HAL
open science

Flexible teaching with structured micro-content - How to structure content for sustainable multiple usage with recombinable character

Walther Nagler, Martin Ebner, Nick Sherbakov

To cite this version:

Walther Nagler, Martin Ebner, Nick Sherbakov. Flexible teaching with structured micro-content - How to structure content for sustainable multiple usage with recombinable character. Conference ICL2007, September 26 -28, 2007, 2007, Villach, Austria. 8 p. hal-00197275

HAL Id: hal-00197275

https://telearn.hal.science/hal-00197275v1

Submitted on 14 Dec 2007

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Flexible teaching with structured micro-content

How to structure content for sustainable multiple usage with recombinable character

Walther Nagler[1], Martin Ebner[2] , Nick Sherbakov[3]

Work Group Social Learning – Computer and Information Services (CIS)
Graz University of Technology and
Institute for Information Systems and Computer Media (IICM)
Graz University of Technology

Key words: *webbased learning, micro-content, authoring tool, content standards, Web2.0, e-Learning*

Abstract:

This paper reflects the possibilities of reasonable structured content production and management as it is exercised by the Work Group Social Learning (WG Social Learning) at Graz University of Technology (TU Graz). By splitting content into standardised pieces adjusted to lecture-units they turn highly qualified for multiple usages and commutability purpose. Three different examples of such micro-content and a way of implementing it into online and offline learning scenarios fitting the requirements of eLearning2.0 are presented.

1 Introduction

1.1 What is elearning2.0?

Elearning2.0 as described by Wikipedia "refers to a second phase of e-Learning based on Web 2.0 and emerging trends in eLearning" [6]. A more human centred and therefore better definition of what eLearning2.0 can be is given by Bret Schlenker in one of his "Corporate Elearning Strategies and Development"-blog posts from September the 11th of 2006 reminding: "So stop thinking about Learning2.0 as a new toolset…It's so not about that! Learning2.0 is about people. The tools simply allow us to do what we do best…and that's connecting with other people to support, share, and learn with each other" [7]. In the course of the second revolution of how we use the internet by speaking about the phenomenon Web2.0 (a term by Tim O´Reilly [8]) elearning2.0 was a logical progression of it. The new possibilities of user-editing online content on demand and the high grade of connectivity are perfect ingredients to be adapted for new didactical opportunities [3]. The ongoing and growing success of Web2.0 has been made possibly by a wide coverage of broadband technology and the breakthrough of the RSS-technology. Elearning2.0 uses the efforts of Web2.0 within educational settings. In this context informal learning becomes more important.

1.2 Elearning2.0 at TU Graz

Electronically supported learning, briefly elearning, in the form of very good single initiatives has been practiced for years at the TU Graz. First steps in the eighties for instance go back to several programs for load flow- and short-circuit calculations as well as for inductive and ohmic interference [2]. These activities to bundle („to network“) was the basic idea for the Vice-Rectorate for Teachings, the LifeLongLearning office, the Institut for Information systems and computers media, as well as for the Center of Computer and Information Services (CIS). In September 2006 the Working Group “Vernetztes Lernen” (WG Social Learning) became a new service of the Vice-Rectorate for Teachings. By embedding of the Working Group in the CIS established synergies can be used and the service achievements of CIS are being extended with a further component. Main focus of the Working Group is to implement (where necessary) the possibilities of network-based, communication-oriented teaching and learning methods in a didactically meaningfully way and establish them lastingly at the TU Graz [4].

