Modeling the Story Facilitation of Game Masters in Multi-Player Role-Playing Games

Anders Drachen[1], Michael Hitchens[2], Ruth Aylett[3] & Sandy Louchart[3]

[1]IT University of Copenhagen, Rued Langgaards Vej 7, 2300 Copenhagen, Denmark {anty@itu.dk}
[2] Department of Computing, Macquarie University, 2109 North Ryde, Australia {michaelh@ics.mq.edu.au}
[3] Herriot-Watt University, Edingburgh UK EH14 4AS {ruth, sandy@macs.hq.ac.uk}

Abstract

Inherent in all forms of interactive storytelling is the problem of reconciling freedom of the user with requirements for pre-authored plot. In non-digital Role-Playing Games (RPGs), Game Masters (GMs) constantly encounter and solve this problem, facilitating collaborative, interactive storytelling in real-time. In this study, the various theories of GM operations are combined with experiences from a three-year project on storytelling and player interactions in multi-player RPGs; to present a model of the cognitive process of GM operations in RPGs.

1. Game Masters in Role-Playing Games

Inherent in all forms of interactive storytelling (Crawford 1983) is the problem of reconciling the freedom of the user to impact the unfolding story and the requirement for a pre-authored plot that has enough detail and coherence to be programmable (Louchart and Aylett 2003). A potential solution to this problem is to control the interactive narrative via synthetic characters or autonomous agents (Bradshaw 1997; Hayes-Roth 1998) that interact with the human users who also enact specific characters within the framework of the story or experience. Both the pre-authored, plot-directed approach and the approach focusing on autonomous agents present challenges in ensuring that the behavioral consistency and believability of the fictional characters is not violated, and in presenting a coherent, interesting narrative structure (Mateas and Stern 2000). There are various solutions to these inherent problems of producing interactive storytelling software, e.g. letting autonomous agents be influenced by an overall dramatic structure (Louchart and Aylett 2007). The potential solution presented here is offered by perhaps the purest example of emergent, character-based collaborative storytelling systems currently in existence, that of multi-player, non-digital, Role-Playing Games (RPGs) (Edwards 2001; Fine 2002; Peinado and Gervas 2004; Young 2005; Tychsen 2006).

While incredibly varied in form and format, RPGs should not be viewed as a sandbox situation, where characters are placed within the confines of a fictional world and story then happens. RPGs generally feature a function here termed Game Masters (GMs) (Combs 2004; Young 2005), which play a central role as story facilitators (Aylett et al. 2008). GMs manage the overall plot of the game story, autonomous agents in the form of non-player characters (NPCs) and the input and actions of the players and the fictional characters they control (agents from the system perspective). For clarity, all of these features of RPG play are referred to as "story". While it remains debated whether games can feature stories in the classical narrative sense, this discussion is not of interest to the current study. The GM, in other words, acts as an interactive storytelling engine. Understanding how the GM operates at high levels and in detail, is therefore an obvious source of knowledge for how to design digital storytelling systems.

RPGs are however complex games, and the operations of the GM varies from RPG to RPG, and is far from well-understood at either the higher level of operations or in the detail. The general principles of GM functionality have been discussed within the hobbyist community for decades and within the research world to an increasing degree over the past ten years, however with a focus on play functions such as the description of the fictional environment, maintenance of dramatic tension through play, and levels of authorial control, not the actual conceptual process of story evolution through the game process (Edwards 2001; Fine 2002; Peinado and Gervas 2004; Bøckman and Hutchison 2005; Tychsen 2006). For example, that there are different approaches to how GMs manage storytelling is a well-debated subject, and the relative strengths and weaknesses of these approaches known (Young 2005). However, the cognitive processes and detailed mechanics of how GMs operate have not been mapped in any detail, and this is what is needed in order to identify GM operations and transfer principles into the context of digital interactive drama. The model of GM operations presented here is based on experiments and existing literature on RPGs (e.g. Young 2005), which was utilized to provide parts of the model (notably regarding the process of authorial control), and verify some of the conclusions derived from the analysis. Due to space constrains a formal state-of-the-art is not included, but is integrated in the main text a , as well as the experimental material. Substantial parts of the data material have been analyzed for other purposes and published (e.g.

