Narrative theory and emergent interactive narrative

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Abstract: This paper aims at reviewing narrative approaches and theories in an effort to assess their potential as suitable models for computational implementation within the EU Framework V-funded project VICTEC (Virtual ICT with Empathic Characters). We discuss classical narrative theories as well as envisage alternative interactive models according to the narrative requirements presented by VICTEC. The Emergent Narrative (Aylett, 1999) concept is also defined and referred as an essential element of the VICTEC research project.

Keywords: virtual reality; narrative theory; storytelling; interactivity; emergent narrative.

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1   Introduction

This paper is motivated by the EU Framework V-funded project, Virtual ICT with Empathic Characters (VICTEC), which started in March 2002 with five partners in the UK, Germany and Portugal. The project seeks to produce a system to help with anti-bullying education – and by extension, other areas of Personal and Social Education (PSE). This type of education depends heavily on attitudes and feelings rather than on straightforward knowledge, hence role-play and narrative is often used in current teaching programmes. This may be live, as in Theatre-in-Education, or literature-based, for example using cartoon-strips. VICTEC seeks to build on these existing approaches by building empathy between a child user and a synthetic character in a virtual drama. These

dramas would involve actual episodes of bullying between virtual characters, with the child user acting as an 'invisible friend' and trying to help a victim by advising them between episodes.

A premise of this project is that the creation of empathy requires the user to feel the characters have an independent life, that the events 'really' happen to them, and really affect them emotionally, in a way quite different from the indestructible or infinitely regenerating protagonists of most computer games. This produces a number of requirements – one is that events cannot be unwound backwards, but that, just as in life, time can only go forwards – both characters and the user have to live with the consequences of their actions.

This in turn suggests a need for unique narratives, that is, narratives with different characters and events for different users, rather than scripted stories that repeat identically. If stories are literally repeatable, then one loses the sense that the characters have any control over their virtual lives, while if the same characters replay the same narratives making different choices (possibly due to user intervention), the temporal coherence of the character with which the user is to feel empathy is lost. The mechanism being investigated for continuing but different narratives is *emergent narrative* (Aylett, 1999) which is a narrative generated by interaction between characters in the style of improvisational drama, rather than the authored narratives in more widespread use.

Improvisational drama is necessarily episodic in nature. Because it happens in real time and usually in a single locale, one cannot use the methods of literature to skip over 'boring bits' (characters eating, sleeping, making long train journeys, etc.) but must allow gaps in which these things happen 'off-stage'. The stories it is hoped to generate in VICTEC are conceived as multi-episodic, with 'time passing' between episodes in order to allow characters to interact over several school days. This performance-based style also puts a great deal of emphasis on the emotional systems of the characters as a narrative engine, needed to motivate their actions as well as to link with the user, who may be able to influence their emotional state by interaction as a friend. Emotional state also acts as a sort of short-term memory, allowing the effects of one episode to continue motivating the character in the next.

Of course it is one thing to explore the concept of emergent narrative, and quite another to implement it. As a basis for building the detailed model needed to support implementation, we have investigated what we consider to be the most influential theories of narrative in order to examine whether they support the requirements just outlined. First we considered Aristotelian theory (1987), the oldest approach in western Europe at least, and one that has been used by a number of researchers in computer-based narrative, for example (Mateas, 2001). Next we considered the Formalist and Structural approach to narrative by presenting the narrative macro structural theory introduced by Propp, (1968) whose analysis of Russian folktales has also exerted a great deal of influence on computational approaches to narrative (Prada, Machado and Paiva, 2000). After that we considered the French Structuralist perspective through the work of Roland Barthes (1981). Finally, we briefly considered the approach taken in role-playing games (RPG) running not on a computer, but during a role-playing session with a group of human participants.

2   Narrative theories and emergent interactive narrative

The first issue in assessing existing narrative theories is that they are intended to support the analysis of existing narrative rather than the generation of new narrative. As we have just seen however, researchers have tried to adapt them to generative narrative, so that they cannot be excluded as useful guides for this reason alone.

2.1   Narratives and plot oriented structures

Aristotle was certainly the first to apply logical and ordered reasoning to the investigation of narratives in his Poetics in order to identify their different structures and components. Here Aristotle distanced himself from his teacher Plato, not because of his logical method, but because his subject matter, poetry, was recognised but condemned by Plato.