A great step forward was done by the WG Social Learning by implementing the so called TU Graz TeachCenter within the digital structure of the TU Graz study-services landscape (see Figure 1-1). The TU Graz TeachCenter is a free electronic platform for the promotion and management of digital teaching activities for all teachers of the TU Graz. It is an adjusted system of the so called “WBT Master”-system that has been developed at the Institute for Information Systems and Computer Media (IICM) at Graz University of Technology. The range of possibilities for the teachers nearly exceeds the state of the art in elearning2.0. The outstanding difference to other comparable platforms is the modular design of the TU Graz TeachCenter, which means that the platform can be used by each teacher very individually. This modular principle reaches the smallest unities of content within the TU Graz TeachCenter. Anything structural unit within the system can be seen as a single module – a separate PDF-file as well as a whole forum or a logged in user. There are no default applications or basic tools coming with a ready made new online course. It depends on the teacher which functionalities to choose and to be added to his/her course. Once an application is selected it can be removed by one click again. Amongst others the high operability and speed of the system results from the fact that there is no database storing the content at all.

Furthermore in October 2006 the TU Graz LearnLand was launched. By using the open source software ELGG [9] a blogosphere is offered to each member (lecturers and students) of the university [1]. After the first logon a personal weblog is created where contribution can be published very easily. Users can establish digital identities and connect with other members, collaborate with them and discover new resources through their connections [2]. Users can create own communities with own member-management. A bookmark benchmarking function and a prospective presentation tool collecting selected blog posts are further features of this blogosphere. The high grade of networking is established by tagging of any contribution which turns searching into an effective interaction.

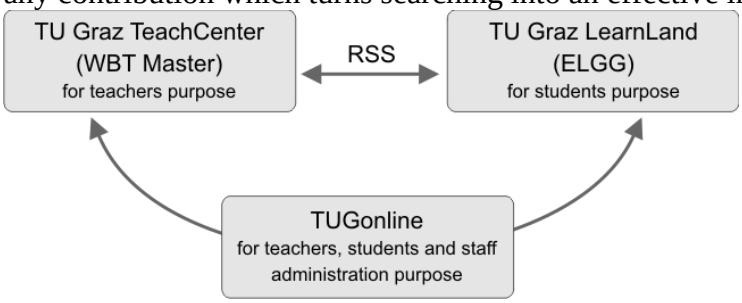

Figure 1-1: The different platforms of the TU Graz and their impact on elearning

Both the TU Graz TeachCenter and the TU Graz LearnLand offer RSS functionality for their content including media files. By using RSS the administration of a course is being very simplified and the just-in-time communication is being enhanced as well as building up communities easilier.

2 Didactics on Micro Content

2.1 General didactical aspects of micro content

„Microcontent is information published in short form, with its length dictated by the constraint of a single main topic and by the physical and technical limitations of the software and devices that we use to view digital content today“ as described by Anil Dash in 2002 [10]. From a didactical point of view it must be pointed out the term “single main topic”. With other words microcontent can be described as information chunk, a small piece of a big knowledge cake.
The idea is to separate the content of a lecture in didactical reasonable parts. This is not very new because it is standard for each teacher in a traditional setting. The new thing is to do the same with digital content and enhance the teaching and learning process with internet technologies. If content is very granular, following advantages can be pointed out:

- Exchangeability: Content can be replaced easily by exchanging. For example a special learning object can be used in one year but is not needed in the following year. Removing this object will be easily.
- Multiplicity: Microcontent can not only used nearly endless, but also in many different environments. Multiple usage for special teaching and learning settings - just when needed - is a very important strength.
- Stand alone: Each part represents a stand alone content (html file, Flashmovie, podcast ..) and this means also direct retrievable.
- Servicability: If the content is granular changes can be done just in time. Editing online files just on the fly, comparable with a wiki or a Weblog are possible.

The main concept behind using microcontent is that an amount of such files can be put into a structured environment, simply by bringing it into a hierarchical order. The lecturer is preparing his lecture by connecting and bringing content together.
With this possibility real new didactical scenarios are possible, because not only each kind of media files can be presented also content from anyone. With other words contributions of students or learners can also become an active part in an electronically environment.
Bearing these thoughts in mind the first experiments and trials have been done on Graz University of Technology.

