

An Edutainment Approach to Academic Teaching

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ABSTRACT

In this paper, we describe an approach to academic teaching in computer science using storytelling as a means for background research to hypermedia and virtual reality topics. It is shown that narrative activity within the context of a Hypermedia Novel related to educational content can enhance motivation for self-conducted learning and in parallel lead to an edutainment system of its own. The narrative practice and background research as well as the resulting product can supplement lecture material with comparable success to traditional academic teaching approaches.

Keywords

edutainment, digital storytelling, hypermedia

1. INTRODUCTION

It is a well-known fact that people memorize facts and ideas better when they are emotionally involved. In addition, memorization is supported by reception of content through multiple sensory channels [1]. Various E-Learning Tools make use of this knowledge. However, the success of E-Learning often suffers from a lack of motivation for self-conducted studies [2].

The reception of a well-told narrative usually includes a high degree of emotional involvement. It also often triggers the motivation to learn more about the background facts, especially in a historical, scientific, or technological context. Current documentary productions in TV tend to mix the presentation of facts and dramatic scenes to keep the spectator interested (and emotionally involved). Hypermedia-based E-Learning environments are well-suited to fulfill the desire for background information directly related to narrative content, which may well close the previously mentioned motivation gap.

Active research of literature as well as demonstrations and interviews with experts instead of passive reception of educational material also enhances memorization. This is particularly valid with respect to background research for narrative writing. Even for most fictional stories authentic details have to be included [3]. The author has always to know much more about the background of a story (including the facts behind the fiction) than he eventually tells to the recipient. In addition, developing narrative content is a highly creative process, filled with emotion and – maybe even more important in terms of motivation – fun.

The integration of storytelling and non-linear story reception in a Hypermedia environment linking narrative and informational content seems therefore to be a promising concept for edutainment.

2. THE HYMN PLATFORM

As an extension to previous storytelling paradigms combining several media, the Hypermedia Novel (HyMN) has been introduced as a generic concept for digital storytelling [4], as well as a platform for narrative edutainment applications [5]. The HyMN paradigm integrates different user roles like receptor, author, and publisher in a single environment, allowing personalized as well as distributed story reception and storytelling.

Two approaches to HyMN structuring have been described so far [6]. Both define a combination of serial and parallel structure elements for the organization of Narration Modules (NarMo) as atomic semantic units. These units resemble the “movement” as defined by Sharda [7] as basic narrative building blocks. In a Hypermedia

Novel, however, atomic narrative units (ANU) are distinguished from media units (Content Modules – CM), which are often, but not always, identical. Serial Containers (SC) represent a logical order of reception, while Parallel Containers (PC) offer alternatives, which are equal in narrative content but different in media, viewpoint, level of detail, etc. Depending on the choice among these alternatives, several different paths lead through a single story. Branching threads offer the possibility for the recipient to make decisions that may change the plot (thereby strengthening the interactive aspect) – and also of relating information material to the story.

The relationship of the different structural elements of a Hypermedia Novel is depicted in Figure 1.

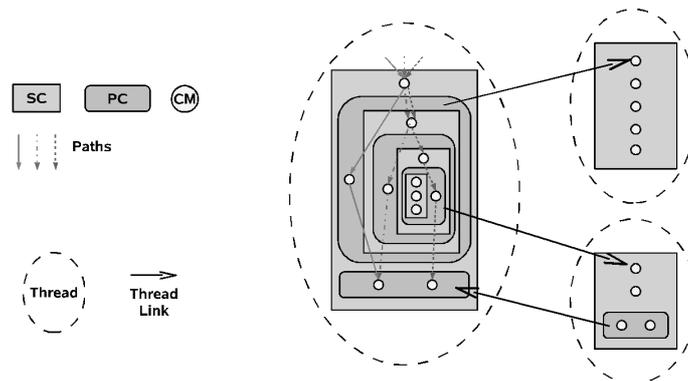


Figure 1. Hierarchical structure of a Hypermedia Novel (including separate threads plus some paths and thread links):
SC = Serial Container (sequential scenes, vertical)
PC = Parallel Container (alternatives, horizontal)
CM = Content Module (atomic narrative unit within one media block)

3. EDUTAINMENT EXPERIMENT

3.1 Edutainment Concept

Students were asked to produce multimedia content for narration modules extending a given exposé. The story was designed such that topics related to the teaching content were covered by essential stations of the plot, thus requiring deeper investigation of the subject in order to tell the story consistently. Different research subjects were distributed over several groups of students. The research results were reported by these groups in project-internal workshops, supplemented by additional lectures and educational documents. Visits of cooperating research institutes including discussion with experts brought additional insight to the topics.

For those students with less creative interest there was a more technical work package devoted to the development and improvement of the HyMN platform itself.

3.2 Teaching Content

The lecture subject was “Advanced Hypermedia”. Topics included were advanced hypermedia application development and immersive virtual environments (VE) as a special hypermedia interface.

3.2.1 Content units

The teaching content (in the VE area) was related to several chapters of a science fiction story (“Butterfly dreams”), covering the following aspects of VE technology and research:

- Virtual TV studios (VTV)
- Immersive Virtual Environments (IVE)
- Human Perception and Simulators (HPS)

Supplementing the VE topic, the following areas were covered by the project:

- Hypermedia technology, including XML, compression formats for multimedia data, etc. (HMT)
- Storytelling theory (STT)
- Cosmology and space travel (CST)

This sums up to six units of teaching content.

