Instructional design: how to integrate technology in course and curriculum development (based on the ADDIE model)

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Instructional Design
Why to discuss ‘Instructional Design’

Because we don’t need ‘at random shooting’ in course and curriculum development! We need to:

*improve EFFECTIVITY AND EFFICIENCY in HE education to educate students to become competent graduates*

- Acquire new knowledge on Augmented and Virtual Reality (AVR) in education for successful implementation of e-T&L
- New knowledge on AVR is integrated into the teachers’ and learners’ world
- Rethink your T&L strategy and curriculum cohesiveness
- Rethink your course didactics and methodology
- Then measure the quality of your actions and apply PCDA !!!
Primordial Principles of Instruction

‘Learning is facilitated’ when:
1. Learners are engaged in solving real-world problems.
2. Existing knowledge is activated as a foundation for new knowledge.
3. New knowledge is demonstrated to the learner.
4. New knowledge is applied.
5. New knowledge is integrated into the learner’s world

The learning environment: the workspace connecting student characteristics and learning objectives
ADDIE – ADDIE – ADDIE – ADDIE – ADDIE

A model that describes the different steps in the process of instructional design (ID)

5 phases represent a dynamic, flexible guideline for building effective training

Diagram:
- Analyse
- Design
- Develop
- Implement
- Evaluate
Analysis:
Students and their characteristics
What characteristics do students have?
Student characteristics

- Prior knowledge
- Motivation
- Expectations
- Group characteristics
- Background
- Acquired level of self directed learning
- ...

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Millennium Student Characteristics

- ICT-minded
- Multitasking
- Media literate
- Non-linear, a-synchronous
- Explorative, interactive
- With a positive attitude
- Target oriented
- Social, connected
- Partners with educators
- ...
Generation Z or α or…
Analysis: Context
What is the “context of learning” for our students?
Context

- Accessibility
- Mobility
- Size of the group
- Infrastructure
- Culture
- Resistance
- ....
Analysis: Learning Objectives
The knowledge, skills and attitudes students have to acquire
Learning objectives: SMART formulation

- **Specific:** State exactly what you want to accomplish, addressing the five W ‘What, When, Where, Who and Why’, and ‘How’

- **Measurable:** How will you know when your objective has been successfully met? How will you measure the objectives?

- **Achievable:** An objective should be feasible and to be effected within your control. Is it achievable with the available resources?

- **Relevant:** How is the objective tied into your key responsibilities? How meaningful is the objective in the actual context?

- **Time bound:** State a definite target date for completion and/or frequencies for action steps in achieving the objectives.
Bloom’s Taxonomy, with an overlay of AVR – by University of Arkansas
Bloom’s taxonomy: 6 levels of cognitive learning

Six levels of Cognitive Learning

1. **Knowledge**
   - define, repeat, record, list, recall, name, state

2. **Comprehension**
   - classify, discuss, describe, express, identify, locate, report, review, tell

3. **Application**
   - interpret, apply, employ, use, demonstrate, practice, illustrate, operate, schedule

4. **Analysis**
   - distinguish, analyze, differentiate, appraise, compare, contrast, criticize, inspect, debate, inventory, question

5. **Synthesis**
   - compose, plan, propose, design, formulate, arrange, collect, create, set up, organize, manage, prepare

6. **Evaluation**
   - judge, appraise, evaluate, rate, value, revise, score, select, choose, assess, estimate, measure

Bloom, B. (1973). Taxonomy of Educational Objectives
Revised Taxonomy (2000)

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<table>
<thead>
<tr>
<th>Bloom's taxonomy</th>
<th>Bloom's modified taxonomy</th>
<th>Bloom's extended digital taxonomy</th>
<th>Functional Levels</th>
<th>Activities with digital tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Remembering</td>
<td>Doing</td>
<td>Recognizing, listing, describing, identifying, retrieving, naming, locating, finding</td>
<td>Bullet pointing, highlighting, bookmarking, group networking, shared bookmarking, searching</td>
</tr>
<tr>
<td>Comprehension</td>
<td>Understanding</td>
<td>Connecting</td>
<td>Interpreting, summarizing, inferring, paraphrasing, classifying, comparing, explaining, exemplifying</td>
<td>Boolean searches, advanced searches, blog journaling, tweeting, categorizing, tagging, commenting, annotating, subscribing</td>
</tr>
<tr>
<td>Application</td>
<td>Applying</td>
<td>Applying</td>
<td>Implementing, carrying out, using, executing</td>
<td>Running, loading, playing, operating, uploading, sharing with group, editing</td>
</tr>
<tr>
<td>Analysis</td>
<td>Analyzing</td>
<td>Conceptualizing</td>
<td>Comparing, organising, deconstructing, attributing, outlining, finding, structuring, integrating</td>
<td>Hacking, mashing, linking, validating, reverse engineering, cracking</td>
</tr>
<tr>
<td>Synthesis</td>
<td>Evaluating</td>
<td>Evaluating</td>
<td>Checking, hypothesising, critiquing, experimenting, judging, testing, detecting, monitoring</td>
<td>Blog commenting, reviewing, posting, moderating, collaborating, refactoring, testing</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Creating</td>
<td>Creating</td>
<td>Designing, constructing, planning, producing, inventing, devising, making</td>
<td>Programming, filming, animating, blogging, video blogging, mixing, re-mixing, wiki-ing, videocasting, podcasting, directing</td>
</tr>
<tr>
<td>Bloom's digital taxonomy</td>
<td></td>
<td>Sharing</td>
<td>Publicly sharing, publishing, broadcasting</td>
<td>Contributing to open social networks, publishing, broadcasting, networking</td>
</tr>
</tbody>
</table>