Aristotle focused mainly on tragedy, and identified its six main components: *Action*, *Character*, *Thought*, *Language*, *Pattern* and *Enactment* (spectacle) – *Muthos* (plot) and *Mimesis* (mimetic activity) being the two main concepts. Aristotle defined Mimesis as the representation or portrayal of action and behaviours – a dramatic enactment; and Muthos as the arrangement of the incidents or the organisation of the events that form the overall plot structure of the narrative. Although Mimesis and Muthos might seem equally important, in fact Mimesis is defined according to Muthos, making Muthos of prime importance. Aristotle clearly saw the structure of the plot as essential to the construction of a narrative and considered its components of prime importance in the narrative structure. The plot structure constituted the primary significance of poetic drama (Chapter VI) and the poet was considered a 'maker of plot structure' (Chapter II). Given that the tragedy of the day portrayed plot, in the form of Fate, as dominant over character, this emphasis is understandable.

In 1991, Laurel (1991) presented a model of the Aristotelian theory, in which she identified two different types of relations between the components of the structure of tragedy. Aristotle's six hierarchical components were related to each other in one direction, from action to enactment, by an authorial view of the narrative represented by the plot, the formal cause; and, in the opposite direction, from enactment to action, by the audience view of the narrative represented by its understanding of the plot, the material cause. The main components of the narrative structure were thus linked by two opposite causal chains.

However, this theory did not integrate interactivity. The emergence of interest from the AI community required the model to be adapted to suit user actions and interactions within the plot. Mateas (2001) put forward a neo-Aristotelian theory (Figure 1), in which the roles and limitations of the user could be represented as a character in the drama. The user's interaction was integrated by the addition of two extra opposite causal chains. The user's intention played the role of the formal cause, from language to enactment, as an authorial perspective on the narrative; and the material cause was represented by the limitations on the user represented by material resources constraints from below and plot constraints from the plot authorial level. In this model is it interesting to see that the user action level is situated at the character level in Aristotle's narrative structure.

When transposed to Virtual Environments, the Aristotelian approach to narrative presents two main constraints. Firstly, its plot oriented structure makes the integration of the type of user interaction presented in VR difficult. Neo-Aristotelian theories that have been recently developed within the AI community (Mateas, 2001; Laurel, 1991) include

user interactions and give more importance to the characters. However, the dominance of plot requires mechanisms to force the user back into the desired action sequence without making this so obvious it breaks the sense of presence. Mateas tries to achieve this through the concept of *beats*, which operate like way-points in a desired route, but in effect this requires him to explicitly define the content of a *universal plan* (Schoppers, 1987) covering all possible branch points, which seems both authorially and computationally intractable. Secondly, Aristotelian and Neo-Aristotelian theories strongly suggest an authorial narrative model. Such consideration, however, conflicts with the character-based narrative approach required for the VICTEC project.

Figure 1 A Neo-Aristotelian theory of Drama
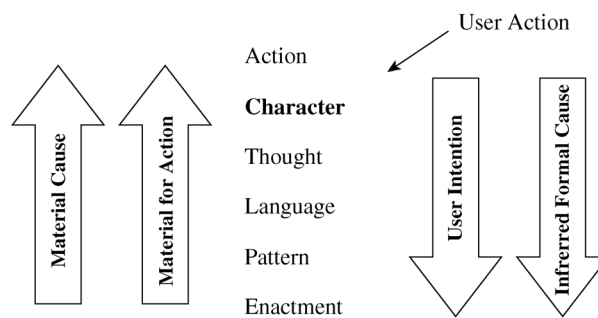
Source: (Mateas, 2001)

2.2 Function, an essential component of the narrative's structure

Another approach is to consider the narrative as a logical sequence of actions, each action possessing a set of functions relative to the narrative. This perspective, which fits in conveniently with AI planning approaches, attracted the interest of the AI community to the study of Russian folklorist Vladimir Propp. Formalist and later structuralist approaches to the macro structural level of narrative rest on the forms of the narrative rather than on the substances of its content. Propp identified 31 functions that help to classify and structure the narratives of Russian folktales. These functions form the core of the narrative, the *Dramatis Personae*. However, because some functions are contradictory and should not appear in the same structure, only 25 could be described as constants.

