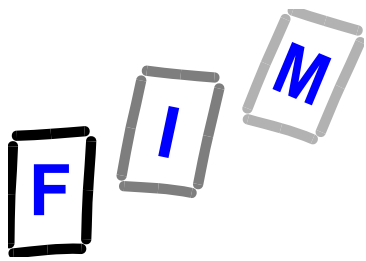


State of the Art of Adaptivity in E-Learning Platforms

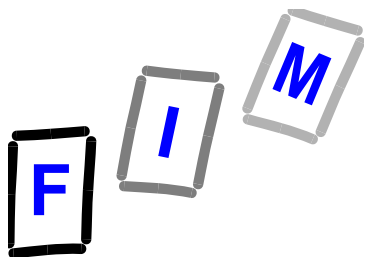
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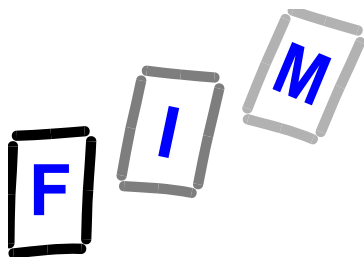
Overview

- Why can adaptivity enhance e-learning?
- How can adaptivity enhance e-learning?
- Evaluation of capabilities of e-learning systems with focus on adaptivity
- Conclusion
- Discussion



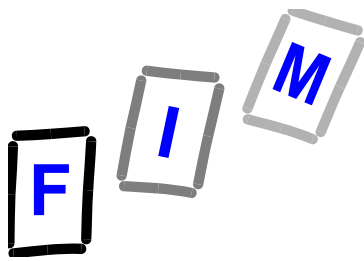
Why Can Adaptivity Enhance E-Learning?

- Basic situation
 - ➔ Users differing in goals, preferences, age, language, education & knowledge, abilities, skills, background, interests, personal circumstances (location, tempo, etc.), motivation and learning styles (of minor importance)
 - ➔ Profile of a single learner changes (e.g. the knowledge increases as an effect of learning)
- Adapting the system according to these differences might lead to a better learning success



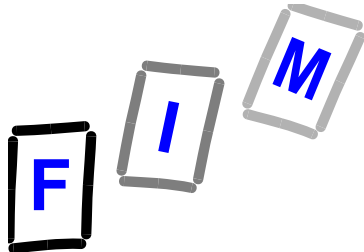
How Can Adaptivity Enhance E-Learning?

- Help to navigate through a course
 - ➔ Avoid getting lost in hyperspace
 - ➔ Prevent user from encountering too much already known content
 - ➔ Help the user to navigate more efficiently (e.g. by providing user-specific (not necessarily linear) paths or ordering items according to their relevance)
 - ➔ Using techniques of adaptive navigation support: direct guidance, adaptive sorting, adaptive hiding, link annotation, map annotation
- Adapt contents to fit the user's needs / preferences
 - ➔ Prevent user from spending too much time with already known content
 - ➔ Provide additional information for experts that could distract novices
 - ➔ Make the user like the system
 - ➔ Using techniques of adaptive presentation support: additional explanations, prerequisite explanations, comparative explanations, explanation variants, sorting



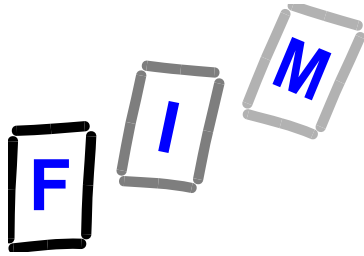
Evaluation

- Goal:
 - ➔ Analysis of capabilities of e-learning systems with focus on adaptivity
- List of features for some representative systems
 - ➔ Features can be grouped into six categories: Learning, Learning Management, Adaptivity, Cooperation, Collaboration, Standards
 - ➔ Systems can be divided into two categories: popular systems, adaptive systems



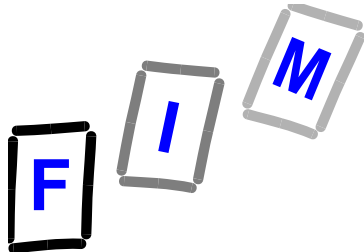
Popular E-Learning Systems

- Some of the most frequently used Learning Management Systems (LMSs)
 - Generally there is a large number of systems, both commercial and open source in different programming languages
 - ➔ Evaluation of the Austrian ministry of education on 400 systems in 2004: 318 commercial, 82 open source
 - ➔ Open source systems have grown in importance
- | | | |
|--------------|----------|-----------|
| • .LRN | • CLIX | • OLAT |
| • Atutor | • Dokeos | • OpenUSS |
| • Blackboard | • Ilias | • Sakai |
| • Bodington | • Moodle | • WebCT |



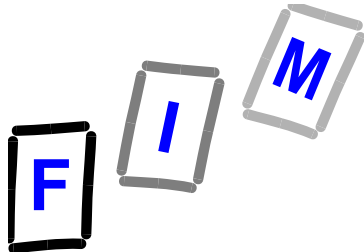
Adaptive E-Learning Systems

- Well-known historical and modern adaptive e-learning systems
- Originate from several areas:
 - Intelligent Tutoring Systems
 - Adaptive Hypermedia
 - Social Software (e.g. collaborative filtering)
- AHA
- ALFANET
- ANATOM-TUTOR
- AnnotatEd
- CHEOPS
- ELM-ART
- EPIAIM
- HYPADAPTER
- InterBook
- ITEM/IP
- iWeaver
- KN-AHS
- KnowledgeSea II
- KnowledgeTree
- MetaDoc
- METHOD
- NetCoach
- SQL-Tutor