Tychsen al. 2008). These analyses were integrated in the considerations for the model where applicable. The dataset for the development of this model was comprised of:

- Audiovisual recording of 10 multi-player table-top RPG sessions and additional recordings of game sessions conducted in two different digital RPG formats, comprising a total of over 150 hours of gameplay. Emphasis is here on the table-top dataset.
- Multiple surveys provided to participants covering different aspects of the gaming experience, their relation with the characters, etc.
- Transcriptions of verbal communication.
- Post-game group semi-structured interviews with open-ended questions allowing for participant deliberation and discussion, and individual interviews of participants, similarly semi-structured.

Due to space constraints, the empirical process is not described in detail here. This, and associated methodologies, are described in more detail in (Tychsen et al. 2008). In brief, the game sessions were run in a laboratory-based setup, which had been modified to conform to the typical play context of RPGs. Audio-visual recording was hidden behind one-way mirrors. Sessions lasted between three to seven hours, depending on the group. The same game module was utilized in all the non-digital sessions, two different modules utilized in the digital sessions with and without GM control respectively. This permits cross-game session correlation and comparison.

The approach to data analysis was explorative, e.g. searching for places where the game story deviated from that described in the game module, and investigating at which levels of abstraction that these changes occurred; as well as variations between recorded game sessions. It was not attempted to make specific counts of e.g. these variations, but rather extrapolate general principles of GM operation. This approach was selected in order to acquire a broad model about how GMs operate, as opposed to e.g. a specific analysis of GM action-response patterns which would create a model specific for a particular aspect of GM operation rather than a top-down model. Furthermore, in an attempt to avoid bias towards a specific approach to digital interactive storytelling, the model does not lean on a specific interactive storytelling system or AI-model for autonomous agents, but builds directly on RPG theory and the experimental material. The model presented is based on a summary of current information, and is not intended as the final word on how GMs operate cognitively: The model forms a hypothesis of GM operations – further analysis will be required to reach a more accurate model.

2. RPG processes

Non-digital RPGs form a mixture of table-top games and games of the imagination. A tremendous variety exists, however they are games where – simply put - the state of a fictional game world changes over the course of play, due to the actions of fictional character controlled by the players and likewise fictional entities and objects within the game world, controlled by the GM (if one or more GMs is even present, this is not a requirement for a game to be a RPG). The game process is readily observed to follow a basically cyclic nature (Figure 1), with players and GMs taking turns in performing actions with the elements of the game world they control (Tychsen 2006). The process has some similarities with Continuous Planning Processing (CPP) (Myers 1998); however GM operations vary from the classic CPP approach because the majority of actions are not dispatched directly by the GM (the system) but autonomously by the players.

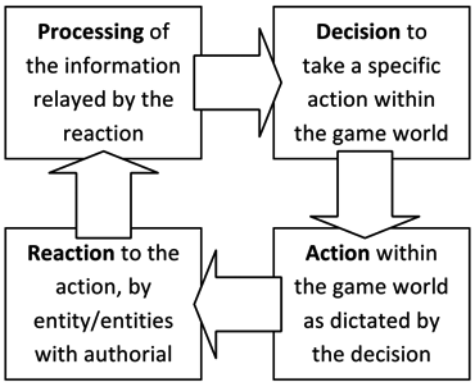

Figure 1: The action-reaction-processing-decision cycle of table-top RPG gameplay (Source: Tychsen 2008).

The effects of PC and NPC actions are generally narrated verbally, possibly with visual aids such as miniatures, maps and similar (Fine 2002). An important role of the GM is therefore to provide all players with at least the minimum level of information necessary to ensure that a shared understanding of the state of the game world is reached. This shared understanding has to be detailed enough that all the game participants (GM and players) are in agreement about the state of the game world, so that players do not have their PCs take conflicting action. For example, if one player believes the PCs are standing in a bedroom, and verbally communicates to the other players that he is lying down, a player who believes the PCs are in a kitchen will be confused. Maintaining this shared understanding is a key aspect of RPG play and although a collaborative task between the participants, the largest portion of the GM's communication is oriented towards describing and updating the virtual environment (almost 50% of all GM communication in the recorded sessions).

