionnaire Design

The aim of the questionnaire is to test whether or not the three factors found in the interviews, *i.e.* gender, game preference and previous experience of watching TV comedy *Ugly Betty* before, would have a significant effect on the user's engagement with emotion-driven IS. A measure of engagement in the form of an Emotion-driven Engagement Scale (EdES) was designed on the basis of previous research as a metric to evaluate user experience and was specifically designed to meet the needs of evaluating emotion-driven interactive storytelling user experience. As reviewed in Chapter 4.1, engagement is a multidimensional concept, and a widely accepted definition is still unavailable. Some researchers measure engagement from the pure "hedonic" perspective, such as attention, interest, and aesthetics (Webster and Ho 1997; O'Brien 2010). Others also consider the influence of interactive mechanisms on achieving engagement, such as focused goals and challenging tasks (Dickey 2005). Peters et al. (2009) suggest that there are two fundamental elements of engagement: attention and emotional involvement. Attention builds the connection between the user and the media content, while emotion as the motivation maintains and modulates attention (Peters et al. 2009; O'Brien and Tom 2008). Nevertheless, engagement is

primarily understood as an emotion (Laurel 1993). Thus, emotional involvement is an important dimension to evaluate engagement.

In emotion-driven interactive storytelling, the user's emotional involvement, as previously discussed, comprises two aspects. On one hand, it is related to empathy with the characters. This is the same as being engaged with non-linear stories, which relies on the narrative itself. On the other hand, emotions evoked by empathising with the characters serve as driving forces to motivate the user to interact with the story and create a unique narrative experience. This is similar to the way that most existing digital games create an engaging experience, which relies on the user's interactions. In this sense, the engagement in emotion-driven interactive storytelling comprises two aspects: one is narrative engagement; the other is interactivity engagement.

1. Narrative Engagement

As reviewed in Chapter 4.1, Busselle and Bilandzic (2009) conducted a comprehensive study on narrative engagement. They developed a scale to measure narrative engagement in film and TV drama, which comprises four dimensions: narrative understanding, attentional focus, emotional engagement and narrative presence. Specifically, narrative understanding is measured by two sub-dimensions: narrative realism and cognitive perspective taking. Busselle and Bilandzic use items, for example "I understood why the events unfolded the way they did" and "I could easily imagine myself in the situation of some of the characters" to measure narrative realism and cognitive perspective taking. Attentional focus is also measured by two sub-dimensions, loss of awareness of oneself and loss of awareness of time's passage, by using items *e.g.* "When the program ended, I was surprised that it was over so quickly" and "I forgot my own problems and concerned during the program". In addition, emotional engagement also comprises two sub-dimensions which are empathy and sympathy. Empathy can be measured by items *e.g.* "At important

moments in the film, I could feel the emotions the characters felt", while sympathy can be measured by items *e.g.* "I felt sorry for some of the characters in the program".

Busselle and Bilandzic (2009)'s study of narrative engagement is based on traditional narrative, *i.e.* film and TV. In emotion-driven interactive narrative, the user is given a chance to make a decision on multiple storylines rather than following a pre-authored and fixed storyline. Therefore, narrative engagement is not only decided by the narrative itself, but also the user's interactions, *e.g.* whether or not the storyline which has been chosen by the user makes sense, whether or not there is feedback or whether or not the user feels his/her control on the storyline after he/she makes choices. In addition, the material used in this empirical study- an emotion-driven interactive video- is made by re-editing existing material. The technical problems raised by re-editing existing materials, such as visual and sound discontinuities, could influence the user's narrative engagement, especially his/her narrative understanding of the story.

2. Interactivity Engagement

Interactivity is one of the important factors used to engage users in interactive entertainment (O'Brien and Toms 2008). Some researchers (Bell et al. 1996; Schlechty 1990) have argued that in an online learning environment allowing the learner to participate actively and be aware of their progress was important for them to feel engaged. Other researchers (Skelly et al. 1994; Webster and Ho 1997) found that challenge and feedback were the common experiences relating to engagement, while O'Brien and Tom (2008) believed the control of interaction was also one contributor. In this sense, engagement is similar to another concept- flow which refers to clear goals, concentration on the task, paradox of control, unambiguous feedback, challenge-skill balance, autotelic experience, action-awareness merging, transformation of time and loss of self-consciousness (Csikszentmihalyi 1990). Regarding the relationship between engagement and flow, Webster and Ahuja (2004)

deemed that engagement was "a subset of flow", "flow in a more passive state" and "flow without user control", while Brockmyer et al. (2009) believed that flow was the high level of engagement. O'Brien and Tom (2008) further concluded the difference between flow and engagement attributed to their different requirements for intrinsic motivation and clear goals as well as focused attention. Flow emphasises clear goals, control, loss of self-awareness and physical reality, but engagement does not.

In comparison to most existing interactive entertainment, the story evolution and user interaction in emotion-driven interactive storytelling are motivated by the user's emotional involvement with the characters instead of pre-authored goals. Accordingly, the challenge of interacting with emotion-driven interactive storytelling does not depend on the difficulty of accomplishing tasks, but the complexity of emotional conflicts and the intensity of emotions evoked by the story or the characters. Therefore, interactivity engagement can be evaluated in terms of the user's emotional involvement and his/her motivation of interactions.

Based on the above analysis and the results of the interviews, an Emotion-driven Engagement Scale (EdES) was designed to evaluate user experience in emotion-driven interactive storytelling (Appendix E). Combining the narrative engagement and interactivity engagement together, EdES comprises four subscales in terms of four measuring dimensions: *narrative understanding*, *emotional involvement*, *focused attention* and *overall enjoyment*. Specifically, narrative understanding is the same as Busselle and Bilandzic's (2009) definition. In addition, the user's interactions are also considered with regard to the feedback and the user's control on the storyline. The emotional involvement subscale aims to evaluate the user's emotional involvement and emotional interactions in emotion-driven interactive storytelling. The focused attention subscale is similar to Busselle and Bilandzic's (2009) attentional focus subscale which is primarily measured from two perspectives: the loss of awareness of oneself and the loss of awareness of time's passage. The enjoyment subscale is used

to evaluate the overall satisfaction, interest and enjoyment of the user's experience. All subscales and items are described in Table 6.1.

Dimension	Item
Narrative Understanding	1. I felt the storyline I chose made sense
	2. I felt that there were some visual or sound discontinuities which made the story difficult to understand
	3. I wanted to know how the events would unfold while watching
	4. I felt my body was in the room, but my mind was inside the world created by the story
	5. I understood that my choice influenced the storyline
	6. After making the choice, I understood why the story unfolded in that way
Emotional Involvement	1. I felt emotionally involved with the story
	2. I could feel the emotions that Betty felt
	3. I could feel the emotional conflict that Betty was going through
	4. When something happened to Betty, such as when she was humiliated in public, I could feel the emotion for her
	5. I made the choices based on my emotional involvement with Betty
Focused Attention	1. I was so involved with the story, I didn't notice time passing
	2. When the video ended, I felt it was over so quickly
	3. I forgot my own problems and concerns
	4. I was unaware of what was happening around me
Overall Enjoyment	1. I felt satisfied with the storyline I chose
	2. I enjoyed the experience
	3. After watching one storyline, I wanted to know what happened in the other storylines I could have chosen
	4. To what extent did you feel engaged?

Table 6.1 Items of Emotion-driven Engagement Questionnaire

In addition, in order to compare user experience between different user groups, a demographic questionnaire was also designed based on the results of the interviews. It attempted to obtain personal information about the user in terms of three aspects: gender, his/her prior experience of watching TV comedy *Ugly Betty* and his/her favourite media entertainment. Furthermore, three questions were added after the EdES with regard to the extent and nature of internet use, whether or not participants played the interactive video without interruption and whether or not they completed the questionnaire immediately after playing the video. These questions help to identify valid user data at the data analysis stage, which attempts to avoid the influence of the uncontrollability of online surveys, such as internet connection problems and other interruptions, on the user experience and the validity of the findings.

Website Design

To carry out the online survey, a website was designed which contained the interactive video and the EdES questionnaire. Online survey relied on the participants themselves choosing how to play the video and complete the questionnaire. Thus, the website should be designed to navigate the participants step by step. In addition, a number of previous studies have indicated that interface design could exert an influence on the user experience (Pope 2007). To avoid distracting the participants with a complex design and navigation, the interface was designed following a simplicity principle. Two colours were used in the whole website, and each page followed the same style to keep visual consistency. There were three main navigation tabs at the top of each page to guide the user to different pages. In addition, some buttons in the main content area served as the local navigation to provide convenience for the participants to locate themselves and decide what to do next.

Due to copyright concerns, the interactive video can only be accessed by registered students or staff in any UK universities. Therefore, the first page of the website provides occupation choices. After submitting their occupation, another webpage is shown to those who are not target participants to prevent further access with the sentence: "Thank for your interest! But sorry that you can not proceed to watch the video because of the copyright issues" (Figure 6.1).
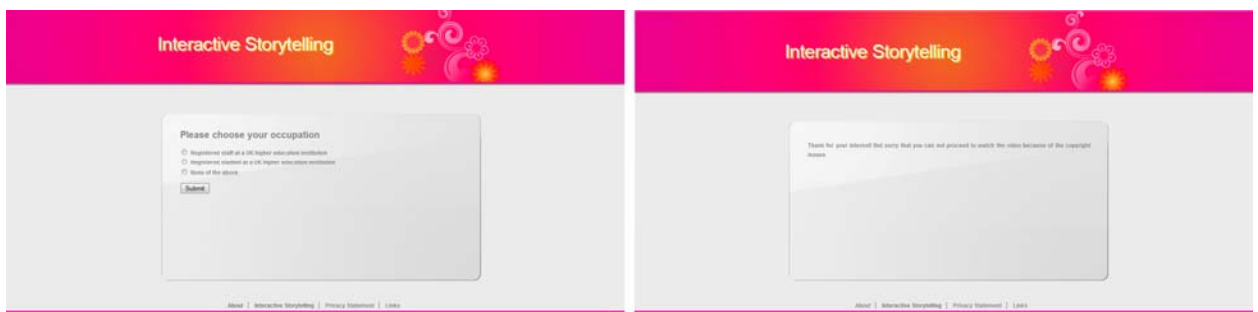
Figure 6.1 Occupation choices page

After the participants enter the website, an introductory page is shown to explain the procedure of this study (Figure 6.2). The instruction starts with 'welcome', and then explains the purpose of this study, the length of the interactive video, what the story is about, how to interact with the video, when and where to fill out the questionnaire, and a privacy statement that the information provided by the participant is protected. Under the instructions, a "watch now" button is embedded. The participant can now click on the button to open the video page.

Figure 6.2 Introduction page

The video page is simply designed with a video player window and a "questionnaire" button (Figure 6.3). The video is not auto-played. Therefore, the participants need to click the "play" button to start it. The participants can also control the process of video playing by clicking "play/pause" "stop" "forward" "backward" buttons at the bottom of the video player window while watching. The structure of the interactive video is the same as explained in Chapter 5. Simply, after each video segment, an interface with a question and several choices is shown to allow the participants to select the forthcoming video segments to play. In order to avoid the influence of a poor network connection on the user's experience, the video is compressed to .f4v format, and the size of the video is 215mb to guarantee the video can be downloaded in real time while watching.

Figure 6.3 Video page

The "questionnaire" button is deactivated initially (Figure 6.3). It only can be activated after the participants have finished watching all the video segments along one storyline. The "questionnaire" button is linked to the questionnaire page which is stored in Google Docs (Figure 6.4). Google Docs is a free, web-based word processor, spreadsheet, and data storage service offered by Google. It provides a free online survey service with unlimited questions and responses. It also can do some simple data analysis. The shortcoming of using Google Docs is that the interface design of the survey could not be changed. Several templates are provided and researchers can choose from these templates, but they are not allowed to use their own design. This makes the interface of the questionnaire look slightly different from the other webpages. Considering the limited funding, Google Docs is a functional and robust free online survey instrument. After completing the questionnaire and submitting it, a thank-you page is automatically generated by Google Docs to thank participants for taking part.
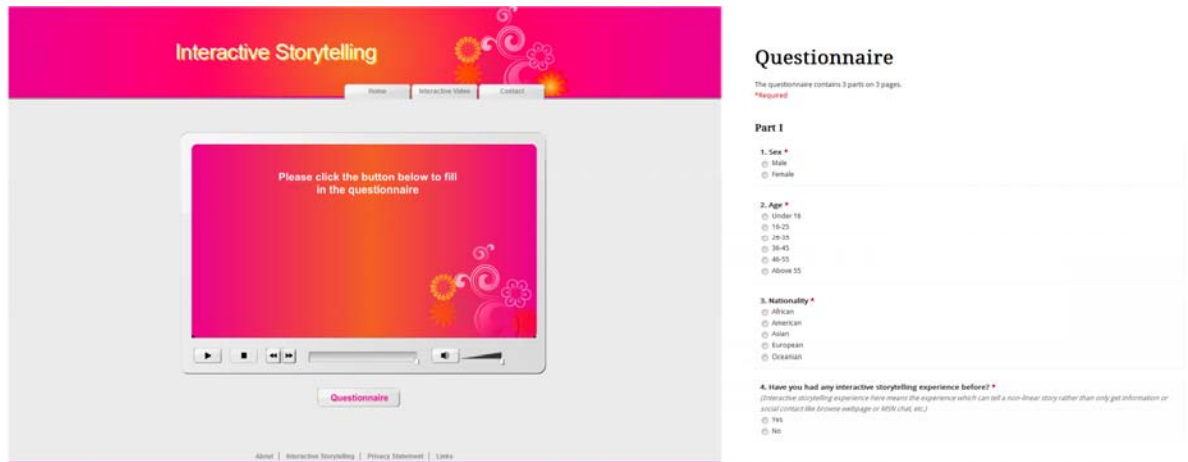
Figure 6.4 Questionnaire page

Importantly, the website can record the participants' emotional choices while they watch the interactive video and make a decision based on their emotional responses to the character. This is very helpful to understand their experience together with the questionnaire. The database which stores the participants' emotional choices can only be accessed using a registered username and password.

6. 3. 2 Procedure

The website was hosted under the domain of http://interstory.cemp.ac.uk/, and administered by The Centre for Excellence in Media Practice (CEMP) which is a research and innovation centre based in the Media School at Bournemouth University[4]. The online survey link was active for four months. A recruitment email was sent to all staff and students at Bournemouth University, some staff and students at Southampton University, Cardiff University, University of Cambridge, University of Portsmouth, Queen's University Belfast, Kingston University, University of Leicester and the University of Leeds. The email contained the link to the website and an invitation to participate in the study. A large amount of the data was collected

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[4] http://www.cemp.ac.uk/

within the first month. In the second month, a reminder email was sent out with the same information as the previous email. More data were gathered following the reminder email. In the next two months, a few further responses trickled in. All valid data were analysed using SPSS statistical software package. Negatively worded items were reverse coded. .

6. 3. 3 Participants

A total of 203 participants watched the interactive video and filled out the questionnaire. However, five participants' internet connections did not work well while they were watching the interactive video. 19 participants failed to watch the interactive video continuously for unforeseen reasons. All of them completed the questionnaires immediately after they had watched the interactive video. Overall, 182 participants' responses were valid for statistical analysis.

Specifically, there were 88 males (48.4%) and 94 females (51.6%) in the sample. With regard to whether or not the participants had watched *Ugly Betty* before, 84 participants (46.2%) had watched, 98 had not (53.8%). In addition, 68 participants (37.4%) preferred digital games more than traditional narrative, while 114 participants (62.6%) preferred traditional narrative more, which included radio (n=24), books (n=70), TV (n=93) and Film (n=124) (n represents user number in each category). (Figure 6.5)
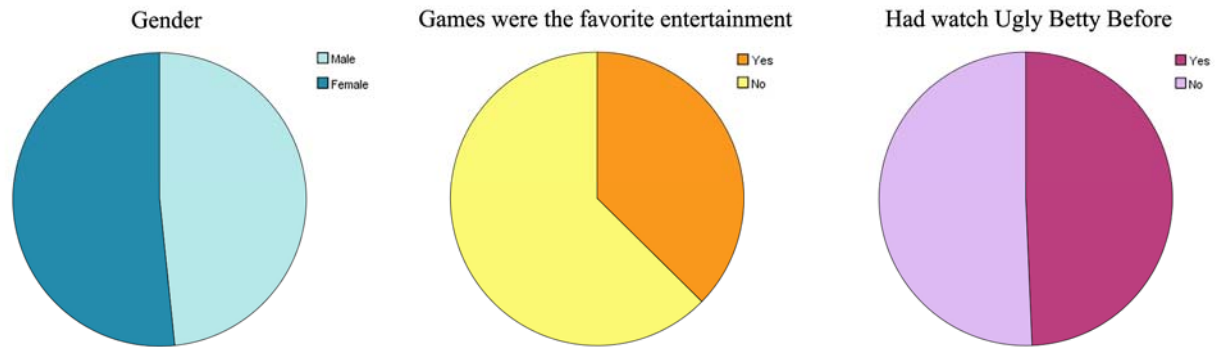
Figure 6.5 Distribution of the participants

6. 4 Results of Online Survey

6. 4. 1 Reliability Estimates of Emotion-driven Engagement Scale

The design of the Emotion-driven Engagement Scale was based on Busselle and Bilandzic (2009)'s Narrative Engagement Scale. Items from the Narrative Engagement Scale were adapted to measure engagement in emotion-driven interactive storytelling. Therefore, in order to test whether or not the Emotion-driven Engagement Scale was reliable for measuring engagement in interactive storytelling, Reliability Analysis was conducted by calculating Cronbach's alpha (Cronbach 1951) for each subscale. As stated in section 6. 3. 1, there were four subscales in the Emotion-driven Engagement Scale, which were Narrative Understanding, Emotional Involvement, Focused Attention, and Overall Enjoyment. The reliability analysis was conducted in SPSS, and the results are revealed in Table 6.2.

Subscale	No. of Items	Cronbach's alpha
Narrative Understanding	6	.705
Emotional Involvement	5	.844
Focused Attention	4	.792
Overall Enjoyment	4	.821

Table 6.2 Reliability value for EdES subscales

De Vellis (2003, p.95) proposed some guidelines to interpret the results of reliability analysis. He investigated the value of Cronbach's alpha, and suggested that when it is below 0.60, the reliability of the subscale is "unacceptable"; when it is between 0.60 and 0.65, the reliability of the subscale is "undesirable"; when it is between 0.65 and 0.70, the reliability of the subscale is "minimally acceptable"; when it is between 0.70 and 0.80, the reliability of the subscale is "respectable"; when it is between 0.80 and 0.90, the reliability of the subscale is "very good"; when it is above 0.90, the number of items in the subscale needs to be reduced. In examining the results of the reliability estimates of the four sub-scales, the alpha value of the Emotional Involvement subscale and Overall Enjoyment subscale were .844 and .821. According to De Vellis, the reliability of these two subscales was therefore very good. The Cronbach's alpha of the Focused Attention subscale was .792, which was respectable. Compared with these three subscales, the Cronbach's alpha value of the Narrative Understanding subscale was the lowest (=.705), but it was still respectable. Therefore, the Cronbach's alpha values of the four subscales were in the range from respectable to very good according to De Vellis (2003). The results indicated that the Emotion-driven Engagement Scale was reliable to test the user's engagement in watching the interactive video.

