

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

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Table of Contents

1. The MiLCA Project
2. ILIAS as a Web Based Training Platform
3. Disadvantages of WBT
4. Structured Content
5. The MiLCA DTD
6. Benefits
 - Current Benefit - Workflow
 - Future Benefits



The MiLCA Project

- Teaching Computational Linguistics with Media-Intense Learning Objects
 - Medienintensive Lehrmodule in der Computerlinguistik-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



ILIAS as a WBT

The screenshot shows the ILIAS user interface. At the top, there is a navigation bar with various icons for user management, documents, search, and settings. Below this is the title "Persönlicher Schreibtisch" (Personal Desktop) by Maik Stührenberg. A horizontal menu contains links for "Persönliche Daten", "Passwort ändern", "Sprache ändern", "Benutzervereinbarung", "Wer ist online?", and "Chat". Below the menu is a table titled "Zuletzt besuchte Lerneinheiten" (Recently visited learning units).

Zeit	Lerneinheit	Seite
12.09.2002	Strukturierung von Informationen	SGML
12.09.2002	Text und Textsorten	Startseite

- OpenSource WBT platform
- Developed at University of Cologne
- LAMP – **L**inux, **A**pache, **M**ySQL, **P**HP



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 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>
      <LayoutInformation CSS-URL="milca.css"/>
      <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

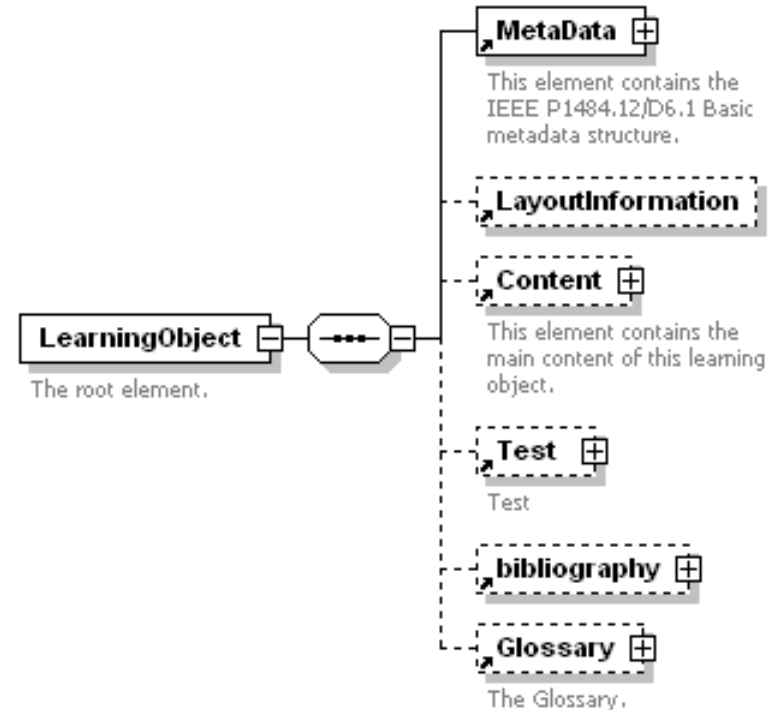
- Metadata concepts based on Learning Object Metadata Standard (LOM) WD 6.1
- IEEE Learning Technology Standards Committee
- Modular and extendable Content part
 - MathML for equations
 - SVG for vector graphics
- Bibliography based on BibTeX
 - Easy import and export
- Test and Glossary



The MiLCA DTD

Root element **LearningObject** consists of:

