

# A 'participant first' approach to designing for collaborative group work in MOOCs

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This paper discusses the learning design of two Massive Open Online Courses (MOOCs), the Carpe Diem MOOC and the Autism MOOC, both of which were designed and delivered by Swinburne University of Technology in Melbourne, Australia. The authors propose a set of principles to guide the design and development of MOOCs where the intent is to facilitate interaction and peer support between participants. They present details of how these principles were enacted in the design of the Carpe Diem MOOC and the Autism MOOC, particularly in the design of groups, and suggest that these principles can be viewed as a 'participant first' approach to design. Key elements of this approach include accessibility, navigation, clarity and consistency, purposeful use of tools and resources and effective support to enable participants to engage easily in collaborative work in MOOC environments.

**Keywords:** Massive Open Online Course, MOOC, learning design, Carpe Diem, design principles, online learning, MOOC design

## MOOCs and learning design approaches

Collaborative work and learning in groups is not a new phenomenon in educational institutions (Juwah, 2006), with the importance of collaborative learning well recognised for its ability to lead to higher levels of learning if managed effectively (Frey, Fisher, & Everlove, 2009). However, Khosa and Volet (2013) suggest that whilst there are benefits to collaborative learning, students may need "instruction in the use of learning-enhancing strategies" (p. 871) in order to benefit from the opportunities afforded by collaboration. This is particularly interesting given that group work and collaboration are relatively new phenomena in online courses (Brindley, Walti, & Blaschke, 2009), particularly in Massive Open Online Courses (MOOCs). This paper discusses one approach to the design principles applied to group interaction in two different MOOCs, and argues that a clear set of design principles are needed to enable groups to work effectively in the MOOC environment.

The term MOOC was coined by Dave Cormier in 2008 to describe a course – Connectivism and Connective Knowledge – which was offered free to the public, as well as to fee paying university students, and attracted 2,300 participants (Yuan & Powell, 2013). The principle behind MOOCs aligns with concepts of universal access and openness in education as anyone can participate and there is no cost. MOOCs are frequently referred to as a "disruptive force" in higher education (Bates, 2013; Shirky, 2012) as they not only present potentially new business models (Yuan, Powell, & Bill, 2014) but they "disrupt the notion that learning should be controlled by educators and educational institutions ..." (Kop, Fournier, & Mak, 2011, p. 75). Their openness can lead to massive enrolments, but there is also a tendency for high drop-out rates. The majority of MOOCs achieve completion rates of up to 13%, with only a few achieving more than 40% (Jordan, 2015), raising interesting questions about how to design for collaboration when numbers of participants are unknown and continuously reducing throughout the course. Consequently, many of the assumptions held about the design for courses in higher education may require rethinking to be transferable into this new context. As Kop et al. (2011) suggest, "a change in the thinking, philosophy, design, and pedagogies of institution-based online courses may be necessary if the affordances of emerging technologies are embraced and adopted within formal educational institutions" (p. 89).

Weller (2011) suggests that we now need to design for a "pedagogy of abundance". He argues that the traditional university model is predicated on the idea of a scarcity of experts, resources and facilities. In a digital, networked environment however, we have access to content as well

as access to peers, experts and other learners, and the opportunity to discuss ideas through social networks (Weller, 2011). Weller presents a number of pedagogical approaches that are better equipped for abundance, including resource-based learning, problem-based learning, constructivism, communities of practice, and connectivism. The “pedagogy of abundance” concept fits well within the MOOC model, and has significant implications for the design of MOOC activities that enable social networks to flourish.

Yuan and Powell (2013) note that MOOCs have developed in two distinctly different pedagogical directions based on different ideologies. xMOOCs are designed as online versions of traditional higher education learning and teaching formats using Learning Management Systems such as edX, Udacity, Coursera, OpenEducation and FutureLearn. cMOOCs are based on connectivist theory, espoused by George Siemens and Stephen Downes (Milligan, 2013), and tend to run on open source learning platforms with a pedagogical model of peer learning. Yuan and Powell (2013) argue that:

cMOOCs emphasise connected, collaborative learning and the courses are built around a group of like-minded ‘individuals’ who are relatively free from institutional constraints. cMOOCs provide a platform to explore new pedagogies beyond traditional classroom settings and, as such, tend to exist on the radical fringe of HE. On the other hand, the instructional model (xMOOCs) is essentially an extension of the pedagogical models practised within the institutions themselves, which is arguably dominated by the “drill and grill” instructional methods with video presentations, short quizzes and testing (p. 7).