In order to compare the structure of various tales, Propp designed a system of symbolic identifiers, one for each function. In this way, it was possible to represent the pattern of a particular tale with a sequence of symbols, allowing the analyst to make comparisons and help with classification. The functions are part of a chronological and logical structure. They should fit into one consecutive story, always appear in the same order and non-logical sequences should not occur.

Since it is impossible to group all the tales in the world under a single set of generic functions, such as abstention, interdiction or violation, Propp broke down these generic functions into a set of sub-classes, each of them affiliated to a single function, which should make a universal grouping achievable. The number of sub-classes is specific to the function and depends on its nature, complexity and role.

Propp regarded the structure of fairy tales as all based on a single type, the quest type adventure story. The number of functions known to be found in fairy tale is limited, and the sequence of functions is always identical. Propp suggested a view of the tale's narrative structure as a seven-part model (Table 1). Therefore, all functions described in this Section (2.2) should be considered as appearing in the order in which they are listed. Some can be grouped into pairs and can cause the occurrence or non-occurrence of certain events that could change the structure of the narrative and its classification. Propp also identified some narrative elements (*Auxiliary elements of the tale*). Placed in between the functions, their role is to link the functions to each other (symbol §), bring elements of trebling (to make or become triple, i.e., in the case of fairy tales, success is met at third attempt, symbol :), or help in the display of motivations within the goals and mission of the hero (es), (symbol mot.)

Since Vladimir Propp's 'morphology of folktales', several authors have been interested in the identification and understanding of plot structure and its components, and eventually adopted a fairly similar approach. For instance, US mythologist Joseph Campbell (1993) studied the adventure of the hero in mythology and identified four distinct parts to the development and unfolding of the adventure, as well as summarising them in a cyclical diagram. However, it was French structuralist Tzvetan Todorov (1966) who helped in introducing Propp to French structuralists and brought the most significant contribution to the understanding of plot structure when he developed a similar technique and presented the plot recurrences in algebraic formulae, identifying and distinguishing the narrative noun-subject (characters), the narrative adjectives (situations) and the narrative predicates (actions).

However, taken out of a quest type storyline, such macro-structural narrative approaches quickly find their limits. The need for narrative to emerge through interaction fits poorly into Propp's rather prescriptive narrative structure, and his fairly reductive consideration of the character's role regarding the narrative somehow collides with the character-based concept of emergent narrative. Whereas such a narrative model could certainly be successfully implemented into VR through quest-type entertaining games, its contribution towards narrative models such as the one we argue for seems to be very limited indeed.

Table 1   Propp's seven part narrative model

Logical and Chronological Process	
Initial Situation Section	
Aims	It is placed prior to the development of the tale itself (represented by the symbol α). It introduces important characters and presents a pre-narrative graphical representation of the different components of the tale.
Example	Once upon a time, in a land far, far away lived a young princess called Victoria and a poor boy called David. Princess Victoria and David loved each other so much that they decided to get married.
Preparatory Section	
Aims	Provides the narrative and the reader with the essential necessary knowledge to understand the next section.
Functions involved	Abstention (β), Interdiction (γ), Violation (δ), Reconnaissance (ϵ), Delivery (ξ), Trickery (η), Complicity (θ).

Table 1   Propp's seven parts narrative model (Continued)

Logical and Chronological Process

Example	Unfortunately for them, Victoria's father, King Henry would not allow his daughter to marry anyone who was not a knight, and had promised her hand in marriage to her cousin Lord Cedric, who although a knight, was a mean and ugly man, and Victoria did not want to marry him.

Complication Section

Aims	The call for action, the logical sequence of events that leads the hero to decision-making, actions and ultimately to leave home and his engagement into a quest. Exposes the reasons, the motivations and the goals of the actions, (ABC↑).
Functions involved	Villainy (A), Lack (a), Mediation connective incident (B), Beginning of counteraction (C), Departure (↑)
Example	King Henry told David that he could achieve a knighthood, and have his daughter's hand in marriage, if he could kill the Dragon that lived in the mountain and was terrorising the people of the land.

