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PRESENTATION OF LEARNING CONTENT AS AN E-MINDMAP AND PUTTING TOGETHER MORE LEARNING STYLES, TO IMPROVE THE E-LEARNING ADOPTION

1. Problem of Adoption of E-learning Solution

Designing, developing, and deploying elearning resources are only part of the elearning battle. Actually getting employees and prospective students and instructors to use elearning is a challenge on its own. Generally, when discussing e-learning adoption, it is interesting to see that the technology itself is secondary to the situations and needs of the client or learner. Rarely is the discussion focused exclusively on technology. Most often, the question being asked is "what can I do with this that I cannot do without it" In elearning, the answer usually centers around access, cost, convenience, and learning effectiveness.

Some discussions from e-learning practice: (<http://business.cisco.com>)

- „It takes A LOT of explaining, hand-holding, and demonstrating to convince a low-tech person that the flexibility and convenience of distance ed are worth the trouble of learning a new trick (our average student age is 37!) ”
- It’s not enough to simply convert classroom materials into HTML files and post them to a Web site. E-learning must also be flexible and offer content choices to account for different learning styles of employees.
- „E-learning must also be compelling, interactive, engaging, and offer feedback options,” says Hallett. „In many cases, it means reading less online and providing more audio or video options.”
- Any successful e-learning effort must be compelling from the opening sequence, according to Lisa Sass. „We had to make it visually stimulating and engage the senses as much as possible,” says Sass. „We wanted to grab them the way a movie trailer grabs them—right at the very beginning—or they would not continue.”

2. Learners Have Different Learning Styles

2.1. Learning styles

Just as every person is unique, so is every learner. But how much this uniqueness matters is a great debate among educators, trainers, and psychologists.

A learning style is a student's consistent way of responding to and using stimuli in the context of learning. We can say that each student learns best using a learning strategy or method that best matches his or her need. Or we can say that what matters the most is the learning process, not the style. What is the truth?

Till to now, achieving a solid learning environment that meets the student's need, seems to be the most important key for effective learning and not their learning styles. There are various instruments used to determine a student's learning style.

2.2. The Learning Process

Learning has to be seen as a process and will result in knowledge, being the ability to find new information, the practice of analysing problems and to expand and apply the knowledge in new situations.

Following Kolb, in the learning process we differentiate between 4 phases.

- Sensing (feeling)
- Watching and reflecting
- Thinking, analysing and having the ability of theoretical reasoning
- Doing, experimenting

2.3. E-blended Learning

In planning the learning process the learning activities have to be specified. The learning strategies or *learner activities* (minor media) that will assist the learners in mastering the objectives will be chosen. Many forms of learner activities do exist. Those activities have to support the 4 phases of learning as set forward by Kolb. To select the proper activities, it helps to know what learning is and what activities enhance a particular form of learning. To find a mix of several kinds of learning activities is the blended learning opportunity.

Blended learning is the solution in which we can take now full advantage of ICT based learning combined with some traditional classroom activities. Types of learning activities that can be found in traditional classes are: lectures, exercises organised in the classroom and as homework, discussion session, individual reading of some course text, team assignment and an individual test. In the context of e-learning the typical learning activities are: self paced learning using online documents and databases, online tests, online exercises, asynchronous discussion forum, individual search for learning materials, sharing online knowledge with other students, synchronic live-session, video-conferencing, online interactive discussion and chatting, application sharing.

E-blended learning is a methodology that associates different learning tools to offer a better follow-up, a tailor-made course, matching the needs of the participants and an effective learning process. Different learning activities are organised along the learning process. A blended learning solution consists of a mix of ICT supported learning activities: making basic course texts available, putting the assessments online, making reference materials, organising online coaching, organising discussion sessions, creating help facilities and job-aids.

Recreating learning online and determining the right blend isn't easy or can't be taken lightly. To create interactions that meet the same standards as traditional programs and to get the right blend, the audience and the technology tools have to be invested.

2.4. VAK Learning Styles and Presentation of Learning Content Combining those 3 Learning Styles

Introduction

The VAK style is a style that is especially applicable in the presentation of e-learning content for the organisation of a self-paced e-learning course. This style is derived from the accelerated learning world, and seems to be about the most popular model nowadays. Its main strength is that it is quite simple, which appeals to a lot of people. It uses the three main sensory receivers – Vision, Auditory, and Kinaesthetic (movement) to determine the dominate learning style. Learners use all three to receive information. However, one or more of these receiving styles is normally dominant. This dominant style defines the best way for a person to learn new information by filtering what is to be learned. This style may not always to be the same for some tasks. The learner may prefer one style of learning for one task, and a combination of others for another task.

