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REPORT ON PRE-SCRIPTIVE NARRATIVE FORMALISMS AND CREATION METHODS IN INTERACTIVE STORYTELLING (NON-DIGITAL AND DIGITAL)

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1. Introduction

1.1 Key problems of creation in Interactive Storytelling

Interactive Storytelling has been and will be an important research topic within the realm of interactive entertainment. However, only few complete and “playable” Interactive Storytelling (IS) artefacts exist that would come close to the vision of the research community, making it hard to envision end products for industry and applications. There are several challenges involved in the realisation of interesting and suspenseful story artefacts to interact with.

First, there is the need that a digital “story” can provide meaningful responses to users’ actions, while “automatically” maintaining a kind of dramatic discourse. At previous conferences, several solutions have been presented how dedicated software – e.g., a story engine, or a drama manager, or a director agent – address this problem of creating a logical flow of causally dependent events. Second, there is a big challenge for authors to conceive and create content in such a way that it runs smoothly with such story engines. Previous attempts to overcome this problem have been mainly focusing on proposing so-called “authoring tools”. They mostly address the difficulty for authors “to program” the engines by supporting them with GUIs, easing the effort of correct coding. However, there is only some sparse and tacit agreement among researchers about the harmonizing of design steps for creation across different approaches. This can be explained by the diversity of approaches of engines. What is missing completely in this community, beyond implementation issues, is a culture of developing creative principles addressing the whole process of creation, including proper conception strategies for semi-intelligent content leading finally to implementation, testing and experiencing the created concepts.

One of the IRIS project’s main objectives is to *“make the next generation of Interactive Storytelling technologies more accessible to authors (scriptwriters, storyboarders, game designers), so as to make possible the transition to Interactive Narrative”*. The scientific progress to be made is the *“development of authoring methodologies independent from specific implementations”*.

The goals of this work are, more specifically:

- Find or develop creation methods (general and/or specific to one approach)
- Conceptualise authoring tools dealing with the generative nature of IS
- Develop authoring and creation philosophies, connecting AI-based generation with traditional creation as best as possible

There are some complications involved, making it difficult to start solving or even discussing these topics:

- Existing IS systems and intended experiences are highly diverse, slowing down discussions for the need of on-the-fly definitions.
- There are almost no specified “IS authors” as a target group who would have created currently known storyworld examples. The field has to lend authors from neighbouring disciplines, which could be diverse and involves “unlearning”.
- There is a need to specify what particular “authoring problem” is talked about, each time the discussion starts. It could be the implementation of a storyworld into an engine’s structure (technical authoring on several levels of detail), or it could address the conception phase of inventing a new storyworld (creative authoring).
- There is confusion about the authors’ intended responsibilities, and of what parts of a storyworld as a “complex system” can/shall be accessible by authors – assuming that other parts are hidden in the runtime engine.
- There is a debate on author “control” about the interactive experience (author has to “let go” vs. “be responsible for a certain IS experience”). We find the radical “let go” philosophy as too weak and fuzzy for sustainable concepts, and try to seek a golden path of semi-control.



With an open attitude to any kind of Interactive Storytelling and to any potential target disciplines of authors, but with an assumption that authors should have responsibilities for a resulting experience, and work on best-informed creative conceptions for interactive storyworlds, we explored the current state of the art and situation for (potential) authors. This report is the research result of investigating existing pre-scriptive narrative formalisms and creation methods in Interactive Storytelling or its closest neighbours.

1.2 Assumptions and Hypotheses

Given the need for clarifications mentioned above, we based our work on a series of hypotheses. First, we clarify what we assume to be meant by “authoring”. Second, we have certain hypotheses of what needs to be done to improve the situation for a perceived gap concerning the integration of authors in the research. Finally, we describe the method used within IRIS.

1.2.1 General Assumptions on Authoring Borderlines

We are discussing types of Interactive Storytelling (IS), in which a user (or users) experiences a narrative by interacting with a digital system of agents during the unfolding of said narrative. Such a system of digital agents including all necessary knowledge about the story is considered to be the created *Interactive Storytelling (IS) artefact* – the actual product that can be delivered to end-users (the audience). It consists of

- a) an IS *storyworld*, running on
- b) an IS *runtime engine*.

The IS *runtime engine* enables the performance of general agents' autonomous or semi-autonomous behaviour, which means that agents are able to act independently of the author after the actual authoring phase is finished. This engine is a software architecture including specific IS platform components (e.g., story structure manager, planning, interaction/dialogue manager, representation managers, other agents ...).

The IS *storyworld* constitutes the actual “content”. It is created by a creator or author (or a team of creators / authors), and uses the agent functionality of the IS engine. For example, authors need to define the storyworld's specific characters as instances of the engine's generic agents. As a special difficulty, the targeted user is as well an active agent (maybe a character) of the storyworld; the creator has to consider this when making up the storyworld. As well as containing components and assets, the content is also made up of rules and conditions that determine the occurrence and actions involving those entities, as well as their effects on the storyworld. As such, the created content ends up being code running on the IS engine.

Examples for such IS artefacts are *Façade* (Mateas and Stern, 2005) and *FearNot!* (Aylett et al., 2007), which are IS projects with integrated storyworlds and agent engines. Other IS research projects have built story engines that allow for various storyworlds to be authored. Examples are: ‘Storytron’ (Crawford, 2009) which can run several storyworlds such as *Balance of Power*, or other examples of the IRIS project, among others IDtension (Szilas et al., 2003) with *The Mutiny* and Scenejo (Spierling et al., 2006) with the *Killer Phrase Game*. In each case, there is an end-user who interactively experiences the storyworld by playing a role in it.

Authoring means delivering content for somebody else's (an end-user) experience. It is different from the potential kind of co-creation that can take place when end-users interact with a storyworld. However, there is a blurry borderline between authoring a storyworld as a delivered artefact, and the end-user's co-creation during the “runtime” experience. In Fig. 1, this blurry line is symbolized between the “Interaction” level and the “Storyworld” level as part of the IS artefact. Another blurry line is drawn between the runtime engine and the storyworld. This refers to the circumstance that an IS storyworld can only work in co-existence with a runtime engine, which (historically) was developed by a team of computer scientists.

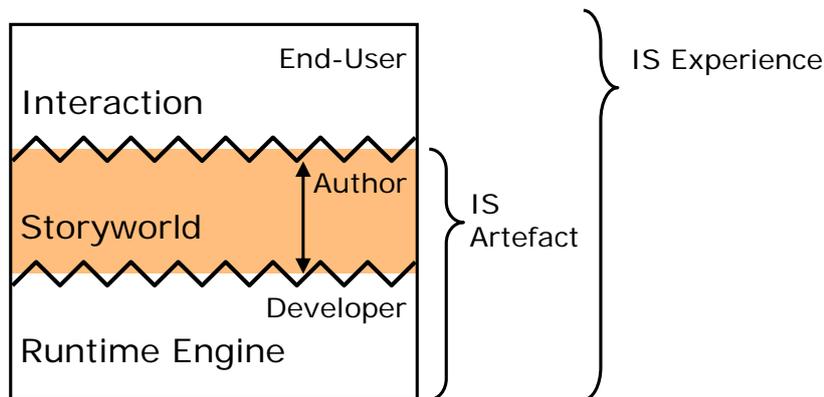


Fig. 1. Authoring between Engine Development and Story Experience

Interfaces, Authoring Tools

An IS artefact is a complex system. The same holds true for each of its components, the runtime engine and the storyworld, which means that there exist potentially many more parameters, rules and attributes making the complex system work than would be wise to display to the next higher level. In that sense, the mentioned borderlines in the above model demand interfaces, by which the next higher level can access the lower level.

For example, an authoring interface in an abstract sense would first of all consist of a subset of the complete rule set by which the engine works. Therefore, the first step of designing an authoring interface is a decision on accessible elements and functions for authors, and further, tools can build upon that, giving the tasks and workflow a certain shape. Recent discussions suggest that there can be levels of detail regarding the revealing complexity, as there can be assumed different roles and expertise of target groups of authors – analogue to a 5-parameter consumer equaliser or a fully-fledged mixing desk for a sound engineer. In IRIS, we are at first concerned with the goal of negotiating possible author interfaces in the sense of potential accessible parameters.

Since also the storyworld is a complex system, quite naturally it is necessary to also think about the access to the storyworld that will be offered to end-users. Creating this interface is actually part of the decisions of “authoring”, because the shape and depth of that access are part of the IS experience, for which authors in our sense are responsible. For example, authors can design a storyworld in which the end-users’ role has to do with creating elements, for which in turn they are equipped with creation interfaces. In that sense, interface design is also assumed as a task of conception and authoring.

Target Groups and a Gap in Disciplines

We assume that the so-called “developers” of the story engine in the above-mentioned model (see Fig. 1) potentially are computer scientists and that “authors” probably include people from creative media fields, for example writers, designers etc. There has been lots of discussion about delimiting these distinctions by terminology. We do not intend to draw too hard lines on that at this moment, as research on these questions is currently ongoing. For example, there have been computer scientists and engineers with cross-disciplinary motivations “authoring” complete storyworlds, and there are media designers regarding themselves as dynamic content “developers” as well. There have also been debates to which extent it is possible to demand for authoring tools allowing creative media experts the creation of a dynamic storyworld without programming know-how.

Further, it is currently unclear how the distribution of roles and tasks in a potential development team would ideally look like. There are obvious assumptions about a distribution of the authoring tasks in “creative authoring and conception” and “technical authoring and



implementation". However, in a typical production process of video games that already implements that distinction, progress repeatedly seems to stall regarding the development of more dynamic and highly interactive stories, making full use of AI-based or generative ideas. There is simply a huge gap perceived between the "writers" having narrative background knowledge and experience, and the novel ideas of story engines that still do not get rid of their technical "smell", because only programmers / "computer guys" understand them. In order to fully embrace the technical possibilities, this gap will have to be reduced so that the technical potentials mate not only with suitable but also compelling ideas. A further vision is that in the end, storytellers can join in and get involved in defining the engines' functionality.

The first year of IRIS has produced results that help to better describe the above-mentioned gap, and to lay the ground for further research in developing authoring interfaces (before tools). Much work has been gone in analysing existing approaches (creative and technical), and to start with involvement of authors through community events. A partial aspect of the still ongoing work is still to draw lines that let classify certain target domains. As a result of many discussions at IS workshops, at the moment, we want to keep the discussion very open to a broad target group of potential authors. We still do not foresee from where the future authors best "recruit" themselves, but found that a mindset from at least impartiality concerning "engines" up to curiosity and enthusiasm are potentially more important prerequisites than having a long track record of authored titles in another mono-discipline, such as screenwriting. As a result of year 1, we succeeded in arranging a (still growing) interest group of authors following the future IRIS research and getting involved in workshops. Participants do have several years of track records in various disciplines, such as writing and conception for film, for TV series, for computer games, or creating stories for role playing games.

1.2.2 Method

The IRIS work described in this report is the result of the first year and points to future work within IRIS. It is based on the following hypotheses:

Hypothesis 1: Creation knowledge will be developed by experiments in creation

IRIS has strived and will further strive to initiate practical experiments in creation, thereby involving authors from several disciplines. It is necessary that several story engines are used and the results of the authoring process are experienced as directly as possible. This hypothesis implies further that the perceived gap between authors and story engineers can be reduced from both sides: As authors gain more knowledge and practical experience, they can give engineers valuable feedback and input for further developments. This has been experienced in first workshops organised by IRIS. Next steps include the development of educational material, which can be partially theoretic but should not exclude practical exercises. Experience is "key".

In order to realise these claims, it is necessary to provide IS systems (as prototypes) for experiments. These prototypes are mostly not fully developed, which causes problems for the appreciation of the general approaches. This caused some community members to claim that caring about authoring access should be delayed until proper runtime systems are available, and then the engine can programmed directly, by a programmer in the team. The problem with this point of view is the underlying hen and egg fallacy. Workshops have proven that also authors need to get feedback on their first ideas by a concrete running system, in order to further develop conceptual knowledge in Interactive Storytelling. The solution is the development of small systems with authoring access.

Hypothesis 2: Classifications of IS systems are necessary

There is a diversity of prototypical solutions and suggestions for IS systems and story engines. Workshops have shown that participants get confused with diverging and technical vocabulary, concepts and approaches. In the first year, IRIS looked at a variety of systems from the IS community but also from peripheral areas. In the future, it is necessary to focus on some system aspects that are crucial to Interactive Storytelling, maybe also revealing features that distinguish



several forms of IS, and IS from other art forms. In situations when it is necessary to work with a subset of all possible approaches, it is useful to know into which group of issues, solutions or systems the current work falls.

It is crucial for the development of a general creation philosophy that we develop a shared vocabulary of concepts and know similarities and differences of solutions. Given the fact that education of authors is necessary, this enables us to teach general principles and distinguish them from particular approaches. Ideally, this would go in some line with known concepts of narratology and storytelling principles.

IRIS has begun to propose criteria for such classifications by analysing tools and approaches regarding their used concepts. This has been done from several points of view and within several work packages, for example from the perspective of narrative theories, the perspective of interaction and the perspective of authoring and creation. As a next step, these points of view will be integrated.

Hypothesis 3: Outline of work from two directions

Following the description of work and based on the above-mentioned hypotheses, several working steps have been handled from the perspective of authoring and creation, in order to achieve a first knowledge input for developing creative principles. Fig. 2 gives an overview of relevant knowledge aspects that are finally influencing authoring. Many of them are dealt with in other IRIS work packages; they can be coarsely assigned to knowledge fields in a continuum of theory and practice, and technical and humanistic aspects. Within Fig. 2, only the black outlined boxes were relevant for the recent work of WP3, as a first step. At the centre of inquiry was the acquisition of knowledge about relevant creation and authoring issues, which influence the creative conception of an Interactive Storytelling artefact. This knowledge is positioned mainly in the humanistic/practical area. Naturally, in IS as an interdisciplinary field, there are no clear borderlines between these dimensions, which we intend to integrate. Accordingly the research has been conducted from two directions and covers two main aspects: Acquisition of theoretical knowledge from creative principles, and detailed investigation of currently available tools from a practical perspective.

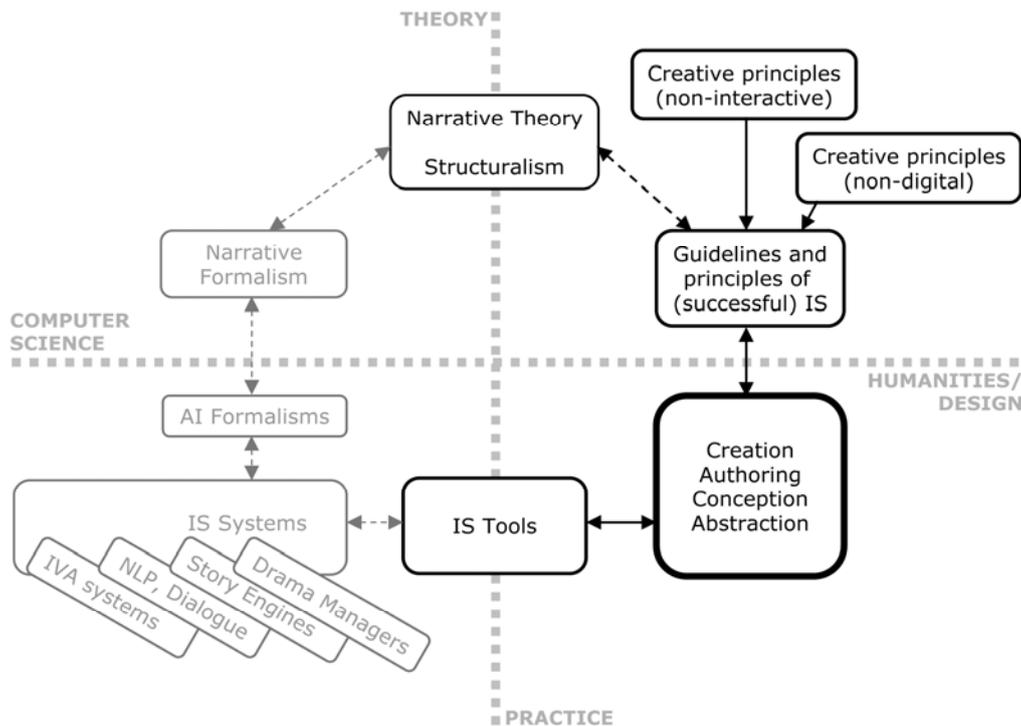


Fig. 2. Approaching the authoring problem from two directions



The outline in Fig. 2 shall illustrate a ring closure that (on purpose) gives the impression of “all is connected to all”. For the research presented here, it is important to notice that for example, narrative theory is researched from different perspectives and with various motivations (within IRIS and elsewhere). In an ideal world, the principles that could be derived from theory would inform the creative process to a similar extent as they inform the “generative process”, meaning the functionality of story engines and their underlying formalisms. At the moment, this is not quite the case, because scientific sources in narrative theory, which are used to inform current story engine formalisms, are based on the mostly structural analysis of finished work. By contrast, creative principles offer more practical advice, do not cite scientific sources and neglect formalisms.

First questions asked in this research are:

- Which concepts exist in current tools? What do they teach us about the conception of Interactive Storytelling? What kinds of IS can be derived? What do authors need to learn to work with these tools?
- Which creative narrative principles exist in guidelines and theory? Can they be applied to Interactive Storytelling? Which other IS principles have to be found?

The answers to these questions are first of all background knowledge in IS tools and creative principles. This leads to further hypotheses for integration that will be the ground for further research, which shall lead to educational material. We assume that authors will have to have an understanding of the technical background “behind” a runtime engine, so integrating knowledge about the formalisms and engines will be the next step.

Next questions to ask would then be

- Which narrative theories exist that can be shared by creators and AI researchers? Do we have to adjust vocabulary in order to share the concepts?
- What are the possible “interfaces” that authors need to communicate with engines and formalisms?
- What can the knowledge of creative principles possibly contribute to the design of engines?

This report summarises the analysis of the state of the art in creative principles from these two outlined perspectives. Section 2 is dedicated to a literature review on guidelines and prescriptive theory in storytelling, outlining the main differences between forms of storytelling in different media. Section 3 provides an overview of the state of the art in the research community’s publications on authoring. In Section 4, we summarised the results of our practical research with authoring tools and the start of interest groups with authoring professionals. Further, this practical exercise led to a first categorisation of different approaches immanent to IS systems. The report ends with a conclusion and outlook.



2. General Literature on Creative Principles in Storytelling Disciplines

2.1 Introduction: Prescriptive theory vs. descriptive theory

Many theoretical aspects have been covered in narrative theory, which is also subject of the research in work package 1 of the IRIS project. The motivation for most of the analytic work done from that perspective is the search for calculable formalisms capable of serving as grounding for algorithms in story engines (work package 2). Further, also the tasks of authoring (creation in the sense of conception and implementation of a storyworld running with a story engine) need to be based on theoretical underpinnings, if we look for generalisations describing more than one creation process. Regarding their goal, these are different from the analyses of finished stories. Prescriptive theories not only *describe* content, structure and/or form of finished artefacts – they give *prescriptive* guidelines on *how to create* successful pieces of art or applications.

First of all, it is remarkable that while literature on narrative theory / narratology takes part in a scientifically motivated discourse aiming at provability and general validity, almost no “serious” creative guidelines (no matter what creative discipline) exist without disclaimers concerning their incompleteness. It is a common belief that “only the fool” sticks to strict rules and formulas, and storytelling in any medium reinvents itself all the time throughout generations, eras and new media.

In this section, some relevant ingredients of existing literature on creative principles in storytelling are explored, the list being non-exhaustive. In the conclusion, the result is compared with the current state of the art in Interactive Storytelling. The focus is especially on those techniques that have been recently discussed within Interactive Storytelling circles, namely Screen Writing, Video Game Writing, Story Creation for Role Playing and Improv Theatre.

2.1.1 Finding Design Principles for the Creation of Interactive Storytelling

In the early stages of a new medium, it is a common approach to rely on some ancestors with known forms and creation methods, from which the new forms are developed and explored. In Interactive Storytelling, it has raised criticism – for example – to rely solely on scriptwriting techniques, as these do not account for the non-linear thinking that would be required for interactivity. In the current state of the art form, there is a need to possibly learn from the older storytelling crafts, whereas the limitations of this application and transfer are to be explored in more detail. This report attempts to avoid a unilateral point of view on storytelling by looking into several disciplines: Screen writing, videogame writing, role play creation and improvisation.

The disciplines differ from the start in their philosophy of having written design principles. Writing novels has been left out here, as much can be made up by talented individuals with a motivation to write. Apparently, the more a discipline turns out to get industrialised having to meet production costs or to rely on complex teamwork, the more important are general design principles, up to literature that is used in academic curricula.

Such books are no scientific literature proving their paradigms, and they rarely use references to Narratology in general or to previous work of colleagues. On the other hand, they benefit from their many years in development and refinements over decades, as for example “The Tools of Screenwriting” with its roots in the 1960s (Howard and Mabley, 1993). Compared to that timeframe, the experience scope of videogames and interactive media is naturally smaller, as is the body of work that can be taken as examples.

Most work – especially when considered a serious source used in academia teaching – includes a foreword with disclaimers against preaching any dogma. Robert McKee in “Story”:



“Story is about principles, not rules. A rule says, “You must do it this way”. A principle says, “This works ... and has through all remembered time”. ... “Anxious, inexperienced writers obey rules. Rebellious, unschooled writers break rules. Artists master the form”. (McKee, 1997)

Analogous, Howard and Mabley state:

“What the would-be screenwriter needs most is an unbiased, nondogmatic introduction to dramatic structural principles and an understanding of the different narrative techniques and storytelling devices that cinema has learned to use.” ... “The worst thing a book on screenwriting can do is to instill in the mind of the beginning writer a set of rules, regulations, formulas, prescriptions, and recipes. “ (Howard, Mabley, 1997)

For Interactive Storytelling, it is a necessity to find these media-unique creative (dramatic/structural) principles, which needs to happen in co-evolution with the development of many more interactive storyworlds and IS artefacts. At the moment, interactive story theory is mainly analytical, although there are not many existing artefacts. Narrative theory as the base for structuring software (story engines) has the character of strict formalisms to serve the computational needs. When IS authoring and creation matures as a creative collaboration of “human and engine”, the vision is that the design space for authors gets more dynamic and principles have to be reviewed from that perspective.

2.1.2 Vocabulary

At previous workshops on authoring in Interactive Storytelling, one need has been expressed repeatedly, namely that of defining an understandable vocabulary for authors. It has been found difficult that terminology is throughout technical and not unified, depending on the different story engine prototypes that could potentially be used. Perhaps illustrating the disastrous situation, even the words “author” and “writer”, which we use, are no widely agreed terms of the trade, and need explanation of what they cover.

We see “vocabulary” as a sub-task of finding design principles and structural concepts of Interactive Storytelling. Therefore, we address the topic in section 4.1.13. However, we are more concerned with the ideas and concepts than with a strict definition of terminology, and we do refrain from attempting to create one at this point in time. The problem is not new, as a so-called “cautionary note” regarding screenwriting shows (Howard and Mabley, 1993):

“One of the great difficulties in film and screenwriting analysis is the confusion of its vocabulary. When a doctor uses the word appendicitis, or a lawyer subpoena, or an architect fenestration, others in the same profession know exactly what is being talked about. When a teacher or screenwriter or producer uses the following words (all of them taken from chapter headings in books on playwriting and screenwriting) – continuity, progression, premise, theme, forestalling, finger-posts, preparation, anticlimax, complication, scene, catastrophe, resolution, representation, crisis, antagonist, impressionism, adjustment, peripety, irony, attack, focus, suspense, action, recognition, balance. movement, orchestration, unity of opposites, static, jumping, transition, incident – meanings can become confused, for most of the terms have no precise definitions in the context of the subject matter.