Donor Section

Aims	The hero in this section is tested, and receives a magical agent or helper that proves to be essential for the achievement of the quest that the hero is engaged in. The sequence DEF provides the hero the means by which the completion of the quest is possible.
Functions involved	First function of the Donor (D), the Hero's reaction (E), Provision or receipt of a magical agent (F).
Example	David went on a long journey to the mountain in order to kill the dragon and win the hand of his beloved. It was in the mountain that he met a strange wizard called Archibald. Archibald offered to help David, and gave him a magic sword to kill the dragon.

Action Section

Aims	It is led by a series of actions and ultimately results in direct confrontation of the villain and the hero.
Functions involved	Spatial transference between two kingdoms or Guidance (G), Struggle (H), Branding marking (J), Victory (I), Liquidation of the initial misfortune of Lack (K), the Return (↓), the Pursuit, Chase (Pr) and the Rescue (Rs).
Example	Thanks to the magic sword, David was able to kill the dragon and went triumphantly back to King Henry's castle. The King was overjoyed, and kept his promise. David became a knight of the land, and the king offered him his daughter in marriage.

Repeat Section

Aims	At this stage the author can either opt for a repeat of the first stage, by starting a new villainy, or move on to the second move and end the story (the Second move section).

Second Move Section

Aims	This section involves the function pair MN (Difficult task, Solution to the task), brings the last actions into a story and concludes the story.
Functions involved	Unrecognised arrival (o), Unfounded claims (L), Difficult task (M), Solution (N), Recognition (Q), Exposure (Ex), Transfiguration (T), Punishment (U), Wedding (W).
Example	Victoria and David were married at a wonderful wedding ceremony, and they all lived happily ever after.

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Note:	* Auxiliary elements are universal and may appear at any point throughout the model

2.3 Structural analysis, the three levels of narratives

Stories are innumerable; they are communicated by many means (i.e., in language, both oral and written; in images, both fixed and moving; in gesture/movement); are present in many forms (i.e., myth, tale, fable, essay, story, tragedy, drama, comedy, pantomime, painting, stained glass, cinema, comics, conversation) and in any time, period, place, society or class. Taking this into account, the French literary critic and structuralist Roland Barthes defined them as Universal, International, trans-historic and cross-cultural. Barthes believed in the existence of a universal model to which any story must refer (a sort of narrative parallel to Chomsky's deep grammar). It seemed reasonable to use linguistics itself as a foundation for the structural analysis of narrative.

Russian Formalist and French structuralists recognised that we should not study the literary text itself but its 'literariness' (Jakobson, 1967), literary theory being the study of the nature of literature. We should then be interested in the different elements of the narrative such as its organisation, plot or character (Figure 2). Like the Russian formalists who made the distinction between the 'Fabula' (the events to be related in a narrative) and 'Sjuzet' (plot) (Thematique, 1966), the structuralist theory argues that the narrative text must be divided into two different distinct parts – the story and the discourse. As Chatman (1989) explains in simple terms, 'the story is the 'what' in a narrative that is depicted, discourse the 'how'.

Barthes argued that the meaning of a story is not something revealed at the end of the story but uncovered throughout it. He identified three hierarchical levels of narrative linked by a progressive integration mode; Functions, Actions and Narratives. Barthes' definition of a function is a unit of content, each function being either distributive (corresponding to the sort of functions identified by Propp, i.e., distributive classes) or integrative (indexing functions, not involving complementary or causal information but information still necessary to the meaning of the narrative, i.e., integrative classes). Relationships between the unit and its components are different. Functions (distributive classes) have a metonymic relationship within the unit, as indexes (integrative classes) have a metaphorical relationship within the unit.

Figure 2 A simple representation of the structuralist theory
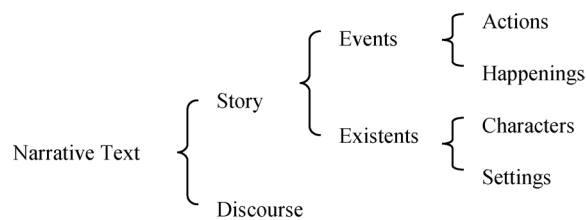
The first one deals with the functionality of doing, the other with the functionality of being. The distributive class of functions is separated into two sub-classes of narrative units: the cardinal functions (core, articulation of the story) and the catalysis functions (to fill in the 'blanks' in the narrative space). In Chatman's work, the Cardinal and Catalysis functions are interpreted as Kernel and Satellites, kernels representing the 'narrative moments that give rise to cruxes in the direction taken by events', and satellites representing minor plot events.