- MetaData
- LayoutInformation
- Content
- Test
- Bibliography
- Glossary





The MiLCA DTD

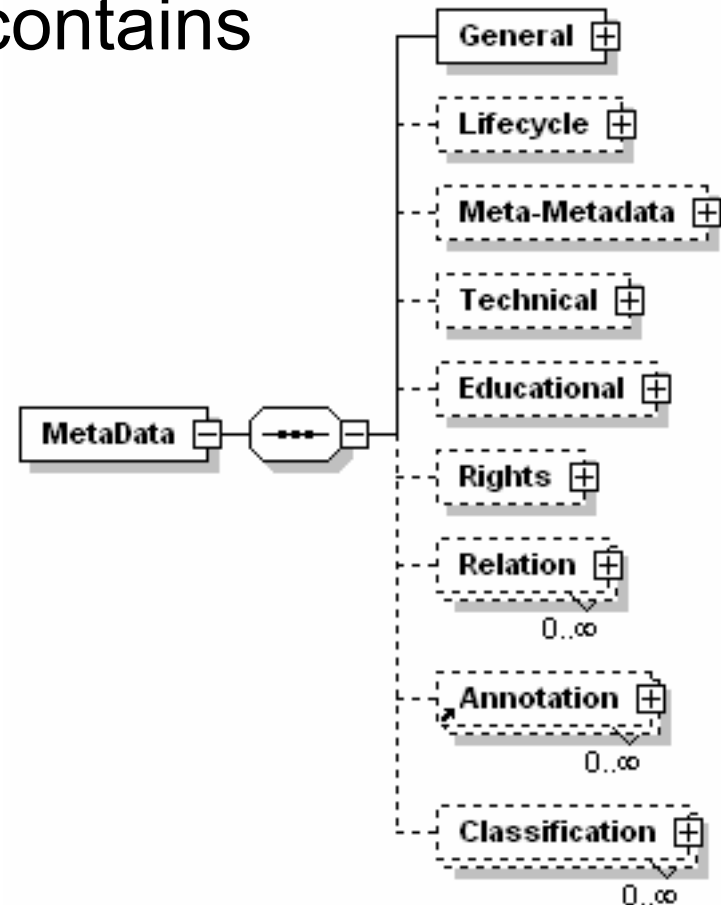
Apart from **MetaData**, all elements are optional, thus allowing

- “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

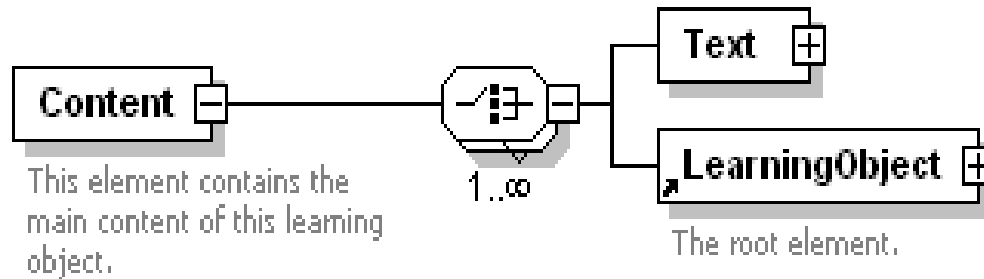
- title
- author
- structure
- languages used
- size
- technical requirements
- educational use
- taxonomy
- classification
- copyright
- ...





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





Current Benefit – Workflow

- 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



Current Benefit – Workflow

1. Authors create Learning Objects with an XML editor of their choice

4.29. Einheiten 487 und 488, 48a und 48b Material der Grauwacke.
Kartennummer und Lage der Punkte.

Als Grauwacke wird ein Stein von vulkanischen Gestein bezeichnet, der die Zentralen von den Nördlichen Kalkalpen trennt. Die Grauwacke ist heute im Gelände als unregelmäßige Berg- und Kuppenlandschaft auf, die sich schief von den Flanzbergen der Kalkalpen im Norden, das südlich durch schiefen Felsgarten gekennzeichneten Landschaft der Zentralen und der sogenannten Untersteinen im Süden abhebt.

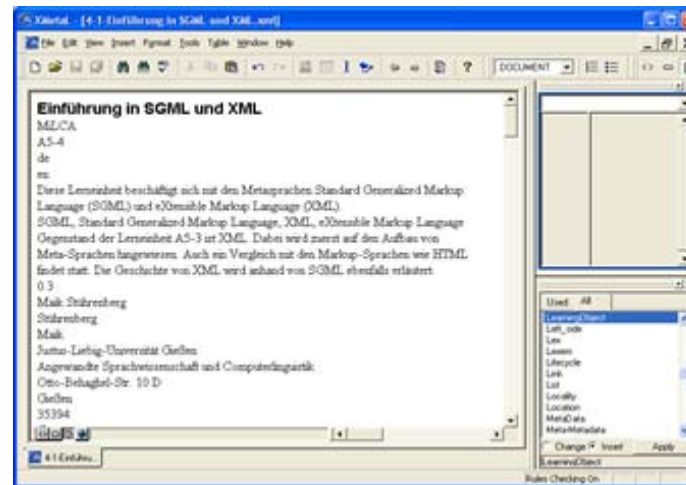
Die Grauwacke umfaßt eine Abfolge von verschiedenen, meist schwach metamorphen Gesteinen, wie Grauwacke, Quarzporphyrophyllite, Grünschiefer, daneben auch Ergußgesteine, Kalk, Dolomit, Ton- und Kieselschiefer (OBERHAUSER, 1980, pag. 205; THINUS, 1974, pag. 149 ff).