6. 4. 2 Results of MANOVA on Emotional Involvement Subscale

Due to the significance of emotional involvement in motivating the user's interactions and engaging him/her with emotion-driven interactive storytelling, the variance of emotional involvement between different user groups was investigated by analysing the Emotional Involvement subscale as a whole using Multivariate Analysis of Variance (MANOVA; Field 2009). In particular, the global effects of gender (female/male), gaming preference (like gaming/do not like gaming), and experience of viewing *Ugly Betty* (regular viewer/not a regular viewer) were examined. Table 6.3 shows the mean ratings of emotional involvement for each group. It suggests that on average females and non- gamers showed higher mean ratings in all these items, which indicated that these two groups of participants were more emotionally involved than males and gamers. Therefore, they were more likely to feel Betty's emotions and make choices based on their emotional involvement. However, there were different user responses to different items when considering the factor of whether or not they had watched *Ugly Betty* before. Those who had watched *Ugly Betty* before showed higher mean ratings on items Q5, Q6 and Q9, which indicated that participants in this group were more likely to feel emotionally involved with the story (Q5), feel emotions Betty felt (Q6), and make choices based on their emotional involvement (Q9). In comparison, participants who had not watched *Ugly Betty* tended to feel the emotional conflicts Betty felt (Q7) and emotions for Betty (Q8).

Means Question	Male	Female	Gamer	Non-gamer	Watched *Ugly Betty*	Not watched *Ugly Betty*
Q5 Emotionally involved	3.10	3.52	3.12	3.44	3.39	3.26
Q6 Feel emotions Betty felt	2.74	3.56	2.63	3.48	3.25	3.09
Q7 Feel emotional conflicts Betty felt	3.15	3.63	2.94	3.67	3.39	3.40
Q8 Feel emotions for Betty	3.35	3.65	3.34	3.61	3.45	3.55
Q9 Choices made based on emotional involvement	2.81	3.74	2.66	3.67	3.33	3.26

Table 6.3 Mean rating of emotional involvement items

The results of multivariate analysis of variance have been attached in Appendix F. They revealed that there was a significant effect of gender on the emotional involvement subscale, F (5, 174) = 10.416, *p* < .001. However, whether or not participants had watched *Ugly Betty* previously did not influence their emotional involvement significantly, F (5, 174) = .894, *p* = .486, and there was no significant interaction between these two factors, F (5, 174) = 2.259, *p* = .051. When the effects of gaming experience were considered, significant effects of gaming preference (F (5,174) = 7.580, *p* < .001) on emotional involvement were observed. As already noted, non-gamers tended to be more emotionally involved with the storyline than gamers. However, there were no interaction effects between gender and gaming preference, F (5, 174) = .797, *p* = .553. In other words, the effects of gender and gaming preference are additive rather than interactive.

Overall, the Multivariate Analysis of Variance showed that regarding emotional involvement with the story there was a significant difference between women and men (*i.e.* effects of gender) as well as those who preferred digital games and those who did not (*i.e.* effects of gaming preference). Although those who had watched *Ugly Betty* showed higher mean ratings in some items than those who had not

135

watched, these differences were not significant as a result of Multivariate Analysis of Variance. In other words, the emotional involvement of those who had watched *Ugly Betty* did not significantly differ from those who had not watched *Ugly Betty*. All these effects were additive rather than interactive, *i.e.* no significant interaction effects were found between these factors.

6. 4. 3 Results of ANOVA on Each Item in the Scale

Multivariate Analysis of Variance examined the effects of gender, gaming preference and whether or not participants had watched *Ugly Betty* before on the participants' emotional involvement with the emotion-driven interactive story. The results indicated there were overall significant differences in emotional involvement between males and females, gamers and non-gamers. To investigate these differences in more detail, two-way Analyses of Variance (ANOVA; Field 2009) was conducted to examine the pairwise effects of gender and gaming preference as well as gender and whether they had watched *Ugly Betty* or not on each item of the scale.

Effects of Gender and Gaming Preference

Table 6.4 shows the means and standard deviations of ratings for each item in the scale. Table 6.5 provides a summary of results of two-way ANOVA with two factors of gender (female/male) by gaming preference (gamer/non-gamer). The significant findings are shown in bold and in shaded boxes in the tables below and are subsequently explained in further detail.

Items	Male		Female		Gender		Game Preference	
	Gamer	Non-gamer	Gamer	Non-gamer	Male	Female	Gamer	Non-gamer
Q1 Storyline makes sense	3.94	4.12	4.14	4.22	4.02	4.20	4.00	4.18
	(0.70)	(0.90)	(0.73)	(0.63)	(0.80)	(0.65)	(0.71)	(0.74)
Q2 Visual or sound discontinuities	1.83	1.98	1.90	1.60	1.90	1.67	1.85	1.74
	(0.89)	(1.08)	(1.04)	(0.66)	(0.98)	(0.77)	(0.94)	(0.85)
Q3 Want to know how events unfolded	3.17	3.51	3.43	3.71	3.33	3.65	3.25	3.64
	(1.03)	(1.19)	(0.87)	(1.124)	(1.11)	(1.08)	(0.98)	(1.15)
Q4 Mind inside the story world	2.36	2.73	2.81	3.16	*2.53*	*3.09*	*2.50*	*3.01*
	(1.07)	(0.95)	(0.98)	(1.00)	*(1.03)*	*(1.00)*	*(1.06)*	*(1.00)*
Q5 Feel emotionally involved	3.00	3.22	3.38	3.56	*3.10*	*3.52*	3.12	3.44
	(0.98)	(1.01)	(0.74)	(0.91)	*(1.00)*	*(0.88)*	(0.92)	(0.96)
Q6 Feel emotions Betty felt	2.34	3.20	3.29	3.64	*2.74*	*3.56*	*2.63*	*3.48*
	(0.98)	(0.98)	(0.78)	(0.84)	*(1.07)*	*(0.84)*	*(1.02)*	*(0.91)*
Q7 Feel emotional conflict Betty felt	2.81	3.54	3.24	3.74	*3.15*	*3.63*	*2.96*	*3.67*
	(0.99)	(0.90)	(0.94)	(0.94)	*(1.01)*	*(0.96)*	*(0.99)*	*(0.93)*
Q8 Feel emotions for Betty	3.21	3.51	3.62	3.66	3.35	3.65	3.34	3.61
	(0.95)	(1.03)	(0.81)	(0.93)	(1.00)	(0.90)	(0.92)	(0.97)
Q9 Choice made based on the emotional involvement	2.45	3.22	3.14	3.92	*2.81*	*3.74*	*2.66*	*3.67*
	(0.90)	(0.99)	(0.85)	(0.89)	*(1.02)*	*(0.94)*	*(0.94)*	*(0.98)*
Q10 Choices influenced the storyline	2.91	3.46	3.43	3.56	3.17	3.53	*3.07*	*3.53*
	(0.97)	(1.08)	(1.25)	(0.99)	(1.05)	(1.04)	*(1.08)*	*(1.02)*
Q11 Understand the way of story unfold	2.96	3.37	3.19	3.33	3.15	3.30	3.03	3.34
	(0.83)	(1.07)	(0.93)	(0.88)	(0.97)	(0.89)	(0.86)	(0.95)
Q12 Not notice time passing	2.62	2.98	2.90	2.96	2.78	2.95	2.71	2.96
	(0.85)	(0.99)	(0.94)	(0.95)	(0.93)	(0.94)	(0.88)	(0.96)
Q13 Video was over quickly	2.40	3.10	2.95	3.00	2.73	2.99	*2.57*	*3.04*
	(1.04)	(1.04)	(1.02)	(1.04)	(1.09)	(1.03)	*(1.06)*	*(1.04)*
Q14 Forgot problems and concerns	*2.62*	*3.10*	*3.19*	*2.96*	2.84	3.01	2.79	3.01
	(0.77)	*(1.16)*	*(0.87)*	*(0.93)*	(0.99)	(0.92)	(0.84)	(1.02)
Q15 Unaware of what was happening	2.45	2.85	2.63	2.64	2.64	2.64	2.50	2.72
	(0.86)	(1.04)	(0.59)	(0.98)	(0.96)	(0.90)	(0.78)	(1.00)
Q16 Satisfied with the storyline	3.15	3.39	3.38	3.45	3.26	3.44	3.22	3.43
	(0.91)	(0.86)	(0.87)	(0.78)	(0.89)	(0.80)	(0.90)	(0.81)
Q17 Enjoyed the experience	3.06	3.85	3.62	3.97	*3.43*	*3.89*	*3.24*	*3.93*
	(0.87)	(0.85)	(0.86)	(0.76)	*(0.94)*	*(0.80)*	*(0.90)*	*(0.80)*
Q18 Wanted to know other storyline	3.45	3.76	3.38	3.88	3.59	3.77	*3.43*	*3.83*
	(0.86)	(1.02)	(1.12)	(1.08)	(0.94)	(1.10)	*(0.94)*	*(1.06)*
Q19 To what extent felt engaged	3.23	3.90	3.81	4.00	*3.55*	*3.96*	*3.41*	*3.96*
	(0.76)	(0.80)	(0.98)	(0.88)	*(0.84)*	*(0.90)*	*(0.87)*	*(0.85)*

Table 6.4 Means (and standard deviations) of males and females and gamers and non-gamers

Items	Gender	Gaming Preference	Gender * Gaming Preference
Q1 Storyline make sense	F(1,178)=1.630,*p*=.2.3	F(1,178)=1.213, *p*=.272	F(1,178)=.211, *p*=.646
Q2 Visual or sound discontinuities	F(1,178)=1.078, *p*=.300	F(1,178)=.297, *p*=.587	F(1,178)=2.437, *p*=.120
Q3 Want to know how events unfolded	F(1,178)=1.658, *p*=.200	F(1,178)=3.088, *p*=.081	F(1,178)=.027, *p*=.870
Q4 Mind inside the storyworld	*F(1,178)=7.160,p =.008*	*F(1,178)=4.852, p= .029*	F(1,178)=.005, *p*=.963
Q5 Emotionally involved	*F(1,178)=5.578, p= .019*	F(1,178)=1.709, *p*=.193	F(1,178)=.016, *p*=.899
Q6 Feel emotions betty felt	*F(1,178)=22.142, p= .000*	*F(1,178)=16.760, p= .000*	F(1,178)=2.810, *p*=.095
Q7 Feel emotional conflict Betty felt	*F(1,178)=4.180, p=.042*	*F(1,178)=15.791, p=.000*	F(1,178)=.535, *p*=.465
Q8 Feel emotions for Betty	F(1,178)=3.174, *p*=.077	F(1,178)=1.191, *p*=.277	F(1,178)=.710, *p*=.400
Q9 Choices made based on emotional involvement	*F(1,178)=21.751, p= .000*	*F(1,178)=26.797, p=.000*	F(1,178)=.000, *p*=.994
Q10 Choices influenced the storyline	F(1,178)=3.262, *p*=.073	*F(1,178)=4.047, p=.046*	F(1,178)=1.504, *p*=.222
Q11 Understand the way of story unfold	F(1,178)=.424, *p*=.516	F(1,178)=3.298, *p*=.071	F(1, 178)=.805, *p*=.371
Q12 Not notice time passing	F(1,178)=.790, *p*=.375	F(1,178)=1.831, *p*=.178	F(1, 178)=.996, *p*=.320
Q13 Video was over quickly	F(1,178)=1.760, *p*=.186	*F(1,178)=4.760, p=.030*	F(1,178)=3.615, *p*=.059
Q14 Forgot problems and concerns	F(1,178)=1.980, *p*=.161	F(1,178)=.649, P=.421	*F(1,178)=5.312, p=.022*
Q15 Unaware of what was happening	F(1, 178)=.015, *p*=.901	F(1,178)=2.034, *p*=.156	F(1, 178)=1.593, *p*=.209
Q16 Satisfied with the storyline	F(1,178)=1.133, *p*=.289	F(1,178)=1.281, *p*=.259	F(1, 178)=.380, *p*=.538
Q17 Enjoyed the experience	*F(1,178)=6.258, p= .013*	*F(1,178)=18.002, p= .000*	F(1,178)=2.621, *p*=.107
Q18 Wanted to know other storyline	F(1, 178)=.027, *p*=.869	*F(1,178)=5.860, p=.016*	F(1, 178)=.314, *p*= .576
Q19 To what extent felt engaged	*F(1,178)=5.922, p=.016*	*F(1,178)=9.643, p=.002*	F(1, 178)=2.986, *p*=.086

Table 6.5 Summary of findings from ANOVA with two factors of gender by gaming

preference

The significant findings are specified below:

Q4 Mind inside the story world: there was a significant main effect of both gender
(F (1, 178) =7.160, *p* =.008) and gaming preference (F (1, 178) =4.852, *p*= .029) on
Question4 'I felt my body was in the room, but my mind was inside the world created

by the story'. This indicated that females (M=3.09, SD=1.002) and non-gamers (M=3.01, SD=1.000) were more likely to put their mind inside the story than males (M=2.53, SD=1.028) and gamers (M=2.50, SD= 1.058). No significant interaction effects between these two factors were found, F (1,178) =.005, p=.963.

Q5 Emotionally involved in the story: there was a significant main effect of gender on Question5 'I felt emotionally involved with the story', F (1, 178) =5.578, p= .019. It indicated that females (M=3.52, SD=.877) tended to be more emotionally involved than males (M=3.10, SD=.995). However, no significant main effect of gaming preference (F (1,178) =1.709, p=.193) and interaction between these two effects (F (1,178) =.016, p=.899) were found.

Q6 Feel emotions Betty felt: there was a significant main effect of both gender (F (1, 178) =22.142, p= .000) and gaming preference (F (1, 178) =16.760, p= .000) on Question6 'I could feel the emotions that Betty felt'. Specifically, females were more likely to feel emotions that Betty felt (M = 3.56, SD=.837) than males (M=2.74, SD=1.067), and non-gamers (M= 3.48, SD=.914) tended to empathise more easily with Betty than gamers (M=2.63, SD=1.021). There was no significant influence of the interaction between these two factors, F (1,178) =2.810, p=.095.

Q7 Feel emotional conflicts Betty felt: there was a significant difference in Question7 'I could feel the emotional conflict that Betty was going through' as a result of gender (F (1,178) =4.180, p=.042) and gaming preference (F (1, 178) =15.791, p=.000). Specifically, females (M=3.63, SD=.961) and those who do not like playing digital games (M= 3.67, SD=.928) were more likely to feel the emotional conflicts Betty felt than males (M=3.15, SD=1.012) and those who like playing digital games (M=2.96, SD=.991). No interaction between these two effects was found either, F (1,178) =.535, p=.465.

Q9 Choices made based on emotional involvement: there were significant effects from of both gender (F (1,178) =21.751, *p*= .000) and gaming preference (F (1, 178) =26.797, *p*=.000) on Question9 'I made the choices based on my emotional involvement with Betty'. Specifically, females (M=3.74, SD=.938) were more likely to make choices based on their emotional involvement than males (M= 2.81, SD=1.015), while non-gamers (M= 3.67, SD= .984) were more likely to make choices based on emotional involvement than gamers (M= 2.66, SD= .940). There was no significant interaction effect between gender and gaming preference, F (1,178) =.000, *p*=.994.

Q10 Choices influenced the storyline: there was a significant main effect of gaming preference on Question10 'I understood that my choice influenced the storyline', F (1,178) =4.047, *p*=.046. It indicated that those who do not like playing digital games (M=3.53, SD=1.015) were more likely to feel their choices made an impact on the storyline than those who preferred playing digital games (M=3.07, SD=1.083). However, no significant main effect of gender F (1,178) =3.262, *p*=.073 or interaction between these two effects (F (1,178) =1.504, *p*=.222) were found.

Q13 Feel the video was over quickly: there was a significant effect of gaming preference on Question13 'When the video ended, I felt it was over so quickly', F (1, 178) = 4.760, *p*=.030. Non-gamers (M=3.04, SD=1.038) felt the video was over more quickly than gamers (M=2.57, SD=1.055). However, there was no significant effect of gender, F (1,178) =1.760, *p*=.186, and no significant interaction effect between gender and gaming preference, F (1,178) =3.615, *p*=.059.

Q14 Forget problems and concerns while watching the interactive video: There was no significant main effect of gender (F (1,178) =1.980, *p*=.161) or gaming preference (F (1,178) =.649, *p*=.421) on Question14 'I forgot my own problems and concerns'. However, a significant interaction effect between gender and gaming preference was found, F (1, 124) =5.312, *p*=.022. Figure 6.6 shows that males and

females were affected differently according to whether or not they like playing digital games.

