Expanding Learning Scenarios
Opening Out the Educational Landscape
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BUILDING BETTER MOOCS: USING DESIGN PATTERNS FOR MASSIVE OPEN ONLINE COURSE DEVELOPMENT

Steven Warburton, University of Surrey, United Kingdom, Yishay Mor, 2PAU Education, Spain

Abstract

The range and number of MOOC offerings has continued to expand and arguably, MOOCs have now established themselves as an important part of the online educational landscape. This paper outlines how a design pattern approach was used to bring experts together through the participatory pattern workshop methodology and to explore the successful design approaches that have been deployed to design and deliver Massive Open Online Courses. The resulting set of 19 design patterns are offered as a way for those charged with creating and delivering MOOCs to build on expert success and help design better MOOCs.

Introduction

The expansion in range and number of massive open online courses has led to a series of different approaches to their delivery, pedagogy, functionalities and support mechanisms. Some of these have been successful and others not so successful, for an example we have witnessed high variability in the documented retention rates across different MOOC offerings (Jordan, 2014). Some systemic reviews of the MOOC landscape are becoming available and we note that in a recent study of a selection of 76 MOOC offerings, Margaryan et al. (2015) found that the majority of the analysed MOOCs scored poorly on instructional design principles. The goal of the MOOC design patterns project has been to explore, define and articulate the emerging successful design principles and patterns that underpin the development and delivery of massive open online courses, and to put them forward for the design of new MOOCs. The context of the project has been ambitious. It adopted a multidimensional approach that incorporated input from diverse but complementary perspectives. These included designers, deliverers, researchers, learners and tutors who have been engaged in the area of MOOCs and Open and Distance Learning more broadly. The project was driven by a set of key questions that revolved around a desire to understand the design processes and mechanisms by which we come to create and deliver open and distance learning at scale and by extension how we can formulate this into sharable design solutions that can be applied by others. This is particularly pertinent where we are observing differentiation and varying degrees of success in the current landscape, reflected in:

- Delivery modes and platform choices;
- Style of MOOC (for example: ‘x’ versus ‘c’ versus ‘p’);

- Reported experiences of learners on MOOCs;
- Reported experiences of tutors teaching on MOOCs;
- Increasing use of motivational schemes such as micro-certification and badging;
- Retention figures.

The particular methodological approach in this project draws on previous work in the field of design patterns and pattern languages. The design patterns paradigm (Alexander et al., 1977) was developed as a form of design language within architecture. Several studies (Voogt et al., 2011; Ronen-Fuhrmann, Kali & Hoadley, 2008) have demonstrated the value of engaging in design for educators and extensive research over the last decade highlights the complexity of learning design and the design of learning technologies (Beetham & Sharpe, 2007; Mor & Winters, 2007). This complexity calls for novel approaches to the articulation, validation, sharing and application of design knowledge and here, design patterns can be viewed both as "solutions to problems" and also developed as a way to support theory-praxis conversations (Goodyear et al., 2004). Here a scaffolded approach using the Participatory Patterns Workshops has been adopted (Mor, 2013; Mor, Warburtonc & Winters 2012).

Methodology

The SNaP! (Scenarios, Narratives, and Patterns) methodology was implemented in the form of Participatory Patterns Workshops (PPW). The Participatory Methodology for Practical Design Patterns (Mor, 2013; Mor, Warburton & Winters, 2012) is a process by which communities of practitioners and experts collaboratively reflect on the challenges they face and the methods for addressing them (Figure 1). Participants share accounts of their experiences prior to the workshop series, which are formulated as design narratives, and collaboratively extract design patterns from these over the course of three workshop sessions.

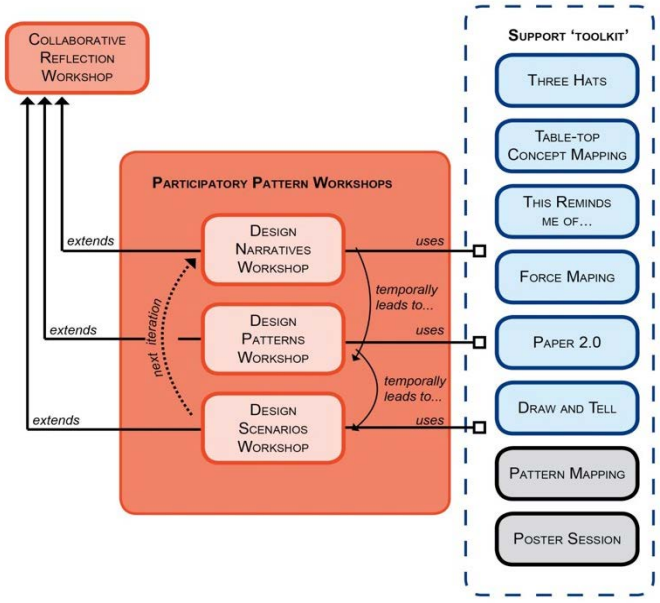

Figure 1. Overview of the participatory pattern workshop methodology with auxiliary support toolkit (from Mor, Warburton & Winters, 2012).

