MOOC pedagogies and learning design

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MOOC or MUCK

Welten Institute
Research Centre for Learning, Teaching and Technology
Systematic literature review

- EBSCO host
- Academic Search Elite
- Business Source Premier
- E-Journals
- PsycINFO
- ERIC, the Education Resource Information Center
- Psychology and Behavioural Sciences Collection
- PsycARTICLES
  - IEEE collection
  - Google Scholar

Search terms: MOOC, or MOOCs and Pedagogies and Instructional Design, plus Apply Related Words; Search within the Full Text of Articles; Scholarly (peer reviewed) Journals; 2010-2014

80 articles - 17
Trends

- Technological determinism vs pedagogical determinism
- No significant difference phenomenon (Russell, 2001) – 355 research reports
- cMOOC vs xMOOC
- Cognitive-behaviourist (Instructivism) vs Social-constructivist vs Connectivism
- Individual cognition vs Distributed cognition
- Trends in the Trends
- MOOCs, SPOOCs, VOOCs… MOORFAP…
- AND...

- To be continued…
Run fast…Quantitative analysis of the text on MOOCs
Imagine Learning…

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Imagine Networks...
Imagine Courses...
Instructional design approaches

• Four Component Instructional Design Model (4C/ID) (Van Merriënboer and Kirschner, 2007)
• Problem-based learning (Hmelo-Silver, 2004)
• Cognitive apprenticeship approach (Brown and Duguid, 2000)
• Cognitive flexibility theory (Spiro, and Jehng, 1990),
• Design Inquiry of Learning (Laurillard, 2012; Laurillard, Charlton, Craft, Dimakopoulos, Ljubojevic, Magoulas, Masterman, Pujadas, Whitley, and Whittlestone, 2013).
• Design-based research (Collins, Diana, and Bielaczyc, 2004; McKenney, and Reeves, 2013).
• The theory of deliberate practice (Ericsson, 1993)
• Experiential learning (Kolb, 1984)
• Identify elements across different evidence-based instructional design approaches (First Principles of Instruction - Merrill, 2002).
First Principles of instruction - aggregation

- Confront learners with a problem, issue, challenge, preferably, real-life one
- Consider the problem from different (criss-cross) perspectives
- Divide the problem into sub-problems/tasks
- Provide for each task an explicit support in terms of background information, examples, procedures, methods, techniques, and tools
- Accommodate learning preferences
- Draw upon learners’ experience
- Experience needs to be reflected upon, shared and discussed with others
- Deliberate practicing and creating artefacts
The Handson MOOC case - challenges

- A Teacher-training course
- Applying ICT tools
- Implementing creativity
- Emphasizing on learning-by-doing
- Using Moodle platform
Learning Design Studio - background

- Learning Design Studio (Cox, Harrison and Hoadley, 2008; Mor and Mogilevsky, 2013).
- Re-conceptualizes the traditional concept of teacher-training
- Teachers in position of:
  - Identifying an educational challenge
  - Generating innovative solutions to the problem
  - Designing an artefact
  - Evaluating the artefact
- Design Inquiry of Learning (DIL) - the theoretical background of LDS
  - Design-Based Research (Collins, Diana, and Bielaczyc, 2004; McKenney and Reeves, 2013).
  - Studio Instruction in arts and design
LDS phases

Design Inquiry of Learning

Imagine
Define an educational challenge that you would like to address.

Investigate
Analyse the context, refine the challenge, identify a suitable pedagogical approach

Inspire
Review examples of past innovations and apply the insights from those to your project.

Reflect
Produce an account of your design process, the learning experiences you derived from it, and their outcomes.

Ideate
Conceptualise a solution

Evaluate
Assess the extent to which your design meets its objectives, identify areas for improvement

Prototype
A rapid crude implementation to test your ideas
Learning Design Studio - structure

- Advanced Organiser
- Define the problem/Needs analysis
- Writing Personas
- Ideation and Conceptualisation
- Design blueprint/Prototyping (visioning and storyboarding)
- Evaluation
ADVANCED ORGANISER

A brief description of the module and what you as a participant can expect from it. In addition, a publication is attached to provide some information about Learning Design Studio and some suggestions as how to work effectively in groups.

Organisation of the course

The document explains the educational philosophy of the course and describes the learning outcomes and learning activities included.