They are used to mean different things by different writers. Reading half a dozen books on screenwriting in succession is apt to leave one quite bewildered, unless one ignores the terminology and thinks in terms of concepts. Anyone venturing another book on the subject must also choose his own vocabulary, and indicate what every imprecise term means to him or her. The reader, to avoid confusion, had best ignore for the moment what others have meant by premise and crisis and unity and so on, and concentrate on the meaning in the context of the work in hand. Unfortunately, there seems to be no other way around this difficulty.”

2.1.3 Relationships to Narrative Theory: Story-Discourse Relation

As there are either only few or even no direct references in written pre-scriptive narrative principles to scientifically motivated analytical narratology, relating the concepts is no straightforward process, although relations are possible and sometimes appear obvious. Most remarkably, there have been found only few accounts of structuralistic prescriptions, or of sequential story models outlining a certain plotted structure or order of events, beyond the three-act structure. For example, the hero’s journey (Campbell, 1947) as a suggested order of



events – sometimes referenced in primers about storytelling techniques for video games – is absent in guidelines on good screenwriting.

Guidelines rather explore different practical techniques and style of “storytelling” specific to the medium (e.g., cinema or videogame). This assumes one connection to narrative theory that is often apparent: the theoretical distinction of the story (“what happened”) and the way of telling it (“how it is told”). It can be parallelised for example with Seymour Chatman’s distinction of story and narrative discourse (Chatman, 1978), in which he focuses on Gerard Genette’s elaborations on the relations of story-time and discourse-time in terms of order, duration, and frequency of events (Genette, 1980). Further, David Bordwell (1985) pointed out the additional level of “style” (besides fabula/story and syuzhet/discourse), which can never be independent of the medium involved, while there is an assumed media-independent narrative discourse. In the practical guidelines discussed herein, these categories may lie behind many stylistic concepts and “tools” of successful storytelling, but are not mentioned and mostly unknown, as the goal is to “know how” to tell successfully. An example is the technique of how to “setup and payoff” (McKee), which is an element of the craft of timing the order of events in the discourse.

This also means that a clear distinction between a story or a storyworld and the way it is represented in different media can form a common denominator in the analysed art fields of storytelling. It is interesting to see if only the discourse and style change, or if also the core story (events and existents in terms of Chatman) differ when crossing media boundaries. For future authors in Interactive Storytelling, it is not yet established what kinds of stories / plot types can offer which kinds of interactive potential.

Finally, another classic theoretical concept is relevant: The distinction between Mimesis and Diegesis, going back to Platon (Plato et al., 1992). In a mimetic rendering of events, the poet steps back behind his characters and uses a direct mode of imitation, in other words: acting out the actions (including first-person dialogue) that make up the narrative discourse. In diegetic presentation, language is used to convey the “narrated” information (including reported actions and reported dialogue of characters) about the happenings in the story in indirect discourse. Diegetic forms offer the possibility of summarisation and aggregation of underlying motivations and results of events in the story. When forced to transform these rather invisible elements of a story into perceivable events of a direct discourse (Mimesis) – as requested in the common maxim of film-making “show, don’t tell” – the lines between story, discourse and medial style get blurred. Also the choice of certain events is a part of the style then, and creative principles may cover all of the above in one concept.

2.2 Script writing, Screenwriting

Screenwriting, as a main creative task in contemporary filmmaking – can be considered a dominant industrial form of successful and established story-inventing and storytelling. The domain has developed strong principles that are taught globally at universities, for example especially in the metropolis of film, Los Angeles. Two well-established books from Hollywood scholars are the source of our summary on creative principles in screenwriting, although there exist many more. As noted before, the goal is not to deliver an exhaustive list of available literature – it is rather to have a look at general storytelling principles and to discuss how different approaches in the periphery of Interactive Storytelling can cross-fertilise to be the base for newer principles. The two sources are:

- The Tools of Screenwriting. A Writer’s Guide to the Craft and Elements of a Screenplay. By David Howard and Edward Mabley (Howard and Mabley, 1993) and
- Story – Substance, Structure, Style, and the Principles of Screenwriting. By Robert McKee (McKee, 1997)



2.2.1 The screenwriter's role / the creative process

The goal of a screenwriter is according to both sources a “good story well told”. This implicitly refers to the distinction between story and discourse, stressing the fact that the discourse in the film medium is what counts for the screenwriter. Howard and Mabley state: *“The screenwriter's job is called story-telling, not story-making.”* Well-told means well-narrated, skilfully structured and plotted. The result presented by the screenwriter is not the finished film, but a script or screenplay showing a story displayed in rich scenes that inspire the designer, cinematographer, composer, editor and all collaborators who add their talents to the final form.

In the best possible way, scriptwriters step back as narrators of a story and let their characters speak directly. There is no question like “is it ‘my’ story”? Some screenwriters report that they are driven by their characters, not the other way round. Doing so, it is more crucial to develop characters and “listen to them” than following a certain story model as a formula. The literature at hand justifies the absence of strict story formulas and rules by that and stresses the importance on principles: *“Professionals, true masters, search for principles. Principles are based on the nature of stories in general and upon the specificity of the medium itself.”* (Howard and Mabley, 1993)

From the outset, it is further important to keep in mind that the result of writing is not the final form of delivery to the audience, but that it is only that final audience that counts. It is why screenwriting differs from the creation of a novel, an essay or a poem: Screenwriters first communicate their story to directors, actors, costumers, cinematographers, sound designers, production designers, editors etc... However, a screenwriter is considered to be author of the film, often together with the director. *“Although others will eventually interpret the writer's words and story, the original vision of a film is first the exclusive domain of the screenwriter.”* The screenwriter does not necessarily have to be skilled in the other disciplines involved, but *“must know how the various arts of cinema can be utilized to give the impression of reality on film to what was originally born in his head”.* (Howard and Mabley, 1993)

The screenplay is a blueprint for an extremely complex art form. This raises the question of authorship or who is “the auteur of a film” ... *“The interdependencies of the family of filmmakers who produce, shoot, and edit a film are much too strong for any one contributor to be the sole author of the work.”* Emphasised is the relationship between the screenwriter and the director (and next, with the producer and actors). In some cases, the roles of screenwriter and director fall onto the same person.

McKee (1997) also stresses the important point of the budget that is involved in big Hollywood productions with big teams of contributors. His book is focused on “classic” plot design, targeted at huge audiences, but he also acknowledges more experimental forms using “Miniplot”, “Antiplot” or even extremely “Nonplot”, and discusses the existence of an “art film”. Classic plots (“Archplot”) mean that more people can relate and understand them, because the classic design is a “mirror of the human mind”. His statement is *“If the audience shrinks, the budget must shrink. This is the law.”*

For the purpose of this overview, considering production realities is an important context for a storyteller, and screenwriting is particularly challenging as there is a proportionality of cost involved and target numbers in terms of audience.

2.2.2 Structure of the content

As stated before, no story models in the sense of formula are provided in terms of how to structure the linear plot. McKee however has a notion of a “classical plot” addressing a wide audience, based on principles such as: Causality, Closed Ending, Linear Time, External Conflict, Single and Active Protagonist, Consistent Reality. There are also other forms that violate these principles, for example by having inconsistent realities or open endings – which would then probably address a smaller audience.

According to McKee, the first task in creating a story structure is the selection of events from a character's possible life stories, which are composed into a strategic sequence to arouse



specific emotions and to express a specific view of life. *“The mark of a master is to select only a few moments but give us a lifetime”*. (McKee, 1997)

What makes up an event is largely discussed. An event is something that is caused by or that affects people. Event choices must be “composed” according to a certain purpose of the storyteller. The first difficult choice is what to include or what to exclude. Next comes the question of the order of told events.

“A story event creates meaningful change in the life situation of a character that is expressed and experienced in terms of a value. ... To make change meaningful you must express it, and the audience must react to it, in terms of a value. ... all those binary qualities of experience that can reverse their charge at any moment are story values.” (McKee, 1997)

Events are then structured (put in order) into scenes. The ideal assumption for good storytelling is that there is *“no scene that doesn’t turn”*, meaning a turn in the character’s life, or change of a value. *“Look closely at each scene you’ve written and ask: What value is at stake in my character’s life at this moment? Each scene should change some of these values.”*

If a scene “doesn’t turn”, this can happen for example because it only contains “activity” instead of actions as events that change values. Both McKee and Howard/Mabley note the distinction of *activity* and *action*, and suggest to eliminate scenes with mere activity. Another reason could be that the scene is necessary for “*exposition*”, also a concept stressed upon by both sources. Exposition is an important element of a story and means the conveying of information that is necessary to understand the story, mostly occurring at the beginning. McKee: *“If exposition is a scene’s whole justification, a disciplined writer will trash it and weave its information into the film elsewhere.”* This statement again stresses the “Don’t say it, show it!” paradigm immanent to the film medium, which mainly consists of mimetic performance as a delivery technique. It contains the challenge of externalising the internal (see below).

For McKee, the smallest element in a screenplay is a “beat”. *“A beat is an exchange of behaviour in action/reaction.”* “Beat by beat” these changing behaviours shape the turning of a scene.

In contrast to naïve imaginations of “linear writing”, most screenplays get refined and rewritten many times. The selection of events to show is based on an imagined “world of a story”. McKee describes that “creative limitation” is vital to story world creation.

“The world of a story must be small enough that the mind of a single artist can surround the fictional universe it creates and come to know it in the same depth and detail that God knows the one He created. ... Small ... means knowable... You must possess a commanding knowledge of your setting.” (McKee, 1997)

McKee describes an existing irony of “setting vs story”:

“The larger the world, the more diluted the knowledge of the writer, therefore the fewer his creative choices and the more clichéd the story. The smaller the world, the more complete the knowledge of the writer, therefore the greater his creative choices.” (McKee, 1997)

In order to make creative choices, it is necessary that far more story material is created than one can possibly use in a film of limited length This (McKee’s) point of view is interesting from the perspective of Interactive Storytelling, as in recent discussions on authoring problems in IS, the fact has often been stressed that creating a storyworld for interactive exploration is much more work than writing “just a linear story”. Although this is possibly correct, it has to be acknowledged that also “linear” storytellers create a greater storyworld before told events get selected in many iterations of work. The difference is that the selection of the events and their order is not anymore the exclusive domain of the author, therefore the laborious creation of possibilities of events is what replaces the time-consuming polishing of the linear story structure.

2.2.3 Film Storytelling Principles

This report’s goal does not justify the account of a complete list of storytelling principles for film that are mentioned in literature, because this list would be excessively long. Therefore, a



selection is made that offers an interesting comparison with current problems in interactive storytelling.

Externalising the Internal

As Howard and Mabley state, in most films, the screenwriter is constantly confronted with the problem of how to show what is going on inside a character at any given time. This problem is matched with a design principle of “*externalising the internal*” resulting in a phenomenon called “subtext” of shown actions. It is about the difficulty to show inner conflict, complex thoughts or emotional states, as well as motivations for the character’s actions. In a film, and in contrast to a literary novel, usually this can or should only be revealed through the characters’ shown actions.

“Finding actions that reveal complex inner emotions is one of the most difficult tasks a screenwriter faces. ... The beginning screenwriter usually rushes to dialogue to fill the gap, but this is not a very satisfactory solution. What we end up with is a whole host of characters who talk openly and honestly about their feelings; the only drama in the theater is in the audience stampeding for the exits.” (Howard and Mabley, 1993)

This illustrates the difficulty of a medium that relies on showing events rather than telling them. It is of course possible to have acting and speaking characters, but dialogue and action can even be juxtaposed in mismatched opposition:

“If we see a character sneak up on another with a butcher knife hidden behind his back while he speaks of his undying love for the other person, which do we believe, the dialogue or the action? ... The juxtaposition gives us the clearest picture of the inner world of the character.” (Howard and Mabley, 1993)

Skilful screenwriters use scenes that are rich in subtext. This is meant to increase the audience’s enjoyment and participation in the story, because the audience has to work (mentally) to understand the happenings. What it means is that not just the way of acting out a given sequence of events by revealing inner conflict and emotion through the way of acting, but the *choice of events* as the decision of the scriptwriter determines the subtext.

McKee calls that principle “*Writing from the Inside Out*”: He assumes that during creation of a scene, writers must find their way to the centre of each character and experience it from his point of view. He stresses that it is not enough to ask oneself “*How should someone take this action?*”, because this leads to clichés and moralising. It would be preferable to ask “*If I were this character in these circumstances, what would I do?*” By acting out the role during writing, the screenwriter presupposes what actors only follow in the script. He shows by examples of concrete screenplays how he would slip in the different characters’ minds, one after the other (“settle into the character’s psyche”) to determine what would be their next most plausible actions. He writes out inner monologues, puts a scene into ultra-slow motion, gives words to what would be “only flashes of insight” (implicitly, by actions of the characters). McKee states that it could take days or even weeks to write what will be minutes or perhaps seconds on the screen.

It would be interesting to compare how this kind of writing could apply to Interactive Storytelling. Basically, it puts the author in the position of an agent in a simulation – being put directly at the decision points of a story, at which options for actions have to be compared and the best possibility has to be chosen. This can either be useful for considering the preconditions for virtual agents’ actions, or for the anticipation of user actions. There is a connection to the narrative theory presented by Claude Bremond (1980)¹, determining “acting situations” and describing the deliberation of action possibilities of an agent. In an early version of the story engine Storytron, Chris Crawford presents a similar mental “walk-through” along the calculations of the story engine, in the tutorial about “inclinations” of actors:

“Inclinations are just such labels, which you, the storybuilder, put on each Role's Options, so that some Actors in that Role are more inclined to take one Option over another, all based on their personality. There's Pete walking over to the Option shelf for his current Role, Kissee: "Hmm, let's see... StrokeHair sounds exciting! Oh wait, there's an Inclination on it that says 'Sensual'. Says right here in my personality

¹ See also the hypertext report on Interactive Storytelling and Narrative Theories (IRIS Deliverable 1.1)



profile that I'm not at all sensual. Oh well. Hey! Kiss sounds just right! Oh, darn, its Inclination reads 'Doubly Sensual'. So if I were Sensual, I'd take Kiss over StrokeHair, but as it is, I'll pass on both. How about ShyAway? Now that's an Option! Its Inclination reads 'Timid'. Sounds like me, according to the personality profile my friend, the storybuilder, gave me. Patience Pete, mama always said, read all the Options before you choose a reaction. Oh, look at that last one, ProposeMarriage! Its Inclination says 'LovesKisser'. Mary is the Kisser, and I do love her a lot - just look at my personality profile, it shows I'm hopelessly taken by her. I am Timid, true, but I'm not hopelessly timid. I am hopelessly in love with her, though, so I'll ProposeMarriage to her!" Heartwarming, isn't it?" (Crawford, 2007)

The problem with the story engine was that nothing of that internal process was revealing on any representational level for the end-user/player, but only the resulting action taken was narrated in one sentence. It is exactly that design problem of *externalising the internal*, when only chosen actions are available for representation, but no telling of inner states. Future story engines and authoring approaches should consider that challenge.

More Creative Principles, "Screenwriting Tools"

Howard and Mabley called their book "The Tools of Screenwriting", while the term "tools" refers to their found principles of storytelling, when turned into design strategies. Many of the concepts relate to similar principles mentioned in other books. It would be too voluminous to explain them all, and there is not yet a good analysis on how these principles are useful – or what are their limitations – also for other media than film. This would be an interesting research endeavour to start with future authoring exercises in IS.

At first sight, there are some obvious and often-discussed concepts that certainly span media boundaries, such as "Protagonist and Objective", "Conflict", "Obstacles", "Premise and Opening", "Main Tension, Culmination, and Resolution". Also "Theme", "Unity", and "Characterization" appear quite common, although they address more subtle attributes.

Special "tools" address the design of the plot, which – if they would be transferred to interactive media – possibly only survive with some conceptual changes or losses. Examples are: "Development of the Story", "Dramatic Irony", "Preparation and Aftermath", "Planting and Payoff" (Setup and Payoff), "Elements of the Future and Advertising", "The Outline and the Step Outline", and "Plausibility".

A special principle is dedicated to the "time and the storyteller". Analogous to the analytical theories of Gerard Genette (1980) in "Narrative Discourse", techniques called "Ellipsis" and "Elaboration" are mentioned as design strategies to shortcut or stretch "screen time" in relation to "real time", in order to enhance certain causal relationships or increase tension. As time in a film is always too short to tell a story in very detail, timing is an important concept. Howard and Mabley define 3 kinds of time in a film story: "Real Time", the objective duration of an action, "Screen Time", the depiction of action on screen ("*Bad screenwriters get stuck in real time*"), and "Time frame", a deadline that the audience can anticipate to increase attention and tension.

"Exposition" is the important concept of having to convey crucial information that the audience needs to know in order to appreciate the story. Much effort is done and it is seen as a critical and difficult task in screenwriting (see above: "don't say it, show it!"), while for example in videogame writing (see below), exposition seems to be the only reason for "telling something" instead of playing.

Interesting concepts for adaptation are the considerations of "Activity and Action" as well as "Dialogue". Together with "Visuals" and "The Dramatic Scene", they refer directly to the representational levels of events. In short, they re-emphasise the claim that each shown element should lead to a change or effect in the story as briefly as possible, and unnecessary elements should be found and cut as much as possible. For example, it is recommended to use dialogue sparsely, as audiences get bored and do not want to listen. Revealing facts (exposition) by spoken dialogue should be done only in case of extreme need. "*Never pass on exposition unless the missing fact would cause confusion.*" Actions and activity should be distinguished all the time, while only action leads to meaningful changes in the story, whereas activity is a means to embellish scenes, which should also not be overdone.



“*Rewriting*” is the last principle, referring to the above-mentioned writing process within the production realities of teamwork.

The authors of the book have added detailed discussions on how the various tools introduced in the book have been put into practice in real example films.

2.2.4 Conclusion

The over 50 years of experience that have been going into these books of principles is something that Interactive Storytelling still has to develop. In comparison with “real-world” authoring exercises mentioned below (section 4), a huge gap is revealing that shows the struggling with the technology as the one and only motivation determining the current state of the discussion in the IS community. Compared to that, the focus in screenwriting literature is solely on the storytelling and there are almost no technical principles explained, although screenwriters need to know the production pipeline very well.

As the literature on principles is extensive, only a few of the principles were selected and emphasised in this report. They concern the finding of a perfect event structure that allows conveying typical features of a story in mimetic ways (showing it, not saying it): for example, externalising internal conflicts and states, and the changing nature of events.

In the literature, most of the principles could be explained by provided examples of screenplay abstracts, which make up huge parts of the books. For Interactive Storytelling, more examples are needed that can then serve as educational material, speaking for themselves.

2.3 Videogame Writing

Videogames have recently become a big industry, but literature on design guidelines has not been found on book shelves before the year 2000. Since then, many books on game design have been added every year. When looking specifically for “videogame writing” (not computer game design), first publications have appeared only recently. We analysed particularly those sources that are dealing with the writing of narrative aspects of videogames, which is otherwise often mentioned in game design books with a somewhat negative note. This could be explained with the fact that the videogame industry must have made negative experiences with writers changing over from screenwriting, resulting in linear stories that were not suited for games which put the player at the centre of all design effort. The two selected books are:

- *Game Writing: Narrative Skills for Videogames*. Edited by Chris Bateman, and published with the support of the International Game Developers Association (Bateman, 2007) and
- *The Ultimate Guide to Video Game Writing and Design*. By Flint Dille and John zuur Platten (Dille and zuur Platten, 2007)

2.3.1 The Creative Role and Process of Videogame Writing

One of the main differences to screenwriting noticed right at the beginning is that the role of the so-called “writer” is much different than the “writer” role in film, as he/she has less responsibility for the end result. The writer is a small part of a big team, which is led by a lead game designer. Unlike in film, the writer does not “invent” a game – this is done by the game designer. “*Writers do not create videogames.*” (Bateman, 2007)

Game writers know that their work needs to be integrated with that of the producers, concept artists, modellers, animators, programmers, game designers, and voice actors. Multiple roles for them can include crafting the story, writing dialogue lines and supporting text, cut scenes and scripted events. This has to be done in conjunction with financial and technical issues. Sometime, it includes coaching voice actors.

Given that role description, it is obvious that even more than in film production, the writer has to subordinate to technical production issues. However, these do not seem to be very established



rules, as the field is still considered very young in comparison with film. One of the authors of the IGDA-book edited by Bateman (2008), Richard Dansky states that although game writing is more complex than it might seem at first, it is also the place where new ground is being broken for future forms of Interactive Storytelling.

In a game production, the lead game designers and game writers work closely together. The lead game designer has a similar role as a director in a film: He is responsible for “*characters, worlds, core gameplay, level layout and design, core mechanics, weapons, player character abilities, story, usable objects, inventory systems, game-shells, controls*”. This implies necessary collaboration with all other members of the development team. Within that context, the game writer is responsible for a subset: “*story, characters, worlds, mythologies, creatures, enemies, or mystical powers*”.

The books suggest a writing process, emphasising the dominance of production issues:

- Property analysis
- Story overview / story design (often given to the game writer by developer)
- Narrative design (determine expositional needs and dialogue if complex dialogue engine)
- Cut scene creation
- Full design / level analysis
- In-game narrative materials
- Initial testing and checking (script checked in situ via subtitles or by staff, looking for clashes in dialogue)
- Dialogue recording
- Final testing and checking

Also Dille and zuur Platten point out that content creation in video games differs from linear creation, as it is dominated by “iterative” design. “*Changes are part of the process.*” It is necessary to continually add elements to the game and test it directly. “*It is important to remember that your story is working in unison with gameplay. The more your story can be told through gameplay, the better. Much like the film axiom “Don’t say it, show it”, you should be thinking in a similar fashion for the game: “Don’t show it, play it.”*” (Dille and zuur Platten, 2007)

2.3.2 Structure of the content

Game writing is described as being a challenge in comparison to screenwriting. Author of (Bateman, 2007) Richard Boon states: “... *the primary concern of the game writer is that almost every narrative element in the game is triggered by an action on the part of the player.*” By stressing the aspect of “remediation”, he notes that in this medium, “*interactive*” is what drives the narrative, not the other way round.

Interestingly, he also uses the same distinction between “story and narrative”, which was discussed in screenwriting as “a good story well told” and is also a concept found in narratology (Chatman, 1978). However, here it is used with a different flavour: It refers to the distinction of what changes a player can make: Changes to the *narrative* or changes to the *story*? In the first case, it could mean that the player interaction just triggers a piece of dialogue, which would otherwise not have been experienced. Otherwise, when making changes to the story, talking to one character and not to another means something for the long-term development of the story or game. “*The first job of the game writer is to understand possible interactions between player and game and determine how these actions may be used to enhance the narrative experience.*” (Boon in Bateman, 2007)

A typical narrative technique with this regard is the definition of a so-called “story spine” with optional possibilities, sometimes also called “spinal story and side-quests”. This can lead to “simplistic” narrative choices of players of where to look at (camera control) but not really changing story. Interactive Storytelling is seen critical: “*Just because deeply interactive storytelling is theoretically possible, doesn’t mean that it’s a suitable goal for every game project. Sometimes more modest goals are appropriate.*” (Boon in Bateman, 2007) Richard Boon considers emergent narrative forms, or interactive story as a risk not only for the writer,



but for the game designer, because of the uncertainty of development. However, he states that *“some understanding of games as systems – and the possibilities this presents for narrative development – is recommended for game writers. ... While playing a game, consider which events are pre-scripted and which are due to system interactions.”*

The usual task of game writers is not to design such systems, but rather, to deliver the content for more pre-scripted methods, for example writing the dialogue. *“Formal narrative elements (such as dialogue) may be triggered from game system interactions, as long as the game writer has predicted that specific interaction.”* Interactive narrative in this sense is to *“work with a predictable set of natural gameplay outcomes and reinforce through scripted elements. ... Naturally, creating enough formal narrative material to cover all situations is an impossible task ...”*

Further, narrative is used mainly “for expositional purposes”, for example, explaining the mission to the player, or notifying the player of certain situations reached. Dialogue can be used to *“provide gameplay information and advise”*. Dille and zuur Platen (2007) write: *“Great screenwriters and great novelists have suffered horrible fates in the game space ... a great deal of gameplay dialogue is too expositional ... A novelist isn’t expected to write compelling dialogue to tell somebody how to use the controller to open a door ...”*

Remarkably, most examples mentioned in this book are taken from action/racing games or adventures. The most “interactive” story in this context of writing is one in which the player actions have direct consequences for the story as a whole, giving the player a degree of control over the plot – meaning more or less unlocking of previously blocked paths. More than one author in the IGDA book on videogame writing assume that more complex systems (*“treating the game narrative in a systematic manner”*) lie beyond the scope of the book. It is therefore hard to compare with the principles on screenwriting, as the definition of “a great story” seems to be different from the outset. There is no account of character goals and plans, or relationships other than friend vs. enemy mentioned.