The role of GMs in RPGs varies tremendously. A detailed discussion is out of scope of the current paper, however, in brief the responsibility can include setting the scene of the play, directing events and controlling NPCs and objects within the fictional world. The responsibilities of the GM are closely linked to the concept of **authorial control**, which basically defines how the power to affect change within the fictional game world is distributed. In the classical

"*Dungeons & Dragons*"-sense, GMs are all-powerful, being able to overrule or even dictate the actions of player-controlled characters (PCs). In reality, RPG players use different levels of authorial control distribution, and the GM is sometimes reduced to being the person who controls the NPCs, with only the ability to affect the virtual environment that these characters permit (Young 2005). Importantly, authorial control can be illusory – the players may think the actions of their PCs impact on the story at some level, but in reality the GM is altering or ignoring the impact without the players knowing this.

In the experiments that form the basis for the current model, the GMs were free to define their level of authorial control, however in the vast majority of the game sessions they assumed complete authorial control – but rarely forcefully exercised this - and this forms one of the key limitations of the model presented. The degree to which this control was exercised varied tremendously, however. This leads into the topic of how GMs can ensure players take the actions the GM would like vs. adapting the storyline during runtime to the actions of the players, which is a subject discussed in more detail below. On a final note it is important to realize that GMs are not necessarily driven by the need to facilitate the production of dramatically interesting collaborative stories through RPG play. Rather, it is the *motivations* for playing the game of the involved participants that form the driving directive of the GM. The motivations of the participants and their interests in playing is important in determining e.g. when and what type of changes GMs make to the unfolding story, however, in the below emphasis is on *how* these changes are made, rather than the specifics of *what* motivates them. Motivations for play and the division of authorial control during play, are usually established prior to initiating a RPG session, and this is one of the main reasons for why RPG-players can take more than an hour to actually start playing from the point when they meet.

3. Key assumptions

The actual decision-making process of a GM in facilitating interactive narratives is difficult to record and measure, especially if avoiding individual bis. When running a multi-player RPG session, GMs have to be able to operate both at the level of game execution, the moment-to-moment basis of gameplay which is more or less unconscious – e.g. when controlling a NPC and communicating with a player character - as well as think ahead in the space of potential story developments (which bears likeness to the continuous process planning of (Myers 1998). Given this level of complexity, a key assumption of this study is that the information from the interviews, observations etc. represents a data source sufficiently broad to cover the spectrum of GM operations even within a high-authorial control RPG environment.

4. Waypoints

RPG modules form the basis for the typical pre-planning of GMs. Modules are a form of manuscript for a RPG session which GMs utilize as the basic source of information for the fictional world, the overall plotline as well as NPCs and PCs involved. RPG modules – commercially available and hobbyist produced - have structure. As is evident from published game modules, in the "classical" form of RPGs, the game story is to varying degrees pre-conceptualized in the form of discrete events that have specific purposes, which form a malleable framework for the game story, a pre-planned narrative, which can change during play. The individual components of this framework are here termed **waypoints**, based on the utilization of the concept by (Weyhrauch 1997), i.e. as anchors of the narrative. This concept was chosen because it describes fairly well the description of story frameworks in typical RPG modules, and is a concept that allows for a great deal of flexibility, which is presumed necessary in modeling GM operations.

This is not to say that game modules are always used in RPGs; however modules and similar forms of pre-planning are utilized in the vast majority of non-digital table-top-type RPG players (Fine 2002; Tychsen 2006), and these contain some form of narrative pre-planning in the form of waypoint structures (in situations where no pre-planning takes place, the GM develops and plans the game story during play, in collaboration with the players (Young 2005)). Waypoints are here defined as specific states of the collaborative narrative. They differ from each other by a set of changes in the characters and environment with an overall purpose, e.g. providing information or introducing a new NPC. In the experiments, GMs were also furnished with a game module that contained waypoints in the form of specific missions the players could be sent out on by their fictive employer, and descriptions of events occurring along a timeline. The application of the concept of waypoints took place during analysis, not before the experiments were run.

