Using XML Learning Objects –
Current and Future Benefits for Web Based Training Scenarios

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   – Current Benefit - Workflow
   – Future Benefits
The MiLCA Project

• Teaching Computational Linguistics with Media-Intense Learning Objects
  ➢ Medienintensive Lehrmodule in der Computer-linguistik-Ausbildung

• New Media in Education Funding Programme by the Federal Ministry of Education and Research
  ➢ Bundesministerium für Bildung und Forschung
The MiLCA Project

The main goals:

• Creation of interactive Learning Objects for students of computational linguistics
• Implementation of the Learning Objects into a **Web Based Training** platform

➤ **ILIAS**

• Use of these Learning Objects in the partners‘ computational linguistics programmes
• OpenSource WBT platform
• Developed at University of Cologne
• LAMP – Linux, Apache, MySQL, PHP
Disadvantages of WBT Platforms

WBT platforms – like ILIAS – have disadvantages:

• Non-standard usage of metadata
• Lack of reuse and import/export capabilities
• Content often HTML or proprietary data format

Solution: Use of structured content
Structured Content

- Provides information about hierarchical relations
- Strictly separates content and layout

- Markup languages are used to structure content

```xml
<xml version="1.0" encoding="UTF-8">
<!DOCTYPE LearningObject SYSTEM lo_aktuell.dtd>
<LearningObject>
  <MetaData>
    <General Identifier="A-5" Structure="Linear" AggregationLevel="3">
      <Title>XML</Title>
      <Language>de</Language>
      <Description>Die eXtensible Markup Language (XML)</Description>
      <Keywords>XML</Keywords>
    </General>
  </MetaData>
  <Content>
    <LearningObject>
      <MetaData>
        <General Identifier="A-5-1" Structure="Linear" AggregationLevel="2">
          <Title>Einführung in die eXtensible Markup Language (XML)</Title>
          <Language>de</Language>
          <Description>Einführung in XML</Description>
          <Keywords>XML</Keywords>
        </General>
      </MetaData>
      <Content>
        <Text>
          <Paragraph>Dies ist ein Text.</Paragraph>
        </Text>
      </Content>
    </LearningObject>
  </Content>
</LearningObject>
```
Structuring Content with XML

- eXtensible Markup Language
- Metalanguage
- Designed to define markup languages for structuring data
- World Wide Web Consortium (W3C) Standard
- Based on ISO Standard SGML
- License free, platform-independent and well-supported
DTD – Document Type Definition

- Grammar to describe markup language syntax
  - Elements
  - Attributes
- List of elements and attributes available
- Ensures structural validity
- Formalization of the idea of an document type
The MiLCA DTD

- Metadata concepts based on Learning Object Metadata Standard (LOM) WD 6.1
- IEEE Learning Technology Standards Committee
- Modular and extendable Content part
  - MathML for equations
  - SVG for vector graphics
- Bibliography based on BibTeX
  - Easy import and export
- Test and Glossary
The MiLCA DTD

Root element **LearningObject** consists of:

- MetaData
- LayoutInformation
- Content
- Test
- Bibliography
- Glossary
Apart from **MetaData**, all elements are optional, thus allowing

- “pure“ MetaData Learning Objects (describing non-digital Learning Objects)
- Test, Bibliography and Glossary (with MetaData)

to be valid Learning Objects
The **MetaData** element contains information about

- title
- author
- structure
- languages used
- size
- technical requirements
- educational use
- taxonomy
- classification
- copyright
- ...
The MiLCA DTD

- The **Content** element contains textual data or another **LearningObject**, allowing recursive nesting of Learning Objects
- **Text** contains paragraphs and non-structuring headlines
• XML documents can be easily transformed into several output formats with the help of XSLT

➢ eXtensible Stylesheet Language Transformation
  - Open W3C standard
  - XML syntax
  - License free, platform-independent and well-supported

Single-Source-Publishing
1. Authors create Learning Objects with an XML editor of their choice
2. Revision and Metadata information
3. The XML document is parsed and transformed into its output format (e.g. (X)HTML and PDF)
3. Version 3.0 of ILIAS will use a modified MiLCA DTD for XML import and export
Additional Future Benefits

• Addition of educationally motivated metadata
  – Support of a plurality of didactic scenarios
  – Learning Objects will be able to adapt to the learner’s way of learning
  – Learning model more user-centred

• Further development of taxonomy
  – Easy (and maybe automatic) construction of complex Learning Objects
Thank you!