In the community of Interactive Storytelling, there have been several informal discussions on this point. For example, Chris Crawford has long been arguing with members of the game industry about these different concepts of story. (Crawford, 2004)

2.3.3 Creative principles

The main principles with regard to narrative design are described as three basic concerns of a game writer:

- **Player Agency:** The game writer must consider the player’s role in the game. The writer must know what actions of the player are possible.
- **Pacing:** The writer must understand that players want to dictate the pace of the game. Games incorporate a “progress structure”. Game designers pace a game by means of barriers, coupled with the means to bypass them (e.g., keys). Dialogue can provide appropriate notification of a barrier passed. *“Progress structure dictates narrative structure”*.
- **Narrative Delivery:** This is the choice of media used to deliver content, such as full motion video or written text, including varying “levels of cost” in between.

The book authors mention budget and technical effort as the main determinant for the choice of a medium. For example, using text is motivated by low costs and by “last minute” decisions in the production process. Further it is stressed that the length of the text is a crucial factor for acceptance (the shorter the better). This applies even more to spoken dialogue, *“as in traditional writing”*, with the production issue that dialogues have to be recorded.

In addition to the same reasons why dialogue should be short and reduced in film, for games, “repetition” is a crucial factor. According to Dille and zuur Platten, the writing of alternative lines is one of the most challenging tasks of a game writer. While screenwriters only need to write one piece of dialogue once, game writers have to write many iterations (“alts”) of it. There are



more problems with it than at first sight. It is at first hard to find up to 100 ways of rephrasing a line of dialogue, which might reoccur very often. However, it is even more difficult to stay “in-character”, as with the amount of variations, the subtext of “character” goes away.

The use of a “progress structure” over a “narrative structure” has its reason in gameplay, as game elements are “added incrementally to avoid overwhelming the player with possibilities”, and small events build up to a series. Principles integrated in these structures are for example “funnelling” and “gating”. “Funnelling” means leading the player back to the main spine through dialogue. “Gating the story” refers to a plot that unfolds as linear series of checkpoints that the player unlocks. Mary DeMarle in (Bateman, 2007) advocates the creation of “illusion of agency” in a linear plot through “gating the story” for the problem of resources and development costs: *“No game yet has definitely turned interactive story into a profitable endeavour.”*

Another technique of “layer in the detail” suggests to determine a “relevance rating” of any detail for the story (1 – 6). One should make sure that every player encounters details with rate 1, so that the main story is always understood. Details with higher numbers are there to embellish the story or game, but are not elementary for understanding it. Another method is using index cards. Reshuffling them is considered a base technique for testing to what extent order matters.

Concluding again, several authors within the edited game writing book featured by the IGDA (Bateman, 2007) point to “more complicated methods” being beyond the scope of the book. It says: *“Whatever approach is chosen, the illusion of player agency can be created and maintained through interactive narrative techniques and particularly by reflecting player actions in dialogue and set pieces. In the future, it may be possible to render true nonlinear interactive stories by procedural methods, but at the moment, such mechanisms are fanciful at best.”*

Dille and zuur Platten (2007) make a distinction between “writer-friendly” and “writer-difficult” formats, with the conclusion that the more linear the game, the more writer-friendly it is. Less controllable is an open-world design leading to many situations in which writers will have to write “endless alternatives” or “generic exchanges” with NPC characters. *“A consequential story offers a way of balancing free-flow and structure. The idea here is that the world is alive and remembers things and there are consequences for your actions.”*

2.3.4 Conclusion

Compared to the principles of screenwriting, principles for videogame writing seem to be still in their infancy with regard to storytelling. They also differ by nature in some ways:

- The motivation, purpose and range of possible stories are different. There are more simple stories having to do with achievements (racing, adventure, etc.)
- The role of the writer is different. The game designer has more decisive power, and all is catered to the player experience.
- The distinction between story and plot, (good story well told etc.) is similar! However, the main challenge is “The Player”
- In the literature, there is more emphasis on development and production issues than on what makes a good story, in comparison with screenwriting principles
- Compared to story engines authoring and conception (see section 4), this has nothing to do with it
- Literature on game writing is less than screenwriting underpinned with successful examples of their implementation

The philosophy behind the elaborations on narrative in games is very often the “barrier and key” motive, which is common to adventure games. There is no point in externalising the internal, and there is almost no account of “character”. Exceptions are that in extra chapters of the book, creating “character” is being discussed, but not in the context of developing narrative. Very often, the account of character is mostly concerned with externally perceivable attributes, such



as physiognomy, clothing, and equipment, sometimes “skills”. Main motivations for narrative are exposition, mission briefing, and rewards feedback.

In the foreword of the IGDA book, the editor Chris Bateman states: “It cannot be overstressed that whereas the narrative language of theatre, novels, films, and television has become largely codified and consensually agreed, the narrative language of games is still very much in a state of evolutionary flux. We do not know what the final narrative language of games will be like – likely we will not know until all the technology pertinent to games has been developed, and this could take decades or even centuries. Therefore, everyone working in the field of game writing strives toward an ideal that lies somewhere beyond the horizon.”

2.4 Role play creation

From IGDA book on Game Writing (Bateman, 2007): “*Tabletop RPG writing might be the closest to video game writing, but even then there are major differences. RPGs are about open-ended experience and adjusting things on the fly, whereas videogame writing is a closed experience, focusing on keeping the player satisfied with the options and actions available.*”

2.4.1 Forms and Creative Roles

Role-playing game is the generic term for a broad variety of games, what makes it difficult to give an overall definition. What role-playing games have in common is that players assume roles of certain characters and collaboratively create a story, combat or similar experience. The possible resulting story genres are as wide spread as in literature and film.

On a higher level they can be distinguished in pen-and-paper role-playing games (P&P RPG), live action role-playing games (LARP) and role-playing video games (RPG VG), whereas the LARP and RPG VG derived from the original P&P RPG. Here we concentrate on P&P RPG and LARP.

In most role playing games exists a special player, the so-called game master. While the players determine the actions of their characters, the game master judges their success or failure depending on the underlying rules and their influence on the story progress. Finally he describes the outcomes of the intended player actions. He also verbally describes the game world and impersonates its NPC inhabitants when players interact with them. Depending on the chosen degree of interactivity and freedom within the game, the players and the game master may improvise freely and shape the direction of the story. The difference between P&P RPG and LARP is that in P&P RPG, all story events are being verbally described by the participants (in indirect language, only sometimes with direct dialogue elements), whereas in LARP the players (and game masters) act out in-character actions. The vast number of role-playing categories and their intermixture makes a distinction inevitable.

Florian Berger (Berger, 2009) presents a differentiation in *tactical* and *dramatic* role-playing. The precursors of the tactical role-playing were conflict simulation and miniature war games, which have their roots in military tactical maps and models used over many centuries. Tactics is the key element of the tactical role-play, the game master presents a challenge and the players try to find an intelligent and effective solution. These games concentrate on a (mostly) complex set of rules describing the game mechanics. The success criterion for tactical role-playing games is the effectiveness of the found solution.

By and by, dramatic elements – lent from literature and film – have been added that linked single challenges to an overall plot. The challenges evolved to scenes. Some newer role-playing games reduce tactical elements or eliminate them completely, in order to focus on dramatic role-playing. Here, the emphasis is on a rich dramatic story and the quality of the narration, not on tactical mechanisms. Nevertheless, dramatic role-play games exist that still use rule systems. Both tactical and dramatic role-playing now exist in parallel and can occur in different kinds of mixtures and shades.



We focus on *dramatic* role-playing variants, as we consider these forms of non-digital interactive storytelling. The understanding of a game master's role and skills is the key, aspect, because his function for the role-play experience is quite similar to that of an IDS story engine or drama manager.

2.4.2 Literature on Role Play

For a long time, role play was not in the focus of scientific investigations. Existing theories mainly arose out of practitioners' communities of players and game masters. Since the establishment of the internet as a broad communication platform, the communities organised themselves in many distributed forums, where certain aspects of role play are discussed and scholarly participants try to find overall principles and theories.

For example, the role play community "The Forge"², organised and influenced by Ron Edwards before 2005 (stalled but archived since then), discussed the formation of player groups, motivations for participation and game master strategies. As a result, several models and theories have been derived from that early work, such as:

- A so-called "Threefold Model", dividing RPG player motivations, purposes or GM strategies up into three main groups: the purposes of Game, of Drama, or of Simulation (also called GDS). Several similar theories have emerged around that idea, such as GNS (Gamist, Narrativist, Simulationist) and GEN (Gamist, Explorative, Narrative), circling around the same idea. Since then, the distinction between several types of games, one of which is dedicated to "narrative", is common to many theories and RPG principle collections.
- The so-called "Big Model", dividing RPG theory into four levels: the *social contract* with the players, *exploration* (a shared imagined space), *techniques* as procedures of play, and *ephemera* (moment-to-moment actions as smallest elements of techniques). It advances the concepts of the gamist, the narrativist and the simulationist to so-called *creative agendas*. The Forge website contains models and principles for RPG creation, with a personally biased tone.

More recently, within the scientific community of Interactive Storytelling, role play has been taken up as a potential source of concepts also for digital solutions of game mastering. The number of scientific publications is increasing also from a Game Studies perspective, analysing possible structures, forms and the cultural context. Examples for recent publications in the IS community are (Hitchens and Drachen, 2008) and (Drachen et al., 2009). In these publications, reference models for the design of story engines supporting highly interactive artefacts are researched, which are able to show "emergent" narrative features.

It is hard to find established literature on creative principles for the design of non-digital (e.g., P&P RPG) role playing games. The reason is certainly that there is not a big industry involved (yet?). Only until recently, P&P RPG has had the status of a hobby endeavour of marginal or even sub-cultural character, addressing a small target group of dedicated players, compared to the huge audiences of video games or cinema. "Robin's Laws of Good Game-Mastering" (Laws, 2002) is an internationally widely-cited small handbook for creative principles. Further, we mainly use practical sources from German authors who are active in national RPG circles (Berger, 2009, and Wäsch, 2009).

In Scandinavia, where LARP is very popular, the Knutepunkt³ role playing conference exists since 1997. It is centered on LARP and provides regular publications since 2003. Söderberg et al. (2004) have experimented with integrations of LARP and digital media within the domain of Pervasive Gaming.

² <http://www.indie-rpgs.com> (page last accessed 2009-12-20)

³ <http://www.larpconference.org> (page last accessed 2009-12-20)



2.4.3 Creation methods

Creation process

In role-play games, an important distinction exists between the preparation of a story (often called an “adventure”) and the actual role-play experience (during the running of the game). For a game master who also invents stories (Berger, 2009), both parts shape the entire IS creation process, while the players are normally only involved in the actual game. There is no fixed border between the preparation and the play phase regarding the proportion. Depending on the game style of the players and the experience of the game master, the preparation phase can range from nothing to a big amount of the overall IS creation time (Fig. 3).

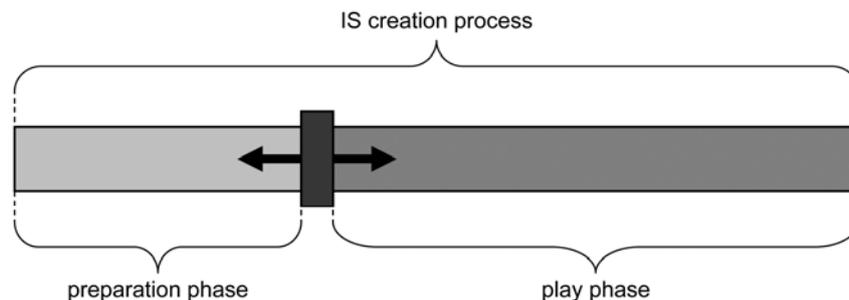


Fig. 3. The IS creation process in role play games

The preparation time can be compared to the “authoring process” in Interactive Storytelling, where authors predefine content. Here, the story concept, the base plot, and important elements of the story are created. Depending on the intended result, these elements can be characters, dialogues, situations, places, objects and many more in different degrees of granularity.

The play phase begins when the players join in and start their interaction with the game master. Based on the pre-authored parts of the story, he creates and moderates the interactive story experience depending on the player interaction. Thereby, he freely uses the pre-authored elements and spontaneously adds new ones, in coordination with the base plot, available pre-authored elements, the user interaction and his imagination. The combination of these elements in an immersive and suspenseful way is the main challenge for a game master and requires both creativity and experience.

Another important distinction lies in the source of the predefined material for the story. Beginners often prefer published stories/games, so called adventures, which were created by experienced authors, who almost always have also been experienced game masters. Most of the commercial publishers of role-playing systems offer collections of adventure ideas, whole adventures or even complete adventure campaigns. Game masters using these kinds of help only have to adapt the adventures to their players and game style. This approach is favoured by game masters with less experience in the creation of own adventures and those who do not want to perform the time-consuming preparation process. More experienced game masters create their own stories from scratch, often inspired by literature, film, TV or other games. A mixture of both is common. Taking a published adventure and reworking or recreating it in the desired way reduces the time consuming preparation phase and allows a higher degree of freedom for the game master and the players.

Players

One main task of the game master is to know his players. The direct feedback and the usually small playing groups lead to a strong connection between players and their game master. Robin Laws (Laws, 2002) points out that the differences among the players influence the kind of play and lead to different challenges for the game master during the creation process. The game experience is created for specific players, therefore their personal tastes and desires are often incorporated in the creation process.



Laws presents a classification of the various role-playing forms that is interesting for our purposes, as he mentions player types called *method actor* and *storyteller* (among others like *power gamer*, *butt-kicker*, *tactician*, *specialist* and the *casual gamer*). If a player prefers a playing style as a *method actor*, he strongly identifies with the played character and bases his decisions on his understanding of the characters psychology. The player type of the *storyteller*, like the method actor, is more inclined in the role-playing itself, not in rules and tactics. He is more interested in participating in an interesting, immersive and suspenseful story, than in strict identification with his character. Story structure is important for both.

One tool for the game master to help him address players right is a so called player goal chart, a simple table with the names of the players, their preferred player type and the emotional experiences they seek from the game. It can be created from the game master's previous experiences with these particular players or in cooperation with them. The player goal chart should be revisited during the creation, preparation and the actual play. A successful adventure contains scenes for each participant, meeting their desires and styles of role-playing. With this in mind, the game master can create or alter (improvise) story elements for each kind of player.

Another important ability of the game master is to appraise the mood of the players during the play. This depends much on the personality and experience of the game master. If he finds the mood decreasing, he can take a look at the player goal chart and improvise new challenges or opportunities to catch the player's attention.

Story structures

Literature on role play often proposes graph structures to describe different kinds of interactive story creation strategies and concepts, like in (Berger, 2009), (Laws, 2002) and (Wäsch, 2009). Graphs are common tools to visualise a story on an abstract level, often used in the preparation phase of an adventure. They are easy to create and to understand, and they support the game master in shaping the base plot of the story.

Different main structures with varying degrees of non-linearity are proposed, which are explained in the following. The nodes of a graph (vertices) symbolise predefined story elements, which can be characters, places, situations, information or a combination of all. The edges show the (theoretically) possible transitions to reach another story element to progress within the story. The order of the shown examples represents the evolution from a complete linear to a highly interactive story structure. The figures are partially redesigned from examples from (Berger, 2009) and (Laws, 2002).

1. Linear sequence

A linear story sequence can be represented as a simple stringing together of story elements, like shown in Fig. 4. In this way it is similar to a book or film script.

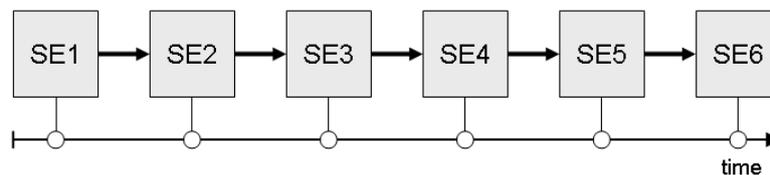


Fig. 4. Linear sequence

Fig. (4) shows what Robin Laws (Laws, 2002) calls an episodic structure. However, he sees no dramatic connections between the story elements, what may disappoint the *storyteller* player type, because of the absence of lasting consequences of reoccurring characters.

2. Linear sequence with multiple transitions

Fig. 5 shows the average form of a role-playing story. The players experience each story-relevant part in the predefined order and at predefined time steps. Their interactions influence the happenings inside the story elements and the transitions between them. That fact is often



referred to as “railroading” and a highly discussed theme in the role-playing scene. Many times, railroading is not wanted by the players who prefer more freedom, but it is often used by game masters, because it is a simple way to prepare a game/story. Furthermore, most of the available commercial story titles – mainly called adventures – are designed that way.

Laws (2002) calls this structure a set-piece. He restrains the number of story elements to a small number (“a handful”). The easiest way of creating multiple transitions between the sequences is to think of one predefined possibility as the result of success and another as the result of failure in one sequence.

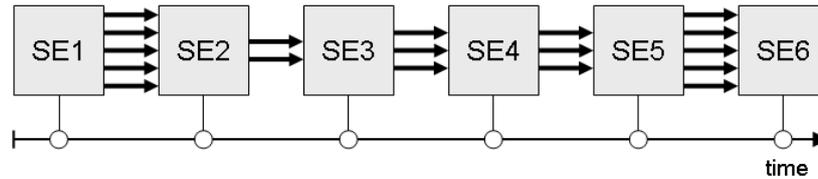


Fig. 5. Linear sequence with multiple transitions

According to Berger (2009), three characteristics are obvious:

- *chronological invariability*: The order of events, encounters and scenes is fixed. Actions of the characters can not change the order, trying it leads to failure.
- *causal invariability*: To keep the logical course of action, no node (vertex) of the graph can be skipped or exchanged. This can lead to dead ends, if the players are not able to find a solution for a certain problem or do not meet the preconditions for the next step.
- *essential presence*: The characters of the story have to be “present” within each of the story elements. If they avoid a key event, for example by not finding the right location, the story can not progress until the game master leads them there, what often results in the undesirable feeling of players being under the control of the game master.

The resulting problems are a low degree of freedom for players with a predictable order of events, and a lack of flexibility for the game master to adapt the story to players’ actions.

3. Linear sequence with multiple transitions without player presence

A simple solution of the before-mentioned problems is to remove the need of all characters’ presence. The story unfolds like before, even without some characters being present during key events. As shown in Fig. 6, the players’ characters advance from story element 3 to 5 without experiencing element 4.

The chronological and causal invariability still exist, but the key event in SE4 can happen without the characters, whose players can be informed – if necessary – about it in a later part of the story. The advantage is that the story is not blocked if players can not find a solution to the presented problem; they simply proceed to another stage. An obvious problem is that players could miss exciting and important parts of the story.

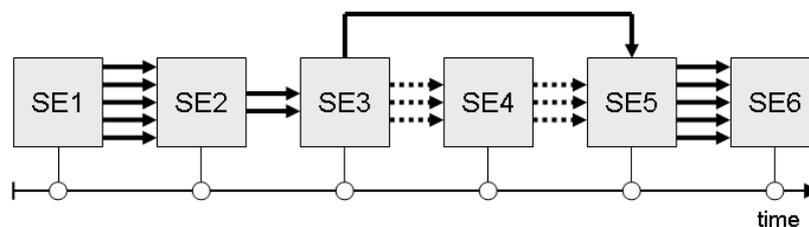


Fig. 6. Linear sequence with multiple transitions without player presence

A related approach called enemy timeline is described in (Laws, 2002). Here, a timeline exists describing actions of the antagonists without the players’ intervention. However, Laws finds it



difficult to use, because the more players interrupt the enemies' plans, the less relevant becomes the predefined content. It is most useful in specialised scenarios, such as chases.

4. Branched sequence with multiple transitions

Fig. 7 shows a (simplified) classical branching structure, in which alternative branches of the story are predefined by the author. Here the players can reach SE3 or SE4 from SE2. This structure suffers from the known problems of creating a huge amount of content for branches that may never be used, a core problem of the branching approach.

Laws (Laws, 2002) addresses this problem too and describes it as the reason why commercial adventures mainly tend to be very loose or very linear.

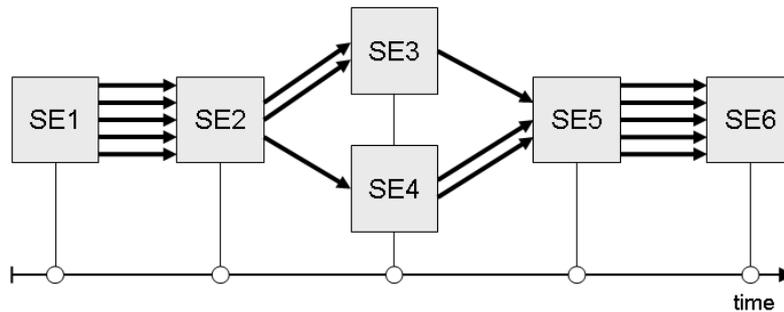


Fig. 7. Branched sequence with multiple transitions

With enough effort in creating a complex branched base structure, the problems of chronological and causal invariability can be partially solved. A combination with the structure in Fig. 6 is also possible.

5. Non-linear net

The main goal of a maximum flexibility and interactivity for the players can be reached by broad chronological and causal variability. Fig. 8 shows an undirected⁴ graph without time axis, so the experience of the story elements is chronologically variable. There are no predefined dependencies of vertices, but these can be created during the progress of the story by the game master in cooperation with the players. The base structure can then become causally variable. It is possible to reach nearly any story element from every other story element.

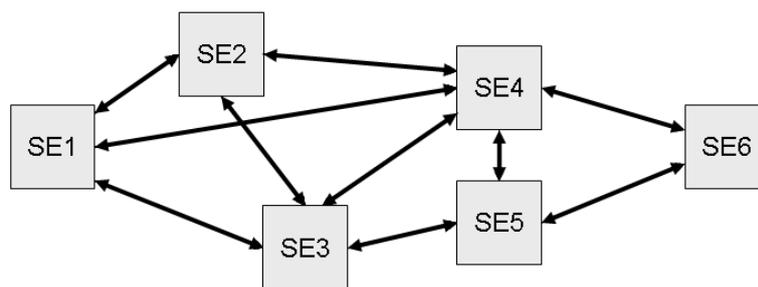


Fig. 8. Non-linear net

The game master predefines only the story elements and the transitions, but dependencies evolve from the interaction with the players and their chosen path. In Interactive Storytelling, this principle has been called "delayed authoring" by David Thue (Thue et al., 2008).

A similar structure is called puzzle-piece (Laws, 2002). Laws points out that it offers a greater flexibility, but the game master has to keep an overview and to know how to cope with the gained flexibility. A possible disadvantage could be that this method hinders the development of

⁴ the use of double arrows is formally not right in the sense of graph theory, but used here for the vividness of the figure

suspense or dramatic flow, as it depends on the abilities and experience of the game master and the interaction with the players. Dramatic flow and suspense would be the main advantage of more linear structures.

6. Non-linear net with linear sub-sequences

A solution to this problem was presented in (Berger, 2009), as a hybrid approach. Fig. 9 shows the same linear net as Fig. 8, but with a time line. The basic idea is to create events, places and encounters in a non-linear net, whereas key information and events are arranged linearly on a time line. It is important that they are not connected before the game begins, as connections are done dynamically during the game play. For example, it is not fixed to get certain information bits from a specific character at a specific place, as it is only important that the information is given at the right time within the plot of the story.