The cardinal functions represent the risky parts of a story, while the catalysis functions represent security zones in the story. A catalysis function takes place between two cardinal functions without changing the nature and the meaning of the sentence (for example: the phone rang (cardinal 1), Bond walked to the office (catalysis) and picked up the phone (cardinal 2). The actions of the phone ringing and Bond picking up the phone are meaningful to the story and could be interpreted as causes for events within the story. The action of Bond walking to the office is of much less importance and would not result in any causal effect within the story. Narrative events follow not only the logic of connection but also the logic of hierarchy where some events are more important than others.

Barthes also identified a set of two sub-classes in the integrative class: feature-based units and informants. Feature-based units are implicit and continuous, their role inside a story is to establish or amplify behaviours, feelings, atmospheres or philosophies; informants help the identification and location of time and space. Feature-based units imply a descriptive activity (i.e., acknowledgement of behaviours or atmospheres) and informants usually bring knowledge and help to fix fiction into reality. To summarise, Barthes' units at the functional level consist of Cardinal functions, Catalysis functions, Indexing units and Informants.

The action level of the narrative is represented in Barthes' view by the actions of different characters, and he saw the identification of grammatical categories as key to the action level. However, as these categories can only be defined through language rather than reality, characters can only find their meaning in terms of units at the action level if these are integrated to a third level of the description, the narrative level. Barthes suggested that the narrative level is composed of a mixture of two different systems of signs, personal and a-personal. The narrative is therefore composed of narrative signs and operators that reintegrate functions and actions in the narrative communication; articulated around the person delivering the story, and the person receiving the story.

Barthes as well as other French Structuralists approach narrative from a completely different angle and in a different context from ours in the consideration of Emergent Narrative. The level of abstraction on which his valuable and conclusive analysis is based makes it difficult for direct computational application, although Cavazza, Mead and Charles (2001) successfully implemented a storytelling system borrowing from this model described by Barthes and the French Structuralists. The fact that in the case of Emergent Narrative we see the narrative as a process, seems to pose problems with its compatibility with an analytical perception of the story. Although we are not ruling out the validity and great achievement that such perception brought to the understanding of the narrative structure, it appears to us that the foundations for a fully interactive character-based narrative should be sought, on a perspective level, in a rather less generic and more specific model.

3   Looking outside of narrative theories

The character-based perspective of the VICTEC project raises problems with plot-based structures like the one described by Aristotle. The need for narrative to emerge through interaction fits poorly into Propp's rather prescriptive structure while the level of

abstraction of Barthes' structural analysis of narrative represents a certain challenge to implementation.

Overall, these classic narrative theories are fairly reductive on the character's role within narrative. In the technical Aristotelian sense, the character was not an essential element to tragedy. Propp (1968) argued that characters are simply the products of what it is that a given Russian fairytale requires them to do whereas Tomashevsky considered them as secondary to plot. The French narratologists adopted more or less the same position as that of Russian formalists, considering characters as means rather than ends of the story.

However, some critics such as Henry James (Chatman, 1989) argued for a greater consideration of the character and its role within the narrative, that the story only exists when both events (actions) and existents (characters) occur and that events cannot be generated without existents. Todorov (1970) would later distinguish two broad narrative categories, the apsychological (plot-centred) narrative and the psychological (character-centred) narrative. Barthes would also consider the role and traits of the character in later works (Chatman, 1989).

These theories were not developed with the idea of a direct computational implementation acting as a constraint. It is also interesting to note the relative absence of any discussion about the role of emotion in the decision making process and its influences on the plot and narrative in general in these narrative theories (apart from Aristotle's consideration of *dianoia*, what is going through a character's mind). It has been argued that the narrative experience is primarily emotional (Schechner, 1983), and certainly the driving force in the VICTEC scenarios is emotions such as anger, hate and fear. Emotions are at the core of human reasoning and recognition (Damasio, 1994), and should logically figure in a narrative model. Traditional storytelling media, such as the novel, cinema, and television, draw much of their emotional power from characters and their interactions.