Presentation of Learning Content Using all 3 Learning Styles

As trainers/authors, we need to present information using all three styles. This allows all learners, no matter what their preferred style is, the opportunity to become involved. It also allows a learner to be presented with the other two methods.

What are the characteristics of the three styles? How to present our learning content to fit best to this learning style? What kind of activities can be organised?

Auditory learners may have difficulty with reading and writing tasks. They often do better talking to a colleague or a tape recorder and hearing what was said. Visual learners can be differentiated into two subchannels - *linguistic* and *spatial*. Learners who are *visual-linguistic* like to learn through written language, such as reading and writing tasks. They like to write down directions and pay better attention to lectures if they watch them. Learners who are *visual-spatial* usually have difficulty with written language and do better with charts, demonstrations, videos, and other visual materials.

Table 1.

	e-learning activity	Other blended learning activity
Auditory learner	In the beginning of the course the new material has been delivered with a brief explanation of what is coming. At the end a summary of what has been covered concludes the course.	Questioning of the learners to draw as much information from them as possible and then fill in the gaps with some own expertise.
		Include auditory activities, such as brainstorming.
		Leaving plenty of time to debrief activities, so the learners can make connections of what they learned and how it applies to their situation.
		An internal dialogue between the teacher and the learners.
Visual learner	Use graphs, charts, illustrations, or other visual aids.	Including plenty of content in handouts to reread after the learning session.
	Include outlines, agendas, handouts, etc. for reading and taking notes.	Leave white space in handouts for note taking.
		Supplement textual information with illustrations whenever possible.
		Have them draw pictures in the margins.
		Show diagrams and then explain them.
Kinaesthetic learner	Use activities that get the learners up and moving.	Give frequent stretch breaks (brain breaks).
	Play music, when appropriate, during activities.	Provide toys such as Koosh balls and Play-Dough to give them something to do with their hands.
	Use colored markers to emphasize key points on flipcharts or white boards.	
		Provide highlighters, colored pens and/or pencils.
		Have them transfer information from the text to another medium such as a keyboard or a tablet.

Kinaesthetic learners do best while touching and moving. It also has two sub-channels, the kinaesthetic (movement) and the tactile (touch). They tend to lose concentration if there is little or no external stimulation or movement. When listening to lectures they may want to take notes. When reading, they like to scan the material first, and then focus in on the details (get the big picture first). They

typically use color highlighters and take notes by drawing pictures, diagrams, or doodling. In the following table some examples of activities can be found.

2.5. An Adaptable Learning Environment: Putting the Styles Together

First, it should be noted that no single presentation of content or activity supporting a specific learning style, ensures that a learner's needs will be met. It is perhaps more important to build an adaptable learning environment that presents the material in a variety of methods and addressing more styles, than trying to focus on each learner's personal style. The more styles are addressed, the easier the instruction will be received by the learners.

Also, material presented in a variety of methods keeps the learners interested and reinforces itself. To improve the usability of the content produced, the instructor has to define scenarios or templates with media-rich content synchronizing static or dynamic multimedia assets, such as streaming videos, slides and animations, with textual information and/or powerpoint slides.

New learning objects templates or scenarios are implementing advanced instructional design and learning strategies, taken into account different learning styles of the learners.

To improve e-learning effectiveness authors can produce highly interactive and engaging content applying innovative approaches in some designed scenarios.