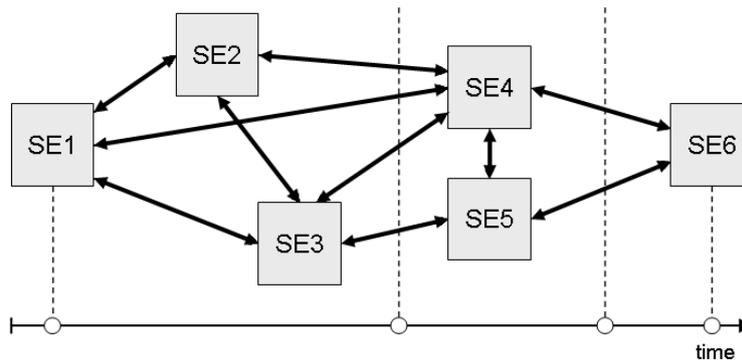


Fig. 9. Non-linear net with linear sub-sequences

The main tasks of the game master in the preparation phase are to identify key information bits and key events of the story and separate them from places, characters and events.

Even some newer commercial titles make partial use of that method, for example the German title “Berge aus Gold” (“Mountains of Gold”) adventure (Raddatz and Kamaris, 2003) of the role-playing system “Das Schwarze Auge” (“The Dark Eye”)⁵. The adventure offers predefined elements, such as different kinds of information like key information, additional information, misinformation (gossip, fallacy, lies); important characters (with background and personality descriptions) and random characters (for elaboration or embellishment of a rich ambience, but without relevance for the story itself); story relevant places and settings (with detailed descriptions). The game master is free to use and combine the elements depending on the flow and interaction with the players. Fig. 10 shows an example of the evolving of the story in retrospect.

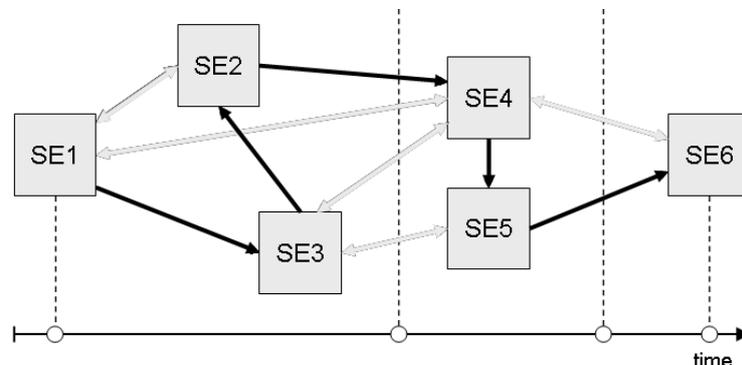


Fig. 10. Final story within a non-linear net with linear sub-sequences

⁵ “Das Schwarze Auge” (“The Dark Eye”) is Germany’s most popular pen-and-paper role-playing system with a history of 25 years and hundreds of publications, four successful PC games (2 more in production), mobile and internet games and an upcoming film.



Tools and strategies

According to Robin Laws, a main challenge for a game master is “preparing to be spontaneous”. As the previous section has shown, almost linear structures are possible, but they reduce the action possibilities and therefore the fun of most players. Good game masters have to make many decisions on-the-fly during a running adventure, including the invention of new story elements. For this reason, there are tools giving game masters a foundation to fall back on, such as lists and charts. Further, it is not only important to think of events to happen in causal consistency with player interaction, but also to include a representational level of acting out details. The latter requires acting and directing talent, for example for acting out in-character direct dialogues with the players, using voice to dramatise and imitate characters’ traits and emotions, and including media techniques to improve “ambient” immersion in certain situations, for example by music, sounds and lighting in the room. Also these elements (dialogue text, media) need to be prepared for their spontaneous use.

These tools, media and strategies need to be considered and prepared beforehand during the creation process of each interactive story adventure. Since their use varies, some are only meant for the game master (e.g. graphs, random lists), and others are targeted at the players during the play phase (e.g. handouts, music). In literature, they are mostly described as examples in specific RPG guidelines or downloadable from online forums (Wäsch, 2009), (Four, 2009), (DSA4, 2009). Some examples are:

Supporting media for creating immersion, ambience during the running of the game:

- music and sound effects
- lights and shades, illumination
- drawings and pictures
- pre-authored text (to be read aloud or enacted by the game master)
- vignettes (small pre-authored text pieces the game master uses for enaction)
- dialogue snippets (typical sentences of NPCs – also for improvisation)

Supporting material used for conveying story information (exposition) during the running of the game:

- pre-authored text (to be read aloud by the game master)
- character charts (handouts)
- maps and miniatures (handouts)
- sketches, drawings and pictures
- audio (e.g., dialogues or non-verbal information)

Supporting material used for “bookkeeping” and overview of the game state:

- graphs (see story structures)
- spreadsheets (with information about the story or characters)
- mind maps and state tables
- conflict webs and character relationship maps (for an example, see Fig. 11)
- player goal chart (tracking what players want)

Supporting material for improvisation and impromptu acting:

- dialogue examples (typical sentences of NPCs - also for ambience)
- random lists of names, personality traits, events, characters, even plot events and more



The use of lists with random elements is a certain style of role playing. While some game masters never use them, others create whole adventures based on them. Therefore many lists and even books are available, which game masters can use or reshape to their desires. The degree of integration of random elements depends on personal tastes and the creativity and experience of the game master, he has to present them in a way they do not look random.

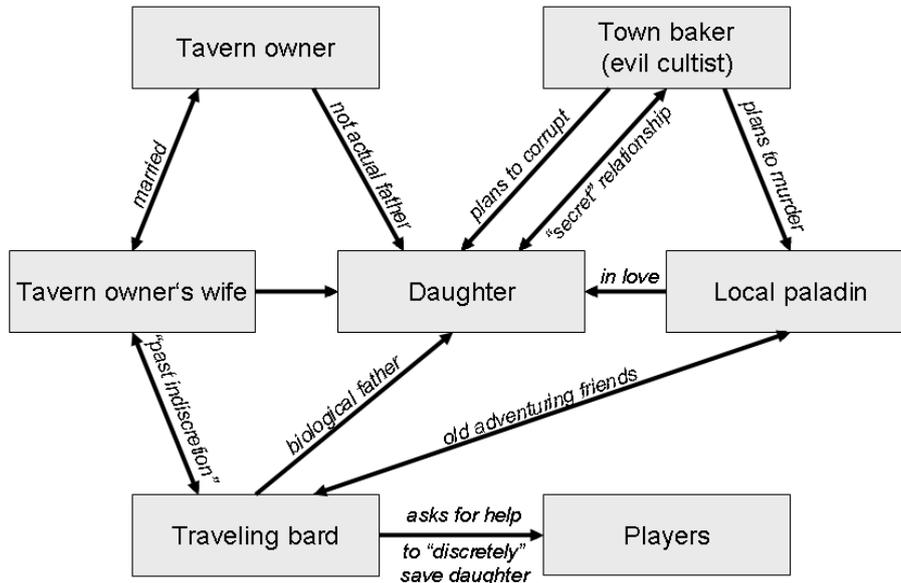


Fig. 11. Relationship map of an example story⁶

2.4.4 Conclusions

Compared with the state of the art and level of establishment of storytelling in videogame writing, principles for good role play creation are even harder to find and less established, due to its non-mainstream character. On the other hand, these principles are interesting for Interactive Storytelling, as they address more intended interaction with the flow of the story than writing for video games. It is worthwhile, though, to clearly focus on those kinds/genres of RPG adventures, which address player types (according to Laws, 2002) of *storyteller* or *method actor*, and less on tactics- or combat-based forms.

Naturally, the analysis shows that linear adventures are easier to prepare than non-linear forms, but the success of the latter depends largely on the improvisational talent of the game master – albeit, good preparation is possible and key to success. Following up on that, creation principles for IS from a non-digital perspective can possibly be derived from these strategies, as much as they can support the creation of digital software support in terms of story engines.

2.5 Improv theatre

2.5.1 Short description and history

Improvisation is defined as any performance in which no story is predefined before the performance. The story events are decided “on the fly”, by the actors. However, improvisation is not a totally free experience: constraints are usually defined beforehand, both by the general genre of improvisation and the specific performance that is prepared. Regarding the latter, it can be decided, for example, that the performance will last 4 minutes, involving two actors, and that one actor will talk, while the other not.

⁶ based on the diagram “The tavern scene” from <http://www.roleplayingtips.com>



For a long time, Improvisation theatre has been widely used in theatre as a training component for actors. Leaving aside the text, actors perform on a stage under various constraints in order to practice gestures, voice, staging, emotions, etc. Another common practice also consists in composing a dramatic piece from an initial improvisation that is later refined to obtain the final piece, to be displayed, without improvisation, to the public.

Although improvisation forms can be found in history, it is only recently that improvisation theatre has become a more widely disseminated theatrical genre. General public now go to the theatre to see actors improvising on the stage. The audience, as it will be detailed below, plays a role in the improvised performance. Back in the 1970s, a specific improvisation genre has been created in the Quebec area, Canada, which was a mixture of improvisation theatre and hockey sport game (Dramaction, 2009). This genre is now widely spread, and we will shortly review the main principles of this kind of improvisation that has a great influence on all recent forms of improvisation.

Two teams, each composed of 7 actors (including one *coach*) compete for victory of a *match*. The stage was originally composed of an “ice ring”, a circular space delimited by a one-meter-high wall, similar to the hockey ring but much smaller. A match is divided into small improvisation performances. For each performance, a *topic* would be chosen randomly within a set of *topics* written by the public before the representation. Along with the topic is given:

- a duration
- the indication of the number of players allowed to play
- a category
- and the information whether each “team” shall improvise with the same constraints one after the other (“compared” mode), or together (mixed mode).

Then the two teams have 30 second to prepare the play. The match is governed by a referee, who plays a central role during the performance. Whenever a *fault* is detected, she/he informs players (and audience) about it. When a team gets three faults, it gives one point to the other team. There are many faults that the referee can detect. Some of them are simply related to the respect of the competition, such as the fact that the preparation should not be extended beyond the allowed 30 seconds. Other rules are designed for the sake of performance quality. For example, imposing a character on another player (“Hi father! How was your day at the factory?”) is forbidden and punished. Other faults occur when actors do not listen to each other carefully enough, create inconsistency, or fail to make any progress in the story, etc.

When time is up (the referee uses a gestural code to inform players about the remaining time), the audience votes for one team to the other. The winning team gets one point. (See (LNI, 2009) for the complete set of rules.)

Improvisation theatre mostly contains humour and laugh, though serious and dramatic performance is not forbidden.

Match-based improvisation, becoming more and more popular, is now completed with less competitive genres and winning a match is not the goal. Each theatre company can create its own genre, or “concept”, and test it on the public. A popular British TV show named “Whose Line Is It Anyway?” has proposed its own form, with four actors improvising on TV based on various games. Note that a specific genre is called the “long form”, in which a full theatrical piece is improvised to the audience (actors might have prepared a coarse structure a few hours before).

Except for their differences, these types of improvisation borrow from the original Quebecois genre (categories, time limits, rules, audience-chosen topics, etc.).

2.5.2 Connection to IDS

Improvisation theatre is of interest for IDS because it gathers two relevant features:

- The story is created dynamically during performance, rather than carefully scripted before the performance.



- It is interactive. Interaction occurs at two levels. First, the audience chooses the topic and reacts to it during performance. Second, the actors interact with each other to shape the story.

There are several references in the field of IDS to Improvisation (Hayes-Roth et al., 1994), (Szilas, 2005), (Swartjes and Vromen, 2007), (Aylett et al., 2006), (Tanenbaum and Tanenbaum, 2008), (Baumer and Magerko, 2009). However, there is no obvious mapping between Improvisation and IDS. Is Improvisation a model for emergent narrative? Should we take the coach as a model of a drama manager? Should the IDS active user be matched with the audience or the improvisation actor? Instead of trying to answer all these questions, we would rather focus on studying further how story creation is possible in improvisation theatre, which mechanics is involved in this process.

2.5.3 Story creation in improvisation theatre: general principles

Story creation occurs at two distinct levels.

Pre-performance creation: From the performance constraints (topic, time, category, etc.) the team, led by the coach, creates a story sketch.

On-stage creation: From the performance constraints and the story sketch, the actors create a story collaboratively.

Let us list all roles in this creation activity, considering the original match form:

- The players: They play the story they are inventing, communicate on stage with other actors, communicate outside of the stage with other players and coaches.
- The coach: He plays an active part before the performance, but also during the performance, by suggesting characters outside the stage to enter, with some ideas.
- The referee: He manages the running improvisation by making sure that the rules be followed. Note that the referee is also an actor, because he systematically plays the role of an antipathetic referee. The purpose of it is to focus the audience's bad feeling towards him rather than the players.
- The animator: He introduces and concludes the show, introduces participants, announces topics.
- The Light engineer: In some shows, he changes atmospheres, and even decides the end of the improvisation by shutting the light down (not in the original match form).
- The DJ or music performer: He creates atmospheres.
- The audience: They choose some topics, they interfere in the improvisation (by laughing, booing, throw "shoes"), they vote.

We will focus our study on the main actor, the player.

So far improvisational theatre has not retained much academic attention, a phenomenon similar to other non digital interactive storytelling forms. This is certainly due to both the recent establishment of improvisation theatre as a type of theatre and the popular nature of the genre. Furthermore, the creation process is far from being simple and transparent. Everything in the improvisation actor play reassembles what has been termed as expert activity in Artificial Intelligence:

- it requires years of training
- it is hard for the player himself to explain his activity
- it contains a lot of intuitive thinking. Improvisation actors will say: "when an improvisation runs well, you do not really control it, it happens just like that".

However, there exist lots of techniques, rules, strategies, which are part of the training of an improvisation actor. We will detail these practical rules, even if they do not describe perfectly the expertise of improvisation actors (Baumer and Magerko, 2009).



2.5.4 Rules for improvisation

Many exercises are used by trainers and trainees to exercise improvisation. These exercises enable the actor to acquire and internalise a certain number of rules. We have divided these rules into four categories.

Classical theatre rules

Improvisation being a kind of theatre, there exists a common ground between classical theatre and improvisation. Some basic theatrical rules are also used by improvisation actors, and they must be perfectly mastered by the actor. These rules include:

- being able to throw the voice to the audience, even when characters are whispering
- always facing the audience
- using available space in the stage: actors should not be stuck on one side of the stage. This rule is also true in theatre, but naturally managed by the stage director, while it is the actors' responsibility in improvisation.
- Improvisation rarely uses stage set and props. They use gesture to simulate them. Many techniques stemming from mime theatre is reused for Improvisation.
- Etc.

Techniques for preparation/coaching

While the way the coach finds ideas for the performance is hard to describe, there exist some practical rules regarding what should be prepared during the 30 seconds. One of the strategies (there is not one single strategy) consists in stating the four following information:

- The character: the actor should have an idea, when he enters the stage of who he is: age, profession, physical characteristics, married, family, etc. Any details that the actor can add to enrich the character are welcome during the preparation. Often, the coach would provide more information regarding the character than the actor can effectively integrate so that the actor can do what he wants when on stage. An actor who enters the stage with a good character and is able to express this character is said to have almost succeeded his performance.
- The emotion: It is recommended to give his character a clear emotion: sadness, happiness, hope, love, envy, etc. Note that there is no strict limit/definition of what is an emotion.
- The location: Each actor should know where the action takes place. It is a big advantage, since the location can provide many ideas of actions, plot twists, characters intervention, etc. This constraint is sometimes difficult to keep in a mixed mode, because two locations are competing. However, it is never impossible to combine the two locations into one single performance.
- The situation: The actor must start with an initial quest, problem, puzzling state, etc. The situation must not be more complex than "I have lost my keys in the swimming pool".

What is noticeable is that the main story plot points are not in this list. In other words, it is not a requirement to have an idea of where the plot is going. In compared mode, it is a possibility, but it is still more important that the information stated below be properly defined. With forms involving longer preparation time, then it is more frequent that a sketch of the plot is defined during the preparation.

The type of information that is effectively given is highly variable, and depends on the style of the coach. Note that it is totally possible to start with no preparation at all.



“Golden Rules” for Improvisation

There exists a set of rules that constitutes the basics of improvisation. The rules are easy to enunciate, but require experience to master. They are listed below in an arbitrary order, with no claim of being exhaustive.

Listen. Since no script exists beforehand, actors tend to concentrate on “their” story, which is a story or a story event/situation they have in mind, rather than listening what the other actor is proposing and possibly guessing what is his story. Any actor should adopt a listening attitude, which is mandatory for a successful performance.

Be consistent. Actors must keep in mind what they say during the performance to avoid contradiction. For example, if actor A says “my brother Bill has been killed”, actor B should not say a few minutes later “let’s ask Bill what he thinks about it”. Of course, if such inconsistency happens, there are several ways to cope with the situation, but the basic rule is to try to stay consistent.

Never say “no”. Refusing a proposition of another actor, even if it seems reasonable usually “kills the improvisation”, especially when the refusal leaves the story with nothing. It is acceptable to say “no, but” followed by proposing an alternative. However, it is “impolite” for the actor that initially proposed something, via his character.

Strategies regarding on-stage behaviours

There are further a multitude of rules, tricks, strategies to help actors to keep the story moving, get the audience engaged and increase the quality of the performance. These rules are multiple, and we select some to illustrate in part the immediate creation process of the improvisation actor.

- Change location. When a story is stagnating, it is a good idea to change the location. Characters were a couple at home? One of them would suddenly realize that there is no cheese in the fridge and express the need for shopping (the other will follow, see the never-say-no principle above).
- Calls for help. There is a code in improvisation to call for other actors in the stage. Typically, by mentioning, with a slightly insistent tone, a character who is not on stage, an actor is called to enter the stage and immediately play this character. For example, an actor would say: “Maybe Miss Charles can help us with this mystery”, or with less subtlety: “Is this not Miss Charles that I am seeing over there?”. One of the out-of-stage actors will come and play Miss Charles. If not, the other actors will be in an embarrassing situation.
- Spontaneous help. When the story is not progressing, it is a good idea for an out-of-stage actor to enter the stage with a character that will propose something. Conversely, it is advised not to enter the stage if the story is running well.
- Avoid too many people on stage. It is better to limit the number of significant characters on stage to around 4. By “significant”, it means that actors playing a tree or an immobile guard do not count as “significant”. The better the player, the more capable they are to be numerous on stage, without creating confusion.
- Contrast (Bernardi, 1992). Showing contrast on the stage is advisable. If the first actor entering the stage plays a happy character, it is a good idea for the second character to enter crying, because he/she creates immediately a conflicting situation and raises questions in the audience’s mind: why is this character so sad while the other so happy? Interestingly, the second character does not need to know why he is crying, or at least, not at the moment he enters the stage. The contrast technique is less widely employed, because it sometimes requires changing initial plans in terms of preparation.
- Ellipsis. To move forward the story, a technique of entering the stage consists in announcing, as a narrator, a time ellipsis. Typically, an actor enters the stage and says “three years later”. Actors on stage adapt immediately and create a new scene following this constraint.



- A similar technique (but less frequent) can be used for location change. An actor would say for example: “Meanwhile in the castle”.

2.5.5 Role of the audience

Beyond their “official” participation as topic proposers and performance voters, how does the audience intervene during a performance, and how do actors take this activity to shape the story?

As most performances in improvisation are on the comic mode, the success of a performance goes with laughs from the audience, which gives the actors an immediate feedback regarding the quality of the improvisation. It is similar to many types of live performance, with the exception that the improvisation actors can totally change the story accordingly.

To our knowledge, there is no explicit rule or strategy regarding the interpretation of the audience's reaction. This binary feedback constitutes a hint to show that the current performance needs improvement, which can then trigger several strategies (see above).

2.5.6 Conclusion on improvisation theatre

This overview of rules and strategies used by actors to create a story dynamically, demonstrates the complexity of the cognitive processes involved in this kind of creation.

It is noticeable how different this process is compared to classical authoring, screenwriting for example. The type of reasoning in improvisation is mostly “local”: from a given situation, an intervention is performed to launch the story somewhere. There is limited structural thinking, although good actors are aware of how the story may unfold. The focus is more on characters than on plot, but the type of character-based reasoning dissembles the character-centric approach promoted in dramatic writing (Egri, 1946). Characters in improvisation are often prototypical (if not based on clichés), exaggerated and often not realistic. Furthermore, there is a greater emphasis on the body and movement characteristics of the character, rather than the high level values or motivations.

It should also be mentioned that the *form* of the improvisation performance (its specific structuring into a well defined system of rules) plays a central role. Actors do not improvise in any place, at any time, without constraints. They need a structure to facilitate the creation. For example, categories that may seem to be a hard constraint to follow for the audience are in fact a great help to shape a good story. This remark, at a general level, could also provide good insights for IDS.

2.6 Conclusion

In this section, the principles of screenwriting, video game writing, role play creation and improv theatre have been explored from literature. From the first to the last, there is an increasing amount of non-determinism in the resulting form, which assumes different tasks and responsibilities for the story creator. It also affects the way of being able to teach design principles. While in screenwriting, a screenplay exists that can be printed in a book, and a film exists that can be studied in parallel, this kind of study is more difficult with the interactive forms. Looking from videogame writing over RPG to Improv theatre, a gradually decreasing amount of information can be prepared in advance and remains in a form that can be easily analysed and compared with the end result, which again is hardly storable for education (at least only in a complicated way).

It has been shown that design principles and guides for good storytelling exist from different perspectives. They are all based on heuristics and practical experiences, showing what has worked and what has not. By their nature, they are neither the result of systematic scientific research nor subject to a scientific proof. What has been shown, however, is that only by going through the complete making of story experiences can authors (as writers, artists, designers, game masters, performers) develop principles, which in turn can influence technological



development. Especially the development of authoring tools, but also story engines, could benefit from stronger visions of how to create rich interactive storyworlds.

The review has shown differences between the characteristics of the disciplines:

- **Screen writing:** There is a defined and potent role for the writer, the production process is clear. A “good story well told” is the main focus. It is the most mature creative discipline, with a strong industry behind it. Therefore it is profitable that people get education. Interactive Storytelling is not mentioned, and there are many direct links to the style of representation and form of the end result.
- **Game writing:** The role is not as important, the game designer is more important. Guidelines are more about the production process than about how to accomplish good storytelling. Stories are still debated for their usefulness, and are mostly functional to the game play, providing exposition and state descriptions for missions and rewards. The industry is strong, so there is potential profit of education. Interactive Storytelling is mentioned as a future prospect, mostly out of scope of current literature. There is acknowledgement of the fact that there is still a lot to do.
- **Role play/game mastering:** It is the form that is most interactive, however it is not an industrial endeavour, mostly performed as a hobby, and therefore there is almost no educational strength in literature. It is hard to find literature, and the principles are not commonly grounded. More than in video games, there are forms that foster strong storytelling, and personal communication reveals that there is much interest in getting in touch with story engines. A main difference, however, is the fact that it doesn’t strive at a closed system of options, rules and actions, but leaves authority to a game master who (to some extent) can make up even new content pieces on the fly during runtime (with differences in possible representational depth).
- **Improv theatre:** It is the most open-ended form. Creative principles are more directed at actors than at authors, as it is the most emergent traditional “storytelling” artform in this study. They can provide valuable insight what can be created only by local principles of how to react. They certainly provide rules, which, on the other hand, are difficult to apply in the creation of digital Interactive Storytelling (IDS).

The review has been done with the hypothesis in mind that future authors in Interactive Storytelling could potentially be recruited from one of these storytelling areas, or at least would like to develop principles based on one of these. It has been shown that there is research in IS with regard to RPG and Improv theatre which tries to reach new ground from the point of view of story engines. Academic education in storytelling disciplines, on the other hand, is dominated by traditional approaches such as literature and film making. Richard Dansky as an author on videogame writing in (Bateman, 2007) mentions that an understanding of single disciplines such as literature writing in general, RPG creation, or scriptwriting, is indeed helpful in understanding videogame writing. *“But videogame writing is all of these and none of them, and anyone relying too heavily on another medium’s techniques as a panacea will doubtless run into difficulties sooner or later.”*

Lastly, the definition of guidelines relies on a huge variety of cases. So far, these cases have not yet been produced within the community of Interactive Storytelling. In the next chapter, the state of the art in literature from that community regarding creation issues is revisited. In section 4, the analysis of existing tools is described, which reflects a current state of the art in creation possibilities.