Die Steirische Grauwacke im Längstal der Kalkalpen wird durch eine alpidische Deckplatte, die „Steirische Überschiebung“, in zwei Einheiten gegliedert, die sich gegenseitig verschieben. Während die tieferen Verriner Decke karbone Schieferungen umfasst, besteht die hangende Norische Decke überwiegend aus alpidischen Formationen. Da sie sedimentär mit dem Tirolien verknüpft ist, kann sie als ein Teil von diesem betrachtet werden.

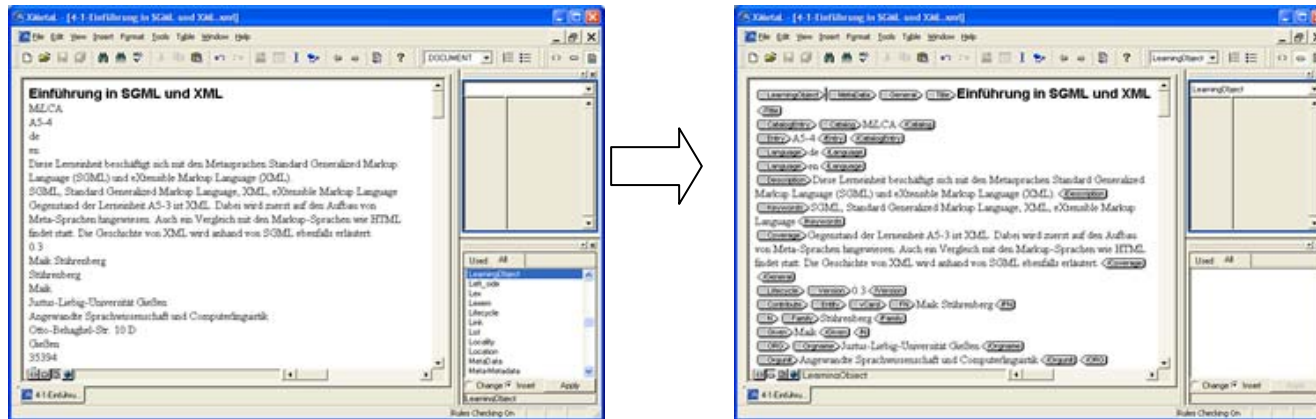
Unglar ist, soweit die zwischen beiden Hauptteilen gelegentlich auftretenden lithomorphologischen Schichten die primäre Basis der Norischen Decke darstellen oder sekundäre Schieferungen sind (LÖGEL, u. NEUBAUER, 1984, pag. 27 - 29).

Die Bodenlandschaft ist vor allem durch Felsmassen gekennzeichnet.