3. Learning Content Presentation Scenario's Taken into Account Different Learning Styles of the Learners.

3.1. MINDMAP

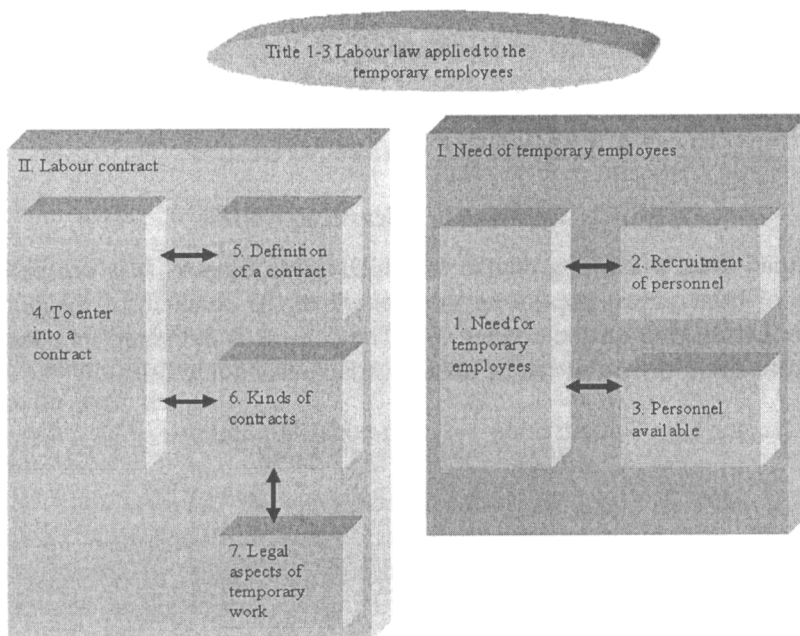
In the e-MINDMAP concept, the learning content will be provided in a graphical way. The e-learning process will be built as a sequence of MINDMAPS. A MINDMAP represents a small story of learning content. An e-MINDMAP corresponding to a course module consists of a number of blocks representing learning content elements. The learning process on this level is defined as a sequence of a number of steps, corresponding to those blocks.

The blocks are composed of some atomic learning-elements, being the short text or audio document, the full text, some additional text or graphical presentations, or pictures, some questions and answers, some tests, some mouse-over animations.

3.2. Presentation of Learning Content as an e-MINDMAP, Putting Together a Number of Learning Styles

E-learning courses can be build following new and advanced learning concepts taking into account the diversity of learning styles of learners. The e-learning course (modules) can be presented in a graphical way by adding a graphical

presentation shell to the traditional e-learning content modules. These e-MINDMAP courses are including the traditional e-learning content modules themselves as “full text” atomic block objects. The e-learning content has been decomposed into a set of smaller content components. Each content component corresponds to a block in a MINDMAP, being a composition of a set of blocks. The e-MINDMAP is so telling the story in a sequence of steps.



The blocks are composed of some atomic learning-elements, being the short text or audio document, the full text, some additional text or graphical presentations, or pictures, some questions and answers, some tests, some mouse-over animations. As a consequence the learner can complete the learning activity on a first level by reading only the short text components or can evolve to a deeper study of the topic by reading the full text components in the pre-defined sequence or learning path. In another way the learner can select his preferred learning topics and selects the corresponding blocks in the MINDMAP.

In the e-MINDMAP learning concept the e-learning content has been presented in a way to create the opportunity of fitting different learning styles. The learner can decide on his/her own learning trajectory. On point of the content, the learner can take a first draft reading through the summary and the short texts. Later on he/she can drill down in the detailed content delivered as full text and supplementary content documents. On point of structure, the learner can follow the sequence as has been set forward by the instructor, or he/she can opt to learn the topics in a different way.

3.3. Other Presentation Scenario's

In principle other scenarios can be built upon the same decomposition of the learning content. But dependent on the type of scenario, a set of presentation components or atomic learning objects, will be defined and are brought together into a scenario design. The learning objects (LO) structure corresponding to a scenario, has to be defined and the corresponding relational data model has to be built.

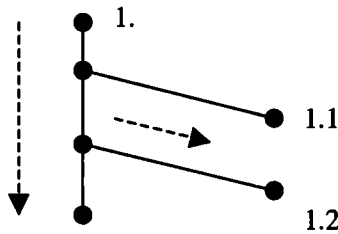
Some of the presentation components are common to different scenarios and can be re-used. Others are very specific for the scenario to which they belong.

4. Learning Content Structure

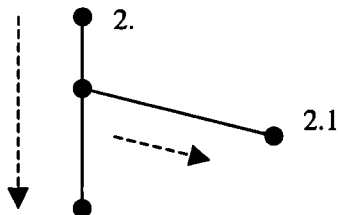
4.1. Traditional E-learning Course

The traditional e-learning course is similar as an e-book. It is presented as a sequence of html pages, presenting the content of the chapters of the book, and accessible by clicking on the content list. The content is delivered in a sequential way. Additional information can be made available using http links.

Chapter 1 main node sub-node (http links)



Chapter 2 main node sub-node (http links)



4.2. Learning Objects

For the E-MINDMAP principle, we use learning objects (LO). A learning object can be defined as any digital content resource that supports learning, that

can be re-used and that can be delivered on demand across the network, be it large or small. Examples of smaller reusable digital resources include short text documents, figures, digital images or photos, live data feeds, live or prerecorded video or audio snippets, animations, and smaller web-delivered applications. Examples of larger reusable digital resources include entire web pages that combine text, images and other media or applications to deliver course modules. In our paper the first ones are named the atomic LO's, the second ones are named the LO's.

