To combine a MOOC to a regular face-to-face course –
A study of three blended pedagogical patterns

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Abstract. Since 2016, the University of Liege (Belgium) has been developing
MOOCs. To be funded, faculty willing to design a MOOC must commit to
making their own local students benefit from this MOOC. The paper describes
3 ways teachers used to fulfil their obligation. In all cases, it went through the
set-up of new blended instructional designs, whose variations are documented
as "pedagogical patterns" candidates. This orderly, visual and comparative
presentation of MOOC/on-campus-course junctions is relevant to lecturers in
search for renewed teaching/learning practice and to staff development units
supporting this pedagogical effort.

Keywords: MOOC, blended design, on-campus courses, H-MOOC framework

1 Introduction

As MOOCs continue to spread (Shah, 2019), calls for pedagogical research on this
instructional format have been issued (Bali, 2014; Hayes, 2015; Hood & Littlejohn,
2016; Margaryan et al., 2015). Literature has delivered valuable reflection on MOOCs
quality and acceptance by participants. However, these efforts remain largely focused
on MOOCs considered as entities isolated from the campus they stem from. The
reason can be that the flowering of MOOCs since 2012 initially focused researchers'
attention on the unique open and massive aspects of this new format of
teaching/learning (Toven-Lindsey et al., 2015). A recent, and still scarce, research
strand (Fair et al., 2017; Gynther, 2016; Holotescu et al., 2014) has notwithstanding
reported concrete examples of MOOCs used, following a range of modalities and
intensities, as local resources for higher education institutions (Albo & Hernandez-
Leo, 2016; Bralic & Divjak, 2018; Ebner et al, 2017; Israel, 2015; Li et al., 2015;
Ostrashewski et al., 2017; Wetzinger et al., 2018). Besides practical case studies, the
literature offers a few attempts to conceptualize variations in the new pedagogical
practice of embedding a MOOC into an in-person course, to the benefit of local
students. Starting from a MOOC targeting adult education professionals, Ebner et al.
(2017) elaborate a didactical approach ("inverse blended learning") wherein online

elements are interrupted by real life situations or local regular training supporting the online course. From an early literature review, Israel (2015) extracts 5 (not labeled) integration models of MOOCs in traditional classrooms. Perez-Sanagustin et al. (2017) offer an advanced theoretical effort by formalizing the "H-MOOC", a classification framework of hybrid MOOC-based initiatives. The present paper takes on this line of research by reporting 3 ways lecturers used to enroll MOOCs in campus courses at a Belgian university. This small-scale investigation was guided by the following questions: how did lecturers manage to connect a MOOCs to conventional classroom settings? What were their pedagogical motives to proceed this way? Is the pattern format, located at mid-term between abstract models and case studies, a usable way to account for their decisions?

2   Methodology

2.1 Participants and data source

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The blended patterns provided in this article were established through a questionnaire and a collective discussion with 6 lecturers who took part in the production of 3 MOOCs (http://thema.ulg.ac.be/mooc/moocs-uliege), during 9 months, according to the P.E.P.I.T.E. process, steadily designed by Uni. Liège. Both with oral and written instruments, lecturers were asked to describe how they combined their MOOC with their face-to-face (abbreviated in f2f) course, how the matriculated students were supposed to benefit from the MOOC, and what justified their learning design choices. Lecturers were invited to provide researchers with student data likely to shed extra light on these issues.

2.2 Presentation format

Information received from lecturers was edited in "pedagogical patterns". As mechanisms for structured description of practice (Fioravanti & Barbosa, 2016), patterns help to capture an experience in a way that it is possible for others to reuse it, as such or adapted. This structure grants specific and local experiences a further level of generality so that, while staying anchored in practice, the pattern can allow comparisons, and encourage discussion and sharing by a larger community (Laurillard, 2012). Patterns also allow illustrations and the presentation of instructional designs to teachers can benefit from visuals (a resource absent from the aforementioned articles, except for Li et al., 2015). Many formats for pedagogical patterns have been developed over the years. Although they vary, they all share common basic components, as identified by the e-LEN project (2004, p.8), namely:

1. a name for the pattern (each pattern here is labelled with an expressive name reflecting its graphic view. In a joint effort towards an overarching model, pattern convergence with the H-MOOC framework is cross-checked);
2. a description of a problem (a pedagogical pattern solves "real world" educational problems, McAndrew, Goodyear, & Dalziel, 2006);

3. a context (a description of the type of course the solution is applicable to);
4. forces (advantages or constraints playing a role in coming to a solution);
5. the solution itself (including a visual and a wrap-up of the MOOC it stems from);
6. (data available on the students' exposure to the pattern, if any).

