A contribution to the process of designing for learning in Massive Open Online Courses (MOOCs)

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1. Extended abstract of the Ph.D. Thesis

Massive Open Online Courses (MOOCs) hold the potential to open up educational opportunities and learning experiences to a global audience by combining recent technological advances with technology-enhanced learning.

In general, MOOCs are considered online courses that require no prior qualifications for entry, can be accessed by anyone, and attract a diverse audience from a variety of learning and professional backgrounds. However, MOOC teams (including instructors and learning designers, among others) face several challenges when designing for learning in this context. In this work, two main challenges are investigated and approached, namely the lack of well-defined and validated learning design strategies to support practitioners in the MOOC development, and the poor pedagogical design models adopted in MOOCs, which are generally based on traditional classroom formats, such as teacher-centered approaches and content-based learning.

Thus, the purpose of this thesis is to propose a learning design strategy, named Learning Design Framework for MOOCs (LDF4MOOCs), which is grounded on Software Engineering mechanisms and systematic procedures to ensure the standardization and the productivity of all the aspects involved in the MOOC development process.

LDF4MOOCs consists of: (i) a MOOC Life Cycle process, which describes fundamental steps to plan, offer, and evaluate a MOOC; (ii) an Educational Design Pattern Language for MOOCs, which is based on problems and recurring solutions to solve the main activities described in the life cycle; and (iii) the related supporting resources. Both, the

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MOOC Life Cycle process and the Educational Design Pattern Language for MOOCs are presented in Figures 1 and 2.
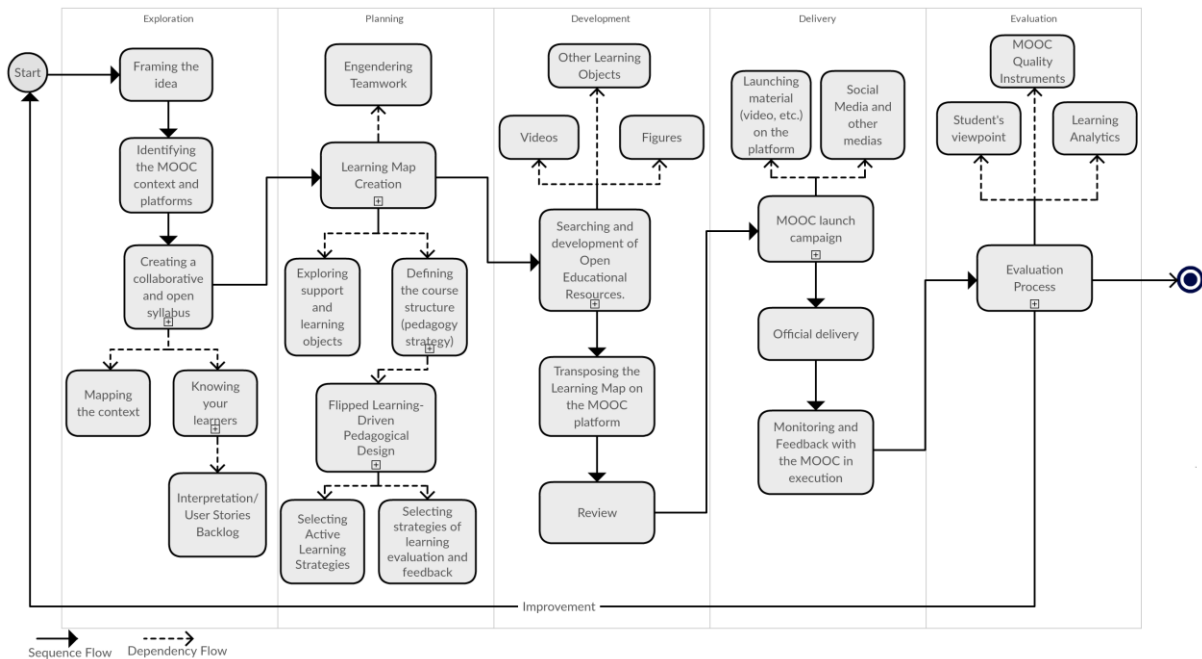
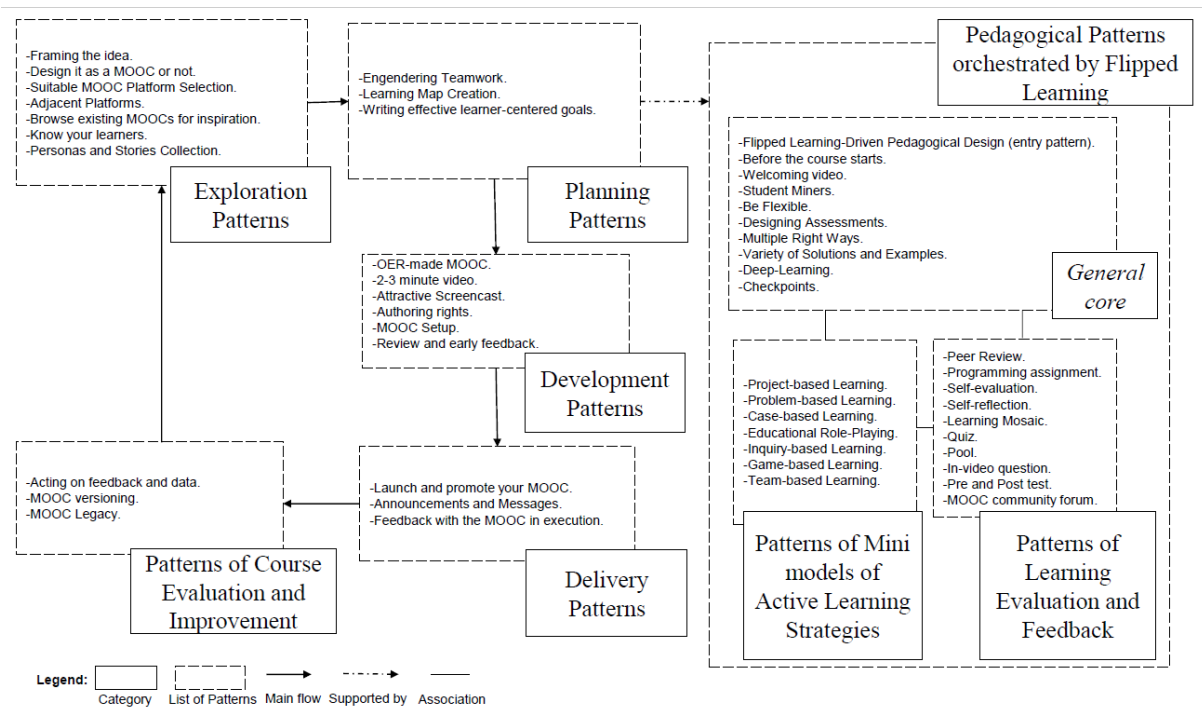Figure 1 - A Life Cycle Process for MOOCs.