To examine this further, one way ANOVA was conducted with four groups: males who are gamers; males who are not gamers; female who are gamers; females who are not gamers. Results indicated that there was a significant difference between the four groups, $F (3,178) = 2.705$, $p =.047$. However, planned contrasts revealed that male gamers responded significantly differently from the other three groups, $t (142) = 2.807$, $p = .006$. It indicated that male gamers (M= 2.62, SD= .768) found it most difficult to forget problems and concerns while they were watching the interactive video compared with male non-gamers (M= 3.10, SD=1.158), female gamers (M= 3.19, SD=.873) and female non-gamers (M=2.96, SD=.934). Although female gamers reported being slightly more likely to forget problems and concerns, the differences between female gamers and non-gamers was not significant, $t (178) = - .990$, $p = .324$.
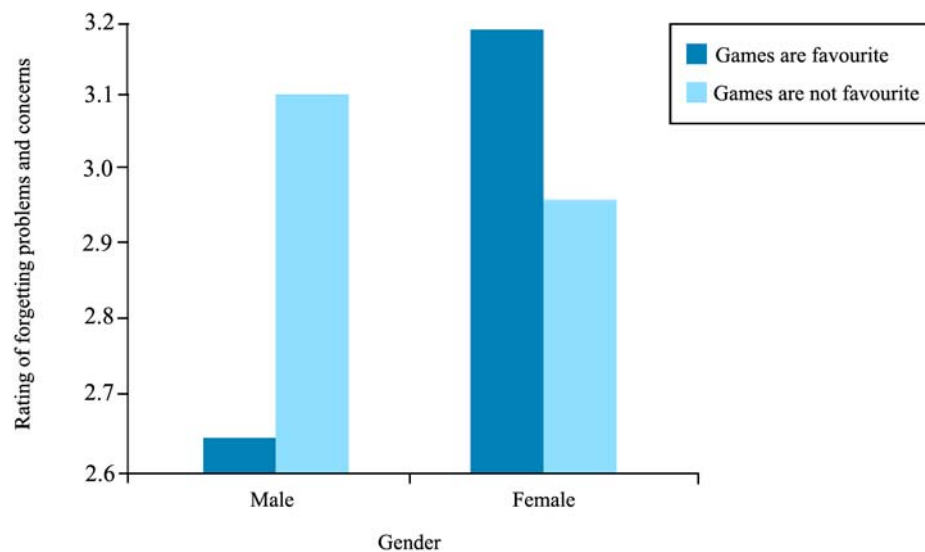
Figure 6.6 Mean ratings of forgetting problems and concerns as a result of gender and gaming preference

Q17 Enjoy this experience: In Question17 'I enjoyed the experience' both gender, F (1, 178) =6.258, *p*= .013, and gaming preference, F (1, 178) =18.002, *p*= .000 were significant. Specifically, females (M = 3.89, SD= .796) tended to enjoy this experience more than males (M =3.43, SD= .944), while non-gamers (M = 3.93, SD= .795) tended to enjoy it more than gamers (M =3.24, SD= .900). There was no significant interaction effects between gender and gaming preference, F (1,178) =2.621, *p*=.107.

Q18 Wanted to know other storylines: there was a significant effect of gaming preference on Question18 'After watching one storyline, I wanted to know what happened in the other storylines I could have chosen', F (1, 178) =5.860, *p*=.016. Non-gamers (M=3.83, SD=1.055) felt the video was over quickly than gamers (M=3.43, SD=.935). However, there was no significant effect of gender, F (1, 178) =.027, *p*=.869, and no significant interaction effect between gender and gaming preference, F(1, 178)=.314, *p*= .576.

Q19 To what extent felt engaged: In Question19 'To what extent did you feel engaged?' both gender, F (1, 178) =5.922, *p*=.016, and gaming preference, F(1, 178)=9.643, *p*=.002 were significant. Specifically, females (M=3.96, SD=.903) tended to enjoy this experience more than males (M=3.55, SD=.843), while non-gamers (M=3.96, SD=.851) tended to enjoy it more than gamers (M=3.41, SD=.868). There were no significant interaction effects between gender and gaming preference, F (1, 178) =2.986, *p*=.086.

Except for the significant differences in the items above, there were no significant effects of gender and gaming preference found in the rest of the items. They were not included in the discussion of findings above. These items were "I felt the storyline I chose made sense" (Q1), "I felt that there were some visual or sound discontinuities which made the story difficult to understand" (Q2), "I wanted to know how the events would unfold while watching" (Q3), "When something happened to Betty,

such as when she was humiliated in public, I could feel the emotion for her" (Q8), "After making the choice, I understood why the story unfolded in that way"(Q11), "I was so involved with the story, I didn't notice time passing" (Q12), "I was unaware of what was happening around me" (Q15), "I felt satisfied with the storyline I chose "(Q16).

Overall, females were more likely to report being immersed in the storyline with their mind inside the story world (Q4), being emotionally involved with the story (Q5), to feel emotions that Betty felt (Q6), to feel the emotional conflict that Betty felt (Q7), to make choices based on emotional involvement (Q9), to enjoy the experience (Q17), and engage with the interactive story (Q19). Non-gamers, *i.e.* those who prefer traditional narrative media like film and TV were more likely to feel their mind inside the story world while they were watching the video (Q4), feel emotions Betty felt (Q6), feel emotional conflicts that Betty was going through (Q7), make choices based on emotional involvement (Q9), understand their choice influence the storyline (Q10), feel the video was over quickly (Q13), enjoy this experience (Q17), want to know other storylines (Q18) and engage with the interactive story (Q19). The results revealed that gender and gaming preference significantly influenced items Q5, Q6, Q7 and Q9 which confirmed the findings of the MANOVA test that males and females, gamers and non-gamers differed in emotional involvement with the story. It also indicated that Q4, Q6, Q7, Q9, Q17 and Q19 were affected by both gender and gaming preference.

However, in this sample most gamers were male while most non-gamers were female as revealed in Table 6.6. This lead to a hypothesis that the different user experience between gamer and non-gamer might be attributed to the effect of gender. Therefore, analysis of covariance (ANCOVA; Field 2009) was carried out on items Q4, Q6, Q7, Q9, Q17 and Q19 to evaluate the hypothesis with gaming preference as the main factor and gender as the covariate.

		Gender	
		Male	**Female**
Games is the favourite entertainment	Yes	47	21
	No	41	73

Table 6.6 Number of participants in each group

Table 6.7, 6.8, 6.9 shows the summary of the results of ANCOVA on Q4, Q6, Q7, Q9, Q17 and Q19. Overall, after controlling the effect of gender, there was a significant effect of gaming preference on Q4 (F (1,179) = 5.017, p=.026), Q6 (F (1,179) =19.048, p=.000), Q7 (F (1,179) = 17.061, p=.000), Q9 (F (1,179) = 27.525, p=.000), Q17 (F (1,179) = 20.322, p=.000) and Q19 (F (1,179) = 5.922, p=.016). The results rejected the hypothesis and concluded that the factor of gaming preference affected user experience singly without the influence of gender.

Q4 Mind inside the storyworld			**Q6 Felt emotions Betty felt**		
Source	**F**	**Sig.**	**Source**	**F**	**Sig.**
Gender	7.773	.006	Gender	19.250	.000
Favor_Games	5.017	.026	Favor_Games	19.048	.000

Table 6.7 Summary of findings from ANCOVA for Question 4 and Question 6

Q7 Felt emotional conflict Betty felt			**Q9 Choices made based on emotional involvement**		
Source	**F**	**Sig.**	**Source**	**F**	**Sig.**
Gender	3.677	.057	Gender	23.873	.000
Favor_Games	17.061	.000	Favor_Games	27.525	.000

Table 6.8 Summary of findings from ANCOVA for Question 7 and Question 9

Q17 Enjoyed the experience			**Q19 To what extent felt engaged**		
Source	**F**	**Sig.**	**Source**	**F**	**Sig.**
Gender	4.477	.036	Gender	9.643	.002
Favor_Games	20.322	.000	Favor_Games	5.922	.016

Table 6.9 Summary of findings from ANCOVA for Question17 and Question 19

Effects of gender and prior experience of watching Ugly Betty

Table 6.10 shows the means and standard deviations of ratings for each item in the EdES. Table 6.11 is the summary of results of the two-way ANOVA with two factors of gender (females/males) by prior experience of watching *Ugly Betty* (those who had watched *Ugly Betty* previously and those who had not). The significant findings are shown in bold and in shaded boxes in the tables below and are subsequently explained in further detail.

Items	Male		Female		Gender		Watched Ugly Betty Before	
	Watched	Unwatched	Watched	Unwatched	Male	Female	Watched	Unwatched
Q1 Storyline makes sense	4.08	3.98	4.08	4.33	4.02	4.20	4.08	4.14
	(0.81)	(0.80)	(0.74)	(0.52)	(0.80)	(0.65)	(0.76)	(0.70)
Q2 Visual or sound discontinuities	1.83	1.94	1.71	1.63	1.90	1.67	1.76	1.80
	(0.88)	(1.06)	(0.82)	(0.71)	(0.98)	(0.77)	(0.85)	(0.92)
Q3 Want to know how events unfolded	2.97	3.58	3.35	3.96	*3.33*	*3.65*	*3.19*	*3.76*
	(1.16)	(1.02)	(1.14)	(0.92)	*(1.11)*	*(1.08)*	*(1.16)*	*(0.99)*
Q4 Mind inside the story world	2.53	2.54	3.02	3.15	*2.53*	*3.09*	2.81	2.83
	(1.08)	(1.00)	(1.12)	(0.87)	*(1.03)*	*(1.00)*	(1.12)	(0.99)
Q5 Feel emotionally involved	3.22	3.02	3.52	3.52	*3.10*	*3.52*	3.39	3.26
	(0.87)	(1.08)	(0.97)	(0.78)	*(1.00)*	*(0.88)*	(0.93)	(0.98)
Q6 Feel emotions Betty felt	2.86	2.65	3.54	3.56	*2.74*	*3.56*	3.25	3.09
	(1.05)	(1.08)	(0.85)	(0.83)	*(1.07)*	*(0.84)*	(0.99)	(1.08)
Q7 Feel emotional conflict Betty felt	*3.33*	*3.02*	*3.44*	*3.83*	*3.15*	*3.63*	3.39	3.40
	(0.86)	*(1.09)*	*(1.01)*	*(0.88)*	*(1.01)*	*(0.96)*	(0.94)	(1.07)
Q8 Feel emotions for Betty	3.22	3.44	3.62	3.67	*3.35*	*3.65*	3.45	3.55
	(1.05)	(0.96)	(0.98)	(0.82)	*(1.00)*	*(0.90)*	(1.02)	(0.90)
Q9 Choice made based on the emotional involvement	2.89	2.75	3.67	3.83	*2.81*	*3.74*	3.33	3.26
	(1.01)	(1.03)	(1.10)	(0.74)	*(1.02)*	*(0.94)*	(1.12)	(1.05)
Q10 Choices influenced the storyline	2.75	3.46	3.13	3.96	*3.17*	*3.53*	*2.96*	*3.69*
	(0.97)	(1.02)	(1.06)	(0.84)	*(1.05)*	*(1.04)*	*(1.04)*	*(0.97)*
Q11 Understand the way of story unfold	3.19	3.12	3.10	3.54	3.15	3.32	3.14	3.32
	(1.04)	(0.92)	(0.83)	(0.86)	(0.96)	(0.87)	(0.92)	(0.92)
Q12 Not notice time passing	2.67	2.87	2.88	3.02	2.78	2.95	2.79	2.94
	(0.99)	(0.89)	(1.10)	(0.75)	(0.93)	(0.94)	(1.05)	(0.82)
Q13 Video was over quickly	2.64	2.79	2.96	3.02	2.73	2.99	2.82	2.90
	(1.22)	(1.00)	(1.05)	(1.02)	(1.09)	(1.03)	(1.13)	(1.01)
Q14 Forgot problems and concerns	2.86	2.83	2.85	3.17	2.84	3.01	2.86	2.99
	(1.10)	(0.92)	(0.85)	(0.97)	(0.99)	(0.92)	(0.96)	(0.96)
Q15 Unaware of what was happening	2.58	2.67	2.50	2.78	2.64	2.64	2.54	2.72
	(1.00)	(0.94)	(1.01)	(0.76)	(0.96)	(0.90)	(1.00)	(0.86)
Q16 Satisfied with the storyline	*3.39*	*3.17*	*3.23*	*3.65*	3.26	3.44	3.30	3.40
	(0.90)	*(0.88)*	*(0.86)*	*(0.67)*	(0.89)	(0.80)	(0.88)	(0.82)
Q17 Enjoyed the experience	3.50	3.38	3.77	4.02	*3.43*	*3.89*	3.65	3.68
	(1.03)	(0.89)	(0.72)	(0.86)	*(0.94)*	*(0.80)*	(0.87)	(0.93)
Q18 Wanted to know other storyline	3.64	3.56	3.69	3.85	3.59	3.77	3.67	3.69
	(0.96)	(0.94)	(1. 15)	(1.05)	(0.94)	(1.10)	(1.06)	(1.00)
Q19 To what extent felt engaged	3.61	3.50	3.83	4.09	*3.55*	*3.96*	3.74	3.78
	(0.84)	(0.85)	(0.93)	(087)	*(0.84)*	*(0.90)*	(0.89)	(0.90)

Table 6.10 Means (and standard deviations) of males and females and those who had watched *Ugly Betty* and those who had not

Items	Gender	Watched *Ugly Betty* Before	Gender* UB
Q1 Storyline make sense	F(1,178)=2.534, *p*=.113	F(1,178)=.418, *p*=.519	F (1, 178) =2.534, p = .113
Q2 Visual and sound discontinuities	F(1,178)=2.739, *p*=.100	F(1,178)=.014, *p*=.906	F(1,178)=.501, *p*=.480
Q3 Want to know how events unfolded	*F(1,178)=5.804, p=.017*	*F (1, 178) =14.581, p = .000*	F(1.178)=.000, *p*=.994
Q4 Mind inside the story world	*F (1,178) =13.170, p = .000*	F(1,178)=.217, *p*=.642	F(1,178)=.157, *p*=.693
Q5 Feel emotionally involved	*F (1,178) =8.140, p =.005*	F(1,178)=.518, *p*=.473	F(1,178)=.527, *p*=.469
Q6 Feel emotions Betty felt	*F(1,178)=31.715, p=.000*	F(1,178)=.320, *p*=.573	F(1,178)=.777, *p*=.379
Q7 Feel emotional conflict Betty felt	*F(1,178)=9.735, p=.002*	F(1,178)=.065, *p*=.799	*F (1, 178) =5.792, p=.017*
Q8 Feel emotions for Betty	*F(1,178)=4.985, p=.027*	F(1,178)=.896, *p*=.345	F(1,178)=.363, *p*=.548
Q9 Choice made based on the emotional involvement	*F(1,178)=40.034, p=.000*	F(1,178)=.005, *p*=.944	F(1,178)=1.037, *p*=.310
Q10 Choices influenced the storyline	*F(1,178)=8.803, p=.003*	*F(1,178)=27.694, p=.000*	F(1,178)=.167, *p*=.683
Q11 Understand the way of story unfold	F(1,178)=1.544, *p*=.216	F(1,178)=1.756, *p*=.187	F(1,178)=3.636, *p*=.058
Q12 Not notice time passing	F(1,178)=1.691, *p*=.195	F(1,178)=1.517, *p*=.220	F(1,178)=.034, *p*=.853
Q13 Video was over quickly	F(1,178)=3.007, *p*=.085	F(1,178)=.446, *p*=.505	F(1,178)=.073, *p*=.787
Q14 Forgot problems and concerns	F(1,178)=1.415, *p*=.236	F(1,178)=.998, *p*=.319	F(1,178)=1.415, *p*=.236
Q15 Unaware of what was happening	F(1,178)=.009, *p*=.925	F(1,178)=1.789, *p*=.183	F(1,178)=.480, *p*=.489
Q16 Satisfied with the storyline	F(1,178)=1.649, *p*=.201	F(1,178)=.694, *p*=.406	*F(1,178)=6.597, p=.011*
Q17 Enjoyed the experience	*F (1, 178) =12.155, p= .001*	F(1,178)=.271, *p*=.603	F(1,178)=1.978, *p*=.161
Q18 Wanted to know other storylines	F(1,178)=1.204, *p*=.274	F(1,178)=.066, *p*=.798	F(1,178)=.612, *p*=.435
Q19 To what extent felt engaged	*F(1,178)=9.575, p=.002*	F(1,178)=.297, *p*=.586	F(1,178)=1.945, *p*=.165

Table 6.11 Summary of findings from two-way ANOVA with two factors of gender by prior experience of watching *Ugly Betty*

The significant findings are specified below:

Q3 Wanted to know how events unfolded: there was a significant main effect of both gender F (1,178) =5.804, *p*=.017, and whether or not participants had watched Ugly Betty previously on Question3 'I wanted to know how the events

would unfold while watching', F (1, 178) =14.581, p = .000. Specifically, females (M=3.65, SD=1.075) would like to know how events would unfold more than males (M=3.33, SD=1.111), and those who had not watched Ugly Betty before (M =3.76, SD=.985) tended to know how events would unfold more than those who had watched Ugly Betty before (M = 3.19, SD= 1.156). There were no interaction effects between these two factors, F (1.178) =.000, p=.994.

Q4 Mind inside the story world: there was a significant main effect of gender on Question4 'I felt my body was in the room, but my mind was inside the world created by the story', F (1,178) =13.170, p = .000. Females (M=3.09, SD= 1.002) were more likely to immerse their mind into the story world than males (M=2.53, SD=1.028). There was no significant main effect of whether or not participants had watched *Ugly Betty* before on Question4, F (1,178) =.217, p=.642. Besides, no interaction effects between these two factors were found, F (1,178) =.157, p=.693.

Q5 Emotionally involved in the story: there was a significant main effect of gender on Question5 'I felt emotionally involved with the story', F (1, 178) =8.140, p =.005. It indicated that females (M=3.52, SD= .877) tended to be more emotionally involved than males (M= 3.10, SD= .995). However, no significant main effect of whether or not they had watched Ugly Betty (F (1,178) =.518, p=.473) and interaction between these two effects (F (1,178) =.527, p=.469) were found.

Q6 Feel emotions Betty felt: there was a significant main effect of gender on Question6 'I could feel the emotions that Betty felt', F (1,178) =31.715, p=.000. Specifically, females (M=3.56, SD= .837) were more likely to feel emotions that Betty felt than males (M= 2.74, SD= 1.067). There was no significant difference as a result of whether or not participants had watched Ugly Betty before, F (1,178) =.320, p=.573. Besides, no interaction effect was found between gender and whether or not they had watched Ugly Betty before either, F (1,178) =.777, p=.379.

Q7 Feel emotional conflicts Betty felt: There was a significant main effect of gender (F (1,178) =9.735, *p*=.002) on Question7 'I could feel the emotional conflict that Betty was going through'. But there was no significant main effect of whether or not the participants had watched *Ugly Betty* before on this item (F (1,178) =.065, *p*=.799). In addition, a significant interaction effect between gender and whether or not *Ugly Betty* had been watched before was also found, F (1, 178) =5.792, *p*=.017. This indicates that males and females were affected differently by whether or not they had watched *Ugly Betty* before (Figure 6.7).

