Use of Narrative Structures in New Media solutions for Museums

Digital Storytelling in Museums and in Other Narrative Spaces Aimed to Large Audience

Abstract

In my research I would like to apply the models of early Russian Formalists as well later structuralists to analyze the means of interactive script writing. As a part of my research project my intention is to produce interactive new media installations for museums. My research will include a theoretical part and a project for museums (or several smaller projects done with my students in Multimodal Museum Interface – MUMMI study project in UIAH Media Lab).

A central approach of my research is user-centered design and accessibility as major design principles. Therefore utilizing attentive user interfaces and multimodal interaction models in museums is a key challenge. Digital applications for wide public audiences should be as easy to use as a physical exhibition. (Actually digital media applications should be easier to use. There are studies, which show that in order to switch to a new mode of interaction, there is a need to make it ten times as beneficial for the user. Otherwise, the user´s "investment" in learning new ways of interaction is not justified.) The use of new technologies like eye-tracking, multimodal interfaces and applying design-for-all -principles in Web-design could lead us to innovative but yet simple and profitable solutions. Multimodality – for example – in media allows people to interact with various senses, hearing, seeing, gesturing unless like traditional graphic user interfaces. Utilizing design-for-all –principles in new media production means designing mainstream products and services to be accessible by as broad a range of users as possible.

For Finnish museums, the use of digital media as on-line and in-site e-learning solutions and media kiosks is still quite rare. For most of the museums – especially in the countryside – the use of Internet and the idea of producing Web based e-learning materials, not to speak about the idea of sharing their resources for wider audience, is still quite strange. Lots of resources are directed to digitalization of collections in museums, but representing the assets by means of using the digital medium is still a unattainable new idea. For my research, I would like to present new and innovative ways for museums to use digital media, in order to draw new audiences to museums and to produce a narrative interactiveweb-based e-learning material for collaborative teaching and learning environments.

The basic research question is whether it is possible to create narrative, interactive spaces for museums, aimed for the general audience, by applying the method of narrative structures, introduced by formalists and structuralists.

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Keywords

Digital storytelling, narration, user centered design, design-for-all, usability in media design, accessibility in museums, museum pedagogy, formalism, structuralism, attentive user interface, multimodality, narrative public environments

Background

Museums are places of thousands stories. In-site media installations and on-line web-based e-learning services are largely used in museums with the aim to re-present their assets.[1] Forums of cultural heritage are always targeted for a vide audience and therefore finding attractive, easy-to-use applications for museums is a vital challenge.

Theories and surveys about hypertext link interactivity and textual narration. The models of interactive storytelling are also widely studied area but interactive and un-linear stories – often described as "The Garden of Forking Paths" still offers user a limited selection of choices. Interactivity means that all the choices for user is planned in advance. To be immersive, participatory, responsive and reactive, (Meadows, 2003, s. 37) – like natural human communication – interactive storytelling needs many kinds of rules and regulations to work in flexible way. When we know how the story functions – in traditional fiction as well as in interactive media – it is possible to create and produce stories where users/readers really could have a significant role.

Russian Formalists was the root of development from text structuralism to semiotics in Eastern Europe. The Formalists goal was to develop a scientific approach to literature and art. In their contributions to the study of narrativity, the Formalists were considered with structures of content (Nöth, 1990). Although Vladimir Propp was not generally considered one of the formalists he was a pioneer of text structuralism. His studies of Russian fairytales are discovered recently anew and applied to the study of interactive storytelling. Vladimir Propp studied several Russian fairytales (Propp, 1928) and found 31 units, variants of which are found in most of the fairytales. He called them functions and showed how these functions serve as dramatic units of a story. In my previous study (Mäenpää 2003) I also found similar functions in the structure of interactive multimedia. It proved possible to decompose a script and find the units that function as a knot in interactive action. The successors of Propp like Claude Bremond (19xx) and A. J. Greimas (1966) and even Roland Barthes (1964) developed further the ideas of Propp and other formalists. I find these models valuable for analyzing and composing interactive media. (Mäenpää, ibid,) I see that the more profound semiotic approach can give valuable tools to analyze as well as compose interactive stories.

