

Evaluation of a MOOC Design Mapping Framework (MDMF): Experiences of Academics and Learning Technologists

John Kerr, Vicki H.M. Dale and Fanni Gyurko

The University of Glasgow, Glasgow, UK

john.kerr.2@glasgow.ac.uk

vicki.dale@glasgow.ac.uk

f.gyurko.1@research.gla.ac.uk

Abstract: With the increasing strategic importance of Massive Online Open Courses (MOOCs) in higher education, this paper offers an innovative approach to advancing discussions and practice around MOOC learning design, in the context of staff development. The study provides a deeper understanding of staff (academic and learning technologists') experience when designing MOOCs, through the evaluation of a novel MOOC design mapping framework (MDMF) at one higher education institution. The MDMF was developed to enhance the MOOC design process for staff involved, providing dedicated, tailored support in this area. This study considers and contributes to the literature on learning design, differences between face-to-face and online learning and the role played by academic staff and learning technologists in the design of MOOCs. The study is based on rich qualitative data drawn from 12 semi-structured interviews with nine academics and three learning technologists who used the framework for constructing MOOCs. This study evaluates: (1) how the framework was used and supported; (2) benefits of the framework to support good practice in learning design and the design process; and (3) limitations of the framework. We also considered suggested enhancements to the framework. The study highlighted new areas that could influence the design process, such as the importance of the learning technologist as a facilitator of the MDMF, the benefits of the visual aspects of the framework, technological challenges, and users' level of digital literacy.

Keywords: Learning Design, MOOCs, Online Learning, Curriculum Development, Academic Development, Learning Technologists

1. Introduction

MOOCs have seen year-on-year growth since their inception with an estimated 60 million registered users across the major platforms (Shah, 2016). Despite reservations about their life span (Haggard et al., 2013), MOOCs are shifting position and are now part of the fabric that make up institutional online offerings. Therefore, we recognise that MOOCs have a growing importance in university curricula as a way of advancing degree offerings and providing greater flexibility to those who want to learn (The Open University, 2017). As a result, universities aim to develop a sustainable MOOC business model within their institution (Daniel, Vázquez Cano and Gisbert Cervera, 2015, Epelboin, 2017). Following this trend, an innovative MOOC design mapping framework (MDMF) was developed by the first author (JK) to improve the MOOC design process for the staff involved at one higher education institution.

Research on MOOCs focuses on two main areas: firstly, the diverse rationale of why institutions have entered the MOOC space (Jansen and Konings, 2017), and secondly the impact of MOOCs on end-users (Christensen et al., 2013, Kerr et al., 2015). However, there is a gap in the literature in terms of how staff can be best supported to design MOOCs. As MOOCs become common practice within institutions, they become more resource-intensive and require a significant number of stakeholders to support and condition their expansion into a mainstream activity (Alario-Hoyos et al., 2014, Kerr et al., 2015). Goodyear (2015) argues that institutions need to invest more in the planning phase of curriculum design. Therefore, the overall aim of this study is to understand how the MDMF is used by academics, and supported by learning technologists, in the design of a MOOC. In particular, the paper presents the use of a novel online tool to aid learning design conversations and product. In the rest of this paper, we relay relevant literature as a background to our study, before outlining our methodology and outcomes from our evaluation, as they relate to how the framework was used, its benefits, limitations and suggested enhancements.

2. Literature review

For a deeper understanding of the MOOC design process, it is important to consider and summarise the research on the differences between online and face-to-face design, curriculum design, learning design frameworks, and the role of academic staff and learning technologists in the design process.

MOOC design differs from the standard approach to online course design, with the vast difference in cohort size and level of subject knowledge being the main differences (Jansen, Rosewell and Kear, 2017). Pedagogical issues arise when educators need to change their mindset from face-to face and online courses (Hill, 2012) since in MOOCs they teach to a massive number of learners from different countries, with different backgrounds, statuses and motivations (Kerr et al., 2015). Moreover, each institution – and indeed schools within institutions – have their own approach to curriculum design; using processes developed in line with local practices.

Curriculum design is a process in which a course – or segments of a degree programme – are constructed with a holistic overview (American Association for the Advancement of Science, n.d.). This process involves the sequencing of learning activities coupled with resources, pedagogies, technologies and methodologies into a coherent structure (Hamza, n.d.). Although MOOC design is comparable to the design of traditional courses, it can often draw upon a greater number of internal stakeholders, e.g. academics, digital education team, media production, academic developers, and social media teams (UACES, n.d.). Therefore, institutions require guidance such as a framework which allows these diverse teams to work in tandem to support course design. The design of a MOOC, like the design of any other course (face-to-face or online), can be addressed from the perspective of learning design (Conole, 2009). Learning design provides tools and methods for articulating and representing the structure and sequence of learning activities, making them more explicit and shareable (Conole and Wills, 2013). This is a creative procedure which can go through several iterations, involving staff time and desire to learn new pedagogical and technological approaches (Koehler et al., 2004). Academic staff rely on prior knowledge in their design practice, which may not be problematic where the context is known, but this approach can cause difficulties when tasked to design courses using new pedagogies and learning technologies (Conole, 2009). There is a wide range of generic learning design approaches currently being deployed. For example, the ABC learning design toolkit (Perović and Young, 2015), based on Laurillard's (2012) learning types, the 7Cs framework (Conole, 2014), the Carpe Diem approach (Salmon, Jones and Armellini, 2008), all of which are paper-based, visual approaches that can be applied to any course design, typically facilitated by a learning technologist in a face-to-face workshop. The 7Cs model has also been considered relevant to MOOC design (Conole, 2015). Similarly, Mor et al. (2016) deployed group-based workshops to support MOOC curriculum design, creating and reusing a set of sharable learning designs, based on earlier learning design work (Mor and Mogilevsky, 2013). That face-to-face activity focused on areas such as learner personas, storyboarding and reflective discussions to support staff in their design thinking.