To examine this further, a one-way ANOVA was conducted with four groups: males who had watched *Ugly Betty* previously; males who had not watched *Ugly Betty*; females who had watched *Ugly Betty* previously; females who had not watched *Ugly Betty* before. Results indicated that there was a significant difference between the four groups, *F* (3,178) = 5.644, *p* = .001. Planned contrasts revealed that males who had not watched *Ugly Betty* felt different from the other three groups, t (178) = 3.198, *p* = .002. Furthermore, females who had not watched *Ugly Betty* felt different from other groups, t (178) = -3.371, *p* = .001. Specifically, males who had not watched *Ugly Betty* (M=3.02, SD= 1.093) tended to find it most difficult to feel the emotional conflicts that Betty felt, while females who had not watched *Ugly Betty* (M=3.83, SD= .877) were *most* likely to feel the emotional conflict that Betty felt.
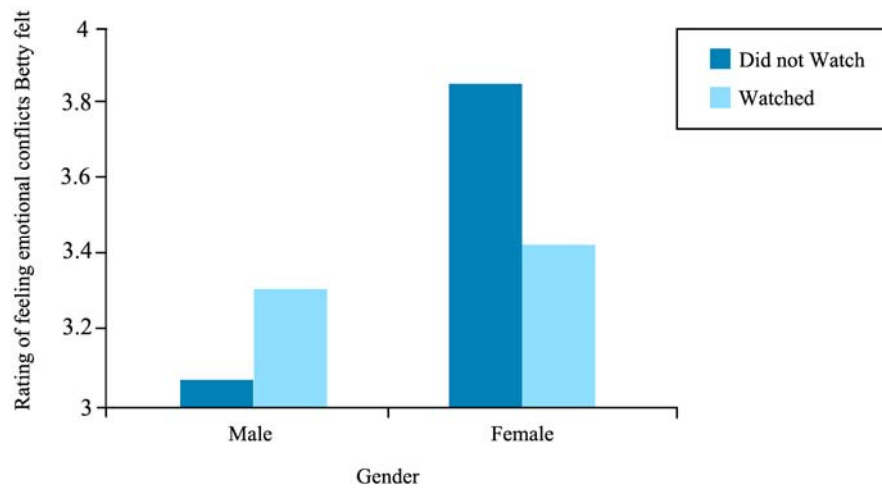
Figure 6.7 Mean ratings of feeling emotional conflicts Betty felt as a result of gender and previous viewing

Q8 Feel emotions for Betty: there was a significant main effect of gender on Question8 'When something happened to Betty, such as when she was humiliated in public, I could feel the emotion for her', F (1, 178) =4.985, *p*=.027. Specifically, females (M=3.65, SD=.901) were more likely to feel emotions that Betty felt than males (M=3.35, SD=.995). There was no significant difference as a result of whether or not participants had watched Ugly Betty before, F (1, 178) =.896, *p*=.345. Furthermore, no interaction effect between gender and whether or not they had watched *Ugly Betty* before was found either, F (1, 178) =.363, *p*=.548.

Q9 Choices made based on the emotional involvement: there was a significant effect of gender (F (1, 178) =40.034, *p*=.000) on Question9 'I made the choices based on my emotional involvement with Betty'. The result indicated that females (M = 3.74, SD= .938) were more likely to make choices based on their emotional involvement than males (M = 2.81, SD=1.015). However, there was no significant main effect of whether or not participants had watched Ugly Betty before on Q9, F (1,178) =.005, *p*=.944. The interaction effect between gender and whether or not participants had watched Ugly Betty before was not significantly affected either, F (1,178) =1.037, *p*=.310.

Q10 Choices influenced the storyline: there was a significant main effect of both gender (F (1,178) =8.803, *p*=.003) and whether or not participants had watched *Ugly Betty* previously (F (1,178) =27.694, *p*=.000) on Question10 'I understood that my choice influenced the storyline'. Specifically, females (M=3.53, SD=1.044) were more likely to feel their choices influenced the storyline than males (M=3.17, SD=1.053), and those who had not watched *Ugly Betty* before (M = 3.69, SD=.968) tended to feel their choices influenced the storyline more than those who had watched Ugly Betty before (M = 2.96, SD= 1.035). There were no interaction effects between gender and whether or not participants had watched Ugly Betty previously, F (1,178) =.167, *p*=.683.

Q16 Satisfied with the storyline: There was no significant main effect of gender (F (1,178) =1.649, *p*=.201) and whether or not the participants had watched *Ugly Betty* before (F (1,178) =.694, *p*=.406) on Question16 'I felt satisfied with the storyline I chose'. However, a significant interaction effect was found between gender and whether or not Ugly Betty had been watched before, F (1, 178) =6.597, *p*=.011. This indicates that males and females were affected differently by whether or not they had watched *Ugly Betty* before (Figure 6.8).

To examine this further, a one way ANOVA was conducted with four groups: males who had watched *Ugly Betty* previously; males who hadn't watched *Ugly Betty*; females who had watched *Ugly Betty* previously; females who hadn't watched *Ugly Betty* before. Results indicated that there was a significant difference between the four groups, *F* (3,178) = 3.178, *p* =.025. Planned contrasts revealed that females who had not watched *Ugly Betty* responded significantly differently from other three groups, *t* (142) = -2.732, *p* = .007 (2-tailed). Specifically, females who had not watched *Ugly Betty* (M=3.65, SD= .674) were more satisfied with the storyline than males who had watched *Ugly Betty* (M=3.39, SD= .903), males who had not watched *Ugly Betty* (M= 3.17, SD= .879) and females who had watched *Ugly Betty* (M=3.23, SD= .857). There was no significant difference in males between those who watched *Ugly Betty* and those who had not, *t* (178) = 1.198, *p* = .233.

Chapter 6 Examination of Users' Experience of Emotion-driven Interactive Storytelling
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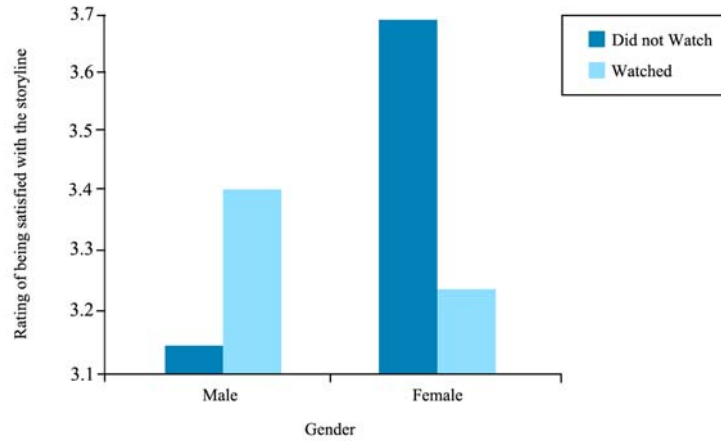
Figure 6.8 Mean ratings of being satisfied with the storyline as a result of gender and previous viewing

Q17 Enjoyed the experience: there was a significant effect of gender on Question17 'I enjoyed the experience', $F (1, 178) = 12.155$, $p= .001$. The result indicated that females (M = 3.89, SD= .796) enjoyed watching this interactive video more than males (M = 3.43, SD= .944). However, there was not a significant main effect of whether or not participants had watched Ugly Betty before on question17, $F (1,178) = .271$, $p=.603$. In addition, the interaction effect between gender and whether or not participants had watched Ugly Betty before was not significantly affected either, $F (1,178) = 1.978$, $p=.161$.

Q19 To what extent felt engaged: there was a significant effect of gender on Question19 'To what extent did you feel engaged', $F (1,178) = 9.575$, $p=.002$. The results indicated that females (M=3.96, SD=.903) enjoyed watching this interactive video more than males (M=3.55, SD=.843). However, there was no significant main effect of whether or not participants had watched *Ugly Betty* before on item19, $F (1,178) = .297$, $p=.586$. In addition, an interaction effect between gender and whether or not participants had watched *Ugly Betty* before was not significantly affected either, $F (1,178) = 1.945$, $p=.165$.

Except for the significant differences in the items above, there were no significant effects of gender and prior experience of watching *Ugly Betty* found in the rest of the items. These items were "I felt the storyline I chose made sense" (Q1), "I felt that there were some visual or sound discontinuities which made the story difficult to understand" (Q2), "After making the choice, I understood why the story unfolded in that way" (Q11), "I was so involved with the story, I didn't notice time passing" (Q12), "When the video ended, I felt it was over so quickly"(Q13), "I forgot my own problems and concerns"(Q14), "I was unaware of what was happening around me" (Q15), "After watching one storyline, I wanted to know what happened in the other storylines I could have chosen" (Q18).

In summary, gender was found to have a significant effect on the user experience. In addition to the findings in previous ANOVA tests with gender and gaming preference as factors, females also appeared to be more interested in the evolution of the story (Q3), more likely to feel the emotions for Betty (Q8) and feel their choices influenced the storyline (Q10) than males. Whether or not the participants had watched *Ugly Betty* previously did not have a significant effect on most items except items Q3 and Q10, which indicates that those who had not watched *Ugly Betty* previously were more likely to want to know how the events unfolded (Q3) and feel their choices had an impact on the evolution of the storyline (Q10).

6. 4. 4 Further Examinations of Gender Differences in User Experience

Gender difference has been found in the previous two ANOVA tests. Males and females reported significant differences in most items (*i.e.* Q3-Q10, Q17 and Q19). Specifically, females were more likely to want to know how events unfold (Q3), immerse their mind inside the story world (Q4), involve themselves emotionally with the story (Q5), feel emotions that Betty felt (Q6), feel the emotional conflict that Betty felt (Q7), feel emotions for Betty (Q8), make choices based on emotional involvement (Q9), enjoy the experience (Q17) and engage with the story (Q19) than males. These differences, on one hand, attributed to the emotion-

driven interactive storytelling approach. On the other hand, the original material used to make the interactive video is also likely to exert an influence on gender differences. Website iCelebZ (2009) cited ABC press release that *Ugly Betty* scored ABC's highest Women 18 to 34 rating. In this sense, *Ugly Betty* was popular with females rather than males, which is likely to result in females and males' different experience of playing the interactive video. In addition, the main character in TV comedy *Ugly Betty* is female and the whole story is based on her experience and feelings. Therefore, males are likely to find it difficult to identify with Betty and think from Betty's perspective. As one interviewee said "I barely can feel Betty's emotions. I guess that's because I am a man. It is a bit difficult for me to feel a girl's emotions" (JN). In this sense, gender differences revealed in previous ANOVA tests may not only result from the emotion-driven storytelling approach, but also the material which is used to make the interactive story. Given these considerations, analysis of covariance (ANCOVA) was carried out to examine user experience of participants who had watched TV comedy *Ugly Betty* via controlling their previous experience of watching TV comedy *Ugly Betty* in attempt to exclude the influence of the original TV material on user experience. Table 6.12 summarises of the results of ANCOVA on all items.

Items	Gender	UB_Enjoyment
Q1 Storyline make sense	F(1,81)=.983, *p*=.324	*F(1,81)=13.156, p=.000*
Q2 Visual and sound discontinuities	F(1,81)=.015, *p*=.902	*F(1,81)=8.460, p=.005*
Q3 want to know how events unfolded	F(1,81)=1.180, *p*=.281	F(1,81)=1.871, *p*=.175
Q4 Mind inside the story world	F (1,81) =1.045, *p*=.310	*F(1,81)=16.156, p=.000*
Q5 Feel emotionally involved	F (1,81) =.126, *p* =.724	*F(1,81)=19.373, p=.000*
Q6 Feel emotions Betty felt	*F(1,81)=5.250, p=.025*	*F(1,81)=19.829, p=.000*
Q7 Feel emotional conflict Betty felt	F(1,81)=.820, *p*=.368	*F(1,81)=28.491, p=.000*
Q8 Feel emotions for Betty	F(1,81)=1.008, *p*=.318	*F(1,81)=9.017, p=.004*
Q9 Choice made based on the emotional involvement	*F(1,81)=5.698, p=.019*	*F(1,81)=15.988, p=.000*
Q10 Choices influenced the storyline	F(1,81)=.910, *p*=.343	*F(1,81)=6.490, p=.013*
Q11 Understand the way of story unfold	F(1,81)=1.646, *p*=.203	*F(1,81)=9.350, p=.003*
Q12 Not notice time passing	F(1,81)=.000, *p*=.994	*F(1,81)=11.380, p=.001*
Q13 Video was over quickly	F(1,81)=.072, *p*=.789	*F(1,81)=15.391, p=.000*
Q14 Forgot problems and concerns	F(1,81)=.107, *p*=.745	F(1,81)=1.165, *p*=.284
Q15 Unaware of what was happening	F(1,81)=.570, *p*=.452	F(1,81)=2.047, *p*=.156
Q16 Satisfied with the storyline	*F(1,81)=4.036, p=.048*	*F(1,81)=17.356, p=.000*
Q17 Enjoyed the experience	F (1, 81) =.008, *p*= .930	*F(1,81)=30.114, p=.000*
Q18 Wanted to know other storylines	F(1,81)=.439, *p*=.510	*F(1,81)=10.143, p=.002*
Q19 To what extent felt engaged	F(1,81)=.189, *p*=.665	*F(1,81)=31.112, p=.000*

Table 6.12 Summary of findings from ANCOVA with controlling participants'

prior experience of watching *Ugly Betty*

The results of ANCOVA test revealed that after controlling the effect of previous experience of watching TV comedy *Ugly Betty*, gender difference was not significantly found in most items, but only found in items Q6, Q9 and Q16. Specifically, females were more likely to feel the emotions that Betty felt (Q6), make the choices based on their emotional involvement with the story (Q9) and feel satisfied with the storyline they have chosen (Q16) than males. It indicated that males and females had different experiences in terms of empathy (Q6), motivation for interaction (Q9) and satisfaction (Q16) while playing the interactive video. These differences can be attribute to the emotion-driven storytelling approach *without* considering the influence of original TV material (*i.e.* whether the TV comedy is male-preferred or female-preferred) because the possible gender differences resulting from previous experience with *Ugly Betty* as a series have now been excluded statistically. In addition, the ANCOVA test also revealed that the participants' previous enjoyment of TV comedy *Ugly Betty* had a significant influence on most items in terms of narrative understanding, emotional involvement, focused attention and overall enjoyment (*i.e.* Q1, Q2, Q4-Q13 and Q16-Q19). In this sense, for those who have watched TV *Ugly Betty*, their experience of playing emotion-driven interactive video was significantly influenced by their previous experience of watching TV *Ugly Betty*.

The ANCOVA test was conducted only within participants who had watched the TV comedy *Ugly Betty*. For those who had not watched *Ugly Betty* before, it is difficult to examine statistically whether gender differences resulting from emotion-driven storytelling approach or the material used to make the interactive video. However, according to previous ANOVA tests and the ANCOVA test, it is possible to conclude that emotion-driven DOES result in gender differences in empathy, *i.e.* feel emotions Betty felt (Q6), motivation for interaction, *i.e.* make choices based the emotional involvement (Q9) and satisfaction, *i.e.* feel satisfied with the storyline (Q17). However, gender differences on items Q3, Q4, Q5, Q7, Q8, Q17 and Q19 which were found in previous ANOVA tests were the result of both emotion-driven storytelling approach and the material used to make the interactive story. In this sense, if using male-oriented or gender neutral material to

make the interactive video, it is possible that males would tend to know how events unfolded (Q3), immerse their mind inside the story world (Q4), feel emotionally involved with the story (Q5), feel emotional conflicts the character felt (Q7), feel emotions for the character (Q8), enjoyed this experience (Q17) and feel engaged with the story (Q19).

Although using female-oriented material influenced participants' enjoyment and engagement, in comparison to watch TV comedy *Ugly Betty*, the participants' enjoyment and engagement while playing the emotion-driven interactive video were *increased*. Figure 6.9 reveals the mean rating of participants' enjoyment and engagement of watching *Ugly Betty* and playing the interactive video. It indicates that participants who had watched *Ugly Betty* before enjoyed playing the interactive video more (M= 3.65) than watching *Ugly Betty* (M=3.45). Meanwhile, they engaged themselves more (M=3.74) than watching *Ugly Betty* (M=3.45) as well.

Figure 6.9 Mean rating of participants' enjoyment and engagement of watching
Ugly Betty and playing the interactive video

The difference is even more obvious within males who had watch TV comedy *Ugly Betty*. Figure 6.10 reveals the mean rating of males' enjoyment and engagement of watching *Ugly Betty* and playing the interactive video. Apparently, males who had watched *Ugly Betty* before enjoyed playing the interactive video more (M= 3.50) than watching *Ugly Betty* (M=3.06). Meanwhile, they engaged

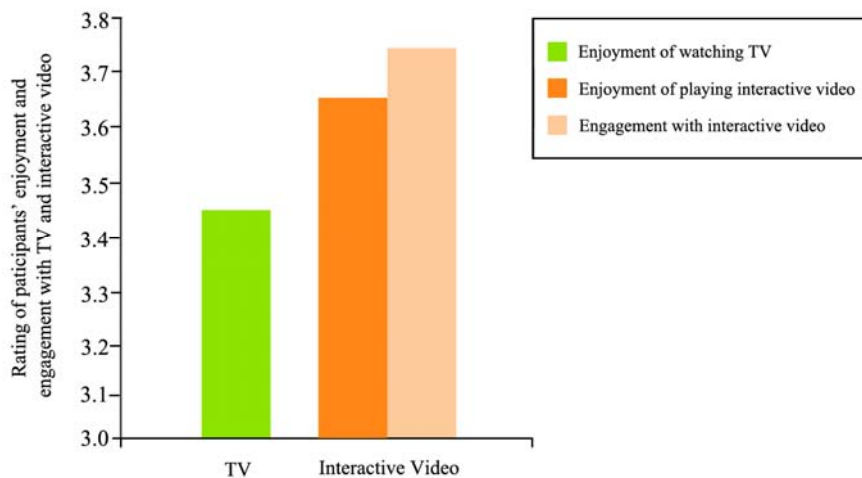themselves more (M=3.61) than watching *Ugly Betty* (M=3.06). Therefore, although males did not enjoy and engage themselves as much as females with the interactive video because of female-oriented material used to make the interactive video, the emotion-driven storytelling approach *increases* males' enjoyment and engagement in comparison to their experience of watching the linear TV comedy *Ugly Betty*.
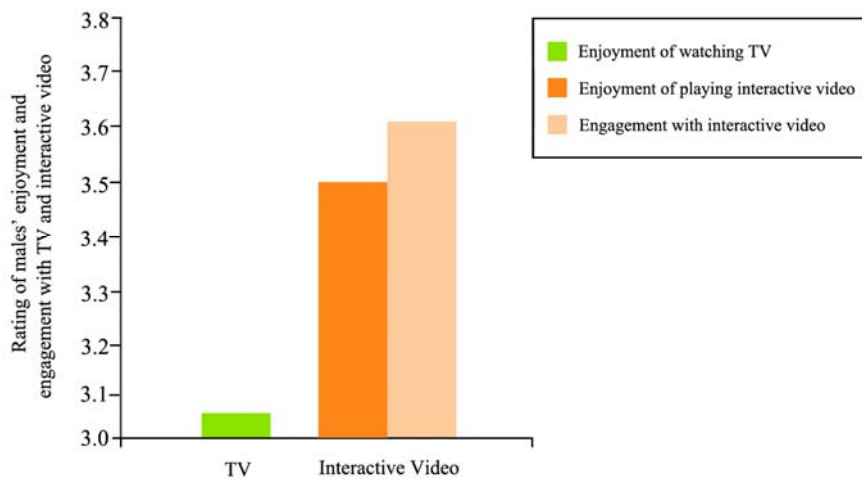
Figure 6.10 Mean rating of males' enjoyment and engagement of watching *Ugly Betty* and playing the interactive video

6. 4. 5 Conclusions

The analyses of quantitative data from the online survey have revealed important results. Overall, three factors were found to significantly influence user experience of playing emotion-driven interactive video, which were gender, gaming preference and whether or not participants had watched TV comedy *Ugly Betty*. First of all, gaming preference significantly affected the participants' emotional involvement with the interactive video. Specifically, non-gamers (*i.e.* those who preferred traditional media entertainment to digital games) tended to feel emotionally involved with the story. They were more likely to feel the emotions and emotional conflicts (*i.e.* empathise with the character) that Betty felt as well as make choices based on their emotional involvement (*i.e.* affectively interact with the story) than gamers. In addition, non-gamers felt their mind inside the story world and enjoyed this experience more than gamers. Regarding focused

attention while watching the interactive video, male gamers were least likely to forget problems and concerns while watching the interactive video. In a word, non-gamers tend to be more emotionally involved with the interactive video. They were therefore more likely to enjoy the interactive experience and feel more engaged with the interactive story than gamers.