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One of the strengths of the PPW methodology is its inherent flexibility in the style and format of the workshops. In this design patterns project an agile approach was adopted to promote a more rapid pattern development process:

- **Workshop 1:** Share design narratives and build proto-design patterns based, building on the 'Rule of Three', where possible.
- **Workshop 2:** Review and iterate design patterns; aggregate and map patterns; rapid validation exercise based on future design scenarios or challenges.
- **Workshop 3:** Selected design patterns are reiterated into publishable outputs via a writer's workshop. The aim being to finalise these chosen design patterns for public release, and to adapt elements to a set of learning design principles for future open online course development.

Throughout the workshop process a suite of online tools were deployed to support sharing and collaboration activities:

- Googlesites (www.moocdesign.cde.london.ac.uk) provided a flexible web presence to organise and engage participants in their journey through the PPW process.
- The Learning design Grid (www.ld-grid.org) provided a resource of tools and instructions to the approaches being used.
- Integrated Learning Design Environment (ilde.upf.edu/moocs) was used as an online tool to support the recording, sharing and editing of the design narratives, patterns and scenarios.

Results

Nineteen design patterns in alpha and beta (peer reviewed) state were developed over the course of the workshop sessions. They foreground particular areas of design interest such as design principles that allow the creation of 'participation pathways' adapted or adaptable to specific profiles of learners. The full list of design patterns is organised below.

Pattern Name (status) and Problem Space Description

1. FISHBOWL (beta) – In a traditional classroom setting, learners and teachers will occasionally pause the flow of educational activities and discuss their experiences, expectations, concerns – and any issues that have emerged. MOOCs do not have the capacity to entertain such interactions: learners are dispersed geographically, the numbers are too big for synchronous sessions, and the teacher to student ratio is such that personal interaction is severely constrained.
2. PROVOCATIVE QUESTION (beta) – Being present in a synchronous forum can count as participation but active engagement through some kind of interaction is not easy to engender. When you have a live chat room full of lurkers how to you spark activity? And by extension how can you flow this into an asynchronous online discussion space.

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3. CHATFLOW (beta) – In an online environment both synchronous and asynchronous discussions occur. In synchronous discussions, for those learners who are unable to participate, it can become difficult as the historic context is often lost on later review. This can limit a learner's ability to engage with the discussion in a timely fashion as chat or forum posts get pushed down the list and effectively lost.
4. SPARKING FORUM PARTICIPATION (beta) – Helping learners to overcome an initial reluctance to post or visibly participate is critical where collaboration is needed or co-creation of learning is desired, as well as where interaction serves a supportive social function.
5. SHARING WALL (alpha) – With large and diverse student groups engaging with MOOC platforms it makes meaningful discussion difficult, because individuals may not get a response to their post. In these circumstances, there is a need for a mechanism which will support the sharing of ideas and lead to meaningful discussion. It is important for students to gain an immediate snapshot of the activity of their peer community which will stimulate their further practice, investigation and discussion.
6. DRUMBEAT (beta) – MOOCs are massive and so participants may not feel a part of a community. Often they feel their voice is not heard, and so they can feel disenfranchised and dissatisfied. In other educational contexts learners can have more regular and focussed contact with tutors that can help to overcome this problem. How can we create the sense of faculty presence in the course, without fragmenting the cohort?
7. CROWDBONDING (alpha) – How do we catalyse the formation of groups from a diverse learner cohort where collaboration is needed, or co-creation of learning is desired.
8. SIX MINUTE VIDEO (alpha) – You are aware that creating a full-length video of your lecture for online delivery is too demanding, from both a teaching and a student learning perspective. You cannot maintain your enthusiasm and passion for a full hour video and you know that student attention will drop dramatically at various points across a long single recording.
9. SEE DO SHARE (beta) – How do you introduce new concepts, tools or practices, in a way that would be accessible and meaningful, assess learners understanding, and facilitate the emergence of social constructs, with limited resources and large number of students?
10. KNOWING THE STORY (alpha) – Knowing what to do when studying a complicated discipline at a distance is not easy. There is a meta-narrative to study which encompasses the idea of a journey and transformation. How does the learner use this to his/her advantage? Inventing a new story is not always a useful exercise and is a risk.
11. BRING THEM ALONG (alpha) –With an open course the diversity of levels (i.e. previous knowledge) is likely to be very wide and highly variable. If you pitch at the wrong level you will lose people quickly. What can you do to bring along as many people as possible on the journey?