The literature – which informed the development of the MDMF – points to visual design acting as a strong influencer for engagement and collaborative building. Hernández-Leo et al. (2007) suggested the idea that providing visual approaches is a good solution for supporting reflective communication and creative generation of designs, while Osterwalder and Pigneur (2010) noted that being able to work collaboratively on a visual representation enhances dialogue, improves communication among participants, triggers new ideas and allows participants to depict 'the big picture' design overview at a glance. Building on this theory, Alario-Hoyos et al. (2014) created an early-stage conceptual framework for educators to describe and design MOOCs from scratch, called the MOOC Canvas. That visual framework offers a visual representation of issues to guide educators throughout the MOOC design process, helping them to reflect on and discuss these issues via specific question prompts.

There are a considerable number of stakeholders involved in the design and implementation of a MOOC, from academic staff to facilitators and the learners themselves (Kerr et al., 2015, McAuley et al., 2010). Academic staff reported that setting up a MOOC for the first time is a time-consuming process; a survey conducted by Kolowich (2013) concluded that a MOOC typically takes over 100 hours' design time. Alario-Hoyos et al. (2014) argued that there is a strong relationship between logistical issues that academic staff have to face when balancing MOOC designing and normal duties, such as research and traditional teaching and design decisions. The technological issue also plays an important part and educators should be clear about the constraints of the platform they will use to run MOOCs (Alario-Hoyos et al., 2014). Recognising the growing importance of

MOOCs and the challenges around designing a MOOC, the first author (JK) developed a MOOC design mapping framework (MDMF).

3. Methodology

3.1 Overview of the MDMF

The MDMF takes its inspiration from several well-known frameworks and learning design concept models. The framework takes the form of a visual, online web resource, produced using RealTimeBoard, a free online solution which allows many collaborators to interact with a virtual design board.

The technological-pedagogical solution for the MDMF was extensively explored before a choice was made. Several design approaches were reviewed, including the online Trello platform for online project management, the paper-based ABC framework (Perović and Young, 2015), and the paper-based Carpe Diem approach (Salmon and Wright, 2014). It was perceived there was an opportunity to enhance the value of paper-based frameworks, by creating a fully online framework to support MOOC curriculum design that could be collaboratively authored by the MOOC teams.

The learning types underpinning the MDMF have been based on the ABC curriculum design framework of Perović and Young (2015), itself based on Laurillard's (2012) different learning types (acquisition, discussion, practice, investigation, production, and collaboration). We have tailored these learning types to suit MOOC-led activities while digitising the end-to-end process. This was achieved through integrating these learning types and the FutureLearn activity types (e.g. videos, audio, articles, discussion, quizzes, peer review, assignments) in RealTimeBoard. Building on the open access ethos of Perović and Young (2015), all materials are Creative Commons licenced to enhance transferability.

Images 1 and 2 provide a visual overview of an empty board and a completed board. To populate the board (centre segment, Figure 2), a virtual post-it note is added to the appropriate activity section and is annotated with a step number and text providing a high-level description of the task. This is repeated to complete the design board. Once complete, that structure is then transposed onto the linear structure (left segment) with timings, before being mapped onto the ABC learning types (right segment).