A publication on Learning Design Studio


Working in groups

The basic idea of the course is that you are going to work in small groups. More often than not people have different perceptions on what is important and what not and how to approach the issue they are confronted with. It could be explained with differences in cognitive style for creative problem solving. If these differences are large it may cause collisions. We then could spend much more time and energy to dealing with differences in our creative problem solving style rather than spending time and energy to dealing with the problem we are facing. The attached file contains some very brief, but we believe, useful information about how to manage diversity in groups, which is based on strong empirical evidence. It is less than 5 minutes reading. Keep it in mind when working in a group. This information might help you to better use yourself and other people, especially those not like you, for mutual benefit in any group, of which you are a member.
**DEFINE THE PROBLEM/NEEDS ANALYSIS**

The idea is that you as a group conduct a sequence of activities toward designing a paper prototype, a storyboard or even a digital prototype if you wish, as a solution to a real educational problem (e.g., a website supporting some learning or teaching activities, a tool supporting lesson design, or a learning game).

We could give you a problem but we would prefer you define it yourselves, and it must be a concrete, a real-life educational problem, something in your practice you want to improve. In defining the problem, you should investigate the needs of the target group(s) involved, providing a brief account of the methods used and the results from this investigation. A proper problem definition is conditional on a well-conducted needs analysis. Literature review can certainly be relied on as such a method but observation and talking to people who are affected by the problem or know about the problem (e.g., colleagues in school/university/organisation) is highly recommendable.

Knowing the needs of those who we are designing for is crucial. There are a lot of educational applications with beautiful interfaces and attractive navigation but they simply do not address the problems of people they are designed for. The following cartoon illustrates the problem.

Below we provide some advanced information about contextually inquiry interview, which has proved an effective needs analysis method. It is a voluntary activity and it is up to you to decide what to use of it at this stage, if any. You may decide also to participate in a forum ('Fast Horse vs Car') discussing some issues of needs assessment; or try some tools for organising and sharing information (scoop.it and pearltrees).

Define the problem

Define the educational problem/challenge you are going to provide solutions. It should clearly describe the needs of the target group(s).

Explore Contextual Inquiry Interview (a voluntary activity)
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Contextual inquiry interview is one-to-one interviews conducted in the user work place together with observation of ongoing work (Holtzblatt, Wendel &Wood, 2005, p.80).

You may wish to make search to find more information about Contextual Inquiry Interview. Our recommendation is to look at InContext. The site features papers from Karen Holtzblatt and Hugh Beyer, prominent writers in the domain of contextual design. Take a look at Beyond the Tower of Babel and Tips to Improve your Contextual Inquiry techniques. You could also follow InContex and Karen on Twitter.

Try additional tools (a voluntary activity)

You can use Learning Journal or a blog to reflect on various issues regarding needs analysis, and forums to share information collected. We suggest here to try out two additional tools for organising, reflecting and sharing information, namely scoop. it and peartrees.

Faster Horse vs Car (a voluntary activity)

You maybe know the famous quote of H. Ford: "If I had asked people what they wanted, they would have said faster horses.” Eventually he constructed a car. Some people like it as it illustrates the importance of identifying real needs of people. Some others do not and their argument is: "The answers you get come from the questions you ask". What is your opinion about?
WRITING PERSONAS

Persona is a very good method for giving a meaningful form of the information collected during the need analysis of your target group. Here we provide some general description of the method and some readings but certainly you can search yourself for some more information.

Persona is a richly presented, highly detailed description of the typical user of a product. Persona is a synthesis of elements drawn from several users who share common job roles, demographics, and user needs characteristics. Persona is to design for a discrete set of users and satisfy all users with similar goals.

Personas represent behaviour patterns, not only job descriptions. Personas must be context-specific - and focused on the behaviours and goals related to the specific domain of a product.