Composing and script-writing multimedia and interactive media is about writing sketches and perceiving the structure of the work. In interactive narrative games, for example, one can find constant functions that recur in most of the games and act as narrative elements in the story. Eddo Stern calls them *artifacts* (Stern, 2002, s. 239).

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[1] See: http://www.archimuse.com/mw2004/best/index.html – annual Museum and the Web –conference is presenting and evaluating culture heritage Web-site design)

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To collect user experiences in museums I need survey existing studies done about the users of the museums. During the cooperation and multimedia productions for Finnish National Museum (during 1998-2000) and Finnish National Gallery (Haapalainen et al, 2003) I became acquainted with the museum pedagogical studies and studies about the accessibility done in Finnish museums recently (Salovaara, 2002). It will be also necessary to collect and evaluate the user experience in some previous Web-based e-learning materials produced by museums.

Digital storytelling and narrative structures

Storytelling as a direct way to communicate information from one person to several others has tradition in human history. Stories originally are invented to give a social closure among people, to help them understand and manipulate their environments. The communication is oral or visual, instant or recorded, via a narrator or by interaction (e.g. while gaming) in several forms of electronic media, such as TV, CD, movies or game consoles, the computer and Internet.

Stories create meaning by providing a known context. Narrative is a means of representing and expressing. People can apprehend, describe and tell their world trough stories. In digital storytelling and multimedia, the content of a story is organized and structured in a new way, and new approaches try to establish these – often entertainment and gaming – aspects in the works process to make it more pleasant and efficient. Interactivity, in its best sense, means that a role is given also to the user and the reader.

Interdisciplinary approaches of linear and "traditional" storytelling (i.e. movies, fiction) are required, comprising human sciences, literary theory, design and computer science - to explore how narration could be interactive. This includes research in a story´s dramatic structures as well as the study of scenic representation of stories, computer generated actors, humanlike interaction.[2]

While seeking ways to recognize the narrator of a story in his classical study of poetic discourse, Seymor Chatman lists the necessary components of a narrative using the structuralist theory of dividing story into a smaller parts. Dramatic structures could be separated into two parts: First a story (*histoire)*, the content or chain of events (actions, happenings), characters, items of settings; and second: a discourse (*discours*), the expression, the means by wich the content is communicated. (Chatman 1978, 19). These same parts exist in the theories of Russian formalists. They make the distinction between the "fable" (*fabula)* the basic story, the sum of total events to be related in the narrative, and the "plot" (*sjuzet)*, the story as actually told by linking the events together. *Fabula* is the story itself, events told in a chronological order and *sjuzet* the way story is told, the choices narrator has used.

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[2] Human-like interactivity in museums could be constructed by using interactive environments like virtual reality, augmented reality, mixed reality applications or using multimodal and attentive user interfaces and all other kinds of means of interactive media.

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The GEIST-project of Computer Graphics Center ZGDV for the Castle of Heidelberg is a good example of narrative environment in a game-based learning application using VR/AR technology and applying formalists theories in interactive story telling.(Braun et al, 2002). When defining the model of script, they found the functions of Vladimir Propp´s morphological model of 31 functions very useful. In their project they found that also in interactive media functions of characters serve as stable constant elements, independent of how and by whom they are fulfilled. When Propp discovered that the number of functions is limited, he showed how one can generate new storylines by algorithmically processing the semiotic structure. In GEIST project it was found that it is possible to get a machine-usable structure of interactive stories by the morphological processing of several narrative sequences and dramaturgical classification (so-called *dramatis personae*) of the story's characters. In GEIST project it was shown that the semiotic approach to story morphology by Propp (Propp 1928) offers the properties needed by Digital Storytelling. Propp defines a story as a set of morphological functions, dependent of the dramatic characters within those functions. He writes that "…function is understood as an act of a character, defined from the point of view of its significance for the course of the action…//… This way, it is possible to narrate variants of a story, based on the author's constraints and user interaction. The resulting story engine performs the story on two abstract levels". (Braun et al, 2002)