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12. SCAFFOLDED MOOC (alpha) – A lot of content already exists on the subject matter that is being delivered. Time constraints mean that more time should be put into the aggregation, evaluation and contextualisation of existing content (e.g. OERS) than originating new content.
13. CHECKPOINTS (beta) – Interaction between participants is essential to the success of a social, non-linear MOOC. However, participants approach activities in a different pace, and sometimes even a different order, making it hard to synchronise their experiences. Some participants diverge into independent explorations branching out of the MOOC activities. Sharing these could enhance the social learning experience, but at the same time it makes synchronisation even harder.
14. ADJACENT PLATFORMS (alpha) – Platforms which support MOOCs are often used to provide places to share resources or bespoke tools to create learning objects. These can used when the MOOC platform falls short.
15. MOOC LEGACY (alpha) – Can you extend the openness of your MOOC beyond the final assessment / closure point of course. Creating a legacy format for the course ameliorates this problem and facilitates expectation management for repeat sessions.
16. KNOW YOUR AUDIENCES (alpha) – The open nature of MOOCs means that the barriers to sign-up are low and therefore virtually anyone can become a participant. Yet when we design a course we often have a particular type of audience in mind. With a MOOC that becomes an impossible task. So who do we design for? How do we reconcile design with audience?
17. BEND DON'T BREAK (alpha) – In a MOOC setting, 'flexible' can potentially entail jettisoning the 'massive', the 'online' and the 'course', leaving just the 'open'. Which learners do you lose if you aren't flexible, and what part of MOOC do you lose if you are flexible?
18. INDUCTION (alpha) – Learners need to understand how to make the most of the MOOC structure. They come from diverse backgrounds, often with very different expectations of and drivers to complete the MOOC.
19. ENGENDERING TEAMWORK (alpha) – Teaching the MOOC team to work collaboratively requires action: create a plan that will gather and direct every party involved (academics, MOOC learning design team, librarian media production team, legal services) with a clear content and delivery strategy.

The MOOC design patterns have subsequently been organised into six design decision domains which represent the key decision areas are integral to the majority of MOOC development projects (Table 1).

Table 1: MOOC design patterns organised by design domain

Domain	**Patterns**
Structure	Adjacent Platforms; MOOC Legacy; Bring Them Along; Scaffolded MOOC; Checkpoints
Orientation	Induction; Bend Don't Break; Know Your Audiences
Participation	Fishbowl; Provocative Question; Chatflow; Sparking Forum Participation; Sharing

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	Wall
Learning	Knowing The Story; Six Minute Video; See Do Share
Community	Crowd Bonding; Drumbeat;
Management	Engendering Teamwork

Discussion

The outputs of this project have included a set of design patterns and a prospective pattern language to support the continued development of MOOCs in relation to the particular design challenges this form of ODL presents. It could be argued that the MOOC design space is still nascent and therefore the quality of patterns derived within this domain remains to be fully tested as expertise grows. However, the MOOC phenomenon has been built upon a long history of expertise and innovation in the domain of distance education and open leaning. There is already substantial body of literature surrounding distance education that spans, for example, early work on transactional distance and the emerging impact of new technologies (Moore & Kearsley, 1996; Bates, 1995) through to modern approaches that acknowledge more open access to learning and the impact of the Internet on modes of study and innovations in pedagogy. For a broad overview see Moore and Anderson (2003) and the distance learning journal IRRODL (www.irrodl.org). Overall the PPW format has demonstrated how rich it can be as a source for generating design material. In the project a total 25 design narratives; 19 design patterns and 5 design scenarios have been created and further work is likely to extend and reformulate these. The preliminary pattern grouping into design domains has developed an organisational structure that draws these together and we already have a variety of pattern states, ranging from alpha to beta and shortly to release states. There is some overlap between the elements and this suggests some refactoring maybe needed, including linking in to related pattern languages, particularly those that fill identified, for example in the area around online assessment designs. Currently, meaningful formative assessment at scale is an area of interest for all MOOC providers. The oscillation between the design pattern generation and the designed output via design scenarios has been an important iterative move in validating and refining the patterns themselves. This opens the pattern to scrutiny as a design object and allows for others in the design community to input their expertise and resource.

Conclusion

The PPW approach has demonstrated itself as powerful methodology for coalescing and abstracting expert knowledge. But this has come at a price in terms of time, effort and organisation (Mor & Warburton, 2014). This was, to some extent mitigated by the use of online tools to support the design activities and these processes have been successfully carried out online in other studies (Warburton, 2009). Certainly, one advantage of using face-to-face group sessions has been in moving design patterns from their alpha to beta status, by enhancing the quality of the patterns through shared scrutiny.