Figure 2 - Educational Design Pattern Language graph.

LDF4MOOCs is also pedagogically informed by Flipped Learning ideas, including active learning strategies, self-regulated learning, competency-based design, learner-centered learning, among others.

LDF4MOOCs and its elements were evaluated through an experimental study, three case studies, and two expert reviews as internal evaluation methods. Additionally, a field evaluation with educators using the framework as a guide to design their MOOCs was considered as an external evaluation method.

Regarding the case studies, they were based on the Participant-Observation approach and were performed from 2015 up to 2017. The case studies consisted in planning, developing, and delivering MOOCs using current versions of the LDF4MOOCs framework, i.e., the current version in the period of the MOOC planning. In fact, such case studies were used as formative evaluation of the LDF4MOOCs framework and its elements during the development and improvement phases. Table 1 summarizes the data related to the three case studies performed during our work.

-	CS1	CS2	CS3
Case Study	*Agile Software Development*	*Web Development with Bootstrap, CodeIgniter, and Agile Practices*	*Introduction to Software Testing*
Original name	*Desenvolvimento Ágil de Software*	*Desenvolvimento Web com Bootstrap, CodeIgniter e Práticas Ágeis*	*Introdução ao Teste de Software*
Web address	https://mooc.ifsuldeminas.edu.br/course/desenvolvimento-agil-de-software/intro/	https://miriadax.net/web/desenvolvimento-web-com-bootstrap-codeigniter-e-praticas-ageis	https://www.coursera.org/learn/intro-teste-de-software
Short description and main pedagogical strategy	Agile software development using Project and Problem-based Learning, and a learning community on Facebook.	A practice-driven introductory course that used the Project-Based Learning approach as the main strategy to support the development of web development skills and agile practices.	A specific introductory course in the Software Engineering field having Case-Based Learning as the main pedagogical strategy.
First delivery	November 2016 to December 2016	November 2017 up to December 2017	February 2018; with automatic offers every 4 weeks
Number of weeks	7	6	6
Provider	Tim Tec IFSULDEMINAS	MiríadaX IFSULDEMINAS	Coursera USP
Registered users	647	665	3009

The obtained results indicated that LDF4MOOCs has a positive impact on the design for learning in MOOCs, suggesting that our strategy can be effectively applied to support and enhance MOOC development. As future works we can briefly summarize that: (i) the Educational Design Pattern Language can be extended to support additional aspects related to the development of Open Educational Resources as well as new kinds of active learning strategies and assessments; (ii) future research must focus on how better use knowledge from MOOC design research to improve the development of platforms and providers; (iii) the development of a tool to support the use of the framework by practitioners would benefit its application agility; and (iv) further research is needed to examine the effectiveness of the framework-based MOOCs on students learning outcomes.

Other information and results related to the thesis are available at

http://caed.icmc.usp.br/mooc

2. Related references

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