3. Literature Review on Authoring and Creation Issues in IDS papers

Conference proceedings and scientific journals in the thematic area of Interactive Storytelling have been analysed as possible sources for information on how authoring problems have been defined and approached within the IS research community, and what solutions have been proposed. We have categorised these publications regarding their contribution to knowledge usable for tackling authoring problems in IS:

- Philosophy of creation concepts and methods, especially with regard to generative methods, planning and so-called "emergence"
- Specific authoring tool descriptions
- Authoring workshops or panel descriptions

We are looking for an integrated and general view on solutions for conception and creation in Interactive Storytelling. As the literature review shows, the majority of publications present solutions for particular problems in one specific system. The current state of the art in the Interactive Storytelling community is mainly defined by existing IS systems and tools. Within IRIS, IS systems are relevant to many issues and are therefore also described within other work packages. Here, we only take a look into the authoring possibilities that these systems offer so far.

3.1 Overview of Publications of the IS Research Community with Regard to Authoring

3.1.1 *General Creation Philosophy*

When looking for general advice or knowledge about conception and creation in Interactive Storytelling at conferences, there have been fewer publications and discussions than suggestions for concrete "tools". Here we list those publications that deal with the more philosophical questions of creation concepts and methods. They have in common that they are not restricted to a single system or tool, but predominantly discuss a general concept. However, often this distinction cannot be made by drawing a hard line, as most publications prove their findings by a specific tool or approach that led to an IS system. We grouped the papers into coarse categories covering typical problems of IS (however, these can be seen as overlapping concepts):

- Planning
- Intelligent agents
- Emergent/generative narratives
- Highly interactive storytelling
- Practical authoring issues

Planning

The papers listed here are sources tackling the general problem of integrating plan-based generative story engines with authoring. As planning software is most often a central component of a generative IS system, authors of storyworlds run by these systems need to put conceptual knowledge about planning into practice. The state of the art is such as these proposals are described from a technical point of view – which at the moment is the only literature on "creative



principles" with planning that is available. This list is not exhaustive on systems incorporating planning; the focus of selection was on papers discussing authoring issues.

- (Charles et al., 2003)
Charles, F., Lozano, M., Mead, S. J., Bisquerra A. F., Cavazza M., 2003. Planning Formalisms and Authoring in Interactive Storytelling.
- (Pizzi, 2008)
Pizzi, D., Cavazza, M., 2008. From Debugging to Authoring: Adapting Productivity Tools to Narrative Content Description.
- (Riedl, 2009)
Riedl, M. O., 2009. Incorporating Authorial Intent into Generative Narrative Systems.
- (Roberts et al., 2009)
Roberts, D. L., Riedl, M. O., Isbell, C. L., 2009. Beyond Adversarial: The Case for Game AI as Storytelling.
- (Thomas and Young, 2006)
Thomas, J. M., Young, R. M., 2006. Author in the Loop: Using Mixed-Initiative Planning to Improve Interactive Narrative.
- (Thomas, 2006)
Thomas, J. M., 2006. Collaborative Authoring of Plan-Based Interactive Narrative.
- (Skorupski, 2009)
Skorupski, J., 2009. Storyboard authoring of plan-based interactive dramas.

Intelligent Agents

The concept of intelligent agents for storytelling has been used in many approaches, usually covered in different domains than especially from the point of view of achieving creative storytelling. Therefore, there is few information about creation and storytelling from an author's point of view, examples of which are listed here.

- (Si et al., 2008)
Si, M., Marsella, S. C., Riedl, M. O., 2008. Integrating Story-Centric and Character-Centric Processes for Authoring Interactive Drama.
- (Si et al., 2008)
Si, M., Marsella, S. C., Riedl, M. O., 2008. Interactive Drama Authoring with Plot and Character: An Intelligent System that Fosters Creativity.

Emergent/Generative Narrative

So-called "emergent narrative" can either be seen as another means to achieve higher levels of interactivity, or as an end in itself. Radical claims of emergent narrative actually argue that there is no justified existence of an "author" – as emergence and design are contradictions in terms. Accordingly, the author shall be replaced by purely generative mechanisms. There are also less radical points of view trying to integrate concepts of design and emergence, with concepts how authors should partially "let go" of their will to control the storyworld. Questions like these are discussed in the papers listed here.

- (Aylett, 1999)
Aylett, R. 1999. Narrative in Virtual Environments - Towards Emergent Narrative.
- (Kriegel and Aylett, 2007)
Kriegel, M., and Aylett, R. 2007. A mixed initiative authoring environment for emergent narrative planning domains.
- (Kriegel et al., 2007)
Kriegel, M., Aylett, R., Dias, J., Paiva, A., 2007. An Authoring Tool for an Emergent Narrative Storytelling System.



- (Kriegel and Aylett, 2008)
Kriegel, M., Aylett, R., 2008. Emergent Narrative as a Novel Framework for Massively Collaborative Authoring.
- (Louchart et al., 2008)
Louchart, S., Swartjes, I., Kriegel, M., Aylett, R., 2008. Purposeful Authoring for Emergent Narrative.
- (Spierling, 2007)
Spierling, U., 2007. Adding Aspects of “Implicit Creation” to the Authoring Process in Interactive Storytelling.

Highly Interactive Storytelling

Similar to the previous topic, but without making extensive reference to “emergence”, are publications that report on possible general creation and authoring concepts that shall make IS storyworlds more interactive.

- (Mateas and Stern, 2005)
Mateas, M., Stern, A. 2005. Procedural Authorship: A Case-Study Of the Interactive Drama Façade.
- (Spierling, 2009)
Spierling, U., 2009: Conceiving Interactive Story Events.
- (Swartjes and Theune, 2009)
Swartjes, I., Theune, M., 2009. Iterative Authoring Using Story Generation Feedback: Debugging or Co-creation?
- (Szilas et al., 2003)
Szilas, N., Marty O., Réty, Jean-Hugues, 2003. Authoring Highly Generative Interactive Drama.
- (Thue et. al., 2008)
Thue, D., Bulitko, V., Spetch, S., 2008. Making Stories Player-Specific: Delayed Authoring in Interactive Storytelling.

Practical authoring Issues

Few publications cover reports on practical experiences with systems in use. The papers selected here discuss issues and experiences with authoring exercises that can probably be generalised.

- (Chen, 2009)
Chen, S., Nelson, M. J., Sullivan, A., Mateas, M., 2009. Evaluating the Authorial Leverage of Drama Management.
- (Mateas and Stern, 2005)
Mateas, M., Stern, A. 2005. Procedural Authorship: A Case-Study Of the Interactive Drama Façade.
- (Spierling and Szilas, 2009)
Spierling, U., Szilas, N., 2009. Authoring Issues Beyond Tools.

3.1.2 Authoring Tool Descriptions

The majority of publications in the realm of authoring cover “solution presentations” of designed systems with their authoring tools or authoring interfaces. This list is divided into categories according to the degree of authoring tools available:

- Complete IS systems with integrated or connected authoring tools or environments
- IS systems without an authoring tool, but authorial access to the story content
- Authoring tools without associated story engines



IS Systems with Authoring Tools

BEcool

- (Szilas 2007)
Szilas, N., 2007. BEcool: Towards an Author Friendly Behaviour Engine.

Authoring Possibilities / Editors:

graph for animations (nodes are animations, arcs are transitions)

EmoEmma (Bovary Authoring Tool)

- (Pizzi, 2008)
Pizzi, D., Cavazza, M., 2008. From Debugging to Authoring: Adapting Productivity Tools to Narrative Content Description.

Authoring Possibilities / Editors:

planning domain (GUI for textual input of e.g. propositions, operators, states and goals); tree-based visualisation

Emohawk

- (Brom et al., 2009)
Brom, C., Bída, M., Gemrot, J., Kadlec, R., Plch, T., 2009. Emohawk: Searching for a “Good” Emergent Narrative.

Authoring Possibilities / Editors:

branching graphs for story; 3D editor for world (objects)

GEIST / Keating

- (Schneider et al., 2003)
Schneider, O., Braun, N., Habiger, G., 2003. Storylining Suspense: An Authoring Environment for Structuring Non-Linear Interactive Narratives.

Authoring Possibilities / Editors:

media (picture, audio, text files); ideas and notices for story concept (GUI simple text); scenes of the story (GUI for text); different visualisations are available (tables, graphs)

INSCAPE

- (Balet, 2007)
Balet, O., 2007. INSCAPE - An Authoring Platform for Interactive Storytelling.
- (Dade-Robertson, 2007)
Dade-Robertson, M., 2007. Visual Scenario Representation in the Context of a Tool for Interactive Storytelling.

Authoring Possibilities / Editors:

story units (stages, situation that contain objects); objects (properties), can have actions, events (scripting language; can have several tasks); storyboard (text, sketches, pictures, camera views, ...); 2D- and 3D editors (to create stages, place objects, ...); story flow by policies (have strategies with conditions and actions)

NM2 (NSL Authoring Tool)

- (Ursu et al., 2007)
Ursu, M. F., Cook J. J., Zsombori V., Kegel I., 2007. A Genre-Independent Approach to Producing Interactive Screen Media Narratives.

Authoring Possibilities / Editors:

tagging of different media (automatic or manual); graphs for story structure (based on Narrative Structure Language)

PaSSAGE

- (Thue et al., 2007a)
Thue, D., Bulitko, v., Spetch, M., Wasylshen E., 2007. Learning Player Preferences to Inform Delayed Authoring.



- (Thue et al., 2007b)
Thue, D., Bulitko, V., Spetch, M., Wasylishen, E., 2007. Interactive Storytelling: A Player Modelling Approach.

Authoring Possibilities / Editors:

player preferences

PRISM

- (Cheong, 2008)
Cheong, Y.-G., Kim, Y.-J., Min, W.-H., Shim, E.-S., Kim, J.-Y., 2008. PRISM: A Framework for Authoring Interactive Narratives.

Authoring Possibilities / Editors:

story structure (by graphs, with situations, beats, scenes); 3D editor for stages and objects

RENAISSANCE

- (Zancanaro et al., 2001)
Zancanaro, M., Cappelletti, A., Signorini, C., Strapparava, C., 2001. An Authoring Tool for Intelligent Educational Games.

Authoring Possibilities / Editors:

graphical knowledge base editor (frame hierarchies, frames, slots, rules); knowledge base shell

Scenejo

- (Spierling et al., 2006)
Spierling, U., Weiß, S., Müller, W., 2006. Towards Accessible Authoring Tools for Interactive Storytelling.

Authoring Possibilities / Editors:

transition graphs for dialogue structure; dialogue editor (utterances, pre-conditions, post-conditions)

SCHEHERAZADE

- (Elson and McKeown, 2007)
Elson, J. E., McKeown, K. R., 2007. A platform for symbolically encoding human narratives.

Authoring Possibilities / Editors:

story graph (as timeline with states and transitions); characters, props, locations, actions and conditions (in natural language)

Scribe

- (Medler and Magerko, 2006)
Medler, B., Magerko, B., 2006, Scribe: A Tool for Authoring Event Driven Interactive Drama.

Authoring Possibilities / Editors:

2,5D editor for objects; graph editor for story

ScriptEase

- (McNaughton et al, 2004)
McNaughton, M., Cutumisu, M., Szafron, D., Schaeffer, J., Redford, J., Parker, D., 2004. ScriptEase: Generative Design Patterns for Computer Role-Playing Games.
- (Cutumisu et al., 2007)
Cutumisu, M., Onuczko, C., McNaughton, M., Roy, T., Schaeffer, J., Schumacher, A., Siegel, J., Szafron, D., Waugh, K., Carbonaro, M., Duff, H., Gillis, S., 2007. ScriptEase: A Generative/Adaptive Programming Paradigm for Game Scripting.

Authoring Possibilities / Editors:

encounters, behaviours, dialogues and quests (as scripts in a tree-based interface)



StoryTec

- (Göbel, 2008)
Göbel, S., Salvatore, L., Konrad, R. A., Mehm, F., 2008. StoryTec: A Digital Storytelling Platform for the Authoring and Experiencing of Interactive and Non-linear Stories.

Authoring Possibilities / Editors:

story (scenes, complex scenes – graph), stages (stages, props – by interface to of-the-shelf software), action sets (story logic; actions, conditions within a scene – graph based on UML Activity Diagram), assets (cameras, lights, props, etc. for the stages – file manager)

Textable Movie

- (Vaucelle and Davenport, 2004)
Vaucelle C. and Davenport G., 2004. A System to Compose Movies for Cross-Cultural Storytelling: Textable Movie.

Authoring Possibilities / Editors:

tag editor for movie clips

Thespian

- (Si et al., 2008)
Si, M., Marsella, S. C., Riedl, M. O., 2008. Integrating Story-Centric and Character-Centric Processes for Authoring Interactive Drama.
- (Si et al., 2008)
Si, M., Marsella, S. C., Riedl, M. O., 2008. Interactive Drama Authoring with Plot and Character: An Intelligent System that Fosters Creativity

Authoring Possibilities / Editors:

plans; characters (goals, beliefs, policies, relationships)

VR Authoring Tool and VR Tuner

- (Wages et. al., 2004)
Wages R., Grützmacher B., Conrad S., 2004. Learning from the Movie Industry: Adapting Production Processes for Storytelling in VR.

Authoring Possibilities / Editors:

parallel hierarchical graph structures (one graph for story, multiple parallel graphs for objects); event scripts

Wide Ruled / Wide Ruled 2

- (Skorupski, 2007)
Skorupski, J., Jayapalan, L., Marquez S., Mateas M., 2007. Wide Ruled: A Friendly Interface to Author-Goal Based Story Generation.
- (Skorupski and Mateas, 2009)
Skorupski, J., Mateas, M., 2009. Interactive Story Generation for Writers: Lessons Learned from the Wide Ruled Authoring Tool.

Authoring Possibilities / Editors:

text-based editors for objects (characters & environments – with traits and relationships), story objects (plot points), author goals (plot fragments, parameters)

WordsAnime

- (Sumi, 2009)
Sumi, K., 2009. Interactive Storytelling System Using Recycle-Based Story Knowledge.

Authoring Possibilities / Editors:

rules (by simple scripts)



IS Systems without Authoring Tools, but Author Accessibility to Content

IDtension

- (Szilas et al., 2003)
Szilas, N., Marty O., Réty, Jean-Hugues, 2003. Authoring Highly Generative Interactive Drama.

Authoring Possibilities / Editors:

characters, objects, values, goals, obstacles, tasks (XML files)

FearNot!

- (Sobral et al., 2003)
Sobral, D., Machado, I., Paiva, A., 2003. Managing Authorship in Plot Conduction.
- (Kriegel et al., 2007)
Kriegel, M., Aylett, R., Dias, J., Paiva, A., 2007. An Authoring Tool for an Emergent Narrative Storytelling System.
- (Aylett et al. 2007)
Aylett, R., Vala, M., Sequeira, P., Paiva, A., 2007. FearNot! – An Emergent Narrative Approach to Virtual Dramas for Anti-bullying Education.

Authoring Possibilities / Editors:

goals (by states) and actions (by pre-conditions and effects) by STRIPS⁷ like planning language; appraisal rules (emotional reactions); action tendencies

Authoring Tools without associated Story Engines

AESOP

- (Silverman et al., 2003)
Silverman, B. G., Johns, M., Weaver, R., Mosley J., 2003. Authoring Edutainment Stories for Online Players (AESOP): Introducing Gameplay into Interactive Dramas.

Authoring Possibilities / Editors:

plot and dialog editing (graph markup language), storyworld templates, pallets of reusable parts, digital cast members, autonomous behaviour modules, art/animation assets

Bowman

- (Thomas and Young, 2006)
Thomas, J. M., Young, R. M., 2006. Author in the Loop: Using Mixed-Initiative Planning to Improve Interactive Narrative.
- (Thomas, 2006)
Thomas, J. M., 2006. Collaborative Authoring of Plan-Based Interactive Narrative.

Authoring Possibilities / Editors:

plan graph editor

DraMachina

- (Donikian and Portugal, 2004)
Donikian S., Portugal, Jean-Noël, 2004. Writing Interactive Fiction Scenarii with DraMachina.

Authoring Possibilities / Editors:

graphical text editor for protostory, actors (personality, behaviour, traits), objects, areas, dramatic actions, protodialog, dialog (graph)

⁷ STRIPS (Stanford Research Institute Problem Solver)



U-CREATE

- (Sauer et al., 2006)
Sauer, S., Osswald, K., Wielemans, X., Stifter M., 2006. U-Create: Creative Authoring Tools for Edutainment Applications.

Authoring Possibilities / Editors:

hierarchical stage graph; scene editor; action editor (transition conditions); 2D & 3D editor; input editor (external devices)

3.1.3 Authoring Workshops and Panel Descriptions

Finally, published titles in the area of authoring also include descriptions of workshops at conferences.

- (Spierling and Iurgel, 2006)
Spierling, U., Iurgel, I. 2006. Pre-conference Demo Workshop “Little Red Cap”: The Authoring Process in Interactive Storytelling.
- (Spierling and Iurgel, 2008)
Spierling, U., Iurgel, I., 2008. Workshop and Panel: The Authoring Process in Interactive Storytelling.
- (Jhala and van Velsen, 2009)
Jhala, a., van Velsen, M., 2009. Challenges in Development and Design of Interactive Narrative Authoring Systems, a Panel.
- (Spierling et al., 2009)
Spierling, U., Iurgel, I., Richle, U., Szilas, N., 2009. Workshop on Authoring Methods and Conception in Interactive Storytelling.

3.1.4 System overview

For a better overview, currently available or documented systems with authoring tools or authoring interfaces/access are briefly listed here. The list does not contain IS systems without a reported authoring access. It includes the systems that are subject of the publications listed in section 3.1.2, and additionally, systems that are otherwise available in the periphery of IS and have been tested within authoring seminars (see section 4.1, those systems are marked with a * in this table).

IS System / Authoring Tool	Authoring Possibilities / Editors
*ActAffAct ⁸	<i>no authoring possibilities; values within predefined plans can be changed in the code</i>
*Adrift	<i>characters, rooms, objects, tasks (preconditions and post conditions/effects) and events (can trigger tasks); simple dialogs; all in a text-based GUI</i>
AESOP	<i>plot and dialog editing (graph markup language), storyworld templates, pallets of reusable parts, digital cast members, autonomous behaviour modules, art/animation assets</i>
*Aurora for “Neverwinter Nights”	<i>3D world editor; objects; characters; dialogs; all can be linked by a scripting language</i>
BEcool	<i>graph for animations (nodes are animations, arcs are transitions)</i>
Bowman	<i>plan graph editor</i>
*EmoEmma (Bovary Authoring Tool)	<i>planning domain (GUI for textual input of e.g. propositions, operators, states and goals); tree-based visualisation</i>
Emohawk	<i>branching graphs for story; 3D editor for world (objects)</i>
DraMachina	<i>graphical text editor for protostory, actors (personality,</i>

⁸ - Systems/tools with a * symbol were examined in the student studies (see 4.1)



	<i>behaviour, traits), objects, areas, dramatic actions, protodialog, dialog (graph)</i>
FearNot!	<i>goals (by states) and actions (by pre-conditions and effects) by STRIPS like planning language; appraisal rules (emotional reactions); action tendencies</i>
GEIST / Keating	<i>media (picture, audio, text files); ideas and notices for story concept (GUI simple text); scenes of the story (GUI for text); different visualisations are available (tables, graphs)</i>
*IDtension	<i>characters, objects, values, goals, obstacles, tasks (XML files)</i>
*Inform7	<i>characters, stages, objects, conditions and more (possible due to the natural language based programming language)</i>
INSCAPE	<i>story units (stages, situation that contain objects); objects (properties), can have actions, events (scripting language; can have several tasks); storyboard (text, sketches, pictures, camera views, ...); 2D- and 3D editors (to create stages, place objects, ...); story flow by policies (have strategies with conditions and actions)</i>
*Korsakow	<i>tagging video clips</i>
“NM2” (“NSL Authoring Tool”)	<i>tagging of different media (automatic or manual); graphs for story structure (based on Narrative Structure Language)</i>
*Morrowind – The Elder Scrolls Construction Set	<i>3D world editor; objects; characters; dialogs; all can be linked by a scripting language</i>
PaSSAGE	<i>player preferences</i>
PRISM	<i>story structure (by graphs, with situations, beats, scenes); 3D editor for stages and objects</i>
RENAISSANCE	<i>graphical knowledge base editor (frame hierarchies, frames, slots, rules); knowledge base shell</i>
Scenejo	<i>transition graphs for dialogue structure; dialogue editor (utterances, pre-conditions, post-conditions)</i>
SCHEHERAZADE	<i>story graph (as timeline with states and transitions); characters, props, locations, actions and conditions (in natural language)</i>
Scribe	<i>2,5D editor for objects; graph editor for story</i>
*ScriptEase (for “Neverwinter Nights”)	<i>encounter, behaviour, dialogue and quest (as scripts in a tree-based interface)</i>
StoryTec	<i>story (scenes, complex scenes – graph), stages (stages, props – by interface to of-the-shelf software), action sets (story logic; actions, conditions within a scene – graph based on UML Activity Diagram), assets (cameras, lights, props, etc. for the stages – file manager)</i>
*Storytelling Alice	<i>stages; objects; actions, events (by scripting with a graphical language)</i>
*Storytron	<i>actors, roles, stage, props (with traits); conditioned actions with consequences (so called verbs); scripts (tree-like language)</i>
Textable Movie	<i>tag editor for movie clips</i>
Thespian	<i>plans; characters (goals, beliefs, policies, relationships)</i>
*The Virtual Storyteller	<i>goals, events, actions, emotions, beliefs, perception, outcome, character (with OWL⁹ and Prolog)</i>
“U-CREATE”	<i>hierarchical stage graph; scene editor; action editor (transition conditions); 2D & 3D editor; input editor (external devices)</i>

⁹ OWL (Web Ontology Language)



VR Authoring Tool and VR Tuner	<i>parallel hierarchical graph structures (one graph for story, multiple parallel graphs for objects); event scripts</i>
Wide Ruled / Wide Ruled 2	<i>text-based editors for objects (characters & environments – with traits and relationships), story objects (plot points), author goals (plot fragments, parameters)</i>
WordsAnime	<i>rules (by simple scripts)</i>

3.2 Conclusion: The State of the Art in Authoring within the Research Community

As the literature review has shown, there exists a variety of systems and tools created by the research community (academic or non-academic) within the last couple of years. In the previous section, Interactive Storytelling systems have been listed with their possibilities for authoring. While their “prototypical” nature is common to almost all systems, several varieties can be found:

- IS systems that are presented as an integrated holistic entity, containing a runtime engine and a particular storyworld with an interface for end-users for experiencing IS through interaction, but not equipped with a defined interface for authoring a new storyworld. A well-known example is *Façade* (Mateas and Stern, 2005), which for that reason is not integrated in the lists above.
- IS systems that are presented as runtime engines and a separated storyworld as a demonstrator for end-user interaction, while the systems also have a defined interface for authoring new storyworlds running on the same runtime engine. There exist two possibilities of how this authoring interface can look like:
 - Authors would have to programme the engine by accessing certain parameters, attributes and rules directly in the description language of the content file. An example is writing the XML structure of *IDtension*.
 - Authors can use graphical editors as parts of special authoring tools, which creates the content structure (e.g. XML files) automatically. Examples are the *SWAT (Storyworld Authoring Tool)* of the *Storytron* system and the *Aurora Toolset* of the *NeverWinterNights* engine.

There are few publications found on possible creative principles. Especially for IS typical technical approaches, such as planning, intelligent agents, and other attempts to achieve more interactivity in IS, there have not yet been enough practical experiences to come up with suggestions for authors of how to start, how to integrate the technologies into their conception, and how to overcome possible pitfalls. Only by putting these concepts into practice and by describing them from a creator’s point of view can this lack be overcome.