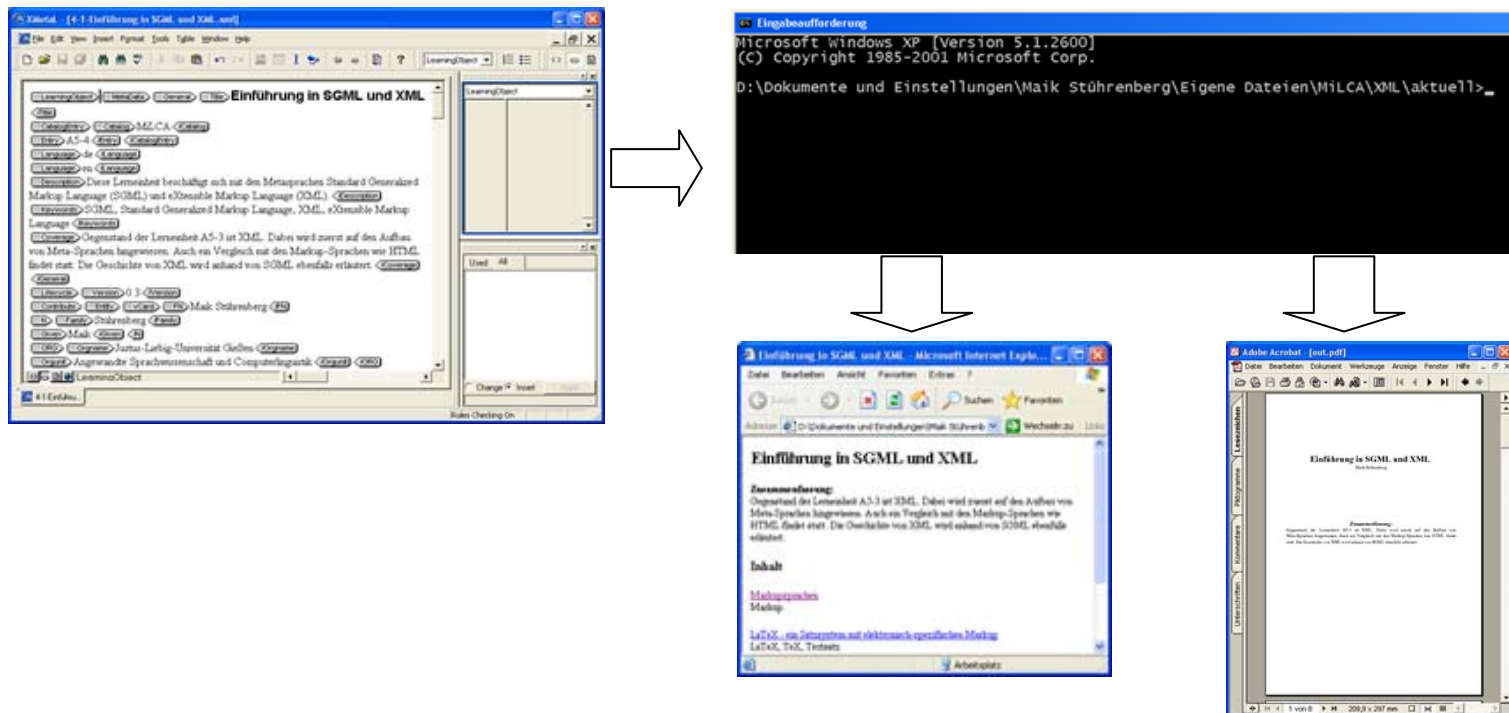
Die Karten 48 und 49 stellen die zugehörigen Punkte dar.



2. Revision and Metadata information



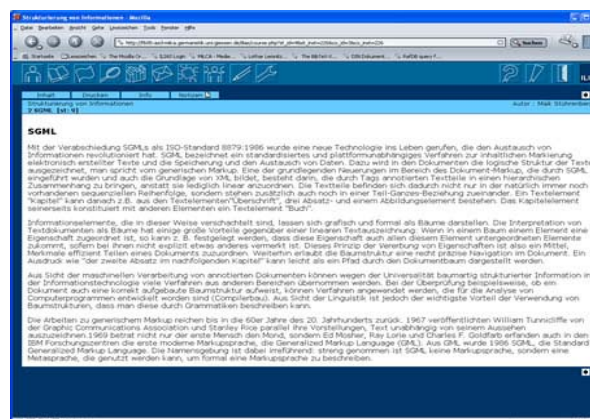
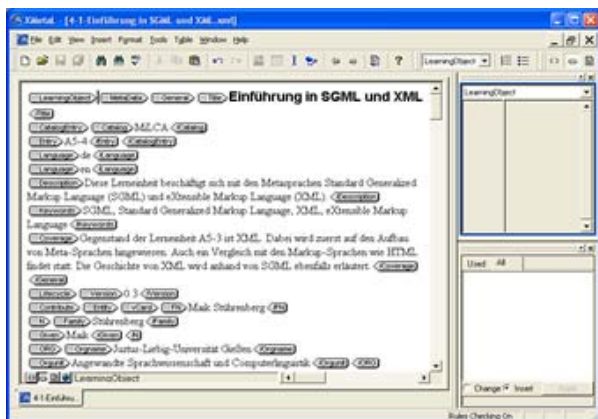
3. The XML document is parsed and transformed into its output format (e.g. (X)HTML and PDF)





Future Benefit – Import into ILIAS

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!