Although two-way ANOVA tests revealed that the factor of gender has a significant influence on user experience on items Q3-Q10, Q17 and Q19, further examination via ANCOVA test indicated that gender differences on item Q3-Q5, Q7-Q8, Q10, Q17 and Q19 was not only resulted from emotion-driven interactive storytelling, but also the material used to make the interactive video as *Ugly Betty* was popular with females. However, ANCOVA test concluded that gender differences on items Q6 (*i.e.* feel emotions Betty felt), Q9 (*i.e.* make choices based the emotional involvement) and Q16 (*i.e.* feel satisfied with the storyline) were significantly related to emotion-driven interactive storytelling. Therefore, the factor of gender mainly influenced the participants' experience in terms of their empathy, motivation for interaction and satisfaction. In addition, in comparison to participants' previous experience of watching TV *Ugly Betty*, emotion-driven interactive storytelling increased the participants, especially males' enjoyment and engagement. Therefore, it is likely that males would be more emotionally involved, enjoy and engage more with the emotion-driven interactive video if male-oriented material or gender neutral material was used.

Since the interactive video was made by re-editing existing materials, there were significant effects of whether or not participants had watched the original TV material on their interests in knowing how events would unfold and to what extent they felt the choices they made influenced the storyline. On average, those who had watched *Ugly Betty* were not interested in knowing how events would unfold as much as those who had not watched it previously. Similarly, those who had watched *Ugly Betty* did not feel their choices affected the storyline as much as those who had not. In addition, males who had not watched *Ugly Betty* found the storyline hard to understand and engage with as well as feeling the emotional

conflicts that Betty felt. In contrast, females who had not watched *Ugly Betty* were the most satisfied with this experience compared to others.

The influence of participants' previous experience on their perception of whether or not the choices they made affected the storyline is an unexpected finding of re-using television footage to make the interactive video. When participants had previously watched *Ugly Betty*, they often misremembered the plot, in as much as they felt that their responses to the choices they made in their interaction had no effect on the subsequent video clips they used (even when clips from very different episodes followed as a result of their choice). This appeared to be because their memory representations for segments from different episodes were difficult to tell apart (memories for episode segments essentially blended together) and so they felt that they were watching a previous *whole* episode rather than a composite of events from a number of episodes determined by their choices. This is a novel and unexpected finding which has implications not only for user experience in interactive video storytelling but also for psychological research examining source monitoring in memory.

6. 5 Summary

This chapter has specified the methods and results of evaluating user experience in emotion-driven interactive video. It attempts to find out the answers to the key questions in aim four which are summarised as below:

Aim four: Evaluate emotion-driven interactive storytelling and find out which types of users are engaged with it.

Key Questions:

1. Which method is used to examine user experience?

   Interviews and questionnaires were carried out to evaluate user experience in emotion-driven interactive video. In order to obtain the participants' preliminary opinions on their experience in emotion-driven interactive video, semi-structured interviews were designed with respect to the participants'

emotional involvement and engagement. After that, the questionnaire was conducted to collect standardised data to test the findings of the interviews. In particular, an online survey was carried out given the consideration of a limited budget and the time scale for a PhD study.

2. How can the evaluation be undertaken empirically?

    The interviews were conducted individually with each interviewee. At the beginning, the aim and procedure of the study was briefly explained along with how interviewees might interact with the video. After that, every interviewee was required to watch the interactive video and complete a demographic questionnaire. Following the demographic questionnaire, the interviews were conducted. All interviews were transcribed and analysed using Grounded Theory.

    The online survey was carried out based on a website in which the emotion-driven interactive video and Emotion-driven Engagement Scale (EdES) were embedded. The EdES evaluated user experience in terms of four dimensions: narrative understanding, emotional involvement, focused attention and overall enjoyment. In the end, valid responses from 182 participants were analysed statistically. All valid data were analysed using SPSS statistical software package.

3. What is the user's experience in emotion-driven interactive storytelling, and which types of users are found to be engaged with the prototype?

    Three factors have been found from the interviews which are deemed to exert an important influence on the user's experience of watching emotion-driven interactive video. They are (1) gender (2) whether users like playing digital games or not and (3) whether they have watched the original TV comedy *Ugly Betty* before or not.

    The results of analysing the data from online survey confirmed the findings of interviews. In particular, gaming preference was the primary factor significantly affecting the participants' emotional involvement with the

interactive video. Specifically, non-gamers tended to be more emotionally involved with the interactive video. They were therefore more likely to enjoy the interactive experience and feel more engaged with the interactive story than gamers. The participants' prior experience of watching the original TV comedy *Ugly Betty* was also found significantly related to their experience of watching the emotion-driven interactive video. But it mainly significantly influenced the participants' perception of whether or not the choices they made affected the storyline.

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CHAPTER 7

CONCLUSIONS AND FUTURE WORK

This research proposed a new approach to interactive storytelling design, emotion-driven interactive storytelling, and also examined the users' experience in a prototype, emotion-driven interactive video. The aims and key questions proposed at the start of this research were kept at the forefront of every aspect of the study. Previous chapters, especially chapter 5 and chapter 6, have summarised how the research aims were met and how the key questions were answered. The purpose of this chapter therefore is to present the conclusions derived from this research, and demonstrate their contribution to our understanding of interactive storytelling. This will be followed by a consideration of the limitations. Overall, this research will inspire future work and discussion in this area and is likely to attract further research interest.

7. 1 Conclusions and Contribution

According to the aims and key questions, two main parts are included in this research: the first part attempted to specify the concept of emotion-driven IS. A theoretical framework was developed for this study in order to implement emotion-driven IS. To test this theoretical framework, an interactive video was made as a prototype. The second part attempted to evaluate the user experience in

emotion-driven interactive storytelling, especially to discover which types of users tend to engage with emotion-driven IS. Four conclusions are drawn from these two parts of study as summaries reflecting the four aims proposed in chapter one:

1. *Emotion can be used as a driving force to motivate user interactions and the evolution of the story*

Emotion is one of the central foci of storytelling. As stated in Chapter 3, affective disposition theory attributes the audience's enjoyment of a story to his/her emotional involvement with the characters (Raney 2006). In particular, empathy, the core concept in affective disposition theory, is considered an important mechanism to achieve the audience's emotional involvement with the characters by allowing the individual to imagine the characters' experience and project emotions onto those characters (Hand and Varan 2009; Harold 2010). In this sense, the individual acts as a witness when they empathise with the characters- although they care about the characters, they can never intervene with the storylines and change what happens to the characters. This explains how traditional narrative engages the audience. However, interactive storytelling *changes* the audience's witness role and provides the audience with opportunities to control the characters' behaviours and decide the evolution of the story. Vorderer et al. (2001) therefore argued that the audience may struggle with making choices in interactive storytelling, which distracts them from developing empathic emotions towards the characters. Jarvimen (2009) also deemed that the enjoyment of an interactive story is determined by the way that pre-authored goals are imposed on the player to motivate him/her to make a choice. However, Zillman (2006) disagreed with above opinions and claimed that any kind of storytelling is "a principal forum of empathic reactivity" (p.14). Hall et al. (2005) also found that the user's empathic feeling towards the character motivates the user's affective interaction with the character and achieve an 'empathic engagement' in interactive storytelling.

This research reveals that empathy plays a significant role in emotionally

involving and engaging the user with interactive stories. In particular, the emotions evoked by empathy in emotion-driven IS motivate the user's interaction. Especially when an emotional conflict occurs, the user's empathic emotions help him/her to make a decision among several emotional choices. This supports Zillman (2006) and Hall et al.'s (2005) veiwpoints. More importantly, this research found that in addition to motivating the user's interaction, emotion can act as a driving force to motivate the evolution of the story. This can be explained by Smith and Lazarus' (1990) "adaption and emotion" theory. According to Smith and Lazarus, emotion is a dynamic experience which reflects an individual's personality. It leads to specific action tendencies which can be translated into corresponding actions. These actions elicit new emotions and trigger new actions in turn. When Smith and Lazarus' theory is applied to IS, the user's emotions play a key role in directing the storylines by determining the character's emotions. At some key narrative points, the user's emotions are translated into the character's actions and have an impact on the evolution of the story. However, different users experience different emotions when they watch the story, which guides the story along different storylines and eventually leads to diversity in user experience. In this sense, emotion does not only determine users' enjoyment of an interactive story, but also can act as a driving force to motivate the evolution of the story.

In this study, an interdisciplinary cooperation between psychology and media research, *i.e.* the psychological theory of emotion and the affective disposition theory, inspires the implementation of emotion-driven IS. Although in previous studies (*e.g.* EMA and FearNot!), psychological theories (*e.g.* Smith and Lazarus' (1990) "adaption and emotion" theory and Ortony et al.'s (1988) "cognitive structure of emotion") have been applied to IS for modelling autonomous non-player characters to create an engaging user experience, an innovation of this research is to combine psychological theory with media theory to produce a new approach to IS.

2. *The implementation of emotion-driven IS follows a combination of character-based and plot-based IS design approaches, which attempts to*

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reconcile the conflict between narrative and interactivity.

The conflict between narrative and interactivity has become a central challenge in IS design (Louchart and Aylett 2003; Ciarlini et al. 2005; Swartjes and Theune 2009). It is attributed to the different natures of narrative and interactivity (Adams 1999). Specifically, narrative relies on the author's 'god-like' power to lead the user into the story world. In this world, the user has no right to choose what he/she wants, but only passively accepts what the author tells them. On the contrary, interactivity allows the user to interact with the story and influence the way that the story evolves. It provides the user with freedom to express himself/herself. Therefore, the conflict between narrative and interactivity appears to create a tension between authorship and usership: how much power should be given to the author and how much freedom should be given to the user? Researchers have given different answers to the questions. Some researchers (*e.g.* Riedl and Young 2006; Dória et al. 2008) suggest that IS should rely on the author scripting multiple storylines at the design time; while others (*e.g.* Si et al. 2007; Crawford 2004) agree that interactive stories should be generated based on user feedback without pre-scripted stories. The different viewpoints on how to balance the tension between authorship and usership lead to two approaches to IS design, plot-based approach and character-based approach. In the plot-based IS approach, the story is composed of a variety of story segments. All these story segments are pre-authored. The user is not allowed to change them, but only can make choices to decide which story segment is executed at a certain time. Therefore, the plot-based approach keeps the author's control over narrative structure and plots, which helps to maintain the dramatisation of the story. However, the user's interaction is restricted as the user is only allowed to interact with the story at predefined narrative points and cannot alter the content of the story segment. The diversity of the stories is therefore reduced (Dória et al. 2008). Compared with the plot-based IS approach, the character-based IS approach gives the user more freedom to influence the evolution of the story through controlling a character. In most existing character-based IS systems (*e.g. Mimesis* and *IDA*), the user's

control is over the character's behaviour and motivated by pre-authored goals. Ideally, the user's interaction should be real time. However, real-time user interaction is likely to lead storylines to an unexpected situation, which violates the dramatisation of the story (Ciarlini et al. 2005). In order to keep the author's control over the dramatisation of the story while giving freedom for user interactions, Cai et al. (2007) proposed a hybrid system of the plot-based approach and character-based approaches. In this system, multi-level goals play a significant role in mediating between character-based IS and plot-based IS.

Emotion-driven IS also follows a combination of character-based IS and plot-based IS design approaches. However, in contrast to most current IS systems, the user's control is over the character's emotions instead of the character's behaviours and determines the evolution of the story. The implementation of emotion-driven IS is based on a modular framework which has been illustrated in Figure 5.1. At the centre of this framework, an *Emotion* module connects the user and the IS system together. It, on one hand, captures the user's emotional responses to decide the character's emotions, which follows the character-based IS approach. On the other hand, it allows the user's emotions to exert an influence on the storyline only at some key narrative points, *i.e.* when emotional conflicts occur, which follows the plot-based IS approach. The methods of capturing user emotion are various, depending on the narrative media (*e.g.* interactive video or digital games) and the technology used. Facial expression, gesture and speech are used in some interactive systems as the way of emotion recognition (*e.g.* Frijda 1988; Camurri et al. 2000; Cavazza et al. 2009). However, a shortcoming of these methods is they need special techniques and devices to capture and analyse the user's emotions (Cohen et al. 2000). In a real-time interaction system (*e.g.* digital games), the *Emotion* module captures the user's emotions and decide the character's emotions, *i.e.* the way of expressing emotions (*e.g.* facial expression, gesture and speech) in real time. This gives the user much freedom to interact with the character without changing the storyline, which keeps the coherence and dramatisation of the story. In this sense, emotion-driven IS approach helps to

reconcile the conflict between narrative and interactivity. However, due to the limited budget and time, the prototype made in this research is an interactive video which does not provide the user with unlimited freedom of interaction. Therefore, it is not obvious that the interactive video reconciles the conflict between narrative and interactivity. Nevertheless, emotion-driven IS attempts to reconcile the conflict between narrative and interactivity by using the user's emotion as a medium to combine the character-based IS approach and plot-based IS approach, resulting in an increase in knowledge in the area of IS.

3. *Recombining existing video material is a feasible way to make an emotion-driven interactive story.*

A number of attempts have been made on generating interactive stories from existing video material in previous studies (Porteous et al. 2010; Piacenza et al. 2011). Specifically, a Video-Based Storytelling (VBS) system is produced using stochastically controlled re-ordering techniques to decompose the video footage and AI planning to generate the story. However, different from the approach in previous studies, this research employs re-editing as the way of creating an emotion-driven interactive video, which brings further understanding of video recombination to make interactive stories.

Since emotion-driven IS relies on the actors' performance to encourage the user's empathy with the characters and the story, one advantage of using existing material is that it provides professional performances to get user emotions involved. In addition, a well-developed storyscript provides a baseline to be adapted into an interactive story. However, challenges also come along with re-editing existing material, including how to control narrative time and how to avoid visual and sound discontinuities. Controlling narrative time is difficult for emotion-driven IS because original material has its own narrative pace and dramatic tension and it takes time to accumulate emotions and create emotional conflicts in narrative. If narrative time is too short, the user may not empathise with the character and feel the emotions for the character. However, if narrative

time is too long, the user may get bored before he/she can interact with the story. In order to solve this problem, techniques used in film editing were applied in re-editing the interactive video, including ellipsis and split screen (Szilas et al. 2011). In addition, editing skills, including cut-away, fade-in/fade-out, subtitle and flashback, are also used between two different shots or scenes with a temporal or spatial difference to avoid visual or sound discontinuities.

Although using existing material brings some challenges, this research reveals that it is a feasible way to make an interactive story by using existing material. In addition, the idea of using existing material to produce an interactive video can be applied to the TV or film industries. TV or film producers can make use of abundant TV and film footage to make emotion-driven interactive videos and put these videos online to provide the user with a different experience. The potential for future applications and related research adds to the value of this study.

4. *Users have different experience in emotion-driven IS. In particular, those who prefer traditional narrative forms (e.g. film and books) are more likely to feel engaged with emotion-driven IS than those who prefer digital games.*

Previous psychological studies have revealed that males and females differ considerably in their emotional experiences (Niedenthal et al. 2006; Timmers et al. 2003). In particular, a number of studies (*e.g.* Hoffman 1977; Davis 1983; Mestre et al. 2009) suggest that females are more likely to feel empathy with others than males. This explains and supports the finding of this research that females tend to feel empathised with emotion-driven interactive stories and make the choices based on their emotional involvement with the story. The males' experience in terms of emotional involvement, enjoyment and engagement was significantly influenced by the material used to make the interactive video. However, in comparison to watching the linear TV comedy *Ugly Betty,* the emotion-driven interactive storytelling approach increased males' enjoyment and engagement while playing the interactive video.

In addition, as a new approach to IS, emotion-driven IS bridges traditional narrative and digital games. Traditional narrative, such as film, relies on the audience's empathy with the characters to engage the audience, while digital games focus on the user's participation and control over the storyline to engage the user. Emotion-driven IS attempts to combine the fascination of traditional narrative and digital games: on one hand, an empathic emotional experience is created in emotion-driven IS. The user takes a third-person perspective to empathise with the character. This is similar to the user experience in traditional narrative. Therefore, users who prefer traditional narrative are supposed to be more likely to feel empathised with the characters and the story. This indicates the reason why those who prefer traditional narrative feel more engaged with emotion-driven IS than those who do not. On the other hand, like playing digital games, the user in emotion-driven IS can interact with the storylines and determine the evolution of the story. However, most current digital games employ goal-oriented narrative mode which tend to elicit self-directed emotions rather than other-directed emotions. As stated in chapter one, this does not satisfy potential users who like experiencing other-directed emotions in storytelling (Duh et al. 2010). Emotion-driven IS abandons a goal-oriented narrative mode and uses emotion, especially users' empathic emotions, to influence the evolution of the story, which engages users who like traditional narrative. Insights are therefore gained into digital games design: tracking the player's emotional responses and adjusting the storylines accordingly might provide players with an engaging narrative experience and potentially attract another target audience.

7. 2 Limitations

The primary contribution of this research is to propose emotion-driven interactive storytelling and create an interactive video to evaluate the user experience. However, due to the limited time scale, resources and funding for a PhD project, some limitations of this research are acknowledged. The limitations addressed here are those pertaining to the approach adopted to create the interactive video:

1. Using existing material to make an interactive video restricts the diversity of storylines and control over the narrative pace. The creation of multiple storylines must be based on the scenes and narrative pace of the original story. In particular, combining two video segments from different episodes with a time difference can produce visual and sound discontinuities. Although in this study a few discontinuities were found as a result of re-editing the material, they did not influence the user's understanding of the narrative.