In the GEIST production it is interesting how a real-time user-adapted storyline is generated by processing the collection of playable function sequences. The story is narrated by mapping the functions on real scenes. This kind of automated narration fits in with the definition of Digital Storytelling and is used in several projects of ZGDV .(Braun et al. 2002)

Another model of using narrative structure in a digital application for museum is the chat-bot Sanelma, a demo for Finnish National Gallery made by students of UIAH Media Lab as MUMMI-study project fall 2003 under my supervision. Chat-bot is a virtual character with whom user communicates textually. Chat-bot technology is based on the metadata of words and lines, a certain word or line written by the user gives certain answer from the chat-bot. The user could have a feeling of natural communication when she/he is chatting with a chat-bot. The metadata of words and lines is collected after research of the potential user groups – middle aged women, school pupils and others most common museum visitors…//… Different persons, three boyfriends, auntie Hetta and in the neighbor apartment an artist with his wife lives in Sanelma´s surroundings. By quoting these characters Sanelma happens to tell some vital things and details about the life in Helsinki in 1930. (Mäenpää et al. 2003)

Museums as narrative spaces

The ease with which it is possible to make any information accessible through the World Wide Web has led to an explosion of virtual repositories. For example, many art museums have digitized versions of their collections. However, besides being a catalogue of a museum collection, the value of such repositories for any kind of knowledge transfer is highly questionable. Seeing a thumbnail of Hugo Simberg´s painting, or even a 'large' image, can hardly convey the essence of artists technique.

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Slavko Milekic stresses also, that the same is true for science museums where, for example, a photograph of Galileo's telescope and an abstract diagram of its optics conveys much less information than what one would get through playing with various lenses and a paper tube. Note that playing with telescope parts creates a unique experience that in view of many cognitive sciences is the basic building block for any knowledge acquisition. (Milekic 2002).

The Internet – like other digital and multimedia applications – offers a major opportunity for the dissemination of cultural heritage beyond national and cultural barriers. However, this promotion and dissemination of content rich and complex information to ever broadening audiences requires also technological and content-based innovations, which would support high quality presentation, user-friendliness and accessibility.

For instance, information provided in monomodal formats (i.e. media that uses only limited parts of senses, e.g. a Graphic User Interface using only vision) cannot be easily accessed by mobile users, and it falls beyond the reach of e.g. visually impaired or the deaf users altogether. At the same time, rapidly evolving multimedia narration and technology offers new options for relating, perceiving and learning from the museum collections in different, multi-sensory ways. By making use of these options and challenges and taking into account the users' perspective, their own needs and interests, as well as communication languages (signed, written and spoken languages), the access to the world of cultural heritage could be extended to a wider range of audience groups through multimodal formats.

Foreground

In my research I will apply the models of early Russian Formalists like Vladimir Tynjanov and Boris Tomashevsky and Vladimir Propp as well later structuralists like Claude Bremond, A.J. Greimas and further Roland Barthes to analyze and produce interactive digital media installations for museums. It is necessary to study further the models of narrative structures and explore the narrative role of museums: how museums can tell stories and make connections by means of interactive digital story telling. The functions of narration and artifacts of narrative games are the elements that I intend to use in the production of interactive media for museums. My ideal is to create interactive stories which could use the same archetypes like TV-series or Hollywod-films are using – and which Vladimir Propp found in his morphological study: good-guys, bag-guys, mean step-mothers, liberators, antagonists.

Research question and claims

In my research I´ll raise several issues and claims, targeted to the basic research question: is it possible to create narrative, interactive spaces for museums to wide audience by applying method of narrative structures used by formalists and structuralist.