The Oz Project (Bates, Bryan and Scott, 1992) brought together writers, artists and artificial intelligence researchers to produce adequate technologies in the 1990s. This research group at CMU (Carnegie Mellon University) formed a company called ZOESIS and studies believable agents and interactive drama. The work produced in the Oz project presents many relevant elements towards an Emergent Narrative. The central part played by characters is rather close to what we propose as Emergent Narrative, in the sense that we also aim at creating believable and behavioural agents, as opposed to a more classical AI approach dominated by reasoning. The attention given to the role of emotions and sociological parameters is also of interest to our research. However, this work also includes an element in charge of managing the storyline, designed according to an Aristotelian plot -based approach.

Fields as diverse as Role-Playing Games, Interactive drama or Improvisational drama also use characters and emotions as essential elements in narrative, often operating outside of the classical theoretical frameworks. They share a concern with interactivity and dynamic narrative development, locating these within a much more abstract and high-level view of plot. Such models, rather than altering the nature and essence of narrative matters, offer a more equal repartition of the decision making process and reduce authorial inputs in favour of the users and/or spectators. We would expect the structures of such models and techniques to reflect a certain interest in story planning and anticipative considerations. The investigation of these areas could lead researchers

towards the identification of essential components in the arousal of emergent and interactive narrative.

3.1 Investigating interactive narrative structures

In seeking more character-oriented and interactive approaches to narrative, we have started to study role-playing games (RPGs) and improvisational drama. The RPGs discussed here are not the computer-based ones, but those carried out by a group of human participants under the leadership and guidance of a Game-Master (GM). Such games last anything from a few hours to many years, when they are played in regular episodes at something like weekly intervals. An offshoot of RPGs not so far studied is the residential performance, for instance 'Murder Weekend', where the audience is coopted into a narrative in a particular location over a specific time period. Improvisational drama (Improv) is the form in which actors are briefed with a situation and roles, and then asked to interact 'in character' without any script. Improv is often used as part of an actor's training, but also for entertainment (often expanding comic elements solicited on the spot from an audience) and for issue-based educational drama, such as in Theatre-in-Education.

In both RPGs and Improv, it appears to us that the approach undertaken is in many ways similar, and the narrative structure is based upon the same principles. Although the existence of a plot at some level of abstraction is important to the success of the play or the game, it is used primarily as a guide rather than prescriptively. The core of the narrative is based on sub-plots resulting from interactions between different characters. This character approach to the narrative enables the user or audience to express empathy with different characters, by providing the means to interpret and understand their decisions or behaviours.

Personal profiling has to be considered, along with emotional status (Schechner, 1983) as a factor in narrative emergence in these genres. If the scenario only provides a general abstract outline of the final narrative, then the characters have to provide the real core of the narrative, which emerges and grows from the background histories and agendas that the characters bring to their interactions with each other. Stanislavski (Milling and Graham, 2001) discussed a dramatic element he called 'Before-Time' as an essential element in the portrayal of character, covering this rich background. The emergence of sub-plots, as a direct result of interactions between characters, depends very much on the richness of the characters and the world in which they are performing. The level of description of different elements of the narrative helps the development of sub-plots and situations by providing them with a reason for being (i.e., causes, reasons, motivations, goals, meanings and history).

In the case of RPGs, the worlds where the action takes place and the elaboration of characters are thoroughly studied and defined prior to the start of the game. The level of description is such that it requires every component to be studied to a high level of detail, and the interest and success of the game partly depends on the thoroughness of these descriptions. The narrative is shaped by the means of pre-scripted, improvised or randomised events, and managed by the Game Master (GM). The GM could be defined as a human and/or computer arbiter in charge of managing the narrative and its interests by making decisions regarding the introduction of new characters, the exact outcome of actions carried out by characters, the content of the world or, the events taking place in the frame of the game. The scenarios are then written consecutively, one by one, as the

game is conducted, taking into account the narrative's abstract plot, the assessment of the current situation and the status of character interaction.

A similar structure can be observed in the performance of Improvisational Drama, where actors are given information about their character's history, background, personality and agenda, which provides them with the essential necessary information for interaction. They then dynamically steer the narrative by choosing actions under the constraints of the personality and history of the character they are portraying. Such performances can be made interactive according to Boal (1999) by involving the audience in the action. In Boal's Forum Theatre, spectators play a role in the unfolding of the narrative by acting as advisors to a particular character. They can in this way influence (though not control) the actors' performances and behaviours; they also by this means indirectly influence the form the narrative takes. Boal coined the term *spectactor* for the participant role of an audience in this type of drama. Part-way between spectator and participant, this corresponds very closely to the role of the child envisaged in the VICTEC project. The ability of a spectator to take responsibility for a character and to see the narrative from their position seems a strong basis for the creation of empathy with the emotions and dilemmas of the character.