2.2 Micro-content used at TU Graz

2.2.1 The Blog-presentation tool within TU Graz LearnLand

A new application running at TU Graz LearnLand offers the user to create a presentation filled with former blog posts. By selecting different posts from any user a new stand alone presentation can be easily created displaying the individual posts and their authors in an optional sequence. The range of usage is to be explored. An example that already has been exercised can be that the teacher uses this functionality to sum up students blog post-activities that have been part of a seminar or workshop lesson. Besides that blog posts of students may so become more important to others when selected by the teacher for a presentation.

2.2.2 Using short podcasts (BTZ / Help-Site)

During the last year podcasts have gained popularity. Since October 2006 the TU Graz is offering podcasts from a small number of lectures to their students in an experimental setting. First evaluations encourage optimizing and enlarging Podcast activities. In July 2007 the first Austrian symposium on Podcasting took place very successfully at the University of Graz organized by iUNIg (Interuniversitäre Initiative für Neue Medien Graz) an new initiative for collaboration in the subject of new media between the four universities of Graz [13]und [14]. So podacsting is becoming a part of teaching methods at TU Graz. The didactical scenarios are to be worked out yet. Besides screening a whole lesson of about 90 minutes one usage of podcasts is to create short videos presenting small pieces of information such as for explaining purposes within help desks.

2.2.3 An introduction to the ABC-eBook

A third example for practicing the ideas of micro-content at the TU Graz is the “ABC-eBook Project” by merging advantages of the so called “ABC-system” and the eBook functionality of the TU Graz TeachCenter. With the ABC-system content is worked into small standardised units embedded within a well structured ABC-course system. The eBook environment allows mashing up these units independently to their ABC-course structure. Therefore each unit can be handled alone.

3 The ABC-eBook Project

3.1 The ABC concept

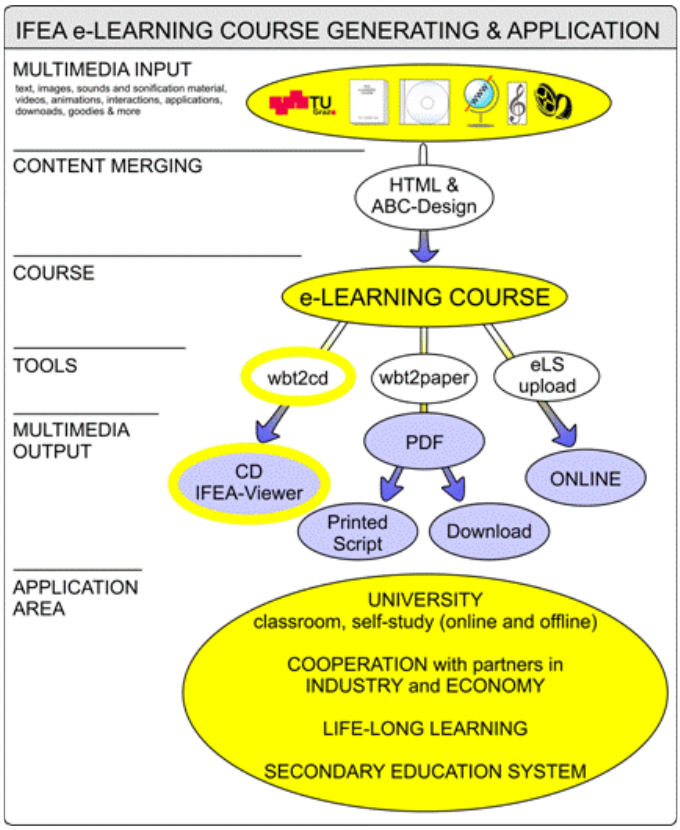

Figure 3-1: The IFEA-ABC concept: multiple input, structured modular multiple output

Motivated by the initiative “New Media in teaching at universities and polytechnics in Austria” (NML) of the Austrian Federal Ministry for Education, Science and Culture (bm:bwk) in spring 2000 the TU Graz started the project “MultiMediaLearning” which lasted till the foundation of the WG Social Learning in September 2006. The Institute for Electrical Power Systems (IFEA) at the TU Graz was one of the first partners of MML. Since spring 2001 IFEA undertakes its own elearning strategy. For this aim a brand new course-system called “ABC-course system” with a specially designed layout for electronic scripts has been developed and evaluated by independent psychologists. The uniform structure and the high usability of the system allow a wide ranged application of the courses as for the lesson in classroom, for online variant, for offline CD-ROM version and for the hardcopy paper script (see Figure 3-1) [1].