Adding life to the persons is important for this technique. Personas are fictional people but they have life stories, goals, and tasks. They have names, age, gender, occupation, ethnicity, educational achievement, socioeconomic status, families, friends. Without a little bit personality, personas can easily turn into generic users instead of precise design targets. One of the purpose of persona is to add an empathetic focus to the design, that is an understanding of and identification with the users. At the same time, too much personal details may be counterproductive for the design. Persona is simple in concept but not easy to construct. Since its introduction by A. Cooper in ‘The Inmates are running the asylum (2004), the technique has gained huge popularity, but also has been subject of misinterpretation. In his more recent book ‘About Face 3’ (2007), Alan Cooper (in a cooperation with R. Reimann and D. Cronin) clarifies and explains in some more depth the idea behind the concept of Persona. The main assumption is that Persona is a model in a similar way as models in economics or physics for example, but it serves the purposes of software design. Persona provides designers with an intuitive but effective way of understanding users behaviour, their thinking, desire and goals.

Personas are composite archetypes, based on the data collected during observation, interviews and other methods for data collections. They are an aggregation of typical usage patterns across users representing a particular class or type. Personas do not represent an average user but try to model exemplary or definitive behaviour within the identified ranges of behaviour.
Persona should be based on data - e.g. the information collected during the needs assessment. When for some reasons personas cannot be based on data, write provisional personas. Although provisional personas are not based on rigorous data they still use some data: the collective knowledge of the designers and users about who the user is. In any case provisional personas are a better option that no personas at all. Provisional personas however need to be treated with care. If you decide to use provisional personas try to bear in mind the following: label provisional personas as such; try to use as much data as possible and describe what data have been used. You may want to look at the papers attached to this section to get an idea what is Persona and how the method has been used in some projects.

Persona - a general description
A paper describing Persona method and how it can be integrated in participatory design.

Multiple personas
A study applying personas to describe the Future of Education 2025.

Description of Persona
Write Persona for the typical user of the paper mock up you want to create.
IDEATION AND CONCEPTUALISATION

During the needs analysis and writing persona stages, you may have already come up with some ideas about the product you want to create. It is also natural to start looking for some already existing solutions to your problem elsewhere exploring similar projects. You could get some insights that can be implemented as they are or adapted to your context. However, it is always a good idea to try generate your own original ("out of box") ideas to the problem. Different creativity techniques can help to enhance the natural creativity you have.

Generate creative ideas

Generate creative ideas as alternative solutions to the problem by either following the creative set up described below or develop your own creative problem solving set up.

1. Select a creativity technique for idea generation, e.g Brainstorming, Attribute listing, Morphological analysis, SCAMPER, Six Thinking Hats, Mind Mapping, Random Stimuli, Dreamer-Critic-Realist, Forced Relationship or Inside View. Here is an overview of creativity techniques. You may need to search for some more detailed description of the technique you selected.

2. Try to individually generate as many ideas as possible, withholding the evaluation of the ideas.

3. To make the process more efficient, software tools can be used. For example, concept mapping software can be applied to support idea generation. You can create quickly many ideas as nodes. Search for and explore concept mapping software to find a tool that you feel most comfortable to work with. Here are some links, you may wish to look at: Inspiration; cMap Personal Understanding Environment; Bubbl.us and Popplet. You could test them either by trial and error, consult the help system of the software, or follow online
4. Share the ideas you generated with the group.
5. Ask someone from the group to compile the ideas generated (remove the redundant ideas; or combine a few ideas into a more comprehensive one).
6. Try to sort the ideas into groups of similarity of meaning and give labels of the groups of ideas (You could consult creativity techniques such as K-J, Affinity Diagram or Card Sorting Board)

Tools for classical concept mapping can be used to support sorting of ideas. More advanced methods and tools are Concept System Global Max and Optimal Sorting. For more information see below (voluntary activities).

**Try some additional tools for sorting of ideas (voluntary)**

We suggest here two more advanced software applications for card sorting in case you want to use them, if not for this course, maybe in their future. The best we know is Concept System Global Max, which is specifically developed to support the Group Concept Mapping approach (not to be confused with the classical concept mapping). You could look at the papers attached if you are interested in. Concept System Global however is a commercial tool. Another good software for card sorting, which is more accessible is Optimal Sorting (was Websort). It is also a commercial tool, but free of use up to 3 projects. You can enter the ideas generated and then ask a group of people (possible users of the application you are developing for or your co-designers) to sort the statements into similarity of meaning. The sorting is user-friendly: by 'drag and drop'. The system has an embedded hierarchical cluster analysis tool, can visualise the results and provides excel export of the raw data for a further analysis.