4. Practical Studies of Creation in Interactive Storytelling

The previous section gave a brief overview on the state of the art in published authoring tools and authoring concepts. However, almost all of these authoring tools are research prototypes, many of them can hardly be used by people outside that specific research group, and only a small subset of tools is available – partly on personal request – in the sense of an alpha-version for testing. In order to get a grip on authoring and conception, we wanted to have a deeper and practical look into as many different tools as possible. We assumed that by using the concepts and by getting to play with the created end result, we will better understand the functionality. Further, metaphorically speaking, as tools in general provide “handles” to accomplish a certain task, these shaped tools also provide certain affordances for their usage. This could be, for example, terms used by the system, visualisations or implied order of tasks. As part of finding concepts for interactive storytelling, we want to analyse how the shape of certain tools influences the resulting ideas of interactive storytelling. Again, the term “tool” often does not necessarily mean complete GUI editors, but also includes script-like interfaces to the systems’ functionality.

This section reports on the analysis of existing tools and authoring interfaces, to get to a description of their affordances, which constitute parts of the current situation of authors in the domain of creating IS artefacts. We started the project with several studies:

- A seminar assigning an authoring task to groups of students (Applied Computer Science, Media Informatics) in one semester. (11 systems/tools)
- A detailed reflection on complete authoring processes done within our research groups. (3 systems/tools)
- A workshop on authoring bringing together IS system developers and authors for one day. (7 systems/tools)

Naturally, these studies have limitations:

- Most used prototypes have usability flaws and software bugs, which require the effort of working around them, which is also an accessibility problem. In extreme cases, this led to the problem that the intended goals of experiencing the own created storyworld could not be reached.
- The mostly limited time of the studies can only reveal insights about a beginner’s learning curve and give a first impression. For the first kind of studies, which had the goal of an overview, this was still useful.

In spite of these known limitations, the experiment could lead to first findings about the process of abstraction, especially when certain effects reoccurred. Moreover, within the next steps of IRIS, further experiments can build upon these findings. They help with the next endeavour to create educational material, and especially the workshop was the start of collaboration with a community of authors.

4.1 Seminar with students’ studies

The first study has been conducted within a seminar during summer term 2009 at FHE with students of Applied Computer Science (Media Informatics). In a first task, short descriptions of systems or tools were created by the students, including information about the availability of tools, of a runtime system, and about tutorial information or system descriptions. Based on that, a selection of tools for the practical study was made.

The final selection is a mixture of tools or systems available from IRIS partners, other interesting tools from the IS community that were available, and for comparison reasons, some examples of older available authoring tools in the periphery of IS, such as for adventure games (interactive fiction), or game editors.



The task for the students was the development of a mini scenario of an interactive story of their choice. Additionally, they should take notes of their process and report their working steps and finally also give a brief feedback or judgement how they liked the tool or system.

This report summarises the main statements from the students' reports. The original text of the students' studies is written in German and available on request. For the purpose of this report, system descriptions are kept brief and the focus is on comparability of the studies. More detailed descriptions of the actual authoring tools can be found at several sources from the original providers of the tool or partially at some IRIS-hosted online resources, for example the systems' overview in the Wiki-based hypertext report, or the "Little-Red-Ridinghood"-Blog (Redcap, 2009) for authoring systems. For each study, the descriptions include a statement on the results the students have achieved, what main steps and judgements they reported and the supervisors' observations and conclusions.

4.1.1 ActAffAct

Origin: OFAI, Österreichisches Forschungsinstitut für Künstliche Intelligenz, Austria

Information: <http://www.ofai.at/research/agents/projects/actaffact.html>

Description

- "ActAffAct" (AAA) is based on the appraisal theory of emotion from Ortony, Clore and Collins (OCC)
- the core is a belief-desire-intention architecture for software agents which is extended by an appraisal component following a psychological model of the appraisal process
- autonomous agents with goals, standards and preferences as well as emotional expressions and coping activities are deployed in a scene and interact with each other and the environment (objects), the influence from outside is very limited, so no direct interaction with the story is possible
- four characters (agents) do exist: hero, villain, victim and mentor
- the target user is not an audience, but a researcher who can test results generated with different initial conditions and parameters and inspect the state of the simulated world at different times

Result

- the original story consists of four characters with different goals, for example to solve a puzzle or to place a bomb
- the students were not able to create a new story, because that is not the purpose of the system
- to create a new story from the scratch, deep changes of the code would have been necessary
- instead they made some experiments with changing parameters and conditions and watched how they influence the outcome of the story

Authoring experience reported by the students

General working steps:

- the students tried to change the code, but this was not possible
- instead they decided to edit the setup files, so that this could influence the story, but they were not successful in achieving a major impact
- they changed parameters, deleted characters and watched the results
- they found out, that same setups lead to similar actions of the characters, behaviour patterns could be recognised
- changing character properties or removing characters lead to great impact on the before noticed patterns, but they said that the behaviour of the characters was still plausible
- changes in the environment (removing one object or adding two of the same kind) influence the behaviour, too

Judgements:



Advantages:

- the agents perform autonomously simple dramatic actions
- repeating the story leads to different situations, that way replays are still interesting
- the students mentioned, that AAA is an excellent tool to create suspenseful short stories without deep plot, so it could find good use in roleplay games or simulations to control the non player characters and make the game world more diversified

Disadvantages:

- it is not possible to create a story with an overall plot arc, because of the autonomy of the characters
- the user has no real interaction possibilities
- the induction in the plan scripting language JAM is elaborate

Observations on their experiment

- the students were motivated to understand the principles of the system, but it was too complex for them to master it
- interesting was their idea to use the tool in the current or a more advanced state for games

Conclusions

- the system is interesting for authors who may experiment with it and understand better the limitations and capabilities of generative storytelling systems
- the system is an interesting test case for autonomous agents, but without authoring tools it is not usable for authors that have no programming skills, the scripting language would be too complicated

4.1.2 Emo-Emma (Bovary Authoring Tool)

Origin: TEES, University of Teesside, England

Information: <http://ive.scm.tees.ac.uk>

Description

- important: for the study the “HSP authoring tool” was used, not the whole Bovary IS system
- only one character (actor) could be created
- the story has to be defined as a planning domain consisting of propositions and operators
- propositions describe the world and/or characters and operators are actions that can be performed
- each operator can have several propositions as preconditions and can add or delete others from the world state after the action was performed, here called effects
- goals can be added or deleted in the same way

Result

- the students created an alternative version of “Little Red Riding Hood”, where the user plays the wolf and tries to get the information where the grandmother lives from the girl and – if he is successful – visits her and tries to convince her to open the door, so he can eat her
- the story consists 25 propositions representing emotions like fear (RC_afraid) or important events of the story, like the wolf eating the grandmother (wolf_eat_GM)
- and there are 22 operators (actions) like knocking on the grandmothers door (knock_hard_at_the_door) or asking where she lives (ask_where_GM_lives)
- the story can be run in the “HSP authoring tool” by choosing the possible actions (operators) in the planning tree (plan evolution)

Authoring experience reported by the students

General working steps:

- the students started with preliminary considerations, like the goals for the actor (wolf), important actions and emotions of the actor; in this phase of creation they differentiated between friendly and unfriendly actions



- next they structured them into propositions and operators and entered them into the tool
- then they started to connect the propositions and operators by setting up the preconditions for the operators
- to make use of the created emotions (for example propositions with the name "RC_afraid_1", "RC_afraid_2" and "RC_afraid_3", which means that 3 different levels of "fear" for the girl exist) they determined that an unfriendly actions increases the afraid level; the highest level for this emotion is the precondition for the action (operator) that will let the girl run away in fear; other propositions are used in a similar way (e.g. convincement)
- if otherwise the girl trusts the wolf, an action (operator) can be performed, that lets her say where the grandmother lives, this action removes the old goal (finding out where grandmother lives) and adds a new one (let grandmother open the door)
- the next step is analogous to the one before (different actions change the emotional state of grandmother, e.g. her convincement level to believe the wolf)

Judgements:

- for the students it was difficult to use only one character, they wanted to make the story more interesting by adding more (mother, little red riding hood, grandmother, hunter); because this was not possible they abstracted other characters by describing them in the actions (operators)
- another problem was the strict action-based approach; they wanted to make some descriptions of the things that were happening or tell things that are not actions performed by the wolf; this was not possible
- they wanted to create situation in which only one operation can be performed, the one with the most met preconditions, but the system allows all other actions too, that have a subset of these preconditions
- for the students it was difficult to abstract the story as a sequence of actions, they missed structures like states and events
- the authoring interface was described as uncomfortable, but they didn't point out why
- summarising they found the tool for very open and free structured stories very useful

Observations on their experiment

- the students needed relatively long to understand the principles of the tool and even though they were able to finish their story, it sometimes seemed that the concept was not fully understood

Conclusions

- problems occur if parts of the story have to be more linear to create narrative context
- it is easy to create unwanted loops in the story that can only be recognised after a few cycles; the tree view makes it difficult to see them, another kind of view could be helpful
- because of the loop problem and the quickly raising number of possible directions the story can take with every added operator (action), it is very difficult to keep an overview after a certain number of operators is exceeded
- because of the same reason the outcome of a story (story branch) is more and more unforeseeable, if the content increases

4.1.3 IDtension

Origin: UNIGE, TECFA Lab at the University of Geneva, Switzerland

Information: <http://www.idtension.com>

Description

- interactive drama engine where the narrative unfolds as the user decides what actions the main character will perform in relation to other characters in story
- story is not described as pre-authored story parts such as scenes but as an structure of goals, tasks, obstacles and values; structure resembles a classical goal driven architecture for agents, but is described in narrative terms (obstacles, ethical values) and not attached to a character but centralised in a "state of the world"



- no authoring tool is available for IDtension, a story has to be created in an XML- and CSV-file; due to the prototype status some important mechanisms are only hardcoded and can not be influenced by the author; because of that the study of the tool was done in a theoretical and conceptual way

Results

- the students created an alternative version of “Little Red Riding Hood”, where the user plays the wolf and tries to get the information what the girl is doing (taking basket to grandmother) and – if he is successful – tries to convince her to leave the paths and pick up some flowers
- this was done in a conceptual way, no playable version exists, but charts of the needed informations and values

Authoring experience reported by the students

General working steps:

- the students started with the suggested creation of a “goal/task structure”
- after that the existing example “The Mutiny” was analysed and the structure and declarations from the XML-file are adapted for the “Little Red Riding Hood” story
- four characters are created (girl and wolf, mother and grandmother) and tasks, goals and obstacles are declared
- then the character features and relations among them are declared

Judgements:

- the students had big problems with the use of the french language in the configuration files and the ambiguity of translations
- they gave up when they realised that it was not possible to play the result without programming access to the engine

Observations on their experiment

- the understanding of the complex concept of IDtension was a big obstacle for the students
- because of the not existing authoring tool and the conceptual approach of creating a story they had a big challenge and were only able to provide results after a lot of enthusiastic work

Conclusions

- IDtension is a tool with lots of possibilities for authors to create a story world, but in the available stage of development it was not possible for them to use it without the help of a software engineer

4.1.4 Storytron

Origin: Storytron, Inc.

Information: <http://www.storytron.com>

Description of the tool

The Storytron system contains the following components:

- *Storyteller* - plays the story worlds
- *Deikto* - a simplified version of the english language used by the player
- *SWAT* - the Storyworld Authoring Tool to create and edit story worlds, it contains editors for Verbs, Actors, Stages, Props, Relationships and Operators
- *Sappho* - a scripting language used by the author

Results

- the students used SWAT to create their own story world, an alternative version of “Little Red Riding Hood”
- the user plays the wolf and tries to lure the girl to a flowery meadow for diversion



- therefore he can give her different objects, like wine or flatteries (they are abstracted as an object, too) to influence her mood
- the story can be played with the Storyteller but was not finished, so that the outcome of interactions seems to be random and illogical

Authoring experience reported by the students

General working steps:

- started with creation of four stages, like forest and meadow
- because of the character based approach they continued with the actors (wolf, little red riding hood) and configured their traits
- next they created props (basket, wine)

Judgements:

- creation of stages, actors and props was simple, although they could not find out how to let the actors carry the props
- the three editors are easy to use and understand, the complexity reduced to a useful minimum
- the opposite applied to the verbs (actions - the core element of Storytron) and the roles; they found them very difficult, even with the help of the provided tutorials
- Sappho (a treelike scripting language, that has to be used) seemed intuitive to them, but during use they found it unusual and too complex
- biggest problem was that the available tutorials pointed to the important option "inclination", that was renamed and rearranged (now "Acceptable/Desirable Option") in the version they used, because of that it was not possible to use different options/reactions (verbs) for the roles
- the included debugging tools (lizards) were not used or understood, they did not find them helpful
- bugs prevented them from fully testing Storytron and their story world and so the intended story could not be finished
- the manuals/tutorials were found insufficient

Observations on their experiment

- the order of creation (editors) is not determined, they could have started with actors instead of stages, but this procedure seems to derive from the use of common game editors
- to let the actors carry an object, only a simple box has to be checked, maybe the students got confused by the interface although they said it was easy to understand
- verbs/roles/Sappho: they understood the principles but were not able to use them properly, because of the high complexity and the needed "backward thinking", that is mentioned in the manual/tutorial
- the students had in the beginning some problems to understand the concept of the role, in the words of Chris Crawford himself "... one of the most difficult concepts in SWAT. Instead of asking 'Who should assume the Role?' we ask 'What conditions specify whether an Actor should assume the Role?'" , he mentions that as "backward thinking"
- the bugs/changes in the software made it impossible for the students to finish their story

Conclusions

- Storytron offers a lot of possibilities for authors to define dramatic acting situations, in which complex contextual information can be taken into account
- actions of end-users and actors are defined in the same way, so that they are interchangeable; the Deikto interface is symmetric in terms of input and output
- a rich environment and experience can only be created with a huge number of verbs, roles and reaction options; this is very difficult, because there's no abstract way of planning/creation, everything has to be done on a very low level, similar to programming with a common programming language
- getting an overview of all created content is also difficult, because of the same reasons
- the high complexity and the counterintuitive "backward thinking" makes learning and mastering of the tool difficult



- finally, it is not possible to use German language for storytelling, which was a barrier for some German students

4.1.5 The Virtual Storyteller

Origin: HMI, part of the Department of EEMCS at the University of Twente, Netherlands

Information: <http://wwwhome.cs.utwente.nl/~theune/VS/index.html>

Description of the tool

“The Virtual Storyteller” (TVS) contains the following components:

- Virtual Environment – world agent
- Simulation – character and plot agent
- Presentation – narrator and presenter
- TVS is a multi-agent framework for automatic story generation
- creates stories based on actions of autonomous agents living in a simulated story world
- formal story representation is constructed on basis of the "adventures" of these agents and then expressed in natural language (text and speech)
- 3 kinds of agents: Character Agents with emotions, beliefs, plans and goals, that inhabit the world and perform actions; World Agent keeps track of the story world state, processes the character agents actions and updates the world; Plot Agent intermediates between the other two and creates the fabula, a formal representation of the story content
- the Narrator converts the fabula to natural language text and then to speech
- the author has to use a domain specific Web Ontology Language (OWL) for the fabula and story world and Prolog to create schemas (actions, events, goals, ...)

Result

- not available

Authoring experience reported by the students

General working steps:

- at first the semantics of the objects have to be described by using OWL
- for OWL they used the recommended Protégé Ontology Editor
- there are two basic ontologies, the Fabula Ontology (concepts like goal, event, action, emotion, belief, perception, outcome, character) and the Story World Core Ontology (describes objects and relationships, like paths, locations) where for example characters and actions (verbs) with preconditions and effects can be added
- after that the schemas (like action, event, goal, belief, framing schemas ...) have to be created in Prolog

Judgements:

- the students failed in creating a working story
- the external Protégé Ontology Editor was found very helpful because of its structure
- the reasons for the unsuccessful work was the high degree of complexity of the system
- the students were distracted by the inscrutable number of menus and windows where the information are scattered
- another point is the high technical level of the software, that makes it very difficult to get an intuitive access to TVS
- an author has to understand the basic principles of OWL and Prolog to be successfully able to create a story world, what means that he needs programming abilities

Observations on their experiment

- the students were overchallenged with the system
- for them was the system too complex and complicated, even with the help of the tutorials
- the lack of knowledge about Prolog was another reason for the failure

Conclusions

- learning and understanding the principles of OWL and Prolog is mandatory



- without preknowledge from the field of programming it is very difficult to understand the underlying principles
- non-technical skilled author would be overchallenged by the very technical based approach
- the tool itself offers no possibilities for interaction, because of its pure generative approach, it generates stories only from the presets of the author and the behaviour of the autonomous agents
- the agent-based approach makes it interesting for further research

4.1.6 Adrift

Origin: Campbell Wild

Information: <http://www.adrift.org.uk>

Description of the tool

Adrift (Adventure Development & Runner – Interactive Fiction Toolkit) contains the following components:

- Adrift Generator – the authoring tool to create stories
- Adrift Runner – to play the created stories
- completely menu-based, minimal scripting abilities needed
- principal elements are characters, rooms (a graphical map is automatically created), objects, tasks and events (everything which relies on time)
- tasks are actions that the player has to perform to advance in the story, this has to be done by entering a certain word or sentence
- tasks have preconditions (called restrictions) and post conditions/effects (called actions), which have a defined structure and can be set via drop down menus
- events can trigger tasks
- with characters can be interacted by simple dialogs, where the user has to talk about a subject and the character says a predefined sentence; they can change depending on the completion of a task

Result

- the students created a story in which the user plays a baby that wants to leave the house
- he is not able to communicate with other characters (mother, father, sister), but with his pet, a dog, that can give hints how to solve different problems
- two basic storylines can be followed to leave the house; in the first he has to trick the family members to make his way out by using different drugs; in the second the dog helps him to use the pet door if he gives him some food, that he has to acquire by distracting the mother
- the story can be played with the free Adrift Runner

Authoring experience reported by the students

General working steps:

- the students created the rooms (9, e.g. bedroom, street) and their connections at first
- after that the characters and objects (12, e.g. a magazine, dog food, sleeping pills) were created and placed inside the rooms, some of the objects are locked inside rooms or other objects
- the most important part was the creation of the tasks, where they connected the before defined elements to create the actual story; therefore they used for example a variable that represents the stress level of the sister and has to be raised before another task can be completed

Judgements:

- the students found out, that only two different character descriptions and dialog alternatives can be used, depending on a certain task; they said that this is unfavourable for more complex stories, where you want to change information about the characters multiple times or want to have more interesting dialogs depending on the progress of the story
- they found out, that a problem is the naming and invoking of the tasks; if someone knows the name of a task, for example the final task to finish the game, he can type it at the



beginning and has not to play; this problem can be solved by connecting all tasks with restrictions (preconditions)

- a task overview is included (a dependency tree), that they did not find helpful during the authoring process, but after completion
- the students said, that it is possible to create interesting interactive stories with Adrift, but the more complex the stories become, the easier the author loses the overview over the project
- they liked the simple and user-friendly interface and found the basic principles easy to understand, even without tutorials
- they said, that the basic elements for interactive storytelling are available (characters, actions, events, preconditions, ...), but because it was not intended to use it for complex character relationships, moods and emotions, it becomes very difficult to create them only with the given task structure and possibly created variables
- by trying to enrich the story with these features the insufficient visualisation capabilities of Adrift become obvious, it is too difficult to keep an overview; they suggested to use diagrams or sketches

Observations on their experiment

- the students made fast progress in understanding the functions of the tool and were motivated and creative during the authoring of their story

Conclusions

- the tool allows the easy creation of simple text adventures, therefore it is even possible to determine complex preconditions for certain actions by the use of simple structured menus
- because of the use of menus for all configurations in the structured GUI, it is easy for the author to learn the base functionality of the tool - no scripting language is needed
- emotional states can be simulated by using variables
- with growing scale and complexity the overview quickly gets lost, because there are no ways for an abstract structuring of the story and the visualisation modes to show the links of conditioned actions are insufficient
- no drama manager or story logic exists

4.1.7 Inform7

Origin: Graham A. Nelson

Information: <http://inform7.com>

Description of the tool

"Inform7" consists of the following primary parts:

- *Inform7 IDE* – includes development tools specialised for testing interactive fiction
- *Inform7 Compiler* – for the Inform7 language
- *Standard Rules* – the core library for Inform7
- "Inform" is a programming language and design system for interactive fiction
- the current version "Inform7" is a highly domain-specific language based on natural language, so the source code looks like natural language and is easy readable
- "Inform7" has a strong bias towards declarative rule-based (logic) programming
- direct support for relations which track associates between objects, including automatically provided relations
- the language is based on assertions and rules
- assertions represent the configuration of the story world
- the story world consist of objects and their relations between each other
- each object has attributes and abilities under certain circumstances
- rules represent how the world reacts, for example if the user interacts with it
- ability to infer types and properties of objects from the way they are used

**Example:**

The statement "John wears a hat." creates a "person" called "John" (since only people are capable of wearing things), creates a "thing" with the "wearable" property (since only objects marked "wearable" are capable of being worn), and sets John as wearing the hat.