4.3. Decomposition of the Chapter Content into a Set of Smaller Content Units/Components (Similar with the Paragraphs of a Chapter)

The first step in creating a presentation scenario is to split the learning content into smaller content components.

C1: C1.1, C1.2, C1.3, ... C1.n1

C2: C2.1, C2.2, C2.3, ... C2.n2

In the presentation layer additional content elements will be added, namely the presentation components.

4.4. A Presentation Layer

In the traditional LO the presentation corresponds to the html presentation of a chapter. A presentation scenario is a layer put above the same original content components, by supplying presentation components, some of them being content related and others more design/format related. An example of content related presentation component: some one tells the story of a best practice. An example of design related presentation component: a live picture of the story teller is shown on the screen. The presentation components are belonging to one or more scenarios.

The e-learning course, the scenario and the chapter content are learning objects (LO). The content and the presentation components are atomic learning objects (ALO).

e-learning course					LO
Presentation layer	Scenario 1	Scenario 2	Scenario n	LO
	Ex. MINDMAP	Ex. Storytelling		Ex. Dialogue	
	Presentation components: Pci: building components of the scenarios				ALO
	Content components: Cci: decomposition of chapter content into n parts or paragraphs				ALO
Chapter content					LO

4.5. The e-MINDMAP Scenario

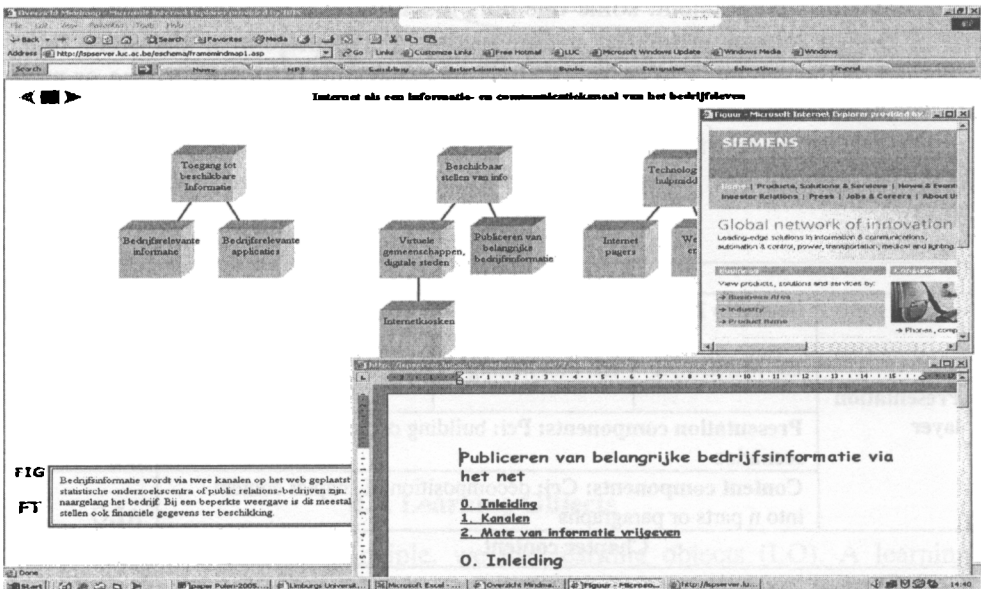
An e-MINDMAP corresponding to a chapter content of a course module, consists of a number of blocks representing learning content components. The e-learning process on this level is defined as a sequence of a number of steps, corresponding to those blocks. Some of the blocks are interrelated via the relation: “is sub-block of” or “it explains further” or “more detailed information can be found in” The blocks are structured as independent content components composed of a set of atomic LO’s, being small learning content elements (a short text, an audio fragment, an additional text /figure and others). The full text document, as part of the original content, functions as an atomic LO too.

The MINDMAP itself is supplemented with an introduction and a conclusion or summary. The MINDMAP is structured as a LO. The metadata is following the international SCORM standard. The object structure has been translated into a relational data model.

5. E-SCHEMA an E-MINDMAP Generator and E-CoGen an E-learning Course Generator

5.1. E-SCHEMA: Authoring and Uploading of the e-MINDMAP Components

The user can model the e-MINDMAP using the system e-SCHEMAS (scheme based authoring system). It is a graphical system. The blocks can be structured in a free way. All atomic objects are linked with its block and metadata on LO level are defined. This generator creates the underlying data structure on running time.