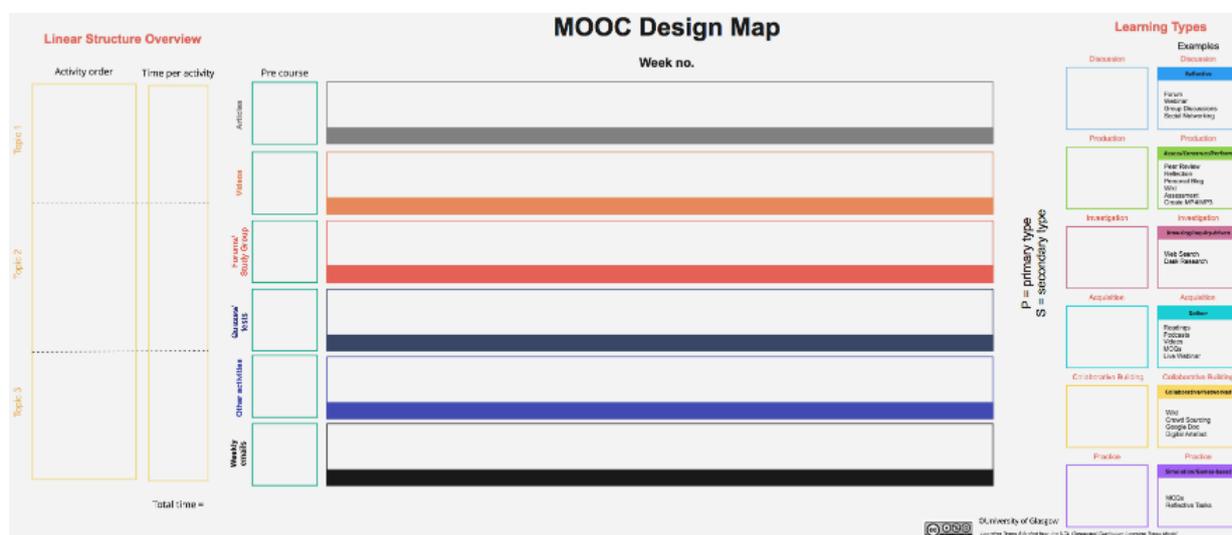


Figure 1: Blank MOOC design map in RealTimeBoard

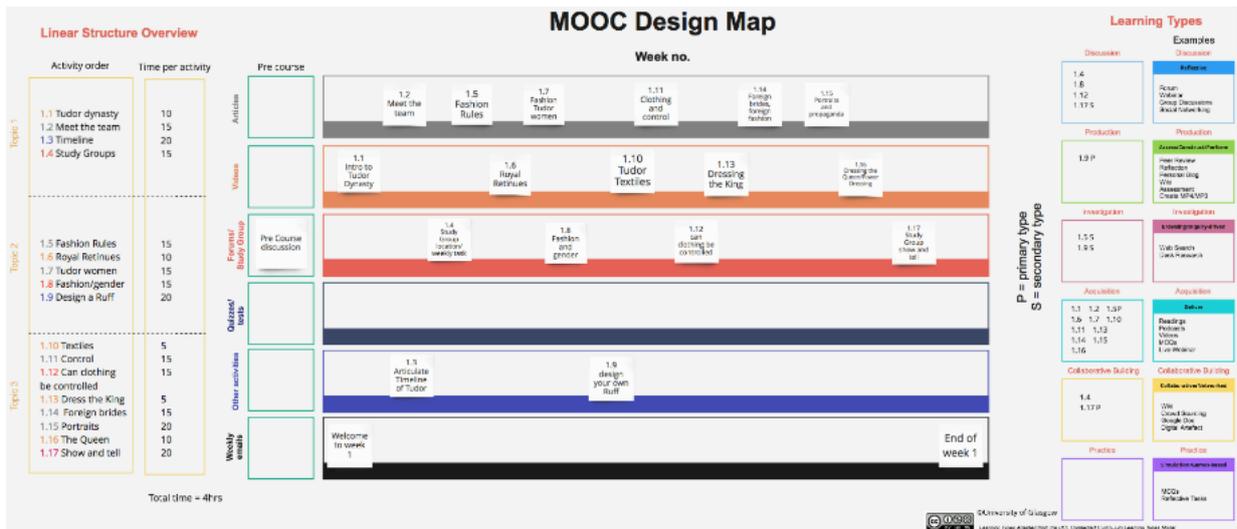


Figure 2: Populated MOOC design map in RealTimeBoard

3.2 Context of the research

The University of Glasgow is a founding member of FutureLearn and to date has produced 30 MOOCs, attracting over 300,000 enrolments. MOOCs are seen as a *driver of change* at Glasgow through many facets, such as: enhancing staff digital literacies, and being a key contributor to our widening access to education agenda. MOOC developments have been distributed across the Colleges with many areas now standardising them within their online provision.

The MOOCs that were supported by the MDMF are generally of three weeks' duration, with each of the academics designing one MOOC at a time. It is likely that the college-based learning technologists were designing multiple MOOCs within their collection of cognate disciplines. This requires working with a range of stakeholders as indicated in Figure 3.

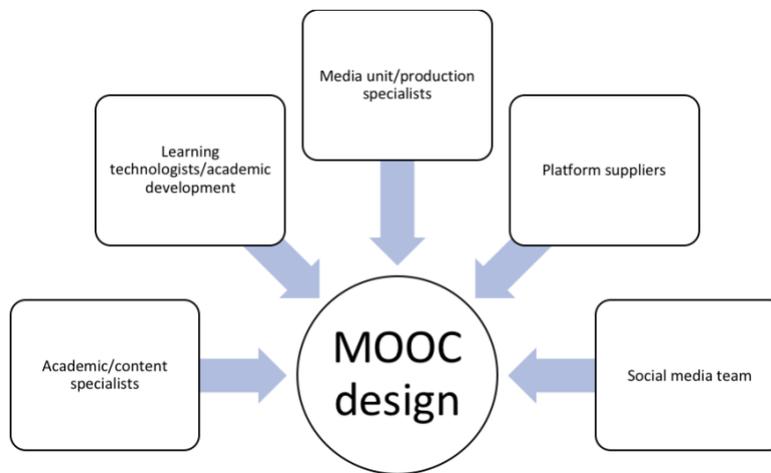


Figure 3: Internal and external stakeholders that contribute to MOOC design

This study focused specifically on the views of academic staff and learning technologists.

3.3 Instrument for data collection

The primary method of data collection involved semi-structured interviews with nine academics and three learning technologists who used the MDMF framework for designing their courses. The participants were designing MOOCs for different subjects in Arts, Education, Humanities, Law, Medical, veterinary and life sciences, and the Careers Service at the University of Glasgow. The interviews were conducted by the third author (FG).

The demographics for the interview participants are shown in Table 1. In terms of sampling, purposive sampling was used (Cohen, Manion and Morrison, 2007) in the sense that we targeted those actively involved in MOOC design and development or who had recently completed this process. Academics were each involved in one MOOC at the time of this study whereas the learning technologists had experience of several MOOCs.

Table 1: demographics of interview participants

Participant	Role	Experience of learning design framework	Experience of MOOC development
P01	Academic	No	No
P02	Academic	No	No
P03	Academic	Yes	No
P04	Academic	No	No
P05	Academic	No	No
P06	Technologist	No	Yes
P07	Technologist	Yes	Yes
P08	Academic	No	No
P09	Academic	No	No
P10	Academic	No	No
P11	Academic	No	Yes
P12	Technologist	Yes	Yes

A detailed interview schedule is included as Appendix 1. The semi-structured interview questions were tailored to the two types of participants – academics and learning technologists – and correspond with the aim of the research, focussing on topics congruent with the research questions. The semi-structured interviews standardised the questions to a degree, which allowed better comparison (Cohen and Crabtree, 2006). At the same time, participants were encouraged to discuss issues of personal significance.