A course consists of separate standardised “ABC-screens” written in HTML and containing the content of the course. The several screens are placed in a predefined course structure of directories. Once the content is didactically adapted and realized as ABC-screens within the ABC-course system, this new course automatically is compiled to a standalone CD ROM-version by an application called “IFEA-Viewer”. Another application called “wbt2paper” generates a PDF-file of the course for hardcopy usage.

The main benefit of the ABC concept is its modular character of multimedia interactive content. It allows the course designer to update already existing courses or to create new ones very easily by mixing, changing and creating new single ABC-screens in general. But it must be said that this process is not standardised yet. The task for the future is to make it that simple so that a teacher is able to manage ABC-courses offline without any programming knowledge. The eBook concept (see next chapter) is the first step realising this aim for an online variant.

3.2 The eBook concept

TU Graz TeachCenter (see chapter 1.2) offers a variety of possibilities to optimise a teachers´ digital teaching activities including functionalities for managing meta-data about training courses. One of basic applications supported by the system is called eBook.
A particular eBook can be seen as a number of Multi-Media elements such as (HTML documents, PowerPoint-slides, PDF-files, movies, etc …) combined into reusable, navigable collections. eBook provides a convenient document accessing facilities (table of content, map, search, bookmark, etc,). Additionally, an eBook provides such communication features as annotation and discussion plus conventional user-control features – statistics, map of visited pages, results of answering embedded questions, etc.. eBooks can be presented in three different formats: internal S-Collections, SCORM packages [11] and LRN [12] packages.

TU Graz TeachCenter provides an automatic conversion between the internal formats; hence, an actual authoring may be carried out using internal TU Graz TeachCenter editors or any third-party authoring component compliant with the SCORM or LRM formats.
Since all the TU Graz TeachCenter authoring tools operate with S-collections we provide a simplified description of the model below. Educational content, according to this concept, consists of addressable logical composites called Structured Collections (S-collections or just collections, for short). An S-collection does nothing but encapsulates members together with some internal structure (i.e. navigational topology). This structure is in fact a link structure expressing the relationships or associations between members. A member is either a document or another S-collection. One member in an S-collection is chosen and designated by the author as its head.

Additionally, an S-collection may have an associated document called its label to provide contents synopsis. If a label is missing then the head is used instead.
We may think of an S-collection as an opaque container: if we are outside the container, its members will not be visible to us. To see what's inside it, we must enter it. Of course, we can only be inside one container - the current container - at any given time. But once inside, we will be able to visit its members by navigating its link topology. A member we visit in the current container may be a document or another S-collection. If a document, it will be visualised in some appropriate way - typically involving the presentation of the document's media objects on the computer display and/or sound system. If an S-collection, its label (which is a document, by definition) will be visualised. The most recently visited member of the current container is the current member. Access to other members from the current member is determined by the container's link structure: only links emanating from the current member can be selected. All such links are typically visualised as anchors on the current display (these may be icons, hot-words, push-buttons, etc). Navigation within the current container therefore is from member to member as allowed by its link topology.

From a teacher perspective, eBook can be perceived as an environment for changeable multimedia content letting a user to make annotations online to any part of the content. In the context of this paper, the modularity of an eBook is to be especially pointed out. Thus, potentially any piece of content available at a TU Graz TeachCenter server can be placed into one or more S-collections and thus reused in different contexts.