2. Due to copyright concerns the use of existing TV footage, the interview and online survey could only be conducted among registered staff and students in the UK, which limits the number and diversity of user responses. Therefore, the findings obtained from the empirical study only represent the opinions of this sample of British university students and staff of emotion-driven interactive storytelling.

3. The material used to make the interactive video in this research is female-oriented, which influences participants' experience in terms of emotional involvement, enjoyment and engagement. Therefore, if using male-oriented material or gender neutral material, females and males probably would experience differently from the finding in this research.

The limitations with respect to making the interactive video and the evaluation of user experience are caused by the lack of funding and time for PhD research. However, the end of my PhD life does not mean the end of my interest in studying this topic. On the contrary, the research I have completed so far will inspire future research which will contribute further valuable findings in this field.

7. 3 Future Work

Based on the limitations of this research, future research can be conducted in terms of three perspectives: the improvement of the concept and implementation of emotion-driven IS, the development of the evaluation of emotion-driven IS, and the exploration of the possible applications of emotion-driven IS.:

1. Male-oriented or gender neutral material can be adapted to make more interactive stories and user experience is examined to confirm/disconfirm the findings of this study. The ANOVA tests in the empirical study revealed that gender was a significant factor to influence the user experience in particular to emotional involvement, enjoyment and engagement. However, the further ANCOVA test which was carried out within the participants who had watched TV *Ugly Betty* indicated that the different experience between males and females in terms of enjoyment and engagement resulted from the female-oriented material used to make the interactive video. However, for those who had not watched TV *Ugly Betty*, using only one choice of material is difficult to examine whether it is the material used to make the interactive video or the emotion-driven storytelling approach attributes to the gender difference. Therefore, more emotion-driven interactive video is needed to make by using male-oriented or gender neutral material. The TV drama *Star Wars* is considered as a good choice for male-oriented material. In addition, comedies, such as *Friends* and *How I met your mother* provide good options for making gender neutral interactive stories. In particular, these comedies have several main characters with different gender and personality. Therefore, the user can choose male or female characters according to his/her gender to explore the story, which avoids the gender influence of the material on the user experience and adds more interactivity to the interactive video.

2. Creating an emotion-driven interactive storytelling system from scratch rather than using existing material. The interactive video made in this study has confirmed that the concept of emotion-driven IS can be used to create video segments and branch structured interactive stories. Some further work is therefore needed to test whether or not emotion-driven IS can be developed into a real-time interaction based storytelling system and how this works. Therefore, it requires automatically generated plots according to the user's emotional responses. The drama manager can monitor the dramatisation of the story and change the plots accordingly to create emotional conflicts. The way

of capturing the user's emotional responses is natural and seamless and does not interrupt the user's interactive experience. To build such an interactive storytelling system, writing an engaged interactive story, choosing the proper visual representation style, modelling the characters or shooting the necessary scenes and coding to make the story interactive, are all needed. Therefore, teamwork among screenwriter, director and programmer is the best choice to guarantee the implementation of the emotion-driven interactive storytelling system.

3. More participants with different backgrounds from all over the world will be recruited, and further examinations can be carried out in empirical studies. The findings obtained in this study can be tested with other targeted users beyond the registered university students and staff in the UK. In addition, more research questions can be explored through the empirical study. For example, does the user who prefers watching TV more than watching film feel more engaged with emotion-driven IS? Would the user who prefers a specific digital game genre (*e.g.* role playing games) feel more engaged with the emotion-driven IS than the user who prefers other genres (*e.g.* action games)? How do different types of users and their previous experience determine their emotional response to emotion-driven interactive storytelling? What is the relationship between the four subscales used to measure engagement in this study (*i.e.* narrative understanding, emotional involvement, focused attention and overall enjoyment)? Are there more factors which can influence the user's engagement with emotion-driven IS? Except for engagement, does the user have other psychological experiences (such as flow) while interacting with the emotion-driven story? The answers to these questions will give a comprehensive understanding of the user experience in emotion-driven interactive storytelling.

4. Applying the concept of emotion-driven interactive storytelling to various forms of interactive entertainment, including narrative-focused interactive entertainment (*e.g.* interactive film and interactive TV) and interactivity-

focused interactive entertainment (*e.g.* digital games). The interactive entertainment industry has attracted plenty of interest in recent decades. However, apart from digital games, other forms of interactive entertainment (*e.g.* interactive film, interactive TV) have not been widely accepted by most users or initiated a well-developed industry. Even for digital games, restricted by the improvement of technology, game designers have begun to seek new solutions to attract more players and expand the market. Emotion-driven interactive storytelling could possibility be applied to these entertainments and provide the user with an emotionally engaged experience. In addition, the birth of new interactive platforms and devices (*e.g.* iPad and Kindle) also brings new horizons for creating stories. Researchers are attempting to explore the appropriate narrative forms for these platforms and devices. Therefore, how to apply emotion-driven interactive storytelling to these new interactive platforms and devices is also worth further study.

In conclusion, the findings of this research have made a significant contribution to our understanding of interactive storytelling and will generate further investigation into emotion-driven storytelling and encourage other researchers to come forward with their valuable contributions.

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APPENDIX A

STORYSCRIPT

STORYSCRIPT

Characters:

Betty: An ugly and unstylish fat girl. She is the editor assistant of Mode magazine which is one of the most famous fashion magazines in the world. Betty graduates from the top journalist university and has lots of passion on magazine. To be a magazine editor is her dream. However, she gets this job totally due to her ugly appearance. Her boss- Daniel- the editor of Mode magazine is a famous "playboy", Daniel's father, the boss of Mode magazine, wants him to focus on the work instead of flirting with his assistant, so he chooses Betty as Daniel's assistant.

Mark: A very vogue guy. He also works as the editor assistant of another co-editor in Mode magazine. He is very sensitive to the fashion trend and dressed very fashion. Thus, he looks down upon Betty because of Betty's unstylish dress. His dream is to be a fashion editor. So he regards Betty as his competitor. He is gay, but he doesn't want his mother to know the truth because his mother doesn't accept gay.

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Daniel doesn't want Betty to be his assistant, so he decides to humiliate Betty, and force Betty to quit the job. So in one model shooting event, Daniel lets Betty wear unfitted slim clothes to stand between models and take pictures. Everybody laughs at Betty.
Choices: Angry/ Humiliated

Angry: Betty condemns Daniel and quit the job. Daniel feels sorry. Betty's advertisement proposal is chosen by a client. Daniel wants Betty to come back and work with him on this advertisement. Betty knows from others that Daniel is always though to be less excellent than his brother, and this time he really wants to do a good job.
Choices: schadenfreude /pity

Humiliated: Betty leaves sadly. After a few days, when she is back to work, she changes completely. But because of her bad fashion sense, she looks even worse. Colleagues laugh at her more.
Choices: Embarrassed / Disappointed

Pity: Betty accepts Daniel's apologies and tries her best to help Daniel. Then they become friends.

Schadenfreude: Betty doesn't want to help Daniel, but then moved by Daniel's hardworking and helps him.

Disappointed: Betty thinks she is not suitable for the job. She decides to quit, but Daniel tells her that her proposal is chose by a client and invites her to work together. Betty is happy and accepts.

Embarrassed: Betty escapes the office quickly and doesn't want anybody to see her. Walking on the street, she sees a high school classmate who used to be laughed at as the same as Betty. But now she looks nice. She tells Betty to be confident. Betty thinks she is right and starts work again no matter what others say about her.

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In a take-away restaurant, Betty met her high school classmate Sammy. Sammy looks very unsatisfied with her job. One day, she comes to Betty's office and begs Betty to help her find a job in Mode.
Choices: pity / schadenfreude

Pity: Betty finds a job for Sammy in Mode. After working for a while, Sammy becomes arrogant again. She treats Betty and other two persons Mark and Amanda badly. Mark and Amanda decide to make a trap for Sammy and make her get fired. They want Betty to help them finish the plan. Betty agrees at first. But when she sees Sammy, she feels **Choices: guilty/ happy**

Schadenfreude: Betty asks Sammy to be her assistant and gives her some trifling things to do. One day, they go to lunch together. Betty helps Sammy to get juice from the high cabinet by standing on the chair which makes Betty recalls when they were in high school, Sammy took off her skirt when she stand on a chair. Sammy walks toward Betty, Betty feels **Choices: nervous / careless**

Guilty: Betty tries to warn Sammy there is a trap. But Sammy doesn't believe Betty. Sammy makes mistakes in her work and gets

Happy: Betty tells lies to Sammy. Sammy believes and gets fired. Sammy hates Betty and steals Betty's work plan. Betty cannot finish her work on time and is criticized by her boss.

Nervous: Betty suddenly comes down from the chair and takes Sammy's skirt off. Sammy feels embarrassing and complains that Betty doesn't trust her, so quit.

Careless: Betty gets the juice and wants to come down from the chair. Sammy helps her. Betty thinks Sammy has changed, so she helps Sammy apply for a new job. Sammy gets the promotion and feels gratitude. They become good friends.

Mark's mother passes by to visit him and wants to see Mark's girl friend and her family. By mistakenly, Betty is regarded as Mark's girlfriend. Though usually Mark treats Betty badly, this time Mark begs Betty to help him. Betty knows that Mark is very obedient to his mother and doesn't want to disappoint her. **Choices: reluctant/ sympathetic**

Reluctant: Betty refuses Mark. Mark has to tell his mother the truth. Mark's mother left disappointingly. Mark feels sad. Later, there is a promotion chance for both of them. But only one can get the job. They need to work together and put forward different proposals. Only the better one can get the job. Mark tricks Betty on purpose which makes Betty late for the submitting the proposal. Finally, Mark gets the new job.

Sympathetic: Betty helps Mark. Mark feels gratitude. Later, there is a promotion chance for both of them. But only one can get the job opportunity. They need to work together and put forward different proposals. Only the better one can get the job. Mark really wants to get the job, so he tricks Betty on purpose at first. But then he feels very guilty, so later he helps Betty. They both submit their proposal on time. At last, Betty gets the job.

APPENDIX B

STORYBOARD FOR RE-EDITING

	Scene	Predicted Time (min.)	Emotional Complex Moment	Choices	Screenshot	Interpretation
01	Betty waits for the interview, but is told the position she applies is filled. She doesn't give up and gives a brief introduction.	≈1				Season 01 Episode 01
02	Daniel is the new chief editor of Mode magazine. His father finds him have an affair with his assistant.	≈1				Season 01 Episode 01
003	Betty receives the call from Meade Publication. She gets the new job.	≈0.30				Season 01 Episode 01
04	Betty meets Amanda in the reception desk on the first day. The she attends a meeting and introduces herself to Daniel.	≈2				Season 01 Episode 01

05	Betty meets Daniel's friend and gives improper compliment. Daniel's friend is mad at Betty and wants to make her quit.	≈2				Season 01 Episode 01
06	Betty has some unfair sufferings. Daniel wants Betty to keep eyes on a model when he is sleeping with another.	≈2	Hilda phones Betty to come back home for their father's birthday, but Daniel wants Betty to stay for working.	**06-01: Guilty** for forgetting father's birthday. **06-02: Worried** about not following the boss's instruction		Season 01 Episode 01
06-01 Guilty	Betty refuses to stay and goes back home.	≈0.30				To scene 07
06-02 Shamed	Betty stays. When she arrives at home, her dad has slept. Hilda doesn't understand her. She gets an advertising idea for Fabia cosmetics.	≈1.30				To scene 07 Season 01 Episode 01
07	On photo shooting day, Betty wants to show Daniel her proposal but is refused. In the closet room, Betty knows the reason why she was hired. She forgets her proposal there.	≈2				Season 01 Episode 01

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08	Betty is asked to wear the wardrobe to stand for a model	≈1	Betty doesn't want to disobey Daniel's require, but she knows he just wants to humiliate her	**08-01: Nervous** to wear the model's wardrobe **08-02: Angry** at Daniel's request		Season 01 Episode 01
08-01 Nervous	Betty wears wardrobe and stands between models. She is laughed at by others.	≈1		**08-01-01: Humiliated** to be laughed at by others **08-01-02: Angry** at Daniel who does this on purpose		Season 01 Episode 01
08-02; 08-01-02 Angry	Betty leaves. Daniel follows and wants to talk to Betty. Betty blames Daniel angrily	≈0.30				To scene 09 Season 01 Episode 01
09	Daniel finds Betty's proposal about Fabia cosmetics.	≈0.20				Season 01 Episode 01

10	Daniel comes to Betty's house and asks for forgiveness	≈2	Betty is still mad at Daniel, but after she heard about Daniel's suffering, she feels sorry for Daniel	**10-01: Sorry** for Daniel's suffering **10-02: Happy** that Daniel likes her idea **10-03: Worried** that Daniel will treat her the same way when she comes back **10-04: Angry** at Daniel still		Season 01 Episode 01
10-01 Sorry 10-02: Happy	Betty helps Daniel make the presentation to the client. The client likes their idea. Betty and Daniel become friends.	≈3				END Season 01 Episode 01
10-03 Worried 10-04: Angry	Betty doesn't show up. Daniel uses the old proposal which irritates the client. Daniel's father feels disappointed to him.	≈2				To scene 11 Season 01 Episode 01

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11	After one month, Betty comes to Mode, but finds it has changed to another magazine.	≈0.30				END Season 03 Episode 01
08-08-01 Humiliated	Betty looks into the mirror and feels unsatisfied with her appearance. She wants to change.	≈1.30				To scene 12 Season 01 Episode 03
12	Hilda brings Betty to a haircut shop and changes her look.	≈1				Season 01 Episode 03
13	Betty is satisfied with her new look and feels happy to walk to company.	≈1-1.30				Season 01 Episode 03
14	Betty attends a meeting with Daniel. Her new look is satirized by Williamina and laughed by others.	≈1	Betty feels despairing to her new look, and embarrassed to be satirized in public	**14-01: Despairing** to work in Mode **14-02: Embarrassed** to be satirized in public		Season 01 Episode 03

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14-01 Despairing	Betty cries in the Lady's room. Daniel comes to talk to her.	≈0.45				Season 01 Episode 03
15	The next day, Betty comes to collect her stuff and quit.	≈1				Season 01 Episode 02
Go to play scene No. 09 & 10 (No.10 has a little change: without apologize for previous humiliating Betty in the photo shoot, Daniel just says he likes Betty's proposal)						
16	Betty comes back to work	≈0.45				END Season 01 Episode 02
14-02 Embarrassed	Betty cries in the Lady's room. Daniel comes and asks her to a lunch with a client. Betty refuses and let Daniel bring Amanda instead.	≈1.30				To scene 17 Season 01 Episode 03
17	(Flashback) Betty and Daniel discuss to find a photographer for their Christmas feature.	≈0.40				Season 01 Episode 03

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18	(Flashback) Betty's father tells Betty that the photographer Betty wants to hire is their old neighbor.	≈0.40				Season 01 Episode 03
19	(Flashback) Betty phones that photographer and talks about their old life. Suddenly the phone is hanged up.	≈1.30				Season 01 Episode 03
20	(Flashback) The photographer calls back. He agrees to talk with Daniel in a lunch time and asks Daniel brings Betty to the lunch.	≈2				Season 01 Episode 03
21	Daniel meets the photographer and introduces him Amanda instead of Betty	≈0.15				Season 01 Episode 03
22	Betty walks out of the lady's room. She finds Daniel leaves the proposal on her table.	≈0.40	Betty feels embarrassed to see others, but she doesn't want to make Daniel lose the business with that photographer because of her	**22-01: Embarrassed** to go to the restaurant and see others **22-02: Determined** to go the		Season 01 Episode 03

			mistake	restaurant and give the proposal to Daniel		
22-02 Determined	She decides to go to the restaurant and give the proposal to Daniel.					To scene 23
23	In the restaurant, Amanda messes up the conversation. Daniel confesses that it isn't Betty. At that time, Betty arrives and meets the photographer.	≈2				Season 01 Episode 03
24	Daniel and Betty come back to office and know that the photographer agrees to shoot for their magazine.	≈1				Season 01 Episode 03
25	Betty comes back home and enjoy the happy evening.	≈1-1.30				END Season 01 Episode 03
22-01: Embarrassed	In the restaurant, Amanda messes up the conversation. Daniel confesses that it isn't Betty. Betty doesn't show up. Daniel fails to come to an					

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	agreement with the photographer and back to the office.					

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APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE FOR INTERVIEWS

1. Gender ☐Male ☐Female

2. Age ☐Under 16 (years old) ☐17-35 ☐36-44 ☐ 45-59 ☐Above 60

3. Nationality ☐Asian ☐African ☐American ☐European ☐Oceanian ☐ Other

4. Occupation ☐Student ☐Academic staff ☐Manual Worker

☐Administrator ☐ Other

5. Have you had any interactive storytelling experience before?

(Interactive storytelling experience here means those experience aims to tell a non-linear story rather than get information or social contact like browse webpage or MSN chat, etc.)

☐Yes ☐No

If 'Yes', which kind of interactive storytelling experience did you have before? (Tick all that apply)

☐Digital Game ☐Interactive fiction ☐Interactive Film ☐Interactive TV

☐Interactive Video Others_____

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6. Have you known the story of *Ugly Betty* or watched the TV comedy *Ugly Betty* before?

☐Yes   ☐No

If 'Yes', how many episodes or seasons have you watched?

☐All seasons which have showed on TV so far

☐More than one season (appro. 23 episodes per season)

☐Less than one season

7. Which are your favorite entertainments? (Tick all that apply)

☐TV ☐Film   ☐Digital Games   ☐Radio   ☐Books

Others_____

APPENDIX D

TRANSCRIPTIONS OF INTERVIEWS

27/09/2010

Bournemouth University

Interviewee: CB

Gender: Male

Whether or not had watched *Ugly Betty* before: Yes

Favourite entertainments: TV, Film

Choices: Guilty- Nervous-Humiliated- Disappointed-Worried

Interview:

Researcher: Do you feel the emotional connection when you watch it?

CB: Definitely. I would say you always generally feel emotional connection to characters in TV, or you are supposed to. But what I think helps with something like ugly Betty is the music also really plays the role of emotion. If you speak with someone like Stephen Deutsch (in the Media School), I think I read some articles in Journal about sound adding emotions. I think they really plant emotions then. What I find with these clips, obviously you can tell from the actress, you know the acting, feel what the way she is feeling. But actually, if you look how

the scenes end, sort of the wording in the sentence they say, give you the emotion. For example, the one (scene) he wants her to dress up as a model, her line is "is this what you really want me to do?" and that just set the subtext is, what I thought, you know, am I being reduced? Is this you think what I am? Obviously she was nervous about dressing up as well, because it shows the image of the girls. But I think in deeper, she kind of feels, you know, she wants him to understand who she is. She wanted to be seen as a real person. So I think the way it ends, the way it gives the end line gives you the emotion as well.