Data collection took place between February and March 2018, and to encourage participation, we offered participants the choice of a face-to-face or online interview (both audio-recorded), or the opportunity to complete a written proforma. Eight interviews were conducted through Skype for Business, lasting between 8 and 17 minutes. Two interviews of similar timing were conducted face-to-face and the other two participants answered the questions via written interview proforma.

Ethical approval was granted by the University of Glasgow's College of Social Sciences Ethics Committee (#400170071). Participants were invited to take part in the research via email, and were sent a plain language statement, consent form and interview proforma in advance of participation. Audio data were transcribed by an independent professional company, and transcripts reviewed for accuracy before being thematically analysed by using the approach advocated by Braun and Clarke (2006). These, and the interview transcripts, were initially read through and then read through again, with relevant text hand 'coded' electronically in MS Word by authors JK and FG. Codes were identified and grouped into categories. Author VHD independently coded the data in NVivo and then the researchers met to negotiate the final codes and categories. The overarching 'themes' are aligned with our original research questions. The themes and categories are represented here by the titles of the subsections in the next section of the paper.

4. Results

Four main themes were identified from analysis of the interview data:

- (1) How the framework was used and supported,
- (2) Benefits of the framework,
- (3) Limitations of the framework, and
- (4) Suggested enhancements.

Within each area, categories were identified around the process of using the MDMF, as well as learning design concepts. Additional categories identified included the role of the facilitator, the importance of visual elements of the framework, and technological challenges. Finally, we present the participants' perceptions on whether they would use the MDMF again and if it should be adopted as a standard for designing all MOOCs.

4.1 How the framework was used and supported

The main categories under this theme included process, learning design, and the role of the learning technologist.

4.1.1 Process

In general, academics had regular meetings with a learning technologist during the planning and design phase, while using the online MDMF to plan each week of content for the course. Academics suggested that they used the framework more for the initial design phase:

"I really only used it for the initial drafting of the course overall. As the course content developed in its later stages there was less need to use it ... since then I have reverted back to tables in word documents as my reference points for the course delivery." (P05, academic)

This means that the framework was useful as a starting point; however, in the later stages of course development some academics used more traditional techniques for the micro level detail.

From the learning technologists' point of view, the framework and the workshops helped to monitor progress, serving as an unintended project management tool:

"It's handy for the other staff to understand where the MOOC is going as well, and kind of what information is needed that they need to work on as well." (P07, learning technologist)

One learning technologist also used the framework as a way to project manage tasks:

"...we then sat down and looked at [the workshop facilitator's] template which it was really helpful because then we could just divide it up and say, right, you do that and I do that ... so that was really useful." (P08, academic)

The framework enhanced collaboration between academics and learning technologists and also across the academic team, as it provided a clear overview of the delivery process:

"It's beneficial for sharing information between the group and easy to change and a clear understanding of the processes of how the MOOCs are going to be delivered during the various weeks." (P07, learning technologist)

From the learning technologists' point of view, one of the most important aspects was that the framework could be used to encourage academics to think about the basics of the course before starting to explore the specifics:

"... what had happened is that staff members had been trying to create MOOCs and trying to kind of put it down on paper what they wanted to do with a MOOC and trying to plan it. They tried to write out sort of from A to Z with the plan of the MOOC and what I found was that the framework became very useful when we were able to say, look, you're already thinking too far ahead of yourself, so we were able to use the framework to step back a bit and to think about tasks and then reorder and organise these tasks." (P06, learning technologist)

4.1.2 Learning design

Academic staff and learning technologists reported that they used the framework for selecting and sequencing learning activities and mapping content onto a structure:

"We used it to map out three weekly sessions and then inside each session to assemble a sequence of differently textured activities and resources as a way of planning a pedagogical sequence and helping us I suppose plan production of the various elements as well." (P03, academic)

One academic also noted that the framework served as good starting point to understand different learning types:

"I looked at the Learning Types and Tools to familiarise myself with the different types of learning, but I found the design map most useful." (P02, academic)

4.1.3 Role of the learning technologist as facilitator

The importance of the learning technologist as facilitator was a theme which emerged strongly from the data. Most participants mentioned that the inclusion of a learning technologist is critical to effective use of the MDMF:

"... sometimes when you're too knowledgeable or too immersed in a topic, you risk losing the learner's perspective, so it's useful to have someone who knows the structure of the MOOC, who knows the tool, but doesn't know much about the content because they can tell you ... you need to make it clear to people who are not experts in the field." (P11, academic)

One of the participants argued that without the workshop facilitator, the process of MOOC design would not have happened:

"Well, I wouldn't say the effectiveness was in the computer tools as such, I would say it was more [the learning technologist's] leadership and him managing us that made the conversations happen. So, I don't know...put it this way, if we just had the tool and not [them], I don't think it would have worked, but [they] sort of drove the framework for us ..." (P03, academic)

4.2 Benefits

The main categories under this theme included process, learning design, and visualisation.

4.2.1 Process

Designing a MOOC is a highly collaborative process involving several stakeholders. This collaboration aspect was strongly communicated by academics and learning technologists who noted that the framework resulted in increased collaboration between the teams:

"I think we all would still have met up for regular meetings however having something to focus on such as the framework made it so that everyone had a visual of what they were working on, which I think made collaboration better." (P01, academic)

The collaboration was also mentioned together with the design process as being highly creative:

"It's a really good focus and as I said it was a kind of collaborative creative process. You've got to think outside the box quite a lot, you know, how to get simple ideas across to your audience." (P08, academic)

One learning technologist suggested that the framework is more effective as a collaboration enabler as the team complexity increases:

"I think it works better though when there's more people on the planning team the better that it works, the more effective it is." (P06, learning technologist)

The framework also supported the learning technologist's dialogue with academics:

"I think it's really good because I think sometimes it is a struggle ... if they haven't done any form of online learning, even blended learning. It's very much a kind of blank canvas and it's sometimes quite difficult to visualise how your face-to-face course would fit in an online environment." (P12, learning technologist)

Linked to the previous theme, learning technologists also suggested that the framework helped academics focus on aims and end goals:

"Instead of just sitting round and talking about what you want to achieve and how you're going to achieve it, it's quite nice to have something as a focus where you can actually have something that you

can put together and have actually something physically at the end of it that can be photographed or forwarded round." (P12, technologist)

The following quote from an academic supports the previous suggestion:

"I think what it helped more was focus. Because collaboration we probably would have got anyway, whereas it's more difficult to actually focus on the structure and make things fit the structure..." (P11, academic)

Participants reported other benefits of the framework, such as being easy to use, efficiencies, and importantly, it aided organisation:

"... we were able to earlier identify issues whereas the previous MOOC what happened is we went ahead and started to put things in FutureLearn and then it caused a bit of problems when we wanted to introduce new factors and new bits and reorganise it so this really helped with the organisation and the planning." (P06, learning technologist)

During the interview, we asked whether using the framework saved time compared with previous MOOC design processes. Only the learning technologists had previous experience with MOOCs. They felt that the MDMF approach saved time but could not quantify how much time. However, they noted that using the framework resulted in a more efficient process compared with working on previous MOOCs:

"It just felt smoother and it feels like we're not making changes ... late on, whereas previously what we would do is we would just work from the original thoughts but then we go, oh, but what if we move that; whereas with the framework it was quite easy to plan that and you don't have those changes coming late ..." (P06, technologist)

4.2.2 Learning design

The most beneficial aspect of the framework in terms of the learning design, mentioned by the academics and learning technologists, was that it made them think about the type, sequence and balance of activities:

"And I think one of the important thing is the balance ... so all different types of learning experiences represented in the structure and the learning technologist also explained to us different categories, for example what we could include as interactive activities, what we could include as discussion forum, what we could include in the visual material, and that clarification always helped ... I think it could be quite a different experience if we just list things in a standard Word document and without any specific structure brought into it, so I think it really helps imagining what we have to do and to keep the right balance between the different elements of that structure." (P09a, academic)

Academics and learning technologists both mentioned that the framework helped to construct a more learner-centred design:

"... it [the framework] made sure that the course was varied with the hope that the learners would stay more engaged and therefore learn more from our material." (P01, academic)

"I think as soon as you actually start thinking of the user experience obviously it's going to be more user-centred and you're going to think of their whole experience and actually how they are going to work through the course and which order is the best way content is going to be presented." (P12, learning technologist)

Learning technologists, who had previous experience with developing MOOCs, found it useful that the framework encouraged a focus on design prior to development:

"The difficulty is sometimes I think that people have gone straight to the FutureLearn platform and tried to build their course ... you can actually move content about to try and figure out what the best fit for the course is going to be and also even just to review how it's going to flow, before you actually start putting the effort in to create resource and activities online." (P12, learning technologist)

4.2.3 Visualisation

Academics and learning technologists referred to the visual elements as beneficial in terms of types and sequencing of activity:

"Well one thing that we really, really wanted to do was to actually just put the different activities on the MOOC to see how it looked ... that helps you to picture what it's going to look like and gives you the confidence to then actually start pulling it together ... into the MOOC online." (P04, academic)

"I like the fact that the different type of activities have different colours, it's visually I think very immediate... it's quite easy to see the balance that you have because of the colour coding." (P11, academic)

Both groups of participants mentioned that the framework helped to see the big picture overview and gaps:

"I think it allowed us to clearly see the interactivity and where we were missing certain elements for - you know, get a good broad overview where students were missing a bit more interaction and a bit more of an engaging course." (P06, learning technologist).

4.3 Limitations and suggested enhancements

The limitations and the suggested enhancements are presented together, since they are closely aligned. The main categories under this conjoined theme included process, learning design, and technical aspects.

4.3.1 Process

The main limitation, mentioned by all participants, was that the framework tool did not capture all workshop discussions:

"One limitation of the system, and it may just be how we were using it, there may be a way round this, but it seemed to me that the size of the boxes for each individual step were small, so our tendency was that we tended to just write in three or four words to describe each step." (P09b, academic)

As an enhancement, making space for detailed workshop notes was suggested by several participants. Details of how this feedback has been actioned is explored later in this paper.

"I think it would be good to be able to have on each box some kind of hyperlink to a place where you could have deeper notes that captured the richness of the conversation, rather than be limited to what can fit on the boxes in the framework." (P03, academic)

4.3.2 Learning design

One limitation that a learning technologist mentioned is the danger of the MDMF becoming too prescriptive:

"The danger potentially could be if you try to fit too much into the framework without actually trying to bend the rules of it a bit, where you actually start to become quite prescriptive with your MOOCs instead of thinking about your learners' experience." (P12, learning technologist)

For this limitation, another learning technologist mentioned simplifying task details as an enhancement:

"... just to keep it more on a visual sort of view to how the course looks and a quick overview of how each week looks on a MOOC rather than getting tied down too much on the acquisitions of skills that are expected on each." (P06, learning technologist)

Only one academic mentioned the visual aspect as a limitation, in the context that it took time to become familiar to the visual layout:

"It took me a while to get used to the layout and as someone used to work primarily with basic lists and tables. I am not a visual person when it comes to planning so this took a while for me to figure out". (P05, academic)

One academic whose MOOC did not align to a current course/programme mentioned that designing a MOOC is more difficult for new course content:

"It's not that we're transferring a course that's already been written to a MOOC programme so we are having to come up with everything right now and therefore when we were sitting with the [learning technologist] we were literally just generating ideas at that moment." (P08, academic)