3.3 To link ABC-system and eBook concept

The ABC-course system fits very well into the concept of eBook. The ABC concept structures content into small pieces of teaching units that can be perfectly displayed and managed with the eBook application. Therefore the eBook functionality is the online realisation of an ABC course fulfilling the demand of mashing up ABC screens like PPT-slides. The manager of a new eBook just chooses online different ABC-screens from different ABC-courses and may add some new screens as well. This new eBook may then be linked to any lecture within the TU Graz TeachCenter (see Figure 3-2).

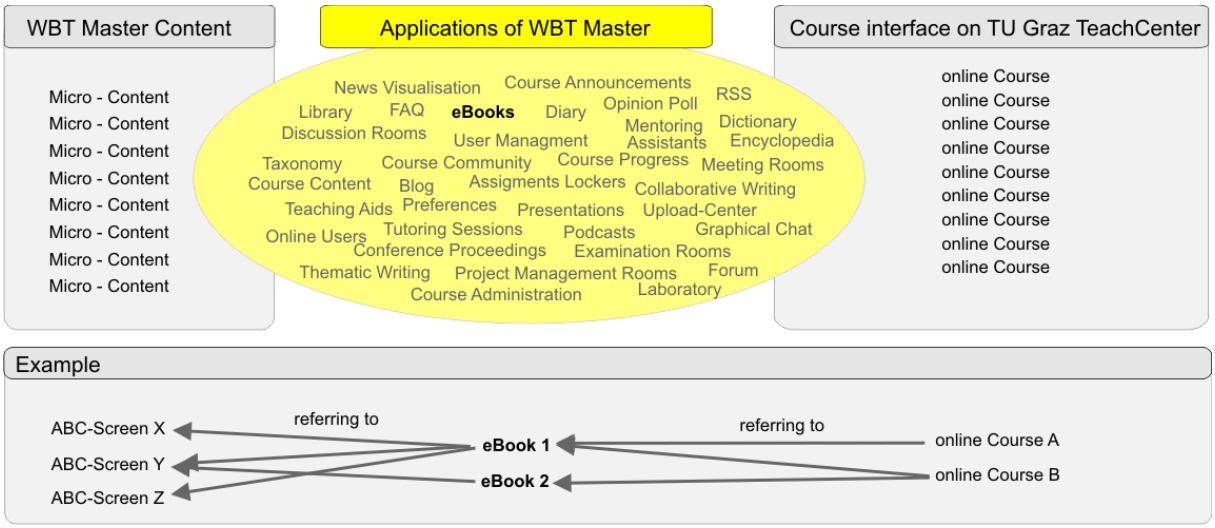

Figure 3-2: TU Graz TeachCenter content and applications on base of WBT Master functionality with an example of mashing eBook content from different ABC-Screens for different online courses.

3.4 The ABC-Manager

The use of the ABC-system has been limited to the purpose of IFEA but is exceeding now. First attempts to apply the system for other institutes have shown that it needs a long introduction and a much disciplined method of operating to fulfil the standards of ABC system which is necessary according to the production of the different outputs. Therefore there is a need to make the creation and the management of ABC-Screens much simpler. The future application called ABC-Manager will be useable for teachers without knowledge of HTML or time to create ABC-Screen. The ABC-Manager is a project just started. Aim of the project is to combine the comfortable mash up functionality for ABC-Screens as provided by the online WBT-Master with the multiple output possibilities of the ABC-system. The prospective application will allow doing the mash up offline. Furthermore it will include a tool for creating ABC-Screens guided by a wizard so no further programming is necessary.

4 Discussion & Summary

4.1 Evaluations on Microcontent

In the past the usage of ABC-courses was highly appreciated by students. Evaluations during the first three years of the implementation of the ABC-system into the teaching of IFEA pointed out that a slowly shifting of the students learning customs was noticeable. The acceptance of using a CD ROM-version for learning efforts increased during these years account of a printed paper-version. Although the evaluations were worked out and exercised by independent psychologists towards significance the rather small number of polled students (150) must be taken into account [5].