Some of the questions I think it could easily choose more than one. You might choose two. For me, I guess because I knew the emotion, so I was thinking what was the emotion led, but I imagine some audience have watched Ugly Betty do not feel the same, so some people maybe think, for example one question is how does betty feel, if she is happy that Daniel likes her idea, I can choose that one, but I can imagine some people, maybe younger audience just think that what is, so could not everybody related to the emotional thing at the same level, that is the problem.

Researcher: Do you mean I need to give more alternative choices or I should allow the audience to choose more than one choice?

CB: I think here I meant that depending upon what you choose as an option, the emotion will or will not connect. When I say emotion, I mean the 'emotional journey' of Betty - emotion as that deep-felt, universal feeling - which can be very abstract, such as guilt, love, loneliness. So, some people might choose something that I personally would not say is an emotional storyline (or storyline driven by character emotion) - but of course, whoever is making the choise is doing it because of their emotion (what they want to see / hear). I guess we should make the distinction between the emotion of the viewer and their choice, and the emotion of the character and how he/she changes throughout the course of a drama.

Researcher: What's the motivation for you to make the choices, for example, based on your own emotion, like if these things happened on you, what will you do?

CB: I guess in some way, my answer maybe slightly skewed. Because my background my research, I kind of know what it is about, so…But I would say, first of all, I would think how Betty was feeling, and then linked to that, would be the second thought: if it was me, how would I feel, my experience, emotional experience. I think what you are looking for is your own satisfied resolution. You want to resolve a way she resolved emotionally. By the end, we both sense she is not just ugly Betty, she is much more inside. So I think people will seek their own resolution. Some people may be purely interested in what if people wear funny dresses. I like to see Betty. I want to choose she is being nervous because I think the next scene might be she put it on. So I guess it depends on when you watch television, (because) if you want to feel the characters or feel the stories or whether they just want to be purely entertainment.

Researcher: Do you feel the video clips are little bit long.

CB: maybe slightly, I think the first one may be a little bit, actually. But obviously you tried to set up the characters, the situation. If you haven't seen the program, I think time will go quickly because she would be interested in learning about it. Because I knew the program, I kind of I wasn't oh my god, this is… but it is really an interesting project.

I think the biggest emotion leap was between when she gave the idea they going to a meeting. They showed the picture of mother and children, because it links with the previous you saw her look at a picture of her mother on the sight. You know her mother dead, so at the end, she presented the image of mother and daughter, you know the emotion she thinks her mother. So she set the idea with passion, rather than the idea she thought might work. But I always like the way it ends, she always gave the credit to Daniel, she tried to say it's his idea, his best idea, but I think it is quite important for her, because even the emotions she

strived, she is still grounded, she is still in modest, that's what helps to keep it to the real life character.

Researcher: This is the storyline you choose, but there is another storyline that Betty didn't show up and Daniel got fired.

CB: It is interesting, because someone chose different answers just driven by other things not emotions, you put the clips together, at the end, I would imagine the viewer might think that is not exactly what I thought. If you put them together, they watch the episode, it would not make sense, but if they watch the whole episode with everything in, with emotions, I think they would prefer it. If you give the clips and took away all emotional stuff, I think people would think they just driven by plot or kind of things. If they succeed to come through, I don't think they would be satisfied with they would. If they saw the whole emotional journey, for example, they may choose the emotional journey, but I bet when they watch the episode the second time around they are more satisfied. I think it is the better experience. I think they might remember more.

Let's say I made clearly emotional choice, if I choose the one I want, there were different clips. I don't think it would make that much sense. I don't think it would be satisfying. So if people choose that route, they may watch and think, it is alright, but if you show me different version, oh, that might be better.

This is the limitation, not in this project, but generally, if the story is dictated by how people think they may want them, possibly they might think it is just alright. But if they saw different version with more emotional choices, the characters, I think they might realise actually that was the better one they missed.

Research: Or do you think if this is because there's lack of surprise or suspense and it would be helpful if adding some surprise?

CB: What I meant by this was if someone chose the clips that were driven by interest in the topic, the locations, humour etc. - so not the character's emotional journey - they would enjoy the narrative still ... BUT ... if they saw a full episode and saw the character's emotional journey (Betty's) - which they hadn't seen fully

before because their choices excluded the more emotional-driven scenes - then I think they would recognise that the story was better when it had more emotion-driven scenes. For example, seeing a story about how and why Betty doesn't want to get dressed up like a model is funny and would be interesting ... but then if you watched those scenes again but with the addition of another level - in other words, she didn't want to wear the clothes AND she was angry at how Daniel thought she was only worthy of this (so, relating to how she feels inside, emotionally), I think the viewers would recognise that this second (longer) version was actually better, and had a longer-lasting impression on them.

27/08/2010

Bournemouth University

Interviewee: JN

Gender: Male

Whether or not had watched *Ugly Betty* before: Yes

Favourite entertainments: Film

Choices: Worried- Nervous- Humiliated- Disappointed- Worried

Interview:

Researcher: What do you feel when you make a choice? Or what motivates you to make the choice?

JN: I make the choice according to my own emotion if I were in that situation rather than Betty's. I barely can feel Betty's emotions. I guess that's because I am a man. It is a bit difficult for me to feel a girl's emotions. Also, I've seen some episodes of Ugly Betty and basically know the story. Sometimes I can guess how the story develops after I make the choice, and what I guess is almost the same as the video shows.

Researcher: what do you think the emotional choice provided? Do you think they cover all emotions you might have?

JN: I think so. I think most of the emotional choices provided are fine. But some of them are very similar, so sometimes it is hard to decide. For example, I remember there are two choices "Disappointed" and "Embarrassed", I took a long time to make a choice between these two, because I think I have both of these two emotions at that time. In the end, I think I chose disappointed.

Researcher: Do you feel there is any visual or audio discontinuity in this interactive video which influences your understanding of the story?

JN: Um, generally, I think it is ok. The story does totally make sense to me. Just one place, I think it is after making the "Humiliated" choice, the video jumps to

Betty put a poster on her face and looks into the mirror, I feel the video is a little discontinuous, but it doesn't influence my understanding of the story.

07/09/2010

Bournemouth University

Interviewee: LL

Gender: Female

Whether or not had watched *Ugly Betty* before: Yes

Favourite entertainments: TV, Film, Radio, Books

Choices: Guilty- Nervous- Angry- Sorry

Interview:

Researcher: Can you tell me your experience while watching the video?

LL: I was expecting to make more choices. The clips were very long until I made the choice. I was really engaged in the process of watching the storyline, but I thought there would be more choices and I would have more of an effect on the storyline and be able to influence more. That was the main thing I thought.

Technically, there were some Internet problem, sometimes it kind of freeses a little bit, it wasn't very much. Occasionally the video almost stopped and then carried on. It wasn't that much and didn't really ruin anything.

Researcher: When you make the choice, it was according to your emotion in that position or the emotion you felt for Betty?

LL: I made the choice for Betty. I think the first choice is quite difficult, because you know she desperately wanted to do that job, and then the call made her know that she forgot her dad's birthday. I think her overriding emotion is probably to guilt that was what I went with, on the other hand, I thought she probably still wanted to do her job, so I think that one is very difficult and I tried to put myself in her shoes.

Researcher: Do you enjoy of process making a hard choice which means you need to think more or do you feel you can get more fun if the choices are straightforward and easy to make?

LL: I like a mixture of both - in think it's a question of creating a rhythm in these stories too and sometimes you'd want it to move forward quickly and other times it's okay that you need to think harder on something, that you're forced to make a challenging choice. But you wouldn't want the entire process to be like that, it would feel like you weren't getting anywhere. Then again, the 'easy' choices can sometimes feel as if the creator is trying to steer you in one particular direction...

Researcher: About the text on the website- the introduction, do you have any problem to understand?

LL: They are quite straightforward in terms of you know what you are doing, it's only one thing after all. I was wondering if I missed something and there were more choices, so that is the only thing. If I was going to change anything in the initial introduction, it would maybe tell people how many choices they should be expecting to make, so they know roughly and so they know they are doing the right thing.

Researcher: You said you have watched Ugly Betty less than one season, do you think if there is any influence on your experience to watch this interactive video?

LL: I watched one episode here and one episode there. I've really never sat down and seen the entire season, so I don't think I am really affected. I don't know it well enough but I know things should do anyway. I kind of know the plotline of this and then the plotline of the entire series you guess in the initial introduction here, because you sort of guess she is hired because she is ugly, that's why it's called ugly Betty, and that's comes across in this episode. But I don't know if you need to know any more, I don't know if somebody who have seen all seasons, how that may affect them? They may more playful and tempted to do things differently [than in the actual series].

Researcher: Do you feel engaged in this experience?

LL: I think it is really… I am old enough to have experience of this process in book form. When I was a kid, we had books that you could make the choice when you read and go to, like if you choose this character, go to page 20. I don't know

if you were meant to read the book like that, but I would choose that option, read that storyline and then I go back and choose the other options and try to find out what happened in others. It is funny to see the different stories.

Researcher: I know there is a book called "Choose your own adventure"

LL: Those kind of books were quite often adventure stories and Sci-Fi stories. You know, it is always about putting your character in peril and you can do that in different ways. I'm not that into video games, but part of the attraction is the same, so here you kind of want to go back and try out different versions of the narrative.

06/09/2010

Bournemouth University

Interviewee: RS

Gender: Male

Whether or not had watched *Ugly Betty* before: Yes

Favourite entertainments: Film, digital games, board games

Choices: Worried- Nervous –Humiliated – Embarrassed – Ashamed

Interview:

Researcher: Can you tell me your experience while watching this interactive video?

RS: Um…I didn't feel particularly drawn to one or another choice. It's not obvious to me which one I want to choose and which outcome I want. I think one reason is that I am aware of Ugly Betty and know its concept. In this sense, I feel the outcome is inevitable, so no matter what decision I make, things will be ok. I don't feel my choice has the significant influence on the storyline. In addition, some choices are similar and some emotions are overlap, so the decision is very difficult to make.

Researcher: Do you think you were emotionally connected with the character while watching it?

RS: It's difficult to get emotionally attached with the character. I don't like watching TV drama. TV doesn't spend lots of time to portray the characters and the characters are usually caricature and stereotype. So I cannot get emotionally attached with the character.

Researcher: What do you think about the quality of the video?

RS: The video quality is jerky. I also feel the video is too long. The length of the video before making the choice can be shorten, especially the first video clip, can start from Betty works in Mode rather than from she gets the job.

07/09/2010

Bournemouth University

Interviewee: ST

Gender: Female

Whether or not had watched *Ugly Betty* **before: No**

Favourite entertainments: TV, film, books

Choices: Guilty- Nervous- Humiliated- Embarrassed- Anxious

Interview:

Researcher: Did you make the choice according to your feeling in that position or the emotion you feel for Betty?

ST: sometimes it was my own emotional sort of connection to the story, sometimes sort of putting in her issues. You know if I was in that position, how would I react? So there was a little bit both. There is one I really struggled. I am trying to remember what the choice was. I could see it was going to either way. Should she go on the photo shoot or should she be embarrassed or should she be angry with her boss putting her in that position. I struggle that one, because I could see going to both directions. I cannot remember what I choose that one.

Researcher: After you made the choice, can you anticipate the story will go on this way?

ST: There were couples of times that they are end of thinking if I made this choice and guessing something is gonna happen. I am those sort of person who try to predict what gonna happen in a TV show anyway, so that might be part of my personality.

Researcher: Do you feel you guess is similar with the way it shows in the video?

ST: Most of them, I would say, I kind of predict pretty well. But they always do it in a much bigger way. Especially the scene to show, because like, her reaction to change her appearance to try to fit in a little bit more. But when you in that

direction, it looks a little bit different from your expecting. She was look like very over the top with colour choices and all that kind of stuff rather than with that kind of the Devil Work of Prada. You know how they had that, sort of the similar idea, going on there, but at the end, the character was going the completely different direction much more like tailored or a little less over the top. But she was over the top in a different way, she was over the top in a glamor way, kind of idea.

07/09/2010

Bournemouth University

Interviewee: SA

Gender: Male

Whether or not had watched *Ugly Betty* before: Yes

Favourite entertainments: TV, film, digital games

Choices: Guilty- Nervous- Humiliated- Embarrassed- Ashamed

Interview:

Researcher: Tell me how you think about this interactive video.

SA: The problem I had with interactive movie was that I wasn't sure because I've already knew the story. I watched Ugly Betty, I watched the first episode and I knew the premise of the story. So in that case, the outcome was already known. And also it made me wonder because choose to re-edit the existing movie has only one outcome, how do you make interactive story with multiple outcomes out of a drama certainly has only one outcome?

Researcher: It has four seasons so far and provides lots of material to use.

SA: It was not so obvious to me the choice I was making was determined anything. It is not seen to me that the choice I made determined any outcome. Actually I thought as supposed to cut of scene, what I was expecting to see is that the story would be evolved, would be going and something would happen and it would stop. And then something would come out and say: what is choice? If you say angry, it would be in the same scene. In my opinion, what would give me the idea that my choice was affecting the story is when I made my choice, and I said I was angry, Betty threw it down and walked out. That would be obvious that my choice affected it. But when I made the choice, I saw a cutscene and you jumped somewhere else. It is not obvious to me that my choice is affecting the outcome of the story.

Researcher: Can you tell me which one makes you feel like that?

SA: I've already watched interactive movies before, but I think you know seeing thing and remember things. I expected interactive story is different, let's say, for instance, two of us got here, and we haven't seen each other for a long time, and we had an argument, let's say, very very bad argument two years ago. We seldom come out to see each other and the question will come out and say: what would you do? The person has to choose, if it is angry, and immediately you would shut and I say get out. And if it is happy, I say hello, you will give sola a hug. In that case, the scene continued in the same place. That is obvious to the viewer that my choices are affected the outcome of the story. The change will be in the same scene, you just screen goes black after the question, it's the same continue from the way it stops, not backed out and jumped to somewhere else. It will be obvious that the characters make the choice. If it is angry, I want to see the character gets angry and react angrily in the same scene, they walk angrily or throw something.

Researcher: I think most of them are in the same scene.

SA: No, no, some of they were took jumped to a cutscene. I will tell you why. Because let's say when I was nervous, betty still did the photo shoot, but if I didn't make this choice, because the storyline anyway its real story on the television story of ugly betty, betty does the shoot anyway. The other reaction you would have to jump to another scene and cut entirely, there is no footage of Betty walking out off the photo shoot angrily.

Researcher: yes, this is the limitation of using existing materials.

SA: exactly, it doesn't give user a total sense of that my choice would determine because sometimes it jumps away. If I say angry, I want to say an angry response. So I didn't think using the existing footage is a good idea. Because the sense of involvement, you want to give them impression that you choices are affecting. So if I would recommend, I would recommend scripting the story, it doesn't have to be the best one, just feel a low budget, you know just two people in the room, and just film two reactions or film three reactions, and proceed from here. Using an

existing footage from a linear sequence, you were trying to make something pilot, but it is already linear. It is very hard to pull off.

Researcher: Do you feel the emotion you feel connected with Betty?

SA: In the way you feel sorry for her, that you will empathised. But really that is the quality of acting, the quality of the character. It is not so much affecting your interactive movie, because I will feel the same way in any case even if I watch the linear sequence.

Researcher: But the difference is that the linear narrative is linear, you cannot choose. I want to create an emotional conflict to give the audience to make the choice.

SA: Sometimes you watched a movie and think what would I do if I were this person, and that could enjoy an interactive story. But then when I watched ugly betty, I watch it on TV, I think four year ago, I feel sorry for her anyway. Even it was a linear sequence, even it was a non-interactive, I could feel sorry for her. So that's not the interactivity make you feel sorry for her or make you feel the emotional connection to her. It is the acting. For interactive story, allow you to answer the question if it were me, what would I do? That's interaction, that is what interactive story to do. In my opinion, interactive story doesn't create the emotion. It is the acting and the situation creates the emotion. Interactive movie only allow you to make the choices.

Researcher: yes, so that is why I give the choices and different choice decide different ending.

SA: one of your questions was do you feel sorry for Betty or do you feel emotional connected to Betty? I answered that question, but I didn't attribute that to the fact of interactive movie.

Researcher: but we cannot deny the effect of linear narrative on interactive story.

SA: I mean in your case, if I have any emotional response to it, it is not the result of interactivity. It is the result of being human, empathy.

Researcher: I want to make the player feel an emotional motivation to make the choice rather than like game which interaction is based on finishing the goal.

SA: it is more like a game for girl. The thing is when you see interactive, in this example, I think it is just a test. This was just the number of choices compare to the length of the sequence was small. In my opinion, there were too few choices. Sometimes the video played for ten minutes, and one choice and it played for eight minutes, one choice, there are too few choices, I expected to see more choices. So it needs to be rich. If you sit down for very very long time and made a choice, it is tending to linear narrative. And the problem is because you are not the author of the story, you cannot control all the story. If you can control the story, you draft the narrative with possible outcomes and possible reaction, you would being perfectly completely control. The fact that the existing narrative, the story is known. It was not new to me. I sort of knew what is going on and I predicted. It doesn't seem too involved. Because I've already known how it would generate the plot. I believe better if something you can control completely, and also where you can see the character reaction. Like you can also ask to choose what you would want the character to say next "you fool" or something and then the character say. Or what would the character to say and you can give three things, for instant, and with the storyline evolved, I want to see the character say or do whatever I want them to do. I want to see they take a reaction.

08/09/2010

Bournemouth University

Interviewee: SB

Gender: Male

Whether or not had watched *Ugly Betty* before: No

Favourite entertainments: Film, radio, books

Choices: Guilty-Angry- Worried

Interview:

Researcher: What do you think of this interactive video?

SB: It seems the story could be a little bit longer and I felt in the sense of authorship in the way I'm interested in seeing it was possible. I think more about man than the woman. I felt more about the boss and bringing him down. So I was trying to make a decision sort of to make him fail rather than succeed. So that motivated quite a lot of my decisions. In the long term, that would be some kind of conciliation that he would learn something from it.

Researcher: Do you feel happy with the outcome?