One academic mentioned difficulties with not understanding specific learning activities:

"I had some uncertainty at the start about what was meant by an article ... I think that over time it became clear to me that an article includes something that we ourselves have written. So, I don't know if there's a way to just clarify that for new users." (P09b, academic)

Suggestions for enhancement include more guidelines on activity types, and simplifying language or descriptions:

"... to have a short ... like a guideline about a category, for example the written materials, readings, visual materials, before anybody starts to use that tool, to have a kind of guideline document about specific learning documents which could be included in each category." (P09a, academic)

"... the language that's used or the descriptions of some of the activities or resource types that could be made clearer or even just added to." (P12, learning technologist)

4.3.3 Technical

A range of technical limitations was mentioned by both academics and learning technologists. Firstly, the lack of flexibility with the tool itself:

"Sometimes it wasn't as flexible. For example, if you're updating 1.1 you would need to take that out and then update all the other notes that were in there, all the little post-it notes." (P07, learning technologist)

One participant suggested, as an enhancement, to develop the possibility of automatically linking activities to learning types.

One academic mentioned that they had problem with accessing specific weeks, and another noted that it only allowed one author, which is not the case. Therefore, we suggest that this aspect reflects the users' digital literacy. One academic acknowledged this lack of technical expertise:

"I had difficulty accessing one of the MOOC weeks online ... because I'm not that technically minded." (P04, academic)

A possible enhancement could be increased training or adjustments for independent use to help with issues when the learning technology is not there to assist:

"So perhaps there might be a way to make the interface even more, you know, something that people can use on their own... there might be adjustments that can be made there, or maybe just training people into the thinking behind it." (P11, academic)

One learning technologist reported that the tool did not work as well on an iPad as it did on a desktop machine. As an enhancement, another learning technologist with previous experience in MOOCs and learning design suggested using Trello instead:

"... I have sort of used the framework but now we're using Trello on a couple of MOOCs as a planning tool which seems to kind of work a bit better for people for the ... you know, as a limitation of the software that we're using. So we've moved over to Trello and that seems to be a bit more in favour with the people that I'm working with at the minute but the framework is still there. It's just in a different tool." (P06, learning technologist)

4.4 Future use

All participants agreed that they would use the framework again when designing a MOOC. Academics had little or no experience with designing previous MOOCs, therefore it was the learning technologists who elaborated further on this topic:

"I think it gives a lot of benefits to the original way of designing MOOCs, which were probably with a Word document or a PowerPoint, or something like that." (P07, learning technologist)

Another learning technologist added:

"I think not just for MOOCs, I think even for any form of course design... it's actually a really good exercise to do because it does get everyone thinking about structure, layout, progression, these, kind of things." (P12, learning technologist)

For the question about whether the MDMF should be standard for designing MOOCs, six academics and all three learning technologists answered yes; however, two academics said no and one was not sure. However, one academic who said no also thought that the MDMF is useful in the initial stage:

"I think it would be useful as a suggested starting point for those who are new to the process but to make it a standard which has to be used I think would be counter-productive." (P05, academic)

One of the learning technologists suggested that it could be used for larger programmes:

"I think in the future not only MOOCs but, because I deal with online learning and online Masters' programmes, it could be implemented in that particular avenue." (P07, learning technologist)

5. Discussion

The main emerging themes to come out of the thematic analysis relate to learning design, the process of course design, and technical aspects.

5.1 Learning design

The toolkit was mainly used as a mechanism to support users in reflecting on the identification, balance and sequencing of learning activities. Goodyear (2002) denotes the importance of sequencing learning activities to avoid two dangers: firstly, students not knowing what is expected of them, which results in dissatisfaction and unproductivity. Secondly, tutors spending significant time – that they cannot spare. The feedback from participants has demonstrated that the framework helps to mitigate these potential pitfalls.

This allowed users to create more learner-centred designs that incorporated active learning opportunities to enhance interactivity and student engagement. This finding is consistent with Murphy (2004, cited by Penna and Stara, 2007) who developed a procedure to facilitate learner-centred design. Briefly, these are: 1) Define target audience; 2) Understanding of user goals; 3) User testing; 4) Small user evaluation; 5) Continued evaluation. The MDMF—together with the FutureLearn platform—facilitates phases 1 and 2 to ensure a learner-centred approach has been followed.

The fact that it took one academic time to get used to the visual layout, or that specific learning activities were not immediately obvious, highlights an acknowledged need for additional guidance. Such guidance has been subsequently produced, to allow users to run the MDMF approach independently. This resource is available at <https://www.gla.ac.uk/colleges/socialsciences/staff/learningandteaching/moocdesign/>. We also recommend that the MDMF is used in partnership with a local learning technologist who can guide and support the process.

5.2 Process

The toolkit was mainly used in the early MOOC design stages and supported overall project management through regular meetings. It was clear that the workshop facilitator played a critical role in ensuring engagement with the toolkit. This is not surprising; Jisc (2017) describes the role of a learning technologist as "...daily influencers of the learner experience", while being the "bridge between technology and teaching and

learning". They therefore play a critical role not just in knowing how the learning technology works, but also how to use it to its best pedagogical effect. As well as supporting dialogue between the learning technologist and academics, facilitation of the toolkit mediated communication between academic team members, who became more focused on the end goal. This is encouraging when compared to the research of Solomon (2010) who found that managing conflict, decision making and expressing opinions was challenge for collaborative virtual teams.

5.3 Technical issues

Given that the MDMF approach is built upon a third-party online tool, there are inevitably technical challenges to navigate. Some of these related to the limitations of the tool itself, while others were a result of variable digital literacies among academics. The availability of the RealTimeBoard app should help to alleviate issues encountered by iPad users. Nevertheless, we recognise that the tool should be as user-friendly as possible. As academics are increasingly expected to engage in online distance and blended learning, so the need for academic staff development around technology-enhanced learning and teaching (TELT) increases. At the University of Glasgow, this is supported through a number of mechanisms, including credit-bearing academic programmes, informal continuing professional development event, a TELT community of practice, and through the support and encouragement of college and school learning technologists.