5.2. E-CoGen: Authoring and Uploading an E-learning Course

Once we have available e-MINDMAPS as LO's, new e-learning courses can become assembled, by packaging selected learning objects from the warehouse. The course structure can be defined and the e-learning course can be generated by linking the selected e-MINDMAPS from the MINDMAP warehouse of our LOMS (Learning Object Management System)

6. Conclusion

We are evolving to a new and advanced e-learning concept e-MINDMAP.

The original chapter content has been decomposed in a set of smaller learning content components presented as blocks linked together as a MINDMAP. E-MINDMAP is a presentation layer over the learning content document. Additional supporting content has been put in place and linked with that original content.

E-MINDMAP is only one example of a presentation scenario. All kind of presentation scenarios can be built on the same set of course components. Some of the added atomic learning objects or presentation components are common to more scenarios and thus can be re-used. Others are very specific.

Our presentation layer model has to put together different learning styles. Research is ongoing on finding the optimal scenario with respect to support more learning styles on the best way. Our MINDMAP presentation layer is a successful one.

References

- Beneker F., Delchot B., Paankeet R., Schoonenboom J., Strijker A., *Werken met metadata in DU projecten*, Deel1: Handleiding; Stichting Digitale Universiteit, 1/2004.
<http://www.digiuni.nl/digiuni/download/7B8DE6C2-FAA2-4E6C-4B48947A2948CF25.pdf>
- CISCO SYSTEMS, Reusable Learning Object Authoring guidelines: How to Build Modules, Lessons and Topics. 8/2003.
http://business.cisco.com/prod/tree.taf%3Fasset_id=104120&ID=44748&public_view=true&kbns=1.html
- Damstra A., Van Geloven M., Kresin F., *Handboek technologie en standaarden, voor het ontwikkelen van digitale content*, Stichting Digitale Universiteit Utrecht 5/2003.
<http://www.digiuni.nl/digiuni/download/DI.PROC.014.Handboek%20techniek.v11.pdf>
- The Herridge Group, Learning Objects and Instructional Design, online version.
<http://www.herridgegroup.com/pdfs/learning%20objects%20%20instructional%20design.pdf>
- Hodgins H.W., The Instructional Use of LO's, online version: The Future of Learning Objects
<http://www.reusability.org/read/>
- Martinez M., The Instructional Use of LO's, online version: Designing Learning Objects to Personalize Learning <http://www.reusability.org/read/>

- Robson: 1999. Object Oriented Instructional Design and Web-Based Authoring.
<http://robby.orst.edu/papers/objectoriented.html>.
- Schreurs J., Moreau R., Picart I., *E-learning Process and Content Management*, Proceedings Eurosyst. IADIS 3-6 June 2003, Lissabon.
- Schreurs J., Moreau R., Picart I., *Building an E-blended Learning Course Using Learning Objects*, EDEN, 15-18 June Rhodos.
- Schreurs J., Ballet G., Moreau R., *An E-learning Concept Mindmap and the Management of the Underlying Learning Objects*, Lecture Notes in Computer Science, Springer-Verlag Heidelberg Volume 3292 / 2004.
- On the Move to Meaningful Internet Systems 2004 OTM 2004*, Workshops: OTM Confederated International Workshops and Posters, GADA, JTRES, MIOS, WORM, WOSE, PhDS, and INTEROP 2004, Agia Napa, Cyprus, October 25-29, 2004. Proceedings. Editors: Robert Meersman, Zahir Tari, Angelo Corsaro p. 758.
- Schreurs J., Moreau R., *E-MINDMAPS in E-learning and the Underlying Learning Objects Management System*, Proceedings TEL04 conference Milano <http://www.infed.org/biblio/b-explrn.htm>: david a. kolb on experiential learning

PREZENTACJA ZAWARTOŚCI NAUCZANIA W E-MINDMAP Z WYKORZYSTANIEM STYLÓW W CELU WZBOGACENIA NAUCZANIA NA ODLEGŁOŚĆ

Streszczenie

E-learning to dziedzina, która cały czas ewoluje. Tradycyjny sposób tworzenia jednostek dydaktycznych nie jest procesem efektywnym. Jedną z istotnych cech e-learningu jest idea tworzenia komponentów treści i ich wielokrotnego wykorzystania.

Artykuł zawiera nowe elementy tworzenia i zarządzania materiałem edukacyjnym za pomocą środowiska e-MINDMAP. Jest to koncepcja, która pozwala na generowanie, szybkie rozwijanie i prezentowanie jednostek dydaktycznych na potrzeby zdalnego nauczania.