Result

- the created story is a classical detective story in which a man has been murdered and the user has to find the killer
- therefore he can visit different locations, investigate evidences and interact with people
- if he chooses the right way in the progress of the story, he is able to convict the victims wife of murder
- the story can be experienced with the free version of "Inform7"

Authoring experience reported by the students**General working steps:**

- not available

Judgements:

- not available

Observations on their experiment

- the students did not use the extensive possibilities the language offered for their story
- the story is considerable big, but does not go into the depth of the language
- the reason for this seems to bet the scale of "Inform7"

Conclusions

- the use of natural language is an interesting and promising approach to interactive fiction
- this approach - the similarity of the author input, user input and the system output - could help in developing new interactive storytelling tools for authors, that can be understood more easy from people who are not studied programmers
- the language is so intuitive, that simple stories can be authored without deep knowledge of the language itself
- nevertheless leads growing complexity and interactivity in the story to the necessity to use more complex "commands" or "command structures", which come close to the complexity of common programming languages
- because of that it is necessary, that an author has basic understanding of the principles of programming
- if that basic knowledge is available, an author has easy access to the system
- it is not clear, if the creation of a drama manager or a story logic from scratch is possible with "Inform7"

4.1.8 Aurora and ScriptEase for Neverwinter Nights**Aurora**

Origin: BioWare, Subsidiary of Electronic Arts, Canada

Information: <http://nwn.bioware.com/builders/>

ScriptEase

Origin: Department of CS, University of Alberta, Canada

Information: <http://webdocs.cs.ualberta.ca/~script/>

Description of the tool

- "Neverwinter Nights" is a 3D computer roleplay game in a fantasy setting
- the authoring tool "Aurora Toolset" is provided with the game
- "ScriptEase" was developed by the University of Alberta to make authoring easier



- like TESCS, the tools were not explicitly developed for use in the field of interactive digital storytelling, but by usage of the scripting language it becomes possible
- like in most game editors, "Aurora" provides a map-based interface, where you place and edit characters (player and non-player characters) and props to create the game world, after that it is possible to write scripts for these objects to manipulate and link them
- the used scripting language is similar to C or Java, but much more simple, nonetheless it has all needed elements to create very complex instructions
- "ScriptEase" replaces the script writing process by a more simple and tree-like way of expressions, where the nodes are encounters, situations, events, actions and definitions
- the user has to choose a few parameters and will get appropriate suggestions from a list of predefined scripts; after that "ScriptEase" generates the final scripts and they can be integrated into "Aurora"

Results

- the students created a story in which the player was poisoned and has to find an antidote, therefore he has to speak to different people and visit different locations, the options chosen in the dialogs change the course of the story
- the students tried three ways to enrich their story world with scripts:
 1. without help of the integrated "Aurora" scripting assistant
 2. with help of the integrated "Aurora" scripting assistant
 3. with help of the external "ScriptEase"

Authoring experience reported by the students

General working steps:

- the students started with rough sketches of their stories, thinking about possible branches and how the choice of dialog options can change them
- after that they created the world with all props
- the next step was the creation of the characters
- then the dialogs were created
- at last all the above was connected with the scripts they created in the described three ways

Judgements:

- the creation of the world itself, the characters and objects was very simple and intuitive
- 1. Without "Aurora" or "ScriptEase"**
 - without help of the tools and directly writing the scripts it was difficult for the students to reach their goal, but they did
 - getting familiar with the scripting language was time-consuming and difficult, because of the abstract names of the predefined scripts and their unknown connections among each other
 - they found the documentation insufficient
 - they created the needed variables for the objects and connected them with predefined and partially self-written scripts ("Aurora" has hundreds of predefined scripts included, from simple instructions like "open door" to complex fighting actions with multiple characters)
- 2. With "Aurora"**
 - the use of the "Aurora" assistant was much easier for them, the documentation was helpful and provided a lot of information
- 3. With "ScriptEase"**
 - "ScriptEase" offered the most useful and simplest way to create the scripts
 - the tutorials were well written and only a short time (compared to writing the scripts from scratch) was needed to get familiar with the tool
 - the biggest advantage was for them, that "ScriptEase" shows only the appropriate predefined scripts for the chosen object or situation, unlike the "Aurora" assistant, that created confusion by showing all scripts every time
 - the biggest disadvantage was that "ScriptEase" is an external tool, so they had to switch between "ScriptEase" and "Aurora" every time they wanted to change or edit objects or the world itself



Observations on their experiment

- the students were very motivated to work with these tools, the reason for that seemed to be the game itself, the rich graphical environment and the huge number of possibilities the script-based system offered
- they worked independently and successfully on their ideas even if they had to face problems, which could mainly be solved by the use of available tutorials and documentations

Conclusions

- with “Aurora” and “ScriptEase” it is possible to create interactive stories on a low but still emergent and suspenseful level, it is easy to create branched story structures
- no abstract level for authoring or planning exists, everything has to be done on the low level of scripting
- for more complexity and freedom in the course of the story, a lot of work has to be done by writing powerful scripts and “storytelling mechanisms”
- the graphical rich 3D environment of “Neverwinter Nights” is easier accepted and provides more motivation for students than text-based tools
- beside the script compiler and the error messages it gives, no other debugging tools are included so it is difficult to keep the overview of bigger and more complex stories

4.1.9 Morrowind – The Elder Scrolls Construction Set

Origin: Bethesda Game Studios, published by Bethesda Softworks and Ubisoft

Information: <http://morrowind.de.ubi.com>

Description of the tool

- “The Elder Scrolls Construction Set” (TESCS) is a free game editor for the game “The Elder Scrolls III: Morrowind”, a 3D computer roleplay game in a fantasy setting, the game itself is played from first-person view
- allows the user to make modifications to the existing game or create new games
- as a classical game editor - like “Aurora” and “ScriptEase” for “Neverwinter Nights” - the tool was not explicitly developed for use in the field of interactive digital storytelling, but by usage of the included script language it becomes possible
- like in most game editors, TESCS provides a map-based interface, where you place and edit characters (player and non-player characters) and props to create the game world, after that it is possible to write scripts for these objects to manipulate and link them together
- the scripting language is similar to C or Java and offers more than 500 predefined functions and commands
- 3D models can be imported from 3ds Max to create individual objects and characters

Result

- a new NPC (non-player character) was created and placed at the starting point of the original game
- the player and the NPC are pupils and when the player starts a conversation with the NPC, a dialog begins in which they talk about watching a movie in cinema
- the NPC asks the player some questions and the player chooses the answers
- they range from accepting to different excuses why the player can not come
- the dialog has nine possible endings, depending on the answers

Authoring experience reported by the students

General working steps:

- the students started with preliminary considerations about the story and decided after some experimenting to only create a dialog
- the first step with the Construction Set was the creation of a map, they decided to use the original game map of “Morrowind” and added some props
- next they created two characters on the base of predefined ones



- the main part was the creation of the dialog and different alternative options for the user to choose from
- in the last step they connected the endings of the dialog with scripts, for example to begin a fight after a negative progress in the conversation

Judgements:

- becoming acquainted with the tool the students found extensive and tedious
- a big help were the numerous and detailed tutorials from the internet

Observations on their experiment

- the students always said, that everything can be programmed, they were sure, that many interactive storytelling challenges can be solved with the scripting language
- the tool offered a wide range of possibilities to enrich the dialog options with preconditions and other interactions by the use of scripts, but the students failed in a first attempt and created the (described) simple version of their dialog
- the students were really enthusiastic to work with the tool, but not to create something that would show the full range of possibilities the tool offered, one reason could be that they were too much distracted by the abilities of the 3d world editor

Conclusions

- the tool offers good possibilities for experimentation, mainly for branching-based stories
- the authoring interface is very much influenced by the original developers of the game, and therefore partially unnecessarily complex, a revised version could make the creation of interactive stories much easier
- because of the fixation of the scripts to objects or characters, it seems nearly impossible to create a story logic layer or drama manager inside the tool only by use of the scripting language

4.1.10 Korsakow

Origin: Florian Thalhofer

Information: <http://korsakow.org>

Description of the tool

The "Korsakow" system contains the following components:

- *Engine* – running, visualising and linking of the final project
- *Editor* – to create and edit a project (the films)
- *Analyser* – for visualisation of the links
- *Subtitler* – to create subtitles for the clips
- *Interfacer* – to edit the user interface
- the "Korsakow" system is a tool for the creation of database films, the target is "database storytelling"
- watching films in the system is interactive, the user can choose which film (scene) is shown next
- watchable alternative scenes presented to the user are defined by the author by using rules, the author decides which scene relates to each other, but does not create fixed links
- the resulting films are generative, the order is calculated while viewing
- a projects consists of SNU's (smallest narrative units), keywords and previews

Results

- their story was about a man, who is robbed on the street, depending on sooner decisions he is able to win or loose the fight if he tries to attack the robber
- the story can be experienced with the free version of the "Korsakow" system



Authoring experience reported by the students

General working steps:

- the students had no film material, so they decided to make pictures with a short written description about what should happen in the scene
- at first they made a simple tree sketch with the story and the alternative branches
- then they decided about the suiting keywords and combined them with the pictures in the editor

Judgements:

- the students had problems with the positioning of the keywords, they started to put them at the end of the clips but found out later, that this never works, because the end of a clip is not processed by the system; the last keyword has to be placed 1 second before the clips ends
- they wanted to create different probabilities for the occurrence of a clip, for example by placing clip A two times and clip B one time in the interface menu, so that A is chosen with a probability of 2/3; but they found out, that each clip can only be used once for the menu; the students made a workaround and copied that certain clip, so the system recognised it as two different clips
- similar problems occurred with the naming of the clips and preview pictures
- the students opinion was, that the system is more intended to be used for films without context, opposing the idea of interactive storytelling
- the idea of the "Korsakow" system is not to present traditional narratives
- they found that the creation of a dramatically rich interactive narrative needs a lot of effort and the low level of interaction (only one click on a preview clip) is insufficient, because of that the system is not useful for interactive storytelling

Observations on their experiment

- even if the system itself is very simple, the students had some problems in the beginning, the reasons were insufficient tutorials, a missing data base for experimentation and unexpected peculiarities, like the impossibility to place keywords on the end of a clip
- the idea of different probabilities for choosing a clip is interesting, but it is open if a user would really chose one clip with higher probability only because it is shown more often
- the workaround for that problem works in the experiment, but practically it is not useful to have the same clip twice or more often in the database

Conclusions

- the tools follows the interesting approach of linking existing movie clips by the use of tags - the result is cinematic hypertext artefact
- because of the lack of superior structures, like a drama manager or a story logic, only branching-based stories are possible, with a high degree of unpredictability regarding the final result
- a dramatic structure is not controllable and depends on chance
- the interactivity is limited to the sole clicking of a clip menu, created on the base of the tags
- it could be interesting to use the tool on very big data bases with a lot of keywords (tags) to recognise if the mere amount of data leads to an interesting story flow

4.1.11 Storytelling Alice

Origin: Carnegie Mellon University, USA

Information: <http://www.alice.org/kelleher/storytelling/index.html>

Description of the tool

- "Storytelling Alice" is a programming environment designed to motivate middle school students to learn to program computers through creating short 3D animated movies
- it is an further development of "Alice", with more animations for social interactions between characters and the possibility to use scenes



- it uses a simple structured graphical programming language to make interactions with pre- and self-defined objects possible
- a great number of objects (like characters and props) are available and already have methods with them, for example, animations can be performed
- even if it was not intended to be used for interactive storytelling, this can be done with the provided interaction possibilities (user can click on objects, type keys to trigger methods or move characters)

Results

- in the beginning the user has to choose which kind of story he wants to experience, fantasy or science fiction, therefore he has to click on a knight or a robot
- if he chooses the robot he is only asked to go back to the start-up screen, the real story is in the fantasy part
- a medieval battle scenario is presented and the user can interact by choosing different options that influence the fighting
- depending on the choices the good or the bad side wins
- the story can be played with the free version of "Storytelling Alice"

Authoring experience reported by the students

General working steps:

- the students started with the tutorials and some experimentation of the features Storytelling Alice has to offer
- they created the scenes with the characters and objects and assigned appropriate methods for the animations
- to make interaction with the user possible, they decided to use simple objects and written text that is clickable and triggers methods that start complex animations

Judgements:

- the students mentioned positive, that „Storytelling Alice“ offers a lot of predefined methods and animations, the live preview of the story/scene, the possibility to integrate sound effects and to download new (partially community made) objects from the internet
- they found negative, that it is difficult to delete methods (maybe a bug), the author has always to choose the right scene in the editor and the world view (otherwise errors occur, maybe a bug), the difficult placing of objects in the 3d world and that downloaded objects most times only have a few predefined methods
- the students found „Storytelling Alice“ only useful for simple interactive stories, because they found that the ways of interaction are too simple

Observations on their experiment

- the students used a lot of time to create the environment and the characters to visualise an interesting and rich story
- but they did not focus on the possibilities to enrich their story with different interaction types or more complex story events
- for example it would have been possible to create methods with preconditions, depending on traits or moods of the characters
- it is not clear if they did not understand how to do this or just failed to make it in the given time

Conclusions

- „Storytelling Alice“ is useful for simple branching-based stories
- could be used for more complex and interactive stories, but only with extensive effort, one reason for that is the missing of more powerful visualisation tools inside “Storytelling Alice”
- because everything has to be “programmed” in the tool, even if it is done with a graphical interface, it addresses more a programmer, than an author who is not from this field
- but the simple programming interface and language can be used to teach authors basic principles of programming (Boolean expressions and loops to realise preconditions), what is the main purpose of this tool



- no story logic or drama manager exists, but could be programmed inside “Storytelling Alice”, but the effort would be as big as to do this in a common programming language
- the 3d visualisation of the story world is an advantage, because the user is more attracted by visually rich environments than by simple text

4.1.12 Conclusion on the Practical Study

The study gave first insight into practical issues when using current state-of-the-art authoring tool prototypes. Not all systems were equipped with authoring tools, but were selected for other interesting insights they could offer, such as conceptual models of planning and agents. Some groups of students managed to create interactive story prototypes that were playable with a certain mini-scene. Others struggled with the software and could not come up with a playable result, however with some insights and a conceptual overview.

Different systems were involved in the study, and a side-effect of the study was to gain a better overview than from reading papers, including in-depth terminology used by the systems. These led to a first categorisation of tools regarding their concepts they support in the runtime system and the subset of concepts that is part of the “interface” for authors, in other words, they can be accessed and changed/influenced by authors.

The following systems/tools started and finished the studies:

- IS systems available from IRIS
 - o ActAffAct (OFAI)
 - o Emo-Emma, Bovary authoring tool (TEES)
 - o IDtension (UNIGE)
- Other IS systems from the IS Community
 - o Storytron
 - o The Virtual Storyteller
- Interactive Fiction
 - o Adrift
 - o Inform-7
- Game Editors
 - o Aurora Toolset/Scriptease for Neverwinter Nights /
 - o Morrowind – The Elder Scrolls Construction Set
- Interactive Video and 3D Animation
 - o Korsakow System
 - o Storytelling Alice

More systems were considered from the start, but were not selected for the final study. Scenejo was dismissed because FHE already had much experience with it. The Inscape authoring tool was selected but then turned out to be unavailable. FearNot! was considered too complex and not supported by enough information. Dramachina was not used because it does not include a runtime system.

On a very general level, and not surprisingly, it could be seen that the more immediate and playable results could be achieved with a system, the more motivated were the students in the first place. This concerned the game editors, interactive fiction tools and Storytelling Alice. The “core” IS systems with story engines caused the most problems. Besides technical problems and missing information, one reason was that these systems (for example Storytron) require a certain complexity before they make sense, and for building complex worlds the allocated seminar time (which included the long learning phase) was actually too short. The seminar could only touch upon the surface of the complex systems.

4.1.13 Conclusion for a Future Categorisation of Concepts

One very important insight was the possibility to directly compare the systems regarding their different “aspects” of Interactive Storytelling for which they offer authors access in order to define content. As the perceived problem had been previously stated that there is no shared vocabulary and a diversity of systems, we categorised the systems by their used concepts. This



categorisation is a reflection on what has been perceived by authors. The categories are an initial suggestion to be followed up by integration with other work packages in IRIS (especially WP 1), which also deal with the question of terminology.

Obviously, as already done in the previous sub-section 4.1.12, systems can be put into certain categories. However, which features finally determine the categorisation into “core” IS systems and into peripheral ones? We suggested a distinction by narrative categories found in these systems from an author’s perspective.

First, we listed concepts that authors found important to define or think about. It could be (most often) a term that was used in the authoring interface of a tool, or a general concept that the users came up with to describe the aspect. Examples for these terms and concepts are:

- Actors / Characters
- Avatar / User
- Stage, Map
- Props
- Character Traits
- Character Emotions
- Goals / Plans
- Tasks
- Obstacles
- Plot
- Actions
- States
- Pre-conditions
- Effects
- Events

Second, we found that these concepts could be grouped into higher-level categories. These higher-level narrative categories showed different levels of abstraction at which the systems operate – not only internally, but with different access for authors to these abstraction levels. For example, some systems offer access to traits and goals of characters and let define conditions for actions, but have no means of directly editing the order of events; some tools are concerned about defining the order of events (or according rules) explicitly; some tools do not have a notion of events at all, but directly handle media assets at the representational level.

Another way of categorising systems would be according to their way of representing actions and events to the end-user. Using the concepts introduced in section 2.1, there are mimetic kinds of representation (acting out events), as well as diegetic (telling about events), and combinations of both; additionally there are distinctions of the extent to which systems use language for interaction, or use a map or 3D environment for interaction, which makes a huge difference for authoring concepts. Finally, there are systems that almost do without narrative terminology, directly accessing media-related terms, such as images, 3D objects, animations etc.

The presence or absence of these narrative concepts could be indicators to which extent we regard systems as “core” IS systems, or, if we do not want to face the risk of excluding some of them along the way, to categorise them into groups. However, at this point in time it is too early to fix any categories by definition. We rather want to keep an open-minded point of view and not exclude any potential source for experiences.

The following list is the suggestion of concept groups derived from terminology and concepts found in authoring tools.



- Story / Fabula: Concepts that describe the fictional world of the story
 - o Events and existents¹⁰: actors/character; avatar (user/player character); stage, map, scene, environment; props
 - o Configurations of existents: character traits, values; character emotions; beliefs; goals, plans; obstacles; inter-character relationships
 - o Configurations of events: plot; events; actions, tasks; pre-condition, effect, states, acting situation, sub-goals
- Discourse / Sjuzet: Concepts that regard the “way of telling”, which needs to include interaction
 - o Operational flow of interactive narrative: trigger; discourse state, node; transition, transition network; state chart, flow chart
 - o Discourse structure/units: act; beat; scene; arc; pace
 - o Dialogue (direct/mimetic or indirect/diegetic): turn; initiative; adjacency pair; stimulus/response; speech act/dialogue act; dialogue state, grammar
 - o User/player interaction concepts: users’ actions within story; interaction mode/style; users’ role or PoV; interaction pacing
 - o Rendered behaviour, direct representation: physical action “move, change”; physical action “position, pose”; style, media style; voice; expression; utterance
 - o Presentation, PoV granted to the user: camera (angle, PoV, etc.); on/off stage; shot/cut; externalised inner states; actions outside presentation?
- Media / Misc.: Other concepts
 - o Media-related concepts: text; image; sound, video; speech bubble / thought bubble; hyperlink, hot spot; sprite, 3D object
 - o Special genre-related terms: environment, map; encounter; threshold; trigger; hypersection; quest
 - o Concept helpers: script; storyboard; fragment; concept map; state chart/directed graph; spread sheets

Concluding, systems and tools show differences in how they incorporate these concepts at the authoring interface, or in other terms, it means that these concepts “are” the interface. Naturally, conception and creation with regard to possible forms are highly influenced by these differences. Future work includes the consolidation of these categories by an interdisciplinary discourse. We analysed several tools regarding the existence of these concepts. The detailed analysis is available as an appendix to this report.

4.2 Feedback from Real Authoring Exercises

IRIS partners used their previously created storyworlds running with the systems IDtension and Scenejo (and Rencontre) for a detailed analysis and brainstorming in retrospective about particular problems that were observed during the long authoring process. Further, assumptions for generalisations could be made, as on an abstract level, similar problems seemed to have occurred. The issues were categorised into several problem groups.

The details were published at the Interactive Storytelling conference ICIDS 2009 in Guimaraes, Portugal, as the paper “Authoring Issues Beyond Tools” (Spierling and Szilas, 2009). For purposes of this report, only the categorisation shall be mentioned.

¹⁰ According to Chatman (1978)



The interactive storyworlds that were referred to and previously created with IDtension and Scenejo are:

1. “The Mutiny”; synopsis: *As a sailor jailed in a 17th century galleon, your goal is to take the leadership by preparing a small riot.* IDtension grants the player diversified and combinable action possibilities by a text interface.
2. “The Killer Phrase Game”; synopsis: *As the moderator of a public debate on an airport extension, you must control the fairness level, otherwise the dispute escalates.* Scenejo allows users to text-chat along with 2 virtual characters.

The found categories of authoring issues included:

- Story Ideas that Do not Fit into the Engine's Approach
 - o Finding Authors
 - o Abstraction
 - o Formatted and Constrained Writing
 - o Algorithm-Centered Story Design
 - o Potential of Engines Underused
 - o When Authoring and Programming Intersect
- Painful Process of Storyworld Implementation
 - o The Time-Consuming Task of Entering Content
 - o Understanding What is Going on Under the Hood
- Deliberating the End-User Experience
 - o Foreseeing the End Result of the Storyworld Possibilities
 - o Interaction Design

The conclusion of the paper stresses the importance of listening to authors, but in order to take advantage of that, they need prior design experience and have to be educated about systems. As this could feel like a hen-and-egg problem, these tasks have to be followed up in a co-evolutionary process.

4.3 “Hands-On” Workshop and Authoring Blog

At the Interactive Storytelling conference ICIDS 2009, IRIS conducted a workshop with the title “Workshop on Authoring Methods and Conception in Interactive Storytelling” (Spierling et al., 2009). The goal was to bring together small groups of story engine developers and authors/writers, and let them go through a short conception phase for story ideas provided by the authors. The assumption was that since “hands-on” using the tools would be too time-consuming and technically complicated for a few hours session within the one-day workshop, engineers would “walk-through” the creation process together with authors. In each conception session, the necessary process of story abstraction was performed, turning the stories prepared by the authors into calculable models to be handled by the story engines.

In order to give information on the available systems and their authoring possibilities before the workshop, a blog has been set up that gives each engine provider the possibility to provide information for preparation. The structure of the information is set to be comparable – each system is described by its architecture, by an imaginary storyworld adapted from the Grimm’s tale “Little Red Riding Hood”, an example scene concretising a certain interaction, and finally, the creation process of that engine. The blog is available at <http://redcap.interactive-storytelling.de/> and shall be further maintained to become a community’s discussion point on authoring tools.

The workshop was well perceived and a success. An evaluation of the workshop was done by questionnaires before and after the workshop, however most information has been given as direct feedback during presentation and discussion. In total, 25 people participated, 10 of which were engine providers bringing 7 story engines to the workshop: Emo-Emma, IDtension, LinearLogic, Scenejo, Enigma, PaSSAGE, and Thespian. (Redcap, 2009) The first 4 engines mentioned were provided by IRIS partners. Further, 7 stories were previously prepared by attending authors.



The feedback has shown that authors benefit from an in-depth discussion on a particular case, more than they would by reading descriptions of the engines. Another feedback said that the time was too short and they would be ready to follow up at a longer event conducted by IRIS.

4.3.1 Building an IRIS interest group of authors

A result of the ICIDS 2009 authoring workshop, an interest group of authors has been set up, who committed to further informally collaborate with the IRIS project on authoring. The list of names is being successively complemented by professional contacts met at several other local IRIS-related lectures and workshops, such as a workshop with the Akademie für Kindermedien (Children's Media Academy) in Erfurt (FHE), workshops with a writer's seminar in Biel (UNIGE) and contacts to professional German RPG authors – more to follow. Having started with an initial questionnaire, more information exchange on a voluntary base is planned. Further longer-term workshops and venues are in preparation, which will be future meeting points.

The constantly growing list of professionals with a track record of published work includes screenwriters for TV series and film, RPG authors, video game writers, including lecturers and authors of textbooks on professional writing. Also artists who have been working in the area of Interactive Storytelling are members of the group.

4.4 Conclusion

This section reported on practical studies in authoring that have been conducted within the first year of IRIS. The practical conclusion is first of all that putting IS authoring into practice is a long-term experiment that will have to continue within the remainder of IRIS and beyond, as we only scratched the surface so far. There are many lessons learned on which the continuation can be directly based. Evaluation of the most recent venues is in progress.

As the goal of this report is the summary on creative principles in Interactive Storytelling, the following first impressions can be derived from the practical studies:

- **Process of abstraction:** The need for abstraction is an elementary difference perceived between “traditional” ways of storytelling and interactive storytelling with contemporary and future story engines. As sometimes was revealed in section 2, traditional storytelling implicitly includes the consideration of character goals, inner states of characters, action possibilities and much more. In Interactive Storytelling with engines that fall into the category of “highly interactive” and “generative”, these implicit considerations have to be made explicit.
- **Conditional nature of acting situations:** Beyond describing actions and happenings in detail, it is crucial that the conditional nature of each action is considered, including pre-conditions and effects, as well as a variety of other options valid in certain acting situations

By playing with these aspects, it was possible to achieve an abstraction of stories. However, there are many issues with the current state of the art that will be put into question in discussions and exercises at future events (list being non-exhaustive):

- Authors tend to think about concrete representations of actions while imagining the intended result. It was found useful to change constantly between abstract and concrete imagination. There was no preference for using a top-down approach.
- The current state of the art concerning representation (for example, of inner states present in IS engines) is often unsatisfactory, which turns off some authors, who would then like to directly influence the representation level and turn away from abstraction.
- End-user interaction has hardly been considered yet in any exercise made.

The results clearly show that this is work in progress. Future tasks take up the idea of using workshops as a testbed for educational material targeted at authors, which at the same time can foster valuable feedback being directed back to engine and tool development. Ideally, workshop participants are returning participants and have experience with professional storytelling,



documented by own published work. Then the obvious gap between known creative principles mentioned in section 2 and the practical exercises can be described more precisely and addressed in the educational material.



5. Conclusion and Outlook

This report looked at the state of the art of creative principles for the design of storyworlds running together with dynamic or generative story engines. It also gave a state of the art on creative principles for storytelling in general, which included peripheral disciplines from which – potentially – future authors will approach Interactive Storytelling. We approached this question from two opposite directions: First, looking at existing (“traditional”) storytelling principles, and second, looking at IS systems and their available tools with their affordances for conception and creation.