5.4 Limitations of the research

We acknowledge that the study did contain a number of limitations as follows. In terms of a potential response bias (Cannell, Miller and Oksenberg, 1981), it is altogether possible that the participants' responses were influenced by the professional relationship between the first author (JK), also the key learning technologist to have worked closely with all the participants. To try to mediate this, interviews were conducted by the second author (FG), and personal identifiers removed prior to data analysis.

Secondly, this evaluation study was a focused case-study of the use of the MDMF approach at a single institution. To fully evaluate the transferability of the findings, and potential use of the approach, the authors suggest that a wider, cross-institutional study takes place. We would therefore welcome the opportunity to work with other learning technologists in rolling out this learning design approach at other institutions. The Creative Commons licensed resources are available at <https://www.gla.ac.uk/colleges/socialsciences/staff/learningandteaching/moocdesign/>.

6. Conclusion

This paper presents the outcomes of the implementation and evaluation of an innovative, online approach to designing MOOCs. The MDMF approach surfaces the importance of learning design, particularly in terms of selecting and sequencing different types of learning activities, in an immediately accessible and engaging format that allows the users to create a learner-centred approach to online learning.

The approach has been shown to be effective in supporting the design process, as facilitated by a learning technologist. The design process now introduces efficiencies as a result of a focus on design before development, and increased communication between academics and learning technologists, and across the academic team.

Technical issues arose from the evaluation, relating to the chosen technology itself, as well as the digital literacies of staff. Potential enhancements to address these have been presented. Finally, more cross-institutional work needs to be undertaken to assess the potential for enhancing MOOC learning design at other colleges and universities.

Acknowledgements

We would like to thank the University of Glasgow for funding to undertake this work through the Learning and Teaching Development Fund, managed by the Learning Enhancement and Academic Development Service.

We would also like to warmly thank our participants for sharing their experiences of using the MDMF, which informed this study and subsequent refinement of the MDMF.

References

- Alario-Hoyos, C., Pérez-Sanagustín, M., Cormier, D. and Delgado-Kloos, C. 2014. Proposal for a conceptual framework for educators to describe and design MOOCs. *Journal of Universal Computer Science*, 1, pp. 6-23.
- American Association for the Advancement of Science. n.d. *Designs for Science Literacy* [online]. Available at: <http://www.project2061.org/publications/designs/online/default.htm> [Accessed 15 February 2019].
- Braun, V. and Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), pp. 77-101.
- Cannell, C.F., Miller, P.V. and Oksenberg, L. 1981. Research on interviewing techniques. *Sociological methodology*, 12, pp. 389-437.
- Christensen, G. et al. 2013. *The MOOC phenomenon: Who takes massive open online courses and why?* [online]. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2350964 [Accessed 15 February 2019].
- Cohen, D. and Crabtree, B. 2006. *Qualitative Research Guidelines Project: Semi-structured Interviews* [online]: Robert Wood Johnson Foundation. Available at: <http://www.qualres.org/HomeSemi-3629.html> [Accessed 13 February 2019].
- Cohen, L., Manion, L. and Morrison, K. 2007. Sampling. *Research methods in education*. Taylor & Francis Ltd, pp. 100-118.
- Conole, G. 2009. The role of mediating artefacts in learning design. *Handbook of research on learning design and learning objects: issues, applications, and technologies*. IGI Global, pp. 188-208.
- Conole, G. 2014. The 7Cs of Learning Design—a new approach to rethinking design practice. 9th International Conference on Networked Learning, Edinburgh.
- Conole, G. 2015. Designing effective MOOCs. *Educational Media International*, 52(4), pp. 239-252.
- Conole, G. and Wills, S. 2013. Representing learning designs—making design explicit and shareable. *Educational Media International*, 50(1), pp. 24-38.
- Daniel, J., Vázquez Cano, E. and Gisbert Cervera, M. 2015. The future of MOOCs: Adaptive learning or business model? *International Journal of Educational Technology in Higher Education*, 12(1), pp. 64-73.
- Epelboin, Y. 2017. MOOCs: A viable business model?, In M. Jemni, Kinshuk and M. K. Khribi eds. *Open Education: from OERs to MOOCs*. Berlin, Heidelberg, Springer Berlin Heidelberg, pp. 241-259.
- Goodyear, P. 2002. Psychological foundations for networked learning. *Networked learning: Perspectives and issues*. Springer, pp. 49-75.
- Goodyear, P. 2015. Teaching as design. *Herdsa review of higher education*, 2, pp. 27-50.
- Haggard, S. et al. 2013. The maturing of the MOOC: Literature review of massive open online courses and other forms of online distance learning. *Department for Business, Innovation and Skills, UK Government*.
- Hamza, A. n.d. *Contemporary approaches to curriculum design with special reference to the concepts of intercultural and interreligious learning and teaching* [online]. Available at: http://www.academia.edu/26909447/CONTEMPORARY_APPROACHES_TO_CURRICULUM_DESIGN_WITH_SPECIAL_REFERENCE_TO_THE_CONCEPTS_OF_INTERCULTURAL_AND_INTERRELIGIOUS_LEARNING_AND_TEACHING [Accessed 15 February 2019].
- Hernández-Leo, D. et al. 2007. A framework for the conceptualization of approaches to “Create-by-Reuse” of learning design solutions. *Journal of Universal Computer Science*, 13(7), pp. 991-1001.
- Hill, P. 2012. Online educational delivery models: A descriptive view. *Educause review*. 84-97.
- Jansen, D. and Konings, L. 2017. MOOC Strategies of European Institutions. The Netherlands, European Association of Distance Teaching Universities, .
- Jansen, D., Rosewell, J. and Kear, K. 2017. Quality Frameworks for MOOCs, In M. Jemni, Kinshuk and M. K. Khribi eds. *Open Education: from OERs to MOOCs*. Berlin, Heidelberg, Springer Berlin Heidelberg, pp. 261-281.
- Jisc. 2017. *Learning technologists* [online]. Available at: <https://www.jisc.ac.uk/guides/enhancing-staff-support-for-learners-with-disabilities/learning-technologists> [Accessed 15 February 2019].
- Kerr, J., Houston, S., Marks, L. and Richford, A. 2015. *Building and Executing MOOCs. A Practical Review of Glasgow's First Two MOOCs (Massive Open Online Courses)*. Project Report. University of Glasgow, Glasgow. [online]: University of Glasgow. Available at: <http://eprints.gla.ac.uk/112764/> [Accessed 17 July 2017].
- Koehler, M.J., Mishra, P., Hershey, K. and Peruski, L. 2004. With a little help from your students: A new model for faculty development and online course design. *Journal of Technology and Teacher Education*, 12(1), pp. 25-55.
- Kolowich, S. 2013. *The Professors Behind the MOOC Hype* [online]. Available at: <https://www.chronicle.com/article/The-Professors-Behind-the-MOOC/137905> [Accessed 15 February 2019].
- Laurillard, D. 2012. *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology*. New York: Routledge.
- McAuley, A., Stewart, B., Siemens, G. and Cormier, D. 2010. *The MOOC model for digital practice* [online]. Available at: https://oerknowledgecloud.org/sites/oerknowledgecloud.org/files/MOOC_Final.pdf [Accessed 15 February 2019].
- Mor, Y. and Mogilevsky, O. 2013. Learning Design Studio: Educational Practice as Design Inquiry of Learning, In D. Hernández-Leo et al. eds. *Scaling up Learning for Sustained Impact*. Springer Berlin Heidelberg, pp. 233-245.
- Mor, Y., Warburton, S., Nørgård, R.T. and Ullmo, P.-A. 2016. MOOC Design Workshop: Educational Innovation with Empathy and Intent. Adaptive and Adaptable Learning, Cham, Springer International Publishing.
- Osterwalder, A. and Pigneur, Y. 2010. *Business model generation: a handbook for visionaries, game changers, and challengers*: John Wiley & Sons.