During my research I have to find answers further questions like,

- how narrative structures function as components of an interactive story
- how digital media and interactive story can introduce new dimensions to the experience museums wish to create
- how museums – at the same time they treasure the cultural heritage – could represent their assets by telling stories
- how Finnish museums can capture the world wide level of producing web based e-learning material
- how to produce profitable and accessible concepts for museums
- will the e-learning material and virtual exhibitions increase the number of visitors in museums
- will the new media application in museums increase new audience

One central hypothesis of my research is, that well designed, accessible interactive, narrative new media application – weather it is a kiosk or www-page bring more and new audience to the museums. Museums are ready to share they resources and assets for wider audience through the Internet and there is a big need to present the content in meaningful and attractive way.

Goals

1) A storytelling component helps us to include a story as a medium to create curiosity and motivation and to convey the teaching material of the museum at the same time. Applications influencing further development, such as the storytelling component, can be linked via the collaborative components and thereby alter virtual objects themselves

2) My research seeks to promote cooperation in production with the museums for new media applications. By the project I wish to create a concept of narration for present the content of museums. Through the concept I wish to indicate how dramatized digital content presented on-line or in-site in physical museum exhibition brings extra value and more new groups of visitors to museums.

3) The research aims to incorporate the content-rich and versatile cultural heritage information with the latest innovations on digital interactive applications and installations. It also aims to enhance the understanding of museum visitors, their expectations of museum visit (both on-line and in-site) and their various needs during the visit. During my research project I wish to create cultural heritage content that is meaningful, intelligible, and communicable for its users - regardless of their backgrounds, skills and learning styles or strategies.

4) The general importance of my research will be the presentation of concepts and models for Finnish museums to deliver their assets to wider audience in attractive way. The importance here is also to present arguments for accessibility in public spaces – also in virtual ones.

Since my hypothesis is to find out whether a well-designed new media application will bring more audience to the museums, one goal is to find out how much resources museums have to put to the productions of new media.

Evidence

The main evidence will be collected during the study project and evaluating the existing media in museums as well as in theme parks and World Expos. One proof for my hypothesis is that innovative, professionally produced Web-based e-learning materials rather bring the audience to the museums than drive them away.

Methods

The survey methods will be chosen from a variety of alternative methods. The main method is to use applied study of structuralist theories in new media design process. One point comes out from the activity theory (Nardi, 1996).

User-centered design is a methodic umbrella under which I intend to study the role of user, museum visitor and designer and the tools are used in scrip writing process. (about user-based and goal-based design: Schank, 1992, Jones, 1999) Collaborative productions require artistic methods in design and script writing as well research of theoretical background of narrative theories (using narrative theories see: Alasuutari, 1999)

The projects included my research will serve as a source of material as well as – what comes to the applying narrative theories to scriptwriting – a base to proof my hypothesis.

Self-evaluation

According to my claims, self-evaluation has to be done at least in two phases: first there is a need to evaluate how narrative structures work in interactive media production and script-writing process. The second phase is to find out how the users interact with the media (in-site or on-line), and whether the storyline is easy to use and attractive, does the media installation bring extra value to the museum visitor, and what kind of multimodal interfaces are best for vide public audience, as initially claimed.

General importance and relevance

The relevance of design for museums is to stress the importance of design new media applications for the wide public. Finnish museums are largely involved with the digitalization processes. For example in MuseoSuomi –project run by Finnish Museum Association and University of Helsinki Finnish museums are committed to digitalize their content and deliver it through a semantic web portal. But still for large audience to compose general meaning from digitalized – even semantic – archives might be difficult. In my study I wish to show that digitalized archives could represent by means of stories and let them serve as narrative interactive e-learning interfaces.