The concept of the waypoint is extended to include also the future course of the game story during play. As mentioned above, the "classical" format of the RPG module, which contains a series of interconnected scenes or events, that can be customized to more or less freely (other formats allow for unconstrained freedom), provide GMs with a rough framework for how the various waypoints will be organized and linked, from start till end, with some additional pre-conceived ideas about how this vision is likely to change (i.e. contingency planning), i.e. a form of hypothetical plot. The reason for this structure appears to be that GMs are responsible for presenting a coherent experience to the players and therefore has to have an idea about how players will likely progress through waypoints (Young 2005). Having a framework for the **end point** of the collaborative story is a common feature of commercial and home-grown RPG modules, and leads to the conclusion that GMs have an end point in mind and a means for the players

to get there conceptualized at some level of abstraction at the point of game start.

Waypoints have an inherent flexibility in their narrative content and the way they are played (executed), their content can be detailed to greater or lesser degree, and they carry a retention value, which specifies how much the GM emphasizes that they are kept in the game story (GM commitment to waypoints). Waypoints can contain more or less narrative content and playing time value: During the observed game sessions, some pre-planned waypoints were shown to contain enough content for an hour of game play, others for a few minutes, and between the RPG groups the length of time spent playing waypoints varied. It is therefore a somewhat subjective judgment to define waypoints in the pre-planned as well as the actually played story that is the result an RPG session. The recorded sessions show how the amount of narrative content, and the playing time spent on waypoints, varied between GMs. This leads to the conclusions that the length of actual playing time that it takes to play through a waypoint does not relate to the amount of narrative progression made. The game participants (players and GM) could spend an hour of gameplay role-playing the investigation of a room in a haunted house, and just a few minutes to have the PCs defeat the arch-villain and rescue the princess, settle down and raise a family - RPGs do not depict every minute of the lives of the PCs, and the literary technique of ellipsis is used to skip to interesting parts.

The content of waypoints is in RPG modules often presented independently, each having a specific setting within the fictional universe of the game, NPCs, and so forth. Some may share elements; however, they will have an independence which can be compared to chapters in a book or scenes in a movie. Once a waypoint "enters play" it will show some form of interdependence with other waypoints in the unfolding story. The movement from one waypoint to another is triggered by fulfillment of specific pre-conditions, which can be pre-defined, changed during play or invented during play. Waypoints and their relations give structure to the game module, and this provides the GM with an overall framework for the game narrative *at the point of game start*.

4.1 GM planning

Runtime during RPG sessions is the playtime itself, and this is when GMs execute the pre-planned waypoints. Initially the first waypoint is executed and the remainder kept in an uncertain state depending on the actions of the PCs, and importantly the interests/ambitions of the GM and players with the playing activity itself, e.g. whether to emphasize combat or high drama. Furthermore, the play context is important to consider, e.g. time constraints.

Based on analysis of the recorded game sessions, it would appear that the process of progressing between waypoints is subject to a form of CPP (Myers 1998), where the GM plans the future course of play. At the point of play initiation, the GM will have a plan covering the game storyline from start till end; however, the interviews with the GMs revealed that the amount of detail in the plan varies between GMs and game sessions.

4.2 Waypoint flexibility

It can be speculated that the framework plan of a GM for the collaborative story does not normally posit a single course from the **active waypoint** (the waypoint currently played) to the end point, rather it is flexible to accommodate player choice, and will evolve during play, both in terms of the structure of the waypoints in the future plan and with subject to change with respect to individual waypoints

Waypoints and the way they are structured in relation to each other are highly malleable and fluctuate during game play, in opposition to traditional narrative media. During the recorded game sessions, GMs would frequently alter the flow of events described at a high level in the utilized game modules (in which the general content and trigger conditions of the waypoints were described), with common alterations of waypoints being elimination, revisiting waypoints, modifying their content, moving them in relation to the pre-planned structure and even creating new waypoints during play. Depending on the GM and players, these fluctuations can cause the played storyline to be unrecognizable from the original intent of the vision of the GM.