In this particular case, the role of the RPG Game-Master is represented by the framework of plot events and the actors' improvisational abilities. The actor not only portrays their character, but, as an actor, also makes choices contributing to the dramatic interest of the performance or to the message it is intended to carry to the audience. In a sense, the actors play the role of a distributed GM, though the cognitive difficulty in performing at these two levels and the level of professional skill required to do so successfully makes the outcome difficult to sustain over long scenes.

We propose to study these genres further, seeing them as relatively similar, because they both rely on an abstract plot and interactions between well-identified and defined characters in a well-defined environment.

4   Conclusion

Our investigation of the major schools of narrative theory has shown that it has been heavily influenced by the idea that narrative must be authored. Narrative is seen as an artefact which can be studied and not as the dynamic process resulting from the interaction between characters and its impact on the user (the 'storification' process). It is this view of narrative-as-artefact that makes it difficult to apply to the VICTEC project in which many similar-but-unique narratives are required rather than one pre-scripted one. Thus we have found that RPGs and improvisational drama are in fact more relevant guides.

Adopting this approach of dynamic generation for the elaboration of virtual storytelling systems raises a number of issues. The rich level of description of the environment needed is unproblematic, because the 'physicality' of a virtual 3D should be able to meet these needs. However, there are more concerns about the level of detail required for the characters, and their methods of interacting with each other. This requires intelligent behaviours, both expressive and recognisable, as well as intelligent decision-making, making the development and elaboration of rich and interactive characters a tremendous challenge. This architecture must also make use of the 'before-time' material, or 'back-stories', which is the authored component on which the

dynamic process rests. Much effort in VICTEC has been put into collecting concrete accounts of bullying episodes from associated schools in order to supply 'back stories'. Finally, it may also require that the character architecture models the dramatic choices an actor would make while playing a character rather than merely modelling the character as an uncritical participant in the narrative process.

A pure form of Emergent Narrative, similar to Henry James' position, might involve the whole experience, story or narrative being generated by nothing other than the characters, their psychologies, their background histories and the general context of the user experience. Thus the 'experiences' would not be authored but would result from the interaction between intelligent agents, mainly emerging from their reactive emotional answers to situation that they themselves had created. The aim for the VICTEC scenarios is to create situations where intelligent agents, through their virtual 'mind', offer the child user a unique experience, reducing the use of scripted scenarios and plot structure to their simplest form at the lowest level of requirement possible. This does not mean rejecting plot and scripted structures altogether. In an episodic format, even if an episode is itself unscripted, it is still necessary to set the time, place and characters involved, where this choice may relate to the sort of advice the child has given a character both in the particular gap and possibly in earlier interactions.

The system must also update the 'before-time' of the characters not only with the previous episode but also with 'off-stage' events. For example, due to the problematic aspects of portraying teachers as characters in the drama, if a character tells the teacher they are being bullied after advice from their child friend, then this event happens off-stage, but the consequences may form the starting point for the next episode. In the same way, because of the effort required, most of the home life of characters as well as scenes involving large numbers of characters, also happen off-stage. The story-net approach (Swartout *et al.*, 2001) seems the most promising approach since it allows the transition between episodes to be modelled without specifying the exact content of episodes.

This approach does not abandon a plot altogether, but raises the level of abstraction at which it is described. For example 'boy meets girl' 'boy loses girl' 'boy regains girl' would produce at least three episodes or scenes in which the overall goal is specified and something about the background, but nothing about the execution. Defining levels of abstraction in plot as well as developing richer characters seems indispensable. We will be pursuing these lines of research actively.

We are aware that Emergent Narrative and Interactive Narrative are seen by some as contradictory terms because of the temporal properties of the concepts of emergency, interaction and narrative (Juul, 1998). Even taking this ambiguity into account, we still feel that the theoretical concept we are exploring is still best described as emergent narrative. We hope in the VICTEC project to show that character-centred narrative where, to a certain extent, the narrative emerges from the characters' interactions can play a real role in the application of virtual environments to this form of education.

Acknowledgments

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