3 Results

3.1 Pattern 1 "Pendulum"

Pattern "PENDULUM". The name refers to a deliberate alternation (Fig. 1) of MOOC sessions and f2f sessions, in a flipped classroom mode. (The pattern "Pendulum" is akin with the H-MOOC framework third model: MOOC as a driver and sub-model "flipped classroom").
Problem description. This pattern is recommended when lecturers in higher education want to enhance the articulation between theory and practice.
Context. The pattern has quite a universal range since, in many circumstance, the teaching challenge resides in the need for stimulating active and self-directed learning. In this pattern, practice (of the virtual microscope in this very case, https://cytomine.coop) is "outsourced" to the MOOC.
Forces that play a role in coming to a solution. Beyond the intention to better balance autonomous and guided learning, 2 forces were active in the implementation of the pattern: the growing need to train students to digital tools (Clark, Vealé, & Watts, 2017) and the surge of students in medical studies, making it difficult for lecturers to monitor large numbers with traditional teaching methods.
Solution. The pattern Pendulum is aligned with the practice of flipped classroom. A module of the MOOC must be carried out every two weeks (workload: 3H30') and is directly followed by classroom instruction (2H30') whose function is to clarify, consolidate and expand learning obtained through MOOC participation. It must be noted that the presence/distance articulation is strong also because the success to tests nested in the MOOC are a condition for being allowed to attend the next in-class session.

Fig. 1. Pendulum: an ongoing combination of MOOC and classroom instruction

The candidate pattern "Pendulum" is derived from the MOOC "Introduction to Histology" which displays 3 learning paths (Multon et al. 2015). The "Gold" path is designed for an in-depth coverage of the material. All on-campus students are

enrolled in this path. Between MOOC sessions, local students convene to classroom lessons wherein their mastery of MOOC modules is checked, clarified and extended.

On-campus students' experience of the pattern. Three iterations of the MOOC generated so far 11706 registrations, among which 961 students matriculated at the Uni. Liège. Exposure to the pattern brought about a fair level of satisfaction (Fig. 2).
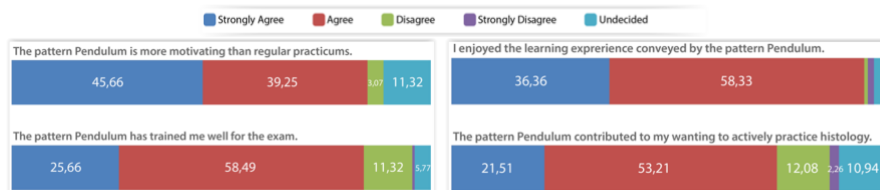

Fig. 2. For 263 on-campus students, experience of Pendulum pattern is globally positive.

3.2 Pattern 2 "Sandwich"

Pattern "SANDWICH". The label is given to a pattern that makes a MOOC the central body of a hybrid instructional design (Fig. 3). (The pattern "Sandwich" might fit the H-MOOC second model – MOOC as a replacement, sub-model "local digital prelude" – or fourth model – MOOC as an added value).
Problem description. This pattern is recommended for large classes where it is difficult to deploy learning activities promoting knowledge integration, beyond orchestrating an ex-cathedra "overview" of the notions.
Context. The pattern "Sandwich" lends itself to teaching situations wherein a special effort is made on a progressive and active assimilation of the theoretical concepts.
Forces that play a role in coming to a solution. Two forces have influenced the implementation of this pattern: helping students to acquaint a more autonomous method of learning and the possibility opened by a MOOC to enrich the course with expert interviews and testimonies likely to contribute, through modelling, to the acquisition of professional attitudes.
Solution. The pattern "Sandwich" presents as 3 introductory courses deemed to show students the objectives, tools (the MOOC platform) and the methods they have to be aware of for covering the MOOC material. A dry-run exercise is performed in the classroom to model how to proceed during the MOOC modules (2H workload each) documenting topics of health psychology. The last three courses are also f2f. They use the material of the last MOOC module (virtual world in the service of health) and extend it with theory and exercises on virtual reality.

Fig. 3. Sandwich: the pattern presents as a MOOC bordered by 2 series of class lessons

The candidate pattern is derived from the MOOC "How to act for my health?" which prompted, for its first iteration, 8300 registrations including 222 local students. Attendance to the MOOC is compulsory and stipulated in the course syllabus. The MOOC is a component of a major course revamp aiming at implementing a progressive autonomous training to clinical reasoning and to medical attitudes.