Because players have freedom in guiding their PCs, the plan of the GM will change. For example, in the game module for the non-digital RPG sessions, players were in one of the early waypoints faced with the task of gathering information. The GM cannot predict how the players will go about this task, even if this process can be attempted guided or controlled by making some choices more obvious and attractive than others. GMs therefore have to continually update and reassess their plan in light of player actions and decide on the next event or waypoint that players will encounter. Failure to accomplish waypoint objectives on the part of the players is an option, both in terms of low-level and ultimate objectives (e.g. finding the required information to proceed in the investigation). As changes are made to the GM's plan, it will be more and more difficult to retain the original waypoint structure, including the end point framework. The more flexible the storyline, the harder is this task. As play is executed, GMs therefore need to evaluate events on a running basis, making changes, constantly providing feedback on the actions of the players while trying to ensure a manageable structure to the storyline. Change can occur at all levels, from minute details to the entire scrapping of remaining waypoints, structure and endpoint. This can also be observed in a limited capacity in the *Fabula* planner of Riedl and Young (2004).

4.3 Commitment to and retention of waypoints

None of the participant groups followed the storyline described in the module completely, and between-group

variations were substantial at all levels of abstraction. Changes in relation to the pre-planned framework occurred at the level of specific scenes, and more rarely at the level of major waypoints, although it did happen in several of the games. As might be expected, the most variation between the recorded storylines of the groups occurred at lower levels of abstraction, which were not defined in the module (e.g. a particular NPC interaction). It can tentatively be concluded that GMs are more willing to deviate from the pre-planned story framework at the lower levels of abstraction, especially those that have not been pre-planned in detail (or not at all) such as specific NPC-PC conversations, in comparison to those at high levels of abstraction. This behavior may be linked to the increased challenge of maintaining control and story consistency when affecting changes at high levels of abstraction, as opposed to lower levels. This GM behavior leads to the conclusion that change can occur either to individual waypoint/-s or the story structure. The intent of a waypoint (e.g. here the PCs acquire information) may be retained while the narrative content may change (e.g. the PCs acquire information from a non-planned source). Creating or just preparing to play a RPG module takes considerable effort on behalf of the GM under the "classical" form of non-digital RPG play considered here. It is therefore natural that GMs attempt to retain major waypoints or at least their intent.

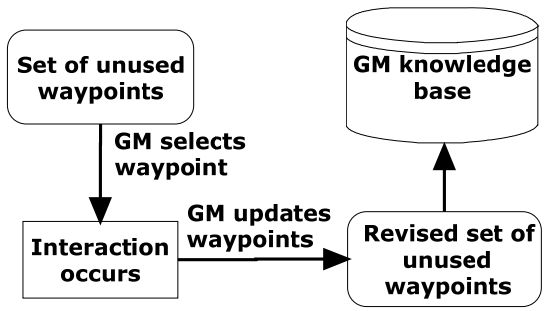

Figure 2: Before commencing an encounter/scene, the GM selects an appropriate waypoint from the set of those that have not been used. This selection will depend on the hypothetical plot and the current state of the waypoints.

Based on the abstract and concrete waypoint components, the GM will present a situation to the players and interaction will ensue. The outcome of this interaction will cause the GM to update the set of waypoints. A variety of factors potentially influences the GM decisions.

Another factor influencing this behavior is apparent in the interviews: That of varying levels of commitment to waypoints. If for example has gone to a lot of trouble in planning a waypoint in detail, or appreciates the narrative action, he or she will be less reluctant to eliminate and/or modify the waypoint during play. The more committed the GM is to a waypoint, and the greater the necessity of retaining the waypoint the way it is due to structure maintenance, the less chance there is of it being eliminated or modified. Changing the position of a waypoint in the module is the least difficult dynamic change possible. Creating new waypoints takes considerably more effort and this has to be done during runtime. This may be the reason for why waypoints were observed to typically be altered to suit the unfolding story, rather than eliminated. Alterations require GMs to examine contents of waypoints and deciding which features that should be kept and/or changed. Presumably, the higher level functions of the waypoints have the highest retention value (e.g. making sure the PCs acquire some information, the method being less important).