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Research community and supervision

My main research community will be the Media Lab of University of Art and Design Helsinki. The Media Lab offers great multidisciplinary environment and background for my studies – to start with the research done by dr. Lily Diaz in the field of representing digital cultural heritage. The research done about collaborative learning environment and e-learning systems in Media Lab will be valuable basis to my own study. The Crusible studio coordinated by Lume and Media Lab could be ideal environment to do comparative and collaborative study projects. Part of my research is to work as a coordinator of the recent MUMMI study project in UIAH Media Lab. MUMMI has a vital part in the studies where Media Lab students, researches and designers of have to consider user friendly and user centred design methods. The MUMMI as a "Design for All & accessibility to art history" -study project has several goals. First of all it aims to benefit from the concepts like accessibility and usability, and methods like Design for All, eAccessibility, Cultural Usability, IT, ICT.

Second goal is to gather together all the cumulative knowledge and research done in Media Lab about these issues. What do these principles mean when designing and planning media for wide audiences, media presentations for museums and virtual museums? Naturally, these methods should also be self evident principles when designing new media solutions for every kind of public usage.

To study Multimodal interfaces is to understand the conversational interface design of the future. Multimodality means flexible use of input modes depending on the setting. In multimodal interface speech, signing, gesture, pen could be a vital part of interaction between human and the computer. Flexible use means broader range of users from ordinary citizens, children, elderly to culturally diverse users.

MUMMI study project is already well linked to the museums of Finland. It is collaborating with the Finnish Museum Association and largely with the Finnish National Gallery and it´s developing unit KEHYS. The director of KEHYS Marjatta Levanto is one of the supervisors in MUMMI study project.

International museum and media research community is linked with various cultural heritage forums. For my perspective the Department of Digital Storytelling in Darmstadt, Germany Zentrum für Gaphische Datenverarbeitung e.V. (ZGDV) is doing an utmost interesting study about typical narrative environments and dramaturgical designed digital edutainment systems.

Through my previous studies in University of Helsinki my research is linked with the department of foreign literature as well as to the department of Slavic Studies. Professor Pekka Pesonen is the main supervising source for my research of Russian formalists and professor Pekka Tammi (now from the University of Tampere) my link to the narrative theories.

Professor Slavko Milekic has promised to work as my supervisor during the research project. He holds a medical degree (Belgrade School of Medicine) as well as Ph.D. in Experimental Psychology (University of Connecticut). His research interests include

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digital design, the psychology of human/computer interaction and building of WWW-based tools for knowledge transfer. Dr Milekic's innovative, child-friendly digital environment (KiddyFace) has been already implemented in a museum setting He currently holds the position of an associate professor of Cognitive Science & Digital Design at the University of the Arts in Philadelphia. See also: http://www.uarts.edu/faculty/smilekic

Schedule

In my present work as a researcher and teacher in UIAH Media Lab it is possible to lead a study group which aim is to create concepts and produce media for museums.´I´m planning to finalize my research in four years – partly working as a full time researcher in Media Lab and – at least durig the last year working as a full time researcher.

year	task	deliverable
04-05	creating concepts, studying the narrative structures planning with museums, literature survey	Model of interactive narrative script, Project plan for museum
05-06	Starting the project, funding, collaboration with ZGDV, UARTS	Demo version, testing, analyzing the 1st user experiences
06-07	production	User tests, user interviews
07-08	Writing, evaluating, analyzing	Evaluation, dissertation

Funding plan

As a full time teacher and researcher my funding is covered by the UIAH. For the project and production is needed to get funding from Ministry of Education (partly funding already the digitalization process of museums) and from other sources (Tekes, Avek, Finnish foundations). My aim is to get 100 % funding for the last year of research.

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For your background the EOWG home page and charter are available:
http://www.w3.org/WAI/EO/
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David Siegel & Jakob Nielsen
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"Siegel's legacy lives on in the thick ranks of designers who see the Web as a medium for artistic expression. The evolution of the Web medium continues to be heavily influenced by "Siegel designers". The irony is that David Siegel long ago ceased to be one of them."

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http://mlab.uiah.fi/interact/index.html

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Web Accessibility Resources http://snow.utoronto.ca/access/resources/index.html

SNOW Special Needs Opportunity Windows
http://snow.utoronto.ca/access/index.html

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