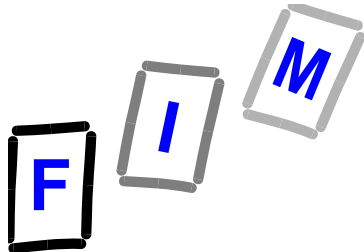
List of Features

	Bodington	Dokeos	Moodle	OLAT	OpenUSS	Sakai	AHA!	Alfanet	ELM-ART	InterBook	Knowledge Sea	METHOD	NetCoach
Learning													
Assignments - Choice													
Assignments - Text													
Assignments - Files													
Stored Evaluation													
Glossary													
Bookmarks													
Annotations													
Search													



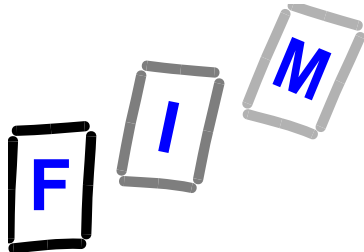
List of Features

	Bodington	Dokeos	Moodle	OLAT	OpenUSS	Sakai	AHA!	Alfanet	ELM-ART	InterBook	Knowledge Sea	METHOD	NetCoach
Learning Management													
User Group Support													
Creating Content Online													
Importing Content													
Stored Learner Model													
Personalization													
Adaptivity													
Adaptive Guiding													
Link Annotation													
Link Hiding													
Adaptive Presentation Support													



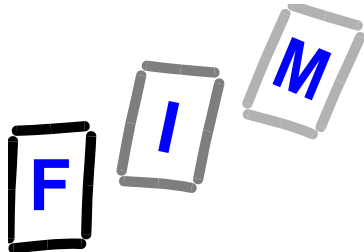
List of Features

	Bodington	Dokeos	Moodle	OLAT	OpenUSS	Sakai	AHA!	Alfanet	ELM-ART	InterBook	Knowledge Sea	METHOD	NetCoach
Cooperation													
Forum													
News													
Email													
Personal Messages													
File Management													
Calendar													
Polls													
Nickpage Authoring													



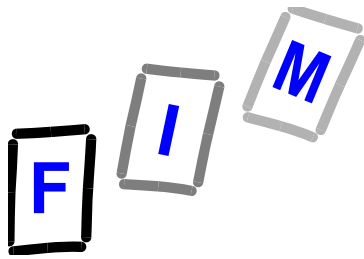
List of Features

	Bodington	Dokeos	Moodle	OLAT	OpenUSS	Sakai	AHA!	Alfanet	ELM-ART	InterBook	Knowledge Sea	METHOD	NetCoach
Collaboration													
Chat													
Audio Conferencing													
Video Conferencing													
Whiteboard													
Desktop Sharing													
Standards													
IMS CP													
IMS QTI													
SCORM													
IEEE LOM													



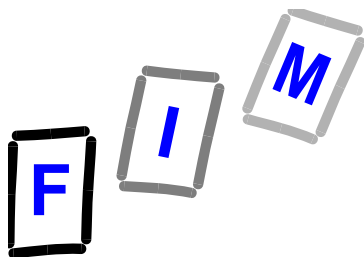
List of Features Overall Categories

Learning		
Learning Management		
Adaptivity		
Cooperation		
Collaboration		
Standards		



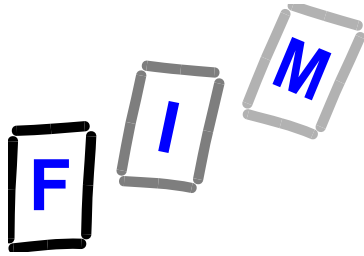
Evaluation Summary

- Popular e-learning systems
 - Support a lot of features
 - No/hardly any support for adaptivity
- Adaptive e-learning systems
 - Support for adaptivity
 - Partial support for learning and learning management
 - Hardly any support for cooperation, collaboration and standards



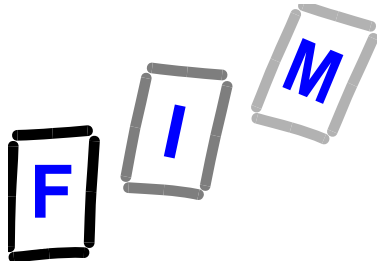
Conclusion

- Most adaptive e-learning systems:
 - Research projects
 - Not used by a large and worldwide community outside the research area
 - Implementing a large number of standard features often exceeds the scope and resources of the project
- Most popular e-learning systems
 - Large number of systems
 - Already a large community
 - Adaptivity is not yet a well-known topic / hardly supported outside the research area
 - Development of adaptive content still resource-intensive
- Although adaptivity has been a research topic for about fifteen years, it is still used mainly in research projects rather than in the most frequently used LMSs



Discussion

- Goal:
 - ➔ Providing adaptivity features for a large community
- Possible Solution:
 - ➔ Development of adaptivity modules/services for (one of) the well established platform(s)
 - ➔ Advantage over developing a new system supporting “all” possible features
 - » Existing community
 - » Focus on adaptivity – no need to re-implement commonly used features
 - » Development of the system will go on even after the end of the project – system will stay up-to-date
 - » Targetted development efforts → less resource intensive



**Thank you
for your attention!**

Questions?

The work reported in this paper has been partially funded by the Socrates Minerva "**Adaptive Learning Spaces**" (**ALS**) project (229714-CP-1-2006-1-NL-MPP).

For information on the ALS project please refer to the project's web site:
<http://www.als-project.org>