4.4 Waypoint detail

The level of detail of planning of waypoints varies between GMs. Some GMs plan each waypoint in detail, others will have only a hazy idea about the content of each waypoint, or have some waypoints planned in detail, others in more general terms. The same is true for commercial RPG modules. Waypoint planning can follow a hierarchical approach with GMs working top-down from geographic location and environment to description and mannerism of NPCs, however this need not be the case, the GM can also begin with an interesting piece of dialogue and work from there. Different parts of the narrative action of a waypoint may vary in planning detail. Each waypoint encountered during play, whether pre-planned or created, has an assigned purpose and will advance the game story in some way, or more precisely changes the current state of play.

The level of detail in the planning of waypoints varies, but does not follow any specific rules. For example, temporal distance from the current point of play does not appear to determine the level of detail, e.g. the end point is usually planned in some detail, or some waypoints may be planned in detail, those that link them being less fixed. Similarly, there is no automatic correlation between the level of detail of a waypoint, and the likelihood of it being changed during play. E.g., a change of locale may still allow detailed dialogue to be retained if the same, or a similar, NPC is there to deliver it. All that can be said in general is that detailed planning of waypoints in RPGs is possible but not universal, and does not follow any specific principles. Waypoints are complex artifacts, which can be "unpacked" into expected (planned) atomic actions and dialogue components, either during planning or as expressed during runtime (play). This complex interior structure in part necessitates the GM understanding the overall purpose of the waypoint, and ability to develop detailed content during runtime, as it is impossible to plan for everything the players might do.

5. Levels of abstraction

Because the behavior of the players cannot be predicted, GMs must during runtime be able to conceptualize and plan waypoints at various levels of abstraction; operate at

different levels of abstraction, considering the general flow of the story, the overall purpose of the active waypoint, and minute events such as NPCs and PCs picking up and using firearms, locating clues or initiating a plethora of different actions. While a digital storytelling engine to some degree must pre-program each of these options for taking action, a GM can handle these without pre-planning. GMs must also continually evaluate the impact of player actions on the succeeding part of the story at minute to high levels of detail. For example, the GM has intended the players (or PCs) to receive a piece of information. This is a high level of abstraction considering a vital part of the story. At a lower level, the GM decides which NPC that should carry the information, and at an even lower level of abstraction the details of the interaction between the player and carrier. At the level of interaction, the GM manages dialogue in runtime while keeping the overall goal of the interaction in mind, while constantly re-evaluating the impact of the dialogue on the higher levels of the story. In this manner, low-level interactions can impact on high-level interactions and vice-versa; the levels of abstraction are interdependent and interact with each other.

This description of GM planning reflects extant ideas from hierarchical planning (Fikes, Hart and Nilsson 1972). Interdependency of levels of abstraction is a common idea in hierarchical planning where lower levels are expansions of higher levels and for the higher level goals to succeed the lower-level ones must: For example, in runtime, the "players acquire information"-goal is expanded into a set of lower-level goals: there are very often more than one set of these, so that the higher-level goal can be satisfied in a number of different ways. This means that failure at a low-level does not always imply failure at the higher level, however, some re-planning may be possible at the lower level. It is important to bear in mind that failure is possible and will affect the higher level of story planning.

Levels of abstraction may be dynamically generated and eliminated during play. The specific number of levels of abstraction varies, and is likely a partially unconscious process (cognitive and reactively determined feedback on player input). The experiences of the GMs involved in the study varied, and it was generally the case that levels of abstraction varied substantially from play session to session. The type and planning of the game module, the group of player, and the social and physical game context, all play a part. However, one conclusion that can be drawn from the interviews is that the level of detail a GM has visualized and planned is generally greater the closer the situation is to the present moment of gaming. Furthermore, the amount of detail verbally communicated about e.g. a NPC encounter must be sufficient for all participants to share an interpretation of the situation that is coherent enough to facilitate play.

The **way point intention** captures the function of the way point within the overall story. It may represent a fight scene, a place where the player(s) gain information, where they meet new NPCs or some combination of these or other possibilities. In essence it captures what the players are meant to do and/or experience in the segment.