Higher Order Thinking Skills

Lower Order Thinking Skills
Design:
Teaching methods
(and learning activities)
Which teaching methods do you use?
Design: Learning materials
Global Scheme @ KU Leuven

Context

- Objective

Evaluation

- Support
  - Content
  - Teaching Methods
  - Material
  - By whom

Learning Environment

e-Teaching methods

Learning Activities

Student Characteristics

Contents

Materials

By whom
Top Tools for Learning

Here are the 2016 Top 200 Tools for Learning list compiled by Jane Hart of the Centre for Learning & Performance Technologies. How are all these tools being used for learning? Take a look at the Best of Breed 2016 list where I categorise the different tools, or the 3 sub-lists Top 100 Tools for Personal Learning 2016, Top 100 Tools for Workplace Learning 2016 and the Top 100 Tools for Education 2016. To get an overview of how the tools in these 3 Top 100 lists fit into the Top 200 list, see the Comparison View. Analysis of this year’s list appears beneath the list.

1. YouTube
2. Google Search
3. Twitter
4. PowerPoint
5. Google Docs/Drive
6. Facebook
7. Skype
8. LinkedIn
9. WordPress
10. Dropbox
12. Yammer
13. WhatsApp
14. Prezi
15. Kahoot
16. Word
17. Evernote
51. EasyGenerator
52. Khan Academy
53. Quizlet
54. Dilgo
55. Socrative
56. Blogger
57. Canva
58. iPad & Apps
59. Sway
60. Google Scholar
61. Udutu
62. Adobe Connect
63. iTunes & iTunesU
64. Keynote
65. Firefox
66. Zoom
67. Canvas
101. Pixabay
102. Confluence
103. OneDrive
104. MindManager
105. FutureLearn
106. XMind
107. Adobe Illustrator
108. Desire2Learn (D2L)
109. Jing
110. Nearpod
111. Wordle
112. Wix
113. Branchtrack
114. eXe
115. Animoto
116. Adobe Premiere
117. LibreOffice
151. Notability
152. Delicious
153. aNewSpring
154. Bing
155. Kaltura
156. Moovly
157. Explaindio
158. Zeetings
159. ILIAS
160. Remind
161. WeVideo
162. Showbie
163. PlayPosit
164. Codecademy
165. Periscope
166. Vrideo
167. Claro
Selecting the proper learning tool
Teaching Method and Medium

**Select Instructional Methods:** selection of methods to support the cognitive processes necessary for trainees to acquire the task performance that is the target of the training

**Select Media Attributes:** selection of a set of media attributes that can support the type, amount, timing, and control of methods selected for the training

**Select Media:** selection of the most economical and convenient set of media that possess all of the required attributes

Learning resources: OER

https://www.oercommons.org/
Learning resources: OER

https://www.openeducationeuropa.eu/en
Europeana

https://www.europeana.eu/portal/en
Design: Evaluation / assessment
Global Scheme @ KU Leuven

Objectives

Student Characteristics

Learning Activities

Support
- Contents
- Teaching Methods
- Materials
- By whom

Evaluation

Learning Environment

Context

Student Characteristics

By whom
Important characteristics of evaluation

- Validity
- Reliability
- Transparency
Alignment with learning objectives

- Conclude, explain, argue, interpret, validate
- Relate, clarify, explain, compare, deduce
- Select, translate, use your own words, paraphrase
- Formulate, rewrite, make, produce, organise, design
- Use, calculate, solve, demonstrate
- Define, cite, describe, label, enumerate
Develop
At work…
Production of (instructional) video

http://www.kuleuven.be/onderwijs/onderwijsbeleid/limel/helpplatform
AVLM-training @ Leuven
Student participation

STUDENTS AS CO-CREATORS
Implement
Just do it
Evaluate
What could happen

- How the customer explained it
- How the project leader understood it
- How the analyst designed it
- How the programmer wrote it
- How a business consultant described it
- How the project was documented
- What operations installed
- How the customer was billed
- How it was supported
- What the customer really needed
PDCA cycle
Quality assurance (Quality culture)

http://e-xcellencelabel.eadtu.eu/
Questions? Suggestions?