3.2.2 Teaching channels

Teaching content was imparted through several different channels:

- background research for narrative content, including interviews with scientists at leading-edge research institutes
- practical use of technology for production of multimedia and hypermedia documents,
- seminaristic presentation of research results,
- supplemental information (demand-oriented) on all topics via traditional lecturing,
- edutainment approach by interactive reception of the finally produced Hypermedia Novel.

The distribution of content among the narrative and practical area is displayed in Table 1.

Table 1. Teaching content

Narrative	VTV	IVE	HPS	CST
Practical	STT	HMT		

3.3 Results

The test subjects were a group of 16 computer science (CS) students in their second last term, all with the chosen major discipline “Media Informatics”, plus 4 students of technical journalism (TJ). The latter group was assigned to work on the project as a simulation of a professional media production remittance work. For the CS students it was a regular course integrated with the BSc curriculum of Computer Science at FH Bonn-Rhein-Sieg¹.

At the end of the term the CS students had to pass an oral exam. The results of this exam were evaluated in comparison to another examination of the same group of students within the same time period and an identical amount of teaching time, also in the media informatics domain (subject: “Advanced Computer Graphics”). The second exam was conducted by the same persons as an oral exam in a comparable style and difficulty level. For a comparative chart of both exam results see Figure 2, where the results of 16 individuals are displayed. Marks go from 1.0 (excellent) to 5.0 (fail).

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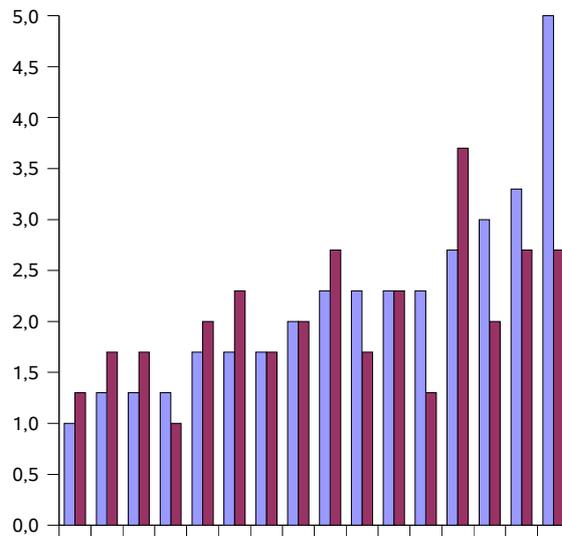


Figure 2. VHM (blue/left) vs. VCG (red/right)

The figure shows no significant difference in the individual performance, indicating that traditional and innovative method both work equally well.

Special consideration was given to the preparation of the exam, e.g. whether a topic was primarily learned through background research, traditional teaching material, or from the resulting HyMN. Every student was assigned to one work package related to the teaching content units named above (3.2.1). The six content units were assessed separately, each one rated from 0 to 4 points. The performance of the subjects in their area of expertise (i.e. the topic on which they worked in their particular work package) related to their overall rating is given in Figure 3. It can be seen that some students achieved the best rating in their own research area, while most performed almost equally well in all areas. Remarkably, two of the subjects performed significantly better outside their work topic (which was not the same in both cases).

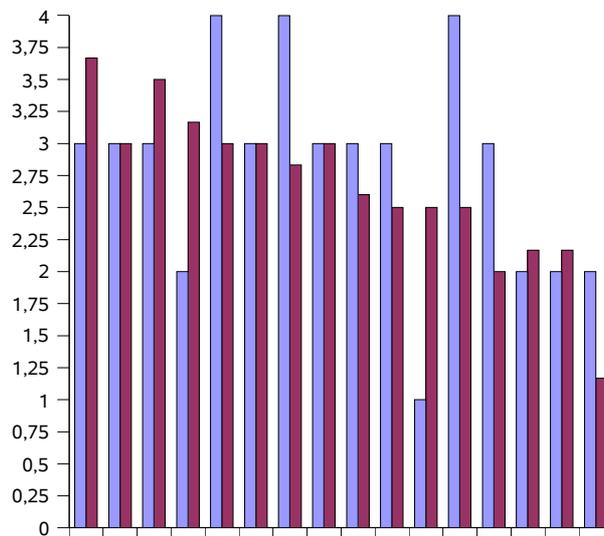


Figure 3. Performance in own research area (blue/left) vs. overall rating (red/right)

4. CONCLUSION

This paper reports work in progress. Although a number of 16 test subjects and a single course over one term with 8 hours per week can not really be considered representative, some conclusions may already be drawn.

All participants (with one exception who was uncertain because he had expected more from the final product) expressed their preference in terms of motivation for this edutainment approach to academic learning compared to traditional lecture-and-practice courses. The result proves that this form of teaching performs equally well as traditional academic teaching. However, the expected improvement of results, in particular for weaker students, due to the enhanced motivation, could not be observed. Therefore there is still much potential for improvement. Probably the most promising target is the improvement of the HyMN story which in its current state is not yet sufficient as a learning platform for Virtual Environments technology. It is, however, one central element of the HyMN concept to always remain open for modular expansion, which is expected to take place in similar future courses.

5. ACKNOWLEDGMENTS

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