The **abstract roles** are a set of high-level descriptions of the game entities needed by the way point. This can include locations, objects and non-player characters. They are described in abstract terms, such as main villain, love interest, friend, information provider, weapon, etc

The **concrete way point** contains the actual description of the way the way point will be presented to the players, including descriptions, pre-scripted events, etc.

The **instantiated roles** describe the actual instantiations of the abstract roles. The actual character who is the villain, what is the concrete realization of the weapon the players find, etc. The concrete way point relies heavily on the instantiated roles for many of its component elements.

Use of this model in software would require the development of suitable languages and grammars to express the necessary information at each level.

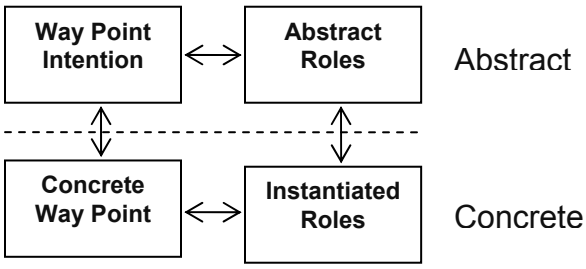

Figure 3: Elements of a Waypoint. The figure is simplified, as it shows only a single abstract layer. In practice a GM may make use of a number of increasingly abstract layers.

5.1 From abstraction to realization

Despite the generally linear nature of the game module utilized in the experiments, none of the groups followed the outline described in the module completely. As might be expected, the most common form of deviation from the framework occurred at the lower levels of abstraction, which were not defined in the module (e.g. a particular interaction). Less common were changes occurring at the level of specific scenes, and even rarer were changes at the level of major waypoints, although it did happen in several of the games. It was also observed that major waypoints could change ordering. While it is tentative, it can be concluded that GMs are more willing to deviate from the pre-planned story framework at the lower levels of abstraction, especially those that have not been pre-planned in detail (or not at all) such as specific NPC-PC conversations, in comparison to those at high levels of abstraction.

In the game story of the module utilized in the experiments, the players needed specific pieces of knowledge in order to solve an overarching mystery. When analyzing the game session recordings, it was immediately

apparent that not only did the pieces of knowledge that GMs provided through player-driven discovery vary; the way that the knowledge was shaped also varied, while fulfilling the same story-related requirement. The concept of levels of abstraction is important in demonstrating how GMs manage to transfer story elements to concrete realizations during play (runtime). A story will require various characters and items (for example, love interest, main villain, and items). The concrete realization of these within the game world may vary in RPGs, however, what is evident from the analyzed sessions is that there exists a relationship between the intended purpose of a story element and the presentation of events in the game world.

As described under the discussion on waypoints, altering events in a layer of abstraction does not mean that the original intent of an event or idea needs to change completely**.** If players refuse to have their PCs visit an area where they were supposed to acquire a piece of information, the GM must find another way to ensure they receive or locate it. Conversely, details may be retained and intent changed. If the level of pre-planning or planning in runtime is less detailed, the GM may only know the PCs should receive the information, and determine the method during play. In short, the concrete instantiation of a story element may change, but the abstract role of the element is retained, however only as long as it is needed for the storyline: If e.g. an NPC intended to be the main villain is killed by the PCs, the GM can reconsider the role of the NPC to be just a henchman of the main villain. Once such changes begin they can have a flow on effect throughout the story structure and its waypoints. The abstract role of a story element can change in other ways than destruction or loss. An NPC can emerge from the crowd to assume an important role if the GM and/or players decide this, and an NPC once central to the plot never encountered because the need for its abstract role (and concrete realization) is eliminated during the unfolding game session. Such changes may cause changes in the waypoints and the overall framework for the story.

6. Creative tension: Changing plans

Multi-player RPGs are interactive, and players will not always react in a manner the GM expects, at various levels of abstraction, and this forms the requirement for plan updating. As mentioned above, the recorded storylines did not fully conform to the module framework. This means that GMs during play commonly are forced to change plans, even at the highest levels of abstraction. Within digital RPGs, using GM toolsets such as the AURORA or ELECTRON toolkits from the *Neverwinter Nights* series of RPGs, GMs are however severely limited in how high a level they can modify story frameworks in runtime. Typically the creation, manipulation and elimination of objects and entities are within the power of the GM, but not changes in game world geography or creation of new geographical areas.