On campus experience of the pattern. 95% of the on-campus students enrolled in the course "Health psychology" experienced the learning pattern "Sandwich". Traces collected on the MOOC platform show a large completion of all modules.

3.3 Pattern 3 "Tetris"

Pattern "TETRIS". The name, evoking a game whose goal is to pile as many layers of geometric blocks as possible, reflects the professors' efforts to design a MOOC which can be used as a building block for different courses (Fig 4). (Depending on the course, the pattern seems to pertain to H-MOOC first model – MOOC as a service, sub-model "canned teaching in f2f course" – and in-between model – MOOC as a textbook, sub-model possibly "remote tutoring with f2f course").
Problem description. This pattern is recommended to lecturers concerned with the challenge of sharing resources between courses.
Context. The pattern "Tetris" is usable every time a group of teachers decide to team up to develop common resources.
Forces that play a role in coming to a solution. Some content domains do not offer so far a broad and multimedia vision of their stakes and challenges. The involved lecturers saw the MOOC as a way to deliver such a primer to students.
Solution. The same MOOC leverages resources to 2 lecturers. The first one (lower line in Fig. 5) requests students to participate in at least three modules in complement of the classroom instruction. During the f2f sessions, the lecturer alludes to the MOOC (*"echoes"*) through questions, examples, reminders, etc. The other teacher (upper line in Fig. 5) sees the MOOC as a resource displaying a web of topics (*"network"*) that students can explore or not.
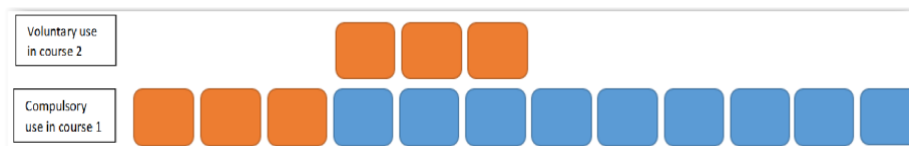

Fig. 5. Tetris: a single MOOC used in multiple courses in mandatory/ voluntary modalities

The candidate pattern "Tetris" is derived from the MOOC Youth Literature. In two iterations, it attracted more than 21.000 registered participants, among whom 450 matriculated at the Uni. Liège.

On campus experience of the pattern. Half of the on-campus students taught by Lecturer 1 have chosen to cover the modules 1-2-3, which strictly echo the f2f

sessions and thus repeat the covered material of classroom sessions. The other half preferred to choose new subjects (modules 4-5-6). In the case of Lecturer 2, several students emphasized the function of open-minding that the MOOC activated.

4   Discussion and further work

Like any educational resource, MOOCs must be embedded in coherent educational processes. This article is driven by an effort to document such cohesive forces between MOOCs and classroom instruction, as organized by lecturers of a Belgian university. To account for these blends (research question 1) and their pedagogical rationale (research question 2), a pedagogical pattern format was selected and enriched with a metaphorical name, a description of the concrete MOOC summoned, and a visual of the new learning design, all important elements for the day-to-day support work of staff development units in higher education. Despite its advantages, the pattern format turned to be complicated (research question 3) to posit in a clear-cut way between case study and abstract model and further research should be conducted on the "patternization" of concrete experience. Eventually, it is important to note that the "Pendulum", "Sandwich", and "Tetris" patterns remain at this stage "candidates" pedagogical patterns. "Patterns are not created or invented; they are identified via an invariant principle (of good design) as manifest across different places and cultures" (Fincher, 2002, p. 2). Yet, to confer to these MOOC/course articulations the statute of full-fledged patterns, they should be confronted with other real-world experiences in order to see whether they can claim universality. This research task is to be made. Introduced in this paper, confrontation of the patterns with existing models, like these of Perez-Sanagustin (2016) or Israel (2015) is also a step towards a more integrated view of possible variations of blended learning with MOOCs, ranging from the pedagogical decision to consider the MOOC as an optional resource for on-campus students (pattern Tetris) to the design of it as a central piece of learning (pattern Pendulum). Other combination patterns with future MOOCs should also complement the inventory initiated in this work-in-progress. Lastly, further refinements about when each pattern is recommended and what outcomes they yield would also be a worthwhile extension of the work presented here.

References

Albó, L., & Hernández-Leo, D. (2016, October). *Blended learning with MOOCs : towards supporting the learning design process*. Paper presented at the Online, Open and Flexible Higher Education Conference, Roma, Italy.

Bali, M. (2014). MOOC Pedagogy: Gleaning Good Practice from Existing MOOCs. *MERLOT Journal of Online Learning and Teaching, 10*(1), 44-56.