SB: Yes, it seems that way, because when she arrived, she seems genuinely pleased to see him, and the last scene was like he sort of got his way. It was like he recognized the (value?), whereas before there wasn't any sign, you could understand she might not believe him. I didn't know what it really carried on-being nasty or it was more acting on her. It wasn't totally acting on her behalf. Because I kind of thought if she did make this decision, we need favor. She might be ambitious to done everything that she said and she might be successful.

Researcher: Can you tell me your whole experience when you watched this?

SB: I felt that was very slow when I was told it was an interactive story. I was expecting like in games that I would have choices very earlier on and much more often. So I anticipated almost that might be tutorial demo or direction level. Once

when I knew that might be a long time to watch between choices, then I knew that was how it works. But at the beginning, I thought I made a mistake. I watch long video after the "watch" button, I don't know how long it is. I thought I might need to click on the screen to make something happen. I haven't been given any choice yet. I did until I got the choice. I wasn't sure whether I'm doing it right, so I'm a little concerned, you know, if I missed something until the first choice came. Then I realised it was tempted to be longer. So if I'm coming as a new user, if I'm not committed to give you feedback, I just found it on Internet, I would probably stop watching very quickly. Because I haven't got any chance to make any choice. So that was the first thing I was thinking about was learning how long it would be before I can made a choice.

Researcher: Another interviewee suggests me in the introduction text I can tell people like how many choices they may make in this video.

SB: Maybe. I didn't think it is long to realize it is a long stretch of time. And also because you said it would take 15 to 30 minutes long, so it would not be many choices. So I concerned it was more like watching a story. I start trying to guess when the next choice was. I was thinking if I have a choice now, oh no, what about now? I kept thinking when I have a choice, so it kept my attention in that sense. I also got tempted to but I didn't do it to fast forward to make a choice. I considered it but I chose not to because I want to see the story.

Researcher: So in this sense I guess if it had more choices would be better?

SB: In the sense, I quite like to be more like watching a TV program than playing an interactive game. I think it created its own space if you like it and created its own styled interaction. So I didn't worry about it. Once I knew how it happened, I didn't think I wish I had more choices. I just thought that is the way it works. So I thought when I was not in a mood or when I want to choose the fast action decisions, I would play that rather than this, but that might be occasions that I just want to sit back and watch a bit more to relax. It might kind of I want to do that when I don't want to work really hard. So it might be certain times when I want this kind of story rather than other kind of fast action. So it is a different kind of

(storytelling) and there are lots of ways you can tell the story. (It creates time transformer?) I like that. It might be occasions that would be nice to, you know, just want to make one choice during the coffee break, watch one little bit and you think alright, ok, I stops, make the next choice and start next journey and carry on. It is facility to pull it come back and carry on where it left. It would be quite nice.

Researcher: I need to use the existing materials, so sometimes I need to keep it…

SB: Yes, I think finding a way it can be a choice, that is quite clever. I was interested in seeing what would happen it might be in a different way but not that bothered. Actually, I thought it was a satisfied story. Then I felt like I want to see more. I didn't want to go back and try different way. But I like the way it (becomes?), that's why I am not interested in game.

Researcher: And why the video clip is so long because I want to accumulate enough emotion, it's emotion-driven, so I want to keep the narrative complete…

SB: I think that was sensible. I suppose the practical thing to do would be to do comparison, depends on what's your research. How long do you need to get the emotion, so doing the same story with less time, or whatever different elements and see if it makes difference? I suppose the hard thing is how you get enough data to make selection among. But the long introduction, if I've been warned about, if I knew there would be a long introduction, like 7minutes introduction before you got the first choice. It will be fine. I will be relaxing. It was to do with the expectations, that wouldn't pull me off. I would to expect that rather than worrying about. The pace for getting emotions seems to work. I think it might be depended on what kind of story, different kind of story might be needed to fast. But also, in my PhD, what I was interested in is if you doing interactive stuff, is changing the pace perhaps sometimes quick decisions, or sometimes a longer period, but it might be demanded by what you want to do emotionally. Anyway, something may take longer just because it takes longer to get that emotion. I think it works.

Researcher: Yes, I did worry about if I put it online and send it to my friends or strangers I don't know online, if they have the patience to watch it.

SB: That is something to think about it, I suppose. If you get it online, you gonna to have restricted access, so it is available to people who register.

Researcher: The website is open to public, they don't need to register.

SB: Oh, alright, it is the copyright. That is a trouble. Because the film belongs to the people who made the series, so you can not just use it without their permission.

Researcher: I've asked CEMP. There is the series Ugly Betty on BOB, so it might be used.

SB: That's right, that's only available to people who register to use it, so it has to be, I think academic, that is rules to say you can use it for something. You should check it. If BOB is available to anybody, it might be ok. But I knew BOB is just available to people academic- in the university or doing research.

Researcher: Do you feel the emotional connection with the character or the story?

SB: I can tell the emotion, what the emotions were, so in this sense, if I was walking along on the road, just passed a child who was crying or someone was angry. I will get the breath, emotional response. But I would not care particularly about that person or individual. So although I felt the emotions, it was a story, so even less affected me than people on the street. Because the story, to me, isn't very deep one. It wasn't surprising me with something would change my emotion or made me think deeply about. It was just a cliché story. It couldn't move me very much unless that is the kind of cliché story I like. So that was really the difference. Even to me, I talked the emotion is entertaining rather than anything else. So it is light entertainment rather than deep moving like poetry.

20/11/2010

Bournemouth University

Interviewee: JK

Gender: Female

Whether or not had watched *Ugly Betty* before: No

Favourite entertainments: TV, film

Choices: Worried-Nervous- Angry- Worried

Interview:

Researcher: have you watched Ugly Betty before?

JK: I'm not really sure, even I watched it before, it is long time ago.

Researcher: Can you tell me your experience, especially your emotional feelings while watching this interactive video?

JK: I think it is very common story. It happens in real life, like in the company when you apply for a job, they look at you and tell you that you are not suitable here, not fit in our company, so they just go overlook at the first time. And then the man, the old man, the father of … he thinks she may have something inside instead of outside. I think it is very common that just judge a person outside. When I watched it, I just felt it was like something happened in the real life, or something happened on me. It happened on me when I tried to get my first job, and tried to fit in the company. I had to change some of my styles, just be more professional. It is not really redirect, but just something in common that you have to adjust yourself. I think I have some sort of emotional connection with Betty.

Researcher: Can you tell me what the motivation to make the choices is? In other words, what makes you choose this option rather than others?

JK: I made the choice based on my feeling. I think about Betty, and also project my own experience on it. So I expect the next scene is based what I choose. I cannot predict what is going to happen in next scene. I just have a feeling that by

the end of the story, the guy will like the girl somehow. I feel the evolution of the story is according to my choices.

Researcher: When you watch it, do you feel engage with the story

JK: Yes, I feel get involved with the story.

Researcher: Do you feel the video clip it is a bit long when you watch it

JK: I feel it is alright. Because you tell the story, you have to tell it step by step. I just thought there must be a happy ending. The guy must fall in love Betty because she has a beautiful heart and beautiful inside. I do not really know the ending, but I think that happens a lot.

22/11/2010

Bournemouth University

Interviewee: YM

Gender: Female

Whether or not had watched *Ugly Betty* before: Yes

Favourite entertainments: TV, books

Choices: Guilty-Nervous-Humiliated-Disappointed-Happy

Interview:

Researcher: Can you tell me your experience while watching the interactive video?

YM: It is quite interesting. I can feel the main character somehow...

Researcher: Did you watch Ugly Betty before?

YM: Yes, so that's why I am always trying to…because I know what's happening at the end. I feel a little bit less engaged with this video. I watched it, and I know what the story will be.

Researcher: So what is the ending of your choices of the story?

YM: Umm…oh, I chose she felt guilty because her dad's birthday, and then I chose she felt humiliated by the people in the photo shoot. And after that I chose she was worried about fitting in the company, yes, she did not think she fit in at the mode. And at the end… it think … umm… Is that all? I think that's all what I choose.

Researcher: She felt hopeless to fit in, and then Daniel found her proposal of a cosmetic company, and then there are still some choices.

YM: No, there was not

Researcher: some choices about whether or not she was happy to help Daniel after Daniel went to Betty's house and asked her help.

YM: All right. I remember that. So what's the choice?

Researcher: She was happy to help Daniel or she was worried about Daniel would treat her the same as before.

YM: I think I chose she was happy to help.

Researcher: So when you made the choices, what's the motivation?

YM: I made the choices based on the emotions, especially the expression of the actor or actress, and also the development of the story. They make me think if I were Betty, how would I feel?

Researcher: Do you feel there is visual or audio discontinuity to affect your understanding of the story?

YM: I did not feel there was discontinuity, but I did feel the video is a bit long.

Researcher: Do you think how long it would be acceptable?

YM: 5minutes, I prefer, the whole interactive video.

23/11/2010

Bournemouth University

Interviewee: YJ

Gender: Female

Whether or not had watched *Ugly Betty* before: No

Favourite entertainments: TV, film, digital games, books

Choices: Worried-Nervous- Humiliated-Embarrassed- Anxious

Interview:

Researcher: Tell me you how you feel about this interactive video.

YJ: I think I quite like the way to present a story because I can feel my choice does affect the ending of the story.

Researcher: How did you make the choices?

YJ: I made the choices according to my personal experience and some thoughts like what is better for Betty.

Researcher: Do you still remember what choices you chose?

YJ: Yes. I think so. Sometimes, Betty feels ashamed and embarrassed, because of her own problems or her boss. She always tried to overcome those difficulties and make the job better, because it is a very hard opportunity for her.

Researcher: I noticed that you made a choice that Betty changed her look. She went to a meeting with Daniel, another lady at the meeting criticised her new look in front of others.

YJ: Yes, I remember

Researcher: When you saw that, what did you feel?

YJ: First, I think it is a very impolite behaviour to Betty. Because she tried very hard to make the people around her like her. But there are also some problems with Betty because no matter you look gorgeous or ugly, you should know what

kinds of behaviour fit you. If she wears something else, it won't make her look that funny. That's too much. I kind of feel sorry for her.

Researcher: Do you think the video is a bit long?

YJ: I think it is alright.

Researcher: Did you feel engaged when you watched it.

YJ: Yes, I can feel myself immersed into another world. I think it is more likely to get involved with that world according to the storyline you choose or the way you prefer that the story evolves. I assume that if I made different choices, there would be different outcomes and endings. I think if Betty says I don't want to continue this job because it is not suitable for me, she probably will find some other jobs and make her feel more happy.

Researcher: Are you satisfied with the storyline and the ending?

YJ: I think the ending is a good ending, however, I don't think in the real world we can have such a good ending.

_____

APPENDIX E

QUESTIONNAIRE DESIGN

1. Sex   ☐Male   ☐Female

2. Age   ☐Under 16   ☐16-25   ☐26-35   ☐36-45   ☐ 46-55   ☐Above 55

3. Nationality   ☐African ☐American ☐Asian ☐European ☐Oceanian

4. Have you had any interactive storytelling experience before?

(Interactive storytelling experience here means the experience which can tell a non-linear story rather than only get information or social contact like browse webpage or MSN chat, etc.)

☐Yes   ☐No

If 'Yes', which kind of interactive storytelling experience did you have before? (Tick all that apply)

☐Digital Games   ☐Interactive fiction   ☐Interactive Film   ☐Interactive TV

☐Interactive Video

Other_____

5. Have you watched the TV comedy *Ugly Betty* before?

☐Yes   ☐No

If 'Yes', to what extent did you enjoy watching it? (1= Not at all; 5= Very much)

☐ 1   ☐ 2   ☐ 3   ☐ 4   ☐ 5

6. Which is your favorite entertainment? (Tick all that apply)

☐Radio ☐Books   ☐TV ☐Film   ☐Digital Games

Other_____

If your answer includes 'TV', which type of TV programs do you like? (Tick all that apply)

☐Dramatic TV series (Soap opera, Romance, Science-fiction, etc)

☐TV comedy (Sitcom, etc)

☐TV movies

☐Documentary

☐TV show (Reality show, talk show, game show, etc)

☐News

☐Other_____

If your answer includes 'Film', which film genre do you like? (Tick all that apply)

☐Action   ☐Adventure/Science-fiction

☐Comedy   ☐Detective

☐Romance   ☐Epics/Historical

☐Horror   ☐Musical

☐War   ☐Western

☐Other_____

If your answer includes 'Digital Games', which type of digital games do you like? (Tick all that apply)

☐Shooting games   ☐Adventure games

☐RPG (Role Playing Games)   ☐Simulation games

☐Strategy games   ☐Vehicle simulation games

_____

☐Sports games   ☐MMOG (Massively Multiplayer Online Games)

☐Other_____

Part II

Please tick the number for each item according to how you felt while watching and interacting with the interactive video. The numbers stand for:

1-not at all   2- slightly   3- moderately   4- fairly   5- extremely

1. I felt the storyline I chose made sense

   ☐1   ☐2   ☐3   ☐4   ☐5

2. I felt that there were some visual or sound discontinuities which made the story difficult to understand

   ☐1   ☐2   ☐3   ☐4   ☐5

3. I wanted to know how the events would unfold while watching

   ☐1   ☐2   ☐3   ☐4   ☐5

4. I felt my body was in the room, but my mind was inside the world created by the story

   ☐1   ☐2   ☐3   ☐4   ☐5

5. I felt emotionally involved with the story

   ☐1   ☐2   ☐3   ☐4   ☐5

6. I could feel the emotions that Betty felt

   ☐1   ☐2   ☐3   ☐4   ☐5

7. I could feel the emotional conflict that Betty was going through

   ☐1   ☐2   ☐3   ☐4   ☐5

8. When something happened to Betty, such as when she was humiliated in public, I could feel the emotion for her

   ☐1   ☐2   ☐3   ☐4   ☐5

9. I made the choices based on my emotional involvement with Betty

    ☐1   ☐2   ☐3   ☐4   ☐5

10. I understood that my choice influenced the storyline

    ☐1   ☐2   ☐3   ☐4   ☐5

11. After making the choice, I understood why the story unfolded in that way

    ☐1   ☐2   ☐3   ☐4   ☐5

12. I was so involved with the story, I didn't notice time passing

    ☐1   ☐2   ☐3   ☐4   ☐5

13. When the video ended, I felt it was over so quickly

    ☐1   ☐2   ☐3   ☐4   ☐5

14. I forgot my own problems and concerns

    ☐1   ☐2   ☐3   ☐4   ☐5

15. I was unaware of what was happening around me

    ☐1   ☐2   ☐3   ☐4   ☐5

16. I felt satisfied with the storyline I chose

    ☐1   ☐2   ☐3   ☐4   ☐5

17. I enjoyed the experience

    ☐1   ☐2   ☐3   ☐4   ☐5

18. After watching one storyline, I wanted to know what happened in the other

    storylines I could have chosen

    ☐1   ☐2   ☐3   ☐4   ☐5

19. To what extent did you feel engaged? (1= not at all; 10= very much)

☐1　☐2　☐3　☐4　☐5　☐6　☐7　☐8　☐9　☐10

If you have watched the original TV comedy *Ugly Betty*, please answer

questions below. If not, turn to next page directly.

20. I found there were some scenes I've watched before

　　☐1　☐2　☐3　☐4　☐5

21. I was trying to recall the original storyline when I was watching the

　　interactive video

　　☐1　☐2　☐3　☐4　☐5

22. I found my memory of the original storyline reduced my interest in

　　watching the interactive video

　　☐1　☐2　☐3　☐4　☐5

23. I found the storyline I chose was different from the original TV comedy

　　Ugly Betty

　　☐1　☐2　☐3　☐4　☐5

Part III

1. Did you find the internet connection worked well when you watched the interactive video?

☐ Yes   ☐ No

If "No", do you think it affected your experience?

☐ Yes   ☐ No

2. Did you watch the interactive video continuously without interruption?

☐ Yes   ☐ No

3. Do you complete the questionnaire as soon as you had finished watching the interactive video for the first time?

☐ Yes   ☐ No

I may contact some people taking part in this study to ask them further questions. If you are happy for me to contact you, please leave your contact details below.

Please note that any contact information that you give will be kept in entirely confidential and not be shown to anyone other than the main researcher in the study and will be destroyed after we have made contact with you.

Thanks very much!

*Name/Nickname_____ (Only for identify)

*Email (required)

_____

Mobile (optional)

_____

Address (optional)

_____

—

APPENDIX F

RESULTS OF MULTIVARIATE ANALYSIS

OF VARIANCE

Effect		Value	F	Hypothesis df	Error df	Sig.
Gender	Pillai's Trace	.230	**10.416**[a]	5.000	174.000	**.000**
	Wilks' Lambda	.770	**10.416**[a]	5.000	174.000	**.000**
	Hotelling's Trace	.299	**10.416**[a]	5.000	174.000	**.000**
	Roy's Largest Root	.299	**10.416**[a]	5.000	174.000	**.000**
UB	Pillai's Trace	.025	.894[a]	5.000	174.000	.486
	Wilks' Lambda	.975	.894[a]	5.000	174.000	.486
	Hotelling's Trace	.026	.894[a]	5.000	174.000	.486
	Roy's Largest Root	.026	.894[a]	5.000	174.000	.486
Gender * UB	Pillai's Trace	.061	2.259[a]	5.000	174.000	.051
	Wilks' Lambda	.939	2.259[a]	5.000	174.000	.051
	Hotelling's Trace	.065	2.259[a]	5.000	174.000	.051
	Roy's Largest Root	.065	2.259[a]	5.000	174.000	.051

Results of Multivariate Analysis of Variance with two factors of gender and whether or not had watched *Ugly Betty* previously

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Effect		Value	F	Hypothesis df	Error df	Sig.
Gender	Pillai's Trace	.164	**6.830**[a]	5.000	174.000	**.000**
	Wilks' Lambda	.836	**6.830**[a]	5.000	174.000	**.000**
	Hotelling's Trace	.196	**6.830**[a]	5.000	174.000	**.000**
	Roy's Largest Root	.196	**6.830**[a]	5.000	174.000	**.000**
Favor_Games	Pillai's Trace	.179	**7.580**[a]	5.000	174.000	**.000**
	Wilks' Lambda	.821	**7.580**[a]	5.000	174.000	**.000**
	Hotelling's Trace	.218	**7.580**[a]	5.000	174.000	**.000**
	Roy's Largest Root	.218	**7.580**[a]	5.000	174.000	**.000**
Gender *	Pillai's Trace	.022	.797[a]	5.000	174.000	.553
Favor_Games	Wilks' Lambda	.978	.797[a]	5.000	174.000	.553
	Hotelling's Trace	.023	.797[a]	5.000	174.000	.553
	Roy's Largest Root	.023	.797[a]	5.000	174.000	.553

Results of Multivariate Analysis of Variance with two factors of gender and gaming preference