In non-digital RPGs, because a degree of authorial control rests on the players, at least the ability to control the actions of their PCs within the fictional framework of the game, GMs do not control the story, but rather the presentation of the fictional world to the players (Tychsen 2006). This includes the events that happen in the game world that are outside of the players' control and the actions of NPCs. How the players react to what the GM presents is up to them. Reactions can only be reliably predicted to a limited degree. GMs therefore take into account the authorial freedom of players to respond to the presentations of the GM, when updating the game story plan, and deciding how the fictional world and its objects/entities respond to the actions of the PCs. Unlike a traditional play, players of an RPG begin in complete ignorance (although they can have meta-level knowledge about e.g. the fictive world, but rarely about the intended story of the GM though, that their PCs do not have), and are unaware of the contents of the module and the GMs plans for the game session. Players are not even aware of the basic nature of the task before them - what, if anything, do they have to discover? Are there opponents to be defeated and if so how? This reflects the imbalance in authorial control of the classical non-digital RPG model. While both players and GMs may have plans, the GM has a higher degree of control and certainty. Players do not know what event the GM will introduce next and at least in the traditional model of RPGs, have far less authorial control and ability to impose their ideas on the course of events without approval by the GM. In summary, the **tension** between the GM´s plans and the reactions of the PCs and random chance (e.g. via dice rolls defined by the game rules) lead to the type of changes in the story structure described above. For all changes, GMs must weigh e.g. story requirements, the roles of game elements, the ambitions of the players and their focus, and importance of the change. This process relates however more to the art than the craft of GMing and is beyond the scope of this paper (see e.g. Edwards 2001).

7. Conclusions and perspectives

The concept of creative tension leads into another important constrain on the work of the GM, which goes beyond considerations of logical story structure: The need to integrate the social context that RPGs take place in, into the choices made about how to navigate waypoints, instantiate story elements etc.. This includes the ambitions and motivations of the players with participating in the game session. Tychsen et al. (2008) found that how well RPG groups functioned socially correlated strongly with the resulting gaming experience. In essence, the considerations of the GM need to move beyond ensuring dramatic story arcs or narrative consistency, and include considerations as

to the specific interests of the participating players and how they interact with each other. While the job of ensuring a good social environment is also one for the players, it is the GM who needs to adapt the storyline in such a way as to facilitate the interests of the players and thereby keep everyone entertained and engaged. If this is unsuccessful, it can negatively impact on the social environment and the engagement of the players in the game storyline. This requirement is similar to the challenge faced by digital storytelling systems in providing engaging content. A related conclusion that can be derived from this is that entertaining, engaging interactive, collaborative narratives – within games at least - do not necessarily follow dramatic structure or narrative principle. Rather, it is the subjective interests and motivations with the playing activity that sets the basis for defining what the participants would define as a good storytelling experience. The analysis of the game sessions highlights the adaptive strength of GM-facilitated storytelling. Based on existing work on RPGs, it was expected that a relatively stable cycle of action-response-action behavior would be exhibited by the participant groups. However, all of the groups exhibited behavior that split groups into cotemporaneous narrative lines, with e.g. the GM interacting with one player, while three others are engaged in a social encounter. Because PC-based actions need not be validated at all levels of abstraction, it is entirely possible for players to perform actions within the game world fiction that has not been sanctioned by the GM (Young 2005), nor which are important for the GM to know. A related behavior saw player characters separated not only spatially within the fictional environment, but also temporally in narrative time – in essence, PCs could be placed separately along the timeline for shorter or longer intervals, although GMs would always synchronize the temporal positioning of the PCs (Tychsen and Hitchens 2007). RPGs thus point to a series of challenges, namely how to integrate the social context, motivations and interests of the users in digital interactive storytelling systems.

The model presented here forms an initial step towards more detailed knowledge about how GMs operate. More detailed analysis and further empirical work is necessary to add more detail and validation to the model and to investigate the relevance to the design of digital interactive storytelling systems. The complex nature of RPGs makes this difficult; however with the current model at least a framework for analysis is available.

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