- Penna, M. and Stara, V. 2007. The failure of e-learning: why should we use a learner centred design. *Journal of E-learning and Knowledge Society*, 3(2), pp. 127-135.
- Perović, N. and Young, C. 2015. *ABC (Arena Blended Connected) Curriculum Design* [online]. Available at: <http://blogs.ucl.ac.uk/digital-education/2015/04/09/abc-arena-blended-connected-curriculum-design/> [Accessed 24 June 2017].
- Salmon, G., Jones, S. and Armellini, A. 2008. Building institutional capability in e-learning design. *ALT-J, Research in Learning Technology*, 16(2), pp. 95-109.
- Salmon, G. and Wright, P. 2014. Transforming future teaching through 'Carpe Diem' learning design. *Education sciences*, 4(1), pp. 52-63.
- Shah, D. 2016. *By The Numbers: MOOCs in 2016* [online]: Class Central. Available at: <https://www.class-central.com/report/mooc-stats-2016/> [Accessed 13 February 2019].
- Solomon, C. 2010. *The Challenges of Working in Virtual Teams* [online], New York. Available at: http://www.communicationcache.com/uploads/1/0/8/8/10887248/the_challenges_of_working_in_virtual_teams.pdf [Accessed 15 February 2019].
- The Open University 2017. Fixing the broken market in part-time study.
- UACES. n.d. *Designing a Massive Open Online Course (MOOC)* [online]. Available at: <http://www.uaces.org/resources/designing-a-massive-open-online-course-mooc> [Accessed 15 February 2019].

Appendix A: Detailed interview questions

For academic staff:

1. What previous experience do you have of designing a MOOC?
2. Have you used a learning design approach before (for online or face-to-face courses)?
3. What were your overall impressions of using the framework?
4. Can you tell us in detail how you used the framework and how you were supported in using it?
5. What were the benefits?
 - a. Specifically, do you feel it brought increased collaboration to staff involved in the design process?
 - b. Did you feel that your course was more learner-centred as a result?
 - c. Did it save you time compared to designing MOOCs previously? In what ways?
 - d. What did you like most about the framework?
6. What were the limitations of the framework?
 - a. What did you like least?
 - b. What modifications would you suggest?
7. Would you use this framework again?
8. Do you think that the framework be deployed as standard for designing all MOOCs?

For learning technologists?

1. What previous experience do you have of aiding the design process for a MOOC?
 - a. How many have you been involved with?
2. Have you used a learning design approach before (for online or face-to-face courses)?
3. What were your first impressions of using the framework?
4. Can you tell us in some detail how you used the framework and how you introduced it to staff and how you supported them using it?
5. What were the benefits?
 - a. Specifically, do you feel it brought increased collaboration to staff involved in the design process?
 - b. Did you feel that the course was more learner-centred as a result?
 - c. Did it save you time compared to designing MOOCs previously? In what ways?
 - d. What did you like most about the framework?
6. What were the limitations of the framework?
 - a. What did you like least?
 - b. What modifications would you suggest?
7. In your role, what did the framework allow you to do that your previous methods didn't?
8. Would you use this framework again?
9. Would you recommend that the framework be deployed as standard for designing all MOOCs?