The work here creates a starting point for further design activity in the domain of MOOC design and development using patterns. We suggest the use of meta-design pattern or

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approach based on a simple design cycle to scaffold the MOOC design process to indicate where patterns and related design principles may be deployed (Figure 2)

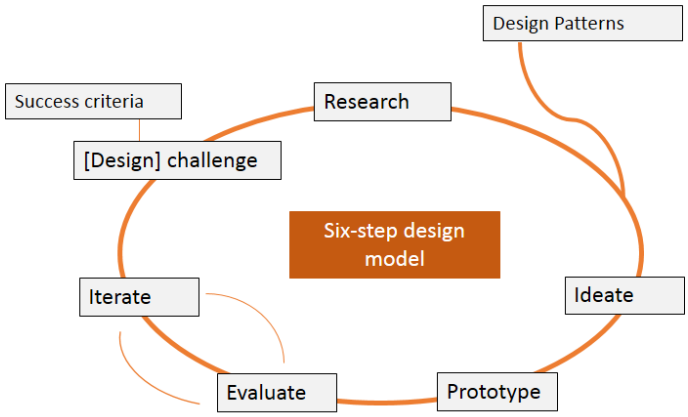

Figure 2. A six-step design model indicating an entry point for design pattern use

The project team are testing the use of these patterns in rapid design challenge workshops. Details can be found on the design patterns project site (www.moocdesign.cde.london.ac.uk).

References

1. Alexander, C.; Ishikawa, S. and Silverstein, M. (1977). *A Pattern Language: Towns, Buildings, Construction.* Oxford University Press, New York.
2. Bates, A. (1995). Technology, Open Learning and Distance Education. London: Routledge.
3. Bayne, S. and Ross, J. (2014). *The pedagogy of the Massive Open Online Course (MOOC): the UK view.* HEA Report. Retrieved 05/01/15 at https://www.heacademy.ac.uk/sites/default/files/HEA_Edinburgh_MOOC_WEB_240314_1.pdf
4. Beetham, H. and Sharpe, R. (ed.) (2013) *Rethinking Pedagogy for a Digital Age: Designing for 21st century learning* (2nd edition). Abingdon: Routledge.
5. Goodyear, P.; Avgeriou, P.; Baggetun, R.; Bartoluzzi, S.; Retalis, S.; Ronteltap, F. and Rusman, E. (2004). Towards a Pattern Language for Networked Learning. In the *Proceedings NLC 2004.* Retrieved 31 January 2014 http://www.networkedlearningconference.org.uk/past/nlc2004/proceedings/individual_papers/goodyear_et_al.htm
6. Margaryan, A.; Bianco, M. and Littlejohn, A. (2015). Instructional quality of Massive Open Online Courses (MOOCs). In *Computers & Education, 80,* (pp. 77-83).
7. Moore, M.G. and Anderson, W.G. (2003). *Handbook of distance learning.* 515Mahwah, NJ: Lawrence Erlbaum Associates.

ISBN 978-615-5511-04-2

8. Moore, M.G. and Kearsley, G. (1996). *Distance Education: A Systems View*. Belmont, CA: Wadsworth Publishing.
9. Mor, Y. (2013). SNaP! Re-using, sharing and communicating designs and design knowledge using scenarios, narratives and patterns. In R. Luckin, S. Puntambekar, P. Goodyear, B.L. Grabowski, J. Underwood & N. Winters (eds.), *Handbook of Design in Educational Technology*. London, UK: Routledge.
10. Mor, Y. and Warburton, S. (2014). Assessing the value of design narratives, patterns and scenarios in scaffolding co-design processes in the domain of technology enhanced learning. In S. Bayne, C. Jones, M. de Laat, T. Ryberg & C. Sinclair (eds.), *Proceedings of the 9th International Conference on Networked Learning 2014.*
11. Mor, Y; Warburton, S. and Winters, N. (2012). Participatory pattern workshops: a methodology for open learning design inquiry. In *Research in Learning Technology, 20.*
12. Mor, Y., Warburton, S.; Winters, N. and Mellar, H. (eds.) (2014). *Practical design patterns for teaching and learning with technology.* Rotterdam, Netherlands: Sense.
13. Mor Y. and Winters, N. (2007). Design approaches in technology enhanced learning. In *Journal of Interactive Learning Environments, 15(1),* (pp. 61-75).
14. Ronen-Fuhrmann, T.; Kali, Y. and Hoadley, C. (2008). Helping Education Students Understand Learning Through Designing. In *Educational Technology, 48(2),* (pp. 26-33).
15. Voogt, J.; Westbroek, H.; Handelzalts, A.; Walraven, A.; McKenney, S. Pieters, J. and de Vries, B. (2011). Teacher learning in collaborative curriculum design. In *Teaching and Teacher Education, 27(8),* (pp. 1235-1244).
16. Warburton, S. (2009). *WP4c Report on Design Patterns for Virtual Worlds.* Retrieved 17 February 2015 at http://dl.dropbox.com/u/4424450/KCL_v6_MUVENATIONDesignPatternsWP4.pdf

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