**Group Concept Mapping and Concept System Global in the Future of Education (voluntary)**
Two artefacts are expected here as low fidelity prototypes: visioning and storyboarding.

Create a vision

Visioning can help you to consolidate your ideas by drawing a rough sketch that represents a story of your Persona’s new practice. (Holtzblatt, Wendell & Wood (2005). Rapid Contextual Design. Morgan Kaufman: San Francisco, CA). The story should be told from the point of view of the Persona, not from the system’s or the product’s perspective. Define clearly what the Persona is doing, thinking, seeing... Try to present the vision on one sheet of paper. If needed, make several visions. Do not care too much about neatness at this stage. As the vision stories are like brainstorming, they must be done quickly so paying too much attention to details and aesthetics could be counterproductive. For drawing visioning you can use any software tools you feel comfortable with.

If you want to see just an example of visioning scroll quickly to the Visioning section at: http://www.interaction-design.org/encyclopedia/contextual_design.html. Visioning is presented as part of Contextual Design (CD) approach. If interested in CD, you can bookmark it for a later reference.

Create a storyboard

The visions can further be elaborated to storyboards. Storyboard, a technique known from the movie industry, is a sequence of pictures with small pieces of text embedded in it that illustrate how the Persona interacts with the system or
USABILITY TESTING

Usability testing is part of paper and software prototypes, but the evaluation should have already started at the early stages of the design and development. Some evaluation has been embedded in the contextual inquiry interview stage, selection of ideas, visioning and storyboarding. In this sub-section we are going to focus on specific procedures and methods for usability testing of mainly paper prototypes and software prototypes.

Evaluation script

Think again of the movie metaphor for software creation: evaluation script is like the movie script. You describe all actions of the cast (evaluators and users) including the techniques for data collection. Look at the templates below for an inspiration in preparing an evaluation script. You do not need to fill out all fields of the template.

Evaluation script template

This is a template for evaluation script of websites but it could be adapted for evaluation of other software products.

Evaluation script adapted

This is an evaluation script prepared for the evaluation of the Handover Toolbox, a website that supports networked learning of medical professionals. Although it is not related to teachers professional development, you might find it useful as how the general template have been adapted.

Walkthrough with think aloud and interview
First principles of instruction - reflection

- Confront learners with a problem, issue, challenge, preferably, real-life one
- Consider the problem from different (criss-cross) perspectives
- Divide the problem into sub-problems/tasks
- Provide for each task an explicit support in terms of background information, examples, procedures, methods, techniques, and tools
- Accommodate learning preferences
- Draw upon learners’ experience
- Experience needs to be reflected upon, shared and discussed with others
- Deliberate practicing and creating artefacts
The process of design

- Design-based approach – course design
- Software design (rational unified process, contextual design)
- Successive Approximation Model (ID for elearning purposes)
  - Progressive, spiral refinement through a cyclical prototype development and their reliance on stakeholders involvement in the design and evaluation of the project’s products (Holtzblatt, Wendell, & Wood, 2005; Kuniavsky, 2003).
  - Evaluation not as a single phase, typically conducted in the end of the process but rather it cuts across other phases (needs assessment, design, development and implementation)
individual learning Journal

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### Analysing context

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Get familiar with personas

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Create your own personas

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Prototype your artefact

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Define evaluation heuristics

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Test your prototype

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Some observation

- We expected about 100 students but got nearly 1000 registered participants.
- Of them more than 100 were active on most of the learning activities.
- The participants found most of the learning activities useful but if we need to pinpoint one which they got especially enthusiastic about, it is Persona.
- Heuristic evaluation was for the participants the most difficult part of the course to understand. The examples given were mostly from user-interface design and we though the participants struggled to make a link to their teaching practice.
- We as a design team agreed on a minimalistic Learning Design Studio approach but finally we tried to put (not entirely of course) the learning activities and content of 10-weeks course (OLDS MOOC) in a 5-week course (Handson ICT).
- We expected an increase in cognitive load of individual participants because of jumping from one environment to another (Moodle, ILDE, Cloudworks, Google Hangouts) but it did not seem to be the case.
- The current design of the Handson MOOC assumes that most of the learners are with external learning locus of control.
- The facilitators did a great job. It is a real challenge to give feedback to at least 50 participants every day, some of them in different stages of the course.
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