Bralić, A., & Divjak, B. (2018). Integrating MOOCs in traditionally taught courses: achieving learning outcomes with blended learning. *Int J Educ Technol High Educ*, *15*(2).

Clark, K., Vealé, B., & Watts, L. (2017). A Review of the Use of Massive Open Online Courses (MOOCs) in Medical Imaging Education. *The Internet Journal of Allied Health Sciences and Practice, 15*(2).

Ebner, M., Khalil, M., Schön, S., Gütl, C., Aschemann, B., Frei, W., & Röthler, D. (2017, November). *How Inverse Blended Learning Can Turn Up Learning with MOOCs?* Paper presented at the International Conference MOOC-MAKER, Antigua, Guatemala.

E-LEN project (2004). *e-LEN booklet: Design expertise for e-learning centres: Design patterns and how to produce them*. http://www2.tisip.no/E-LEN/outcomes.php -LEN.

Fair, N., Russell, S. Harris, L., & Leon Urrutia, M. (2017, September). *Enhancing the student experience: integrating MOOCs into campus based modules.* Paper presented at the International Council for Education and Media, Naples, Italy.

Fincher, S. & Utting, I. (2002, June). *Pedagogical patterns: their place in the genre*. Paper presented at the 7th annual conference on Innovation and technology in computer science education, Aarhus, Denmark.

Fioravanti, M., & Barbosa, E. (2016, October). *A systematic mapping on pedagogical patterns*. Paper presented at the IEEE Frontiers in Education Conference, Erie, Pennsylvania.

Gynther, K. (2016). Design Framework for an Adaptive MOOC Enhanced by Blended Learning: Supplementary Training and Personalized Learning for Teacher Professional Development. *Electronic Journal of e-Learning, 14*, 15-30.

Hayes, S. (2015). *MOOCs and Quality: A Review of the Recent Literature*. The Quality Assurance Agency for Higher Education, QAA 1288.

Holotescu, C., Grosseck, G., Cretu, V., & Naaji, A. (2014, April). *Integration MOOCs in Blended Courses*. Paper presented at the 10th International Scientific Conference on eLearning and software for Education, Bucharest, Romania.

Hood N., & Littlejohn, A. (2016). *MOOC Quality: the need for new measures. Journal of Learning for Development, 3*(3).

Israel, M. (2015). Effectiveness of integrating MOOCs in traditional classrooms for undergraduate students. *International Review of Research in Open and Distributed Learning, 16*(5), 102–118.

Laurillard, D. (2012). *Teaching as a design science: Building pedagogical patterns for learning and technology*. New York, NY: Routledge.

Li, Y., Zhang, M., Bonk, C., Guo, J., & Guo, Y. (2015). Integrating MOOC and flipped classroom practice in a traditional undergraduate course: Students' experience and perceptions. *International Journal of Emerging Technologies in Learning, 10*(6), 4–10.

Margaryan, A., Bianco, M. & Littlejohn, A. (2015). Instructional quality of Massive Open Online Courses (MOOCs). *Computers & Education, 80*, 77-83.

McAndrew, P., Goodyear, P. & Dalziel, J. (2006). *Patterns, designs and activities: Unifying descriptions of learning structures. International Journal of Learning Technology, 2*(2), 216-242.

Multon, S., Weatherspoon, A., Schaffer, P., Quatresooz, P., & Defaweux, V. (2015). *Practical histology in tune with the times. Medical Education, 49*(11), 1166-1167. http://hdl.handle.net/2268/204197

Ostashewski, N., Howell, J., & Dron, J. (2017). MOOCifying Courses: Delivery of a MOOC to Enhance University Course Activities. *Journal of Learning for Development, 4*(2).

Pérez-Sanagustín, M., Hilliger, I., Alario-Hoyos, C., Delgado Kloos, C., & Rayyan, S. (2017). H-MOOC framework: Reusing MOOCs for hybrid education. J*ournal of Computing in Higher Education, 29*(1), 47–64.

Shah, D. (2019). *By the numbers: MOOCs in 2018*. Class central. https://www.class-central.com/report/mooc-stats-2018

Toven-Lindsey, B., Rhoads, R. & Berdan Lozano, J. (2015). Virtually unlimited classrooms: Pedagogical practices in massive open online courses. *Computers & Education, 24*, 1-12.

Wetzinger, E., Standl, B., & Futschek, G. (2018, June). *Developing a MOOC on introductory programming as additional preparation course for CS Freshmen*. Paper presented at the EdMedia/Innovate Learning 2018, Amsterdam, Netherlands.