Metadata, Data, Artificial Intelligence And Personalisation

Where To Start From?

EEPG Meeting, Lisbon 19-20.04.2018
The Components

- Content & Metadata
- Users’ Generated Data
- Data Storage & Analytics
- AI / Adaptive Algorithms
We Know Already That…

Color the pictures in the grid.
1. Does your authoring tool allow to define, edit and store metadata

OR

2. Content is copied to CMS and metadata are managed there?
• Content & Metadata
• Users’ Generated Data
• Data Storage & Analytics
• AI / Adaptive Algorithms
Data are created when user (student) interacts with the content

Where The Data Come From?

Make sure your content & platform collect educationally relevant data based on users’ interaction
### What Are “Educationally Relevant Data”? Where Are They Generated?

<table>
<thead>
<tr>
<th>Your Content</th>
<th>Your Platform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>Who</td>
</tr>
<tr>
<td>Correct and incorrect answers</td>
<td>When</td>
</tr>
<tr>
<td>Attempts</td>
<td>Where</td>
</tr>
<tr>
<td>Errors / Mistakes</td>
<td>Which school</td>
</tr>
<tr>
<td>Time spent</td>
<td>Which teacher</td>
</tr>
<tr>
<td>State</td>
<td></td>
</tr>
</tbody>
</table>

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Collecting Data For All Types of the Activities / Interactions

Add Module

Favourites Activities Reporting Navigation Media Scripting LearnPen

Basic Math Gaps Board Game Choice Clock Connecting Dots

Connection Count and Graph Crossword Figure Drawing Fractions

Graph Hangman Image Gap Image Identification Image Source

Line Number Line Selection Magic Boxes Math Memo Game

Multiple Gap Ordering Paragraph Paragraph keyboard Pie Chart
The Components

- Content & Metadata
- Users’ Generated Data
- Data Storage & Analytics
- AI / Adaptive Algorithms
New Type of Metadata

CONTENT & TRADITIONAL METADATA

STATISTICAL DATA

NEW METADATA
The Components

- Content & Metadata
- Users’ Generated Data
- Data Storage & Analytics
- AI / Adaptive Algorithms
Artificial Intelligence Black Box

- Content & Metadata
- Users’ Generated Data
- ALGORITHMS
- AI / Adaptive Learning Experience
Properties of Exponents

If $a$ and $b$ are real numbers and $m$ and $n$ are any integers, then:

- $a^m \times a^n = a^{m+n}$

Initial Activity

- EASY
- MEDIUM
- HARD

Examples:

- $3^4 \times 3^2 = \square$
- $(-8)^{-2} \div 4^{-2} = \square^3$
Sequence / Session / Lesson Level

**Mathematics - Quadratic Function**

**Additional Easier activities**

**Theory 1**
Definition of a quadratic function.

**Activity 1**
Decide which functions are quadratic functions.

**Theory 2**
The case when \( b = 0 \), 
\[ y = ax^2 + c. \]
Properties and simulation.

**Sample**

**Quadratic Function**
A quadratic function is a function that can be represented in the form 
\[ y = ax^2 + bx + c, \]
where \( a, b \) and \( c \) are arbitrary real numbers with \( a \neq 0 \).

**Indicate all the quadratic functions.**

- \( y = 1 + 2x + 3x^2 - 2x - 1 \)
- \( y = 2 - x - 3x^2 \)
- \( y = \frac{x^2 + x + 1}{x} \)
- \( y = (x^2 + x)^2 + (2 - x)^2 - 2x^4 \)
- \( y = (2 + x)^2 \)
- \( y = 3x + 1 - 2x + 1 \)
- \( y = x^2 - (x + 1)^2 \)
- \( y = x + 5^2 \)

**Score:** 0%
Pre-Assessment Lesson

Remedial Lessons

Main Topic Lesson with enhanced feedbacks and adaptive algorithm on a sequence level

Enhancement Activities

Remedial / Drill & Practice Activities

Next Topic

Course Level
Algorithms Defined At LMS Level

Adaptive Algorithms

Adaptive rules:

1. Remedial 1
   - lesson id="64561919836176"
   - lessonScore="5441728200409088"
   - PageScore="2"
   - score="0.5"

2. Remedial 2
   - lesson id="6430139502232048"
   - lessonScore="5441728200409088"
   - PageScore="3"
   - score="0.5"

SAVE
SAVE
Defining Algorithms
Four Levels / Two Implementation Environments

- Learning Object Level
- Sequence / Session / Lesson Level
- Course / Subject Level
- Cross Subject Level

Authoring Tool Environment
LMS Environment

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How well your content and algorithms are separated from your platform

Lifecycle of content and platform – which one lasts longer?
The Authoring Tool (Player) and LMS are at the centre of a digital strategy based on Big Data analytics for adaptive and personalised learning solutions.
What Do You Really Own?
“We Will Make It For You…”

Content & Metadata
• Ability to Continue without vendor
• Standardised source code,
• Open source Player
• Easy way to edit and maintenance

Users’ Generated Data
• Ownership (technical & legal),
• Standardised format & storage
• Full access

Algorithms
• Ownership (authorship?)
• Content / Platform separation
• Full access and ability to maintenance them in the future
Metadata, Data, Artificial Intelligence And Personalisation

Where To Start From?

Thank You