First results of an ongoing online evaluation of the podcasting activities according to the course “Basics of Power Systems” show that fourth of the students listened to the complete podcasting offer for this course, more than a third listened some parts of the offer but more than one time and actually fourth of the students did not use any podcast. A huge majority emphasizes an enlargement of the podcast offer on other courses even to the point of a podcast-standard for any course held at the TU Graz.

4.2 Summary

In times of rapidly growing information input there is a rising call for methods to manage information. Flexible and reasonable management of content for learning purposes becomes more important. The efforts of Web2.0 make it easier for teachers to structure and redesign their teaching processes intentions. The reuse of content in different meanings and the multiple adaptability of content will be better to be manage the smaller these pieces of contents are. The rearrangement therefore should be as simple and user-friendly as possible. The TU Graz TeachCenter bases on a system taking these requirements into account. The systems´ eBook in combination with the ABC-concept is a very good example for flexible content management. A standardised usage at the university depends on a simplification of the processes. The ABC-Manager will do so in future.

References:

[1] M. Ebner, A. Holzinger, H. Maurer, "Web 2.0 Technology: Future Interfaces for Technolgoy Enhanced Learning?", HCI 2007, Bejing, in print
[2] L. Fickert, G. Eckel, W. Nagler , A. De Campo, E. Schmautzer: "New Development of Teaching Concepts in Multimedia Learning for Electrical Power Systems Introducing Sonification", Paper, Region 8 Eurocon 2006, The International Conference on "Computer as a Tool" Ljubljana, Slovenia 2006
[3] Maurer, H., Schinagl, W. "Wikis and other e-Communities are changing the Web" Proceeding of ED-MEDIA 2006, AACE, p. 2858-2866
[4] W. Nagler, L. Fickert, M. Ebner, C. Stöckler-Penz: "LifeLongLearning and Doctoral Studies - Facilitation with Podcasting Techniques", Paper, Region 8 Eurocon 2007, The International Conference on "Computer as a Tool" Ljubljana, Slovenia 2007, in Print
[5] L. Fickert, E. Schmautzer, W. Nagler, I. Kamrat, C. Stojke: "Experiences and Adaptation of Teaching Concepts in the Field of Multimedia Learning for Electrical Power Systems at the University of Technology Graz", Paper, Region 8 Eurocon 2004, The International Conference on "Computer as a Tool" Ljubljana, Slovenia 2004
[6] http://en.wikipedia.org/wiki/ELearning_2.0
[7] http://elearndev.blogspot.com/2006/09/2001-year-of-key-learning.html
[8] http://www.oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html
[9] http://www.elgg.org/
[10] http://www.anildash.com/magazine/2002/11/introducing_the.html (last visited: May 2007)
[11] http://www.adlnet.org/Scorm/ (last visited: May 2007)
[12] http://www.microsoft.com/eLearn (last visited: May 2007)
[13] http://www.iunig.at/ (last visited: August 2007)
[14] http://iunig.tugraz.at/ (last visited: August 2007)

Author(s):

[1]Walther, Nagler, Mag.rer.nat
Phone: (++43) 0316 873 8540
Fax: (++43) 0316 873 7699
E mail: walther.nagler@tugraz.at

[2]Martin, Ebner, DI, Dr.techn.
Phone: (++43) 0316 873 8540
Fax: (++43) 0316 873 7699
E mail: martin.ebner@tugraz.at

Work Group Social Learning, Computer and Information Services (CIS)
Graz University of Technology
Steyrergasse 30/1, Graz, 8010, Austria

[3]Nicolai, Scerbakov, DI, Dr.techn.
Phone: (++43) 0316 873 5618
Fax: (++43) 0316 873 5699
E mail: nsherbak@iicm.edu
Institute for Informations Sytems and Computer Media
Graz University of Technology