One first conclusion is that the development of design principles can only go in correlation with the existence of either a greater number of available designed storyworlds – including information on their design strategy – to be analysed, or by conducting designing exercises. The latter only makes sense together with available runtime systems, which must be used in order to experience the design decisions. Regarding such an exercise, the process has started within IRIS. The first year has laid the ground for more work in creative exploration.

The main conclusion regarding the state of the art is that there is a huge gap between technical approaches and missing creative knowledge. This is not a new finding, however, one of the first steps dealing with that gap is to be able to describe it in a better and more detailed way, resulting in new research questions. Future work will build upon that, for example:

- Further exercises in the abstraction process of stories
- Research into the situational aspects of actions within successful stories, and how to externalise the internal through event selection
- Research how user interaction can be included in the equation

At the outset for future interdisciplinary discourse, IRIS has initiated the building of an authors' interest group. Further work includes the design and testing of a basis of educational material that helps crossing that gap, the exploration of a shared design vocabulary, and further work with prototypes.



6. Appendices

This report has the following appendices and additional material providing more detail, which are available on request:

Section 4:

- Original reports of the student studies from the authoring seminar (available from FHE, in German language)
- Detailed categorisation of authoring tools in narrative concepts (available from FHE)
- ICIDS 2009 Paper: "Authoring Issues Beyond Tools" (Spierling and Szilas, 2009)
- Redcap Blog on Authoring Interactive Storytelling: System descriptions from an authoring perspective, with the IRIS contributions "Emo-Emma", "IDtension", "LinearLogic" and "Scenejo" (Online: <http://redcap.interactive-storytelling.de/>)
- List of authors collaborating with IRIS (open-ended)
- Authors' questionnaires of ICIDS workshop and other venues (open-ended)



7. References

- 1) (Aylett, 1999)
Aylett, R. 1999. Narrative in Virtual Environments - Towards Emergent Narrative. Proceedings, AAAI Fall Symposium on Narrative Intelligence, TR FS-99-01, AAAI Press (1999)
- 2) (Aylett et al., 2006)
Aylett, R., Figueiredo, R., Louchart, S., Dias, J., Paiva, A., 2006. Making it up as you go along - improvising stories for pedagogical purposes. In: Intelligent Virtual Agents, 6th International Conference, IVA 2006, Marina Del Rey, CA, USA, August 21-23, 2006, Proceedings 2006.
- 3) (Aylett et al. 2007)
Aylett, R., Vala, M., Sequeira, P., Paiva, A., 2007. FearNot! – An Emergent Narrative Approach to Virtual Dramas for Anti-bullying Education. In: Virtual Storytelling. Using Virtual Reality Technologies for Storytelling (ICVS 2007), pp. 202-210, Saint-Malo, France, December 5-7, 2007.
- 4) (Balet, 2007)
Balet, O., 2007. INSCAPE - An Authoring Platform for Interactive Storytelling. In: Virtual Storytelling. Using Virtual Reality Technologies for Storytelling (ICVS 2007), pp. 176-177, Saint-Malo, France, December 5-7, 2007.
- 5) (Baumer and Magerko, 2009)
Baumer, A., Magerko, B. 2009. Narrative Development in Improvisational Theatre. In: I.A. Iurgel, N. Zagalo, and P. Petta (eds.): ICIDS 2009, LNCS 5915, pp. 140–151, Springer-Verlag Berlin Heidelberg, 2009.
- 6) (Bateman, 2007)
Bateman, C. (ed.) 2007. Game Writing: Narrative Skills for Videogames. Featured by IGDA. Charles River Media, USA.
- 7) (Berger, 2009)
Berger, F., 2009. Methodische Spielleitung. Selbstverlag, Leipzig, 2009. (in German).
- 8) (Bernardi, 2009)
Bernardi, P., 2009. Improvisation starters – A collection of 900 Improvisation Situations for the Theater. Betterway Books, Cincinnati, Ohio, 1992.
- 9) (Bordwell, 1985)
Bordwell, D., 1985. Narration in the Fiction Film. The University of Wisconsin Press, Wisconsin, 1985.
- 10) (Brémond, 1980)
Brémond, C., 1980. "The Logic of Narrative Possibilities". In: New Literary History 11.3: pp. 387-411, The Johns Hopkins University Press, Baltimore, 1980.
- 11) (Brom et al., 2009)
Brom, C., Bida, M., Gemrot, J., Kadlec, R., Plich, T., 2009. Emohawk: Searching for a "Good" Emergent Narrative. In: Proceedings for Second Joint International Conference on Interactive Digital Storytelling (ICIDS 2009), pp. 92-97, December 9-11, Guimarães, Portugal, 2009.
- 12) (Campbell, 1947)
Campbell, J., 1947. The Hero with a Thousand Faces. 1st edition, Bollingen Foundation, 1949. 2nd edition, Princeton University Press. 3rd edition, New World Library, 2008.
- 13) (Charles et al., 2003)
Charles, F., Lozano, M., Mead, S. J., Bisquerra A. F., Cavazza M., 2003. Planning



Formalisms and Authoring in Interactive Storytelling. In: Proceedings for Technologies for Interactive Digital Storytelling and Entertainment (TIDSE 2003), Stuttgart, Germany, March 24-26, 2003.

- 14) (Chatman, 1978)
Chatman, S., 1978. *Story and Discourse: Narrative Structure in Fiction and Film.*, Cornell University Press, Ithaca, 1978.
- 15) (Chen, 2009)
Chen, S., Nelson, M. J., Sullivan, A., Mateas, M., 2009. Evaluating the Authorial Leverage of Drama Management. In: proceedings of the AAAI Spring Symposium (AAAI 2009), Palo Alto, USA, March 23–25, 2009.
- 16) (Cheong, 2008)
Cheong, Y.-G., Kim, Y.-J., Min, W.-H., Shim, E.-S., Kim, J.-Y., 2008. PRISM: A Framework for Authoring Interactive Narratives. In: Proceedings for the First Joint International Conference on Interactive Digital Storytelling (ICIDS '08), Erfurt, Germany, November 26-29, 2008.
- 17) (Crawford, 2004)
Crawford, C. 2004. *Chris Crawford on Interactive Storytelling.* New Riders Publishing.
- 18) (Crawford, 2009)
Crawford, C.: *Storytron Interactive Storytelling.* Project Website: <http://www.storytron.com/> (Last accessed: 2009-12-30)
- 19) (Cutumisu et al., 2007)
Cutumisu, M., Onuczko, C., McNaughton, M., Roy, T., Schaeffer, J., Schumacher, A., Siegel, J., Szafron, D., Waugh, K., Carbonaro, M., Duff, H., Gillis, S., 2007. ScriptEase: A Generative/Adaptive Programming Paradigm for Game Scripting. In: *Science of Computer Programming archive*, Volume 67, Issue 1, pp. 32-58, June 2007.
- 20) (Dade-Robertson, 2007)
Dade-Robertson, M., 2007. Visual Scenario Representation in the Context of a Tool for Interactive Storytelling. In: Proceedings for 4th International Conference (ICVS 2007), pp. 3-12, December 5-7, Saint-Malo, France, 2007.
- 21) (Dille and zuur Platten, 2007)
Dille, F. and zuur Platten, J. 2007. *The Ultimate Guide to Video Game Writing and Design.* Lone Eagle Publishing Company, New York.
- 22) (Donikian and Portugal, 2004)
Donikian S., Portugal, Jean-Noël, 2004. Writing Interactive Fiction Scenarii with DraMachina. In: Proceedings for Technologies for Interactive Digital Storytelling and Entertainment Conference (TIDSE 2004), Darmstadt, Germany, June 24-26, 2004.
- 23) (Dramaction, 2009)
Dramaction. <http://www.dramaction.qc.ca/improvisation/histoire.php> (Last accessed 2009-12-30)
- 24) (DSA4, 2009)
Wiki Aventurica of the DSA RPG (Das Schwarze Auge - The Dark Eye). http://www.wiki-aventurica.de/index.php?title=En:Main_Page (Last accessed 2009-12-30)
- 25) (Egri, 1946)
Egri, L., 1946. *The Art of Dramatic Writing.* Simon & Schuster, INC., New York, 1946
- 26) (Elson and McKeown, 2007)
Elson, J. E., McKeown, K. R., 2007. A platform for symbolically encoding human narratives. In Proceedings of the AAAI 2007 Fall Symposium on Intelligent Narrative Technologies, Arlington, Virginia, 2007.



- 27) (Four, 2009)
Four, J., 2009. Roleplaying Tips. Game Master Tips and Roleplaying Advice.
<http://www.roleplayingtips.com/> (Last accessed 2009-12-30)
- 28) (Genette, 1980)
Genette, G., Narrative Discourse. Cornell University Press, Ithaca, 1980.
- 29) (Göbel, 2008)
Göbel, S., Salvatore, L., Konrad, R. A., Mehm, F., 2008. StoryTec: A Digital Storytelling Platform for the Authoring and Experiencing of Interactive and Non-linear Stories. In: The First Joint International Conference on Interactive Digital Storytelling (ICIDS '08).
- 30) (Hayes-Roth et al., 1994)
Hayes-Roth, B., Sincoff, E., Brownston, L., Huard, R., and Lent, B. 1994. Directed improvisation. Stanford University Report KSL-94-61.
- 31) (Howard and Mabley, 1993)
Howard, D., and Mabley, E. (1993). The Tools of Screenwriting: A Writer's Guide to the Craft and Elements of a Screenplay. St. Martin's Press, New York, USA.
- 32) (Jhala and van Velsen, 2009)
Jhala, a., van Velsen, M., 2009. Challenges in Development and Design of Interactive Narrative Authoring Systems, a Panel. In: proceedings of the AAAI Spring Symposium (AAAI 2009), Palo Alto, USA, March 23–25, 2009.
- 33) (Kriegel and Aylett, 2007)
Kriegel, M., and Aylett, R. 2007. A mixed initiative authoring environment for emergent narrative planning domains. In Proceedings of the AISB Annual Convention, pp.453–456, April 2-4, Newcastle University, Newcastle upon Tyne, UK, 2007.
- 34) (Kriegel et al., 2007)
Kriegel, M., Aylett, R., Dias, J., Paiva, A., 2007. An Authoring Tool for an Emergent Narrative Storytelling System. In: AAAI Fall Symposium On Intelligent Narrative Technologies, Technical Report FS-07-05, AAAI press, Arlington, USA, pages 55-62, November 2007.
- 35) (Kriegel and Aylett, 2008)
Kriegel, M., Aylett, R., 2008. Emergent Narrative as a Novel Framework for Massively Collaborative Authoring. In: Intelligent Virtual Agents, 8th International Conference, IVA 2008, Tokyo, Japan, pages 73-80, September 2008.
- 36) (Laws, 2002)
Laws, R. D., 2002. Robin's Laws of good Game Mastering. Steve Jackson Games Incorporated, USA, 2002.
- 37) (LNI, 2009)
LNI. <http://www.lni.ca/fr/reglements-officiels.php3> (Last accessed 2009-12-30)
- 38) (Louchart and Aylett, 2003)
Louchart, S., Aylett, R.: Solving the narrative paradox in VEs - lessons from RPGs In: Proceedings of Intelligent Virtual Agents 2003, Springer LNAI (2003) 244-248
- 39) (Louchart et al., 2008)
Louchart, S., Swartjes, I., Kriegel, M., Aylett, R., 2008. Purposeful Authoring for Emergent Narrative. In: First Joint International Conference On Interactive Digital Storytelling, ICIDS 2008, Erfurt, Germany, Proceedings, pages 273-284, November 2008.
- 40) (Mateas and Stern, 2005)
Mateas, M., Stern, A. 2005. Procedural Authorship: A Case-Study Of the Interactive Drama Façade. In: Proceedings of Digital Arts and Culture (DAC), Copenhagen



- 41) (McKee, 1997)
McKee, R. (1997). *Story: Substance, Structure, Style, and the Principles of Screenwriting*. Harper Collins Publishers, New York, 1997.
- 42) (McNaughton et al, 2004)
McNaughton, M., Cutumisu, M., Szafron, D., Schaeffer, J., Redford, J., Parker, D., 2004. *ScriptEase: Generative Design Patterns for Computer Role-Playing Games*. In: 19th IEEE International Conference on Automated Software Engineering (ASE '04), Linz, Austria, pp. 88-99, September 2004.
- 43) (Medler and Magerko, 2006)
Medler, B., Magerko, B., 2006, *Scribe: A Tool for Authoring Event Driven Interactive Drama*. In: *Technologies for Interactive Digital Storytelling and Entertainment (TIDSE 2006)*, Darmstadt, Germany, December 4-6, 2006.
- 44) (Pizzi, 2008)
Pizzi, D., Cavazza, M., 2008. *From Debugging to Authoring: Adapting Productivity Tools to Narrative Content Description*. In: *Proceedings of the 1st Joint International Conference on Interactive Digital Storytelling (ICIDS 2008)*, Springer, November 2008.
- 45) (Plato et al., 1992)
Plato, Grube, G. M. A., Reeve, C. D. C. 1992. *Plato: Republic*. Hackett Publishing Company, 2nd edition, November 1992.
- 46) (Raddatz and Kamaris, 2003)
Raddatz, J., Kamaris, H., 2003. *Berge aus Gold*. Fantasy Productions GmbH, Erkrath, 2003. (in German)
- 47) (Redcap, 2009)
Little Red Riding Hood Workshop: The Authoring Process in Interactive Storytelling. <http://redcap.interactive-storytelling.de/> (Last accessed 2009-12-31)
- 48) (Riedl, 2009)
Riedl, M. O., 2009. *Incorporating Authorial Intent into Generative Narrative Systems*. In: *AAAI Spring Symposium (AAAI 2009)*, Stanford, California, USA, March 23–25, 2009.
- 49) (Roberts et al., 2009)
Roberts, D. L., Riedl, M. O., Isbell, C. L., 2009. *Beyond Adversarial: The Case for Game AI as Storytelling*. In: *Proceedings for the Conference of the Digital Games Research Association (DiGRA 2009)*, London, UK, 2009.
- 50) (Sauer et al., 2006)
Sauer, S., Osswald, K., Wielemans, X., Stifter M., 2006. *U-Create: Creative Authoring Tools for Edutainment Applications*. In: *Technologies for Interactive Digital Storytelling and Entertainment (TIDSE 2006)*, pp. 163-168, Darmstadt, Germany, December 4-6, 2006.
- 51) (Schneider et al., 2003)
Schneider, O., Braun, N., Habiger, G., 2003. *Storylining Suspense: An Authoring Environment for Structuring Non-Linear Interactive Narratives*. In: *The 11-th International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision'2003 (WSCG 2003)*, Plzen - Bory, Czech Republic, 2003.
- 52) (Si et al., 2008)
Si, M., Marsella, S. C., Riedl, M. O., 2008. *Integrating Story-Centric and Character-Centric Processes for Authoring Interactive Drama*. In: *Proceedings of the 4th Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE 2008)*, Palo Alto, California, 2008.
- 53) (Si et al., 2008)
Si, M., Marsella, S. C., Riedl, M. O., 2008. *Interactive Drama Authoring with Plot and Character: An Intelligent System that Fosters Creativity*. In: *Proceedings of the AAAI Spring Symposium on Creative Intelligent Systems (AAAI 2008)*, Palo Alto, California, 2008.



- 54) (Silverman et al., 2003)
Silverman, B. G., Johns, M., Weaver, R., Mosley J., 2003. Authoring Edutainment Stories for Online Players (AESOP): Introducing Gameplay into Interactive Dramas. In: International Conference on Computer Vision Systems (ICVS 2003), New York City, USA, April 1-2, 2003.
- 55) (Skorupski, 2007)
Skorupski, J., Jayapalan, L., Marquez S., Mateas M., 2007. Wide Ruled: A Friendly Interface to Author-Goal Based Story Generation. In: Virtual Storytelling. Using Virtual Reality Technologies for Storytelling (ICVS 2007), pp. 26-37, Saint-Malo, France, 2007.
- 56) (Skorupski and Mateas, 2009)
Skorupski, J., Mateas, M., 2009. Interactive Story Generation for Writers: Lessons Learned from the Wide Ruled Authoring Tool. In: Digital Art and Culture, 2009.
- 57) (Skorupski, 2009)
Skorupski, J., 2009. Storyboard authoring of plan-based interactive dramas. In: Proceedings of the 4th International Conference on Foundations of Digital Games (FDG 2009), Orlando, USA, April 26-30, 2009.
- 58) (Sobral et al., 2003)
Sobral, D., Machado, I., Paiva, A., 2003. Managing Authorship in Plot Conduction. In: Virtual Storytelling. Using Virtual Reality Technologies for Storytelling (ICVS 2003), Toulouse, France, 2003.
- 59) (Söderberg et al. , 2004)
Söderberg, J., Waern, A., Åkesson, K-P., Björk, S., Falk, J. 2004. Enhanced Reality Live Role Playing. In: Workshop on Gaming Applications in Pervasive Computing Environments. In: Second International Conference on Pervasive Computing (ICST 2004), Vienna Austria, April 21-23, 2004.
- 60) (Spierling and Iurgel, 2006)
Spierling, U., Iurgel, I. 2006. Pre-conference Demo Workshop "Little Red Cap": The Authoring Process in Interactive Storytelling. In: Technologies for Interactive Digital Storytelling and Entertainment (TIDSE 2006), Darmstadt, Germany, December 4-6, 2006.
- 61) (Spierling et al., 2006)
Spierling, U., Weiß, S., Müller, W., 2006. Towards Accessible Authoring Tools for Interactive Storytelling. In: Technologies for Interactive Digital Storytelling and Entertainment (TIDSE 2006), pp. 187-192, Darmstadt, Germany, December 4-6, 2006.
- 62) (Spierling, 2007)
Spierling, U., 2007. Adding Aspects of "Implicit Creation" to the Authoring Process in Interactive Storytelling. In: Virtual Storytelling. Using Virtual Reality Technologies for Storytelling (ICVS 2007), Saint-Malo, France, December 5-7, 2007.
- 63) (Spierling, 2008)
Spierling, U., Iurgel, I., 2008. Workshop and Panel: The Authoring Process in Interactive Storytelling. In: International Conference on Interactive Digital Storytelling (ICIDS 2008), Erfurt, Germany, November 26-29, 2008.
- 64) (Spierling et al., 2009)
Spierling, U., Iurgel, I., Richle, U., Szilas, N., 2009. Workshop on Authoring Methods and Conception in Interactive Storytelling. In International Conference on Interactive Digital Storytelling (ICIDS 2009), Guimarães, Portugal, December 09 - 11, 2009.
- 65) (Spierling, 2009)
Spierling, U., 2009. Conceiving Interactive Story Events. In: In International Conference on Interactive Digital Storytelling (ICIDS 2009), pp. 292-297, Guimarães, Portugal, December 09 - 11, 2009.



- 66) (Spierling and Szilas, 2009)
Spierling, U., Szilas, N., 2009. Authoring Issues Beyond Tools. In: In: In International Conference on Interactive Digital Storytelling (ICIDS 2009), pp. 50–61, Guimarães, Portugal, December 09 - 11, 2009.
- 67) (Sumi, 2009)
Sumi, K., 2009. Interactive Storytelling System Using Recycle-Based Story Knowledge. In: Proceedings Second Joint International Conference on Interactive Digital Storytelling (ICIDS 2009), pp. 74-85, Guimarães, Portugal, December 9-11, 2009.
- 68) (Swartjes and Vromen, 2007)
Swartjes, I., Vromen, J., 2007. Emergent Story Generation: Lessons from Improvisational Theater. In: AAAI Fall Symposium on Intelligent Narrative Technologies, Arlington, Virginia, USA, November 9-11, 2007.
- 69) (Swartjes and Theune, 2009)
Swartjes, I., Theune, M., 2009. Iterative Authoring Using Story Generation Feedback: Debugging or Co-creation? In: Second Joint International Conference on Interactive Digital Storytelling (ICIDS 2009), pp. 62-73, Guimarães, Portugal, December 9-11, 2009.
- 70) (Szilas et al., 2003)
Szilas, N., Marty O., Réty, Jean-Hugues, 2003. Authoring Highly Generative Interactive Drama. In: International Conference on Computer Vision Systems (ICVS 2003), Toulouse, France, 2003.
- 71) (Szilas, 2005)
Szilas, N., 2005. The Future of Interactive Drama. In: Proceedings of the second Australasian conference on Interactive entertainment, pp. 193-199, Sydney, Australia, 2005.
- 72) (Szilas 2007)
Szilas, N., 2007. BEcool: Towards an Author Friendly Behaviour Engine. In: Virtual Storytelling. In: : International Conference on Computer Vision Systems (ICVS 2007), Saint-Malo, France, December 5-7, 2007.
- 73) (Tanenbaum and Tanenbaum, 2008)
Tanenbaum, J., Tanenbaum, K. 2008. Improvisation and Performance as Models for Interacting with Stories. In: Proceedings of the 1st Joint International Conference on Interactive Digital Storytelling: Interactive Storytelling, Erfurt, Germany, pp. 250-263, 2008.
- 74) (Thomas and Young, 2006)
Thomas, J. M., Young, R. M., 2006. Author in the Loop: Using Mixed-Initiative Planning to Improve Interactive Narrative. In: Workshop on AI Planning for Computer Games and Synthetic Characters (ICAPS 2006), Ambleside, The English Lake District, U.K., June 6-10, 2006.
- 75) (Thomas, 2006)
Thomas, J. M., 2006. Collaborative Authoring of Plan-Based Interactive Narrative. In: Workshop on AI Planning for Computer Games and Synthetic Characters (ICAPS 2006), Ambleside, The English Lake District, U.K., June 6-10, 2006.
- 76) (Thue et al., 2007a)
Thue, D., Bulitko, v., Spetch, M., Wasylishen E., 2007. Learning Player Preferences to Inform Delayed Authoring. In: AAAI Fall Symposium on Intelligent Narrative Technologies (AAAI 2007), pp. 158-161. AAAI Press. Arlington, Virginia, USA. November 9, 2007.
- 77) (Thue et al., 2007b)
Thue, D., Bulitko, V., Spetch, M., Wasylishen, E., 2007. Interactive Storytelling: A Player Modelling Approach. In: The Third Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE 2007). pp. 43-48. Stanford, California, USA. June 6, 2007.



- 78) (Thue et. al., 2008)
Thue, D., Bulitko, V., Spetch, S., 2008. Making Stories Player-Specific: Delayed Authoring in Interactive Storytelling. In: The First Joint International Conference on Interactive Digital Storytelling (ICIDS 2008): pp. 230-241. Erfurt, Germany. November 26, 2008.
- 79) (Ursu et al., 2007)
Ursu, M. F., Cook J. J., Zsombori V., Kegel I., 2007. A Genre-Independent Approach to Producing Interactive Screen Media Narratives. In: AAAI Fall Symposium on Intelligent Narrative Technologies (AAAI, 2007), pp. 173-180. AAAI Press. Arlington, Virginia, USA. November 9, 2007.
- 80) (Vaucelle and Davenport, 2004)
Vaucelle C. and Davenport G., 2004. A System to Compose Movies for Cross-Cultural Storytelling: Textable Movie. In: Technologies for Interactive Digital Storytelling and Entertainment Conference (TIDSE 2004), Darmstadt, Germany, June 24-26, 2004.
- 81) (Wages et. al., 2004)
Wages R., Grützmacher B., Conrad S., 2004. Learning from the Movie Industry: Adapting Production Processes for Storytelling in VR. In: Technologies for Interactive Digital Storytelling and Entertainment Conference (TIDSE 2004), pp. 119-125, Darmstadt, Germany, June 24-26, 2004.
- 82) (Wäsch, 2009)
Wäsch, D., 2009. Spielleiten, Prometheus Games Verlag, Duisburg, 2009. (in German)
- 83) (Zancanaro et al., 2001)
Zancanaro, M., Cappelletti, A., Signorini, C., Strapparava, C., 2001. An Authoring Tool for Intelligent Educational Games. In: Virtual Storytelling Using Virtual Reality Technologies for Storytelling (ICVS 2001), pp. 61-68, Avignon, France, September 27-28, 2001.