Gillani (2014) notes that, irrespective of the type of MOOC, participants are able to interact and collaborate in online discussion forums. However, as MOOCs are open and free, participants will come from a wide range of backgrounds, experience and skill levels (Milligan, 2013), and the challenge is to create a pedagogy and design that accommodates this diversity and enables learning through social connections (Kop et al., 2011). In addition to diversity of background, experience and skills, there are different levels of interaction to be accommodated. Hill (2013) identifies four types of MOOC participants: Lurkers, who enrol but only observe; Drop-Ins, who partially participate; Passive Participants, who view and use course content but do not participate in activities; and Active Participants, who actively participate in activities. Interaction also tends to change over the life-time of the MOOC, with a risk of early information overload as discussion forums are overloaded with small-talk, followed by the sharp decline rate as participants drop-out (Brinton, 2014).

Critical literacy skills emerge as one of the key areas needed to learn effectively in connectivist environments. Specifically, Kop (2011) argues that to learn effectively in these environments, participants need to have an open mind, be able to learn cooperatively, have critical analysis skills, and be confident and competent in the use of the tools available to enable learning. (Milligan, 2013). Those with the critical and digital skills are more likely to become the active participants, thereby providing the group with “a high set of resources available in the form of people with varied experiences and expertise” (Gillani et al., 2014, p. 2). However, large groups with high attrition reduces the likelihood that participants will form strong relationships, raising the question of whether smaller groups can be more effective in engaging participants in MOOCs. Gillani (2014) highlights the importance of designing for group interaction, stating:

While theoretical perspectives and emphases differ in studies of online learning, it is recognised that understanding the learning process in online forums requires consideration of interactions at the individual and group level. The interactions at the group level within these forums can be viewed as a kind of scaffold through which learning can occur, and therefore, is of significant practical concern when considering the future design and development of courses (p. 1).

A number of authors have written extensively about design for online learning, and have developed approaches to encourage interaction and learning through collaboration. Laurillard’s Conversational framework supports the establishment of collaborative learning environments for groups of learners to participate in conversations (Hickey, 2014), and emphasises tutor-student dialogue and actions based on dialogue and reflection (Laurillard, 2012). The framework offers

five ways in which learning resources can be designed and used – as narrative, interactive, adaptive, communicative and productive. The scaffolded learning model, or 5 stage model (Salmon, 2002, 2011), and the structure of online activities or e-tivities (Salmon, 2002, 2013), are designed to encourage and enable collaborative learning (Salmon, Gregory, Lokuge-Dona & Ross 2015) in online environments. Tom (2015) discusses how the use of technology to enhance learning and teaching depends on effective design of the resources. Tom (2015) integrates constructivist and collaborative learning theories in establishing the Five C framework for student centred learning: Consistency – in learning and teaching practices; Collaboration – in problem solving and knowledge construction; Cognition – developing higher order thinking; Conception – understanding concepts; and Creativity – creating solutions by applying concepts learnt.

Design principles applicable to learning and teaching online emerge from a variety of discipline areas, including multimedia. For example, Mayer (2001, 2005, 2009) highlights how the cognitive theory of multimedia learning provides ideas for designing online learning resources and environments. Mayer (2009) describes learning as a sense-making process where students build understandings based on coherent representations from the presented learning resources that consists of text, images and audio. He highlights three types of cognitive processing during learning – Extraneous, Essential and Generative – and discusses how learning can be maximised by reducing non-related instructions, presenting essential material in a simple manner to reduce complexities, and creating engaging activities to foster generative processing. Churchill (2011) then presents a number of key principles related to multimedia design that offer key points for consideration in online learning design. These principles can be summarised as follows:

- Multimedia – the use of both visual and verbal information
- Managing essential processing through segmenting (student paced segments); pre-training (key concepts need to be familiar); and modality (words are spoken rather than written)
- Reducing extraneous processing through coherence (excluding extraneous material); signalling (highlighting the organisation of essential material); redundancy (no repeating of material): spatial contiguity (words and pictures are physically integrated): and temporal contiguity (words and pictures are temporally integrated)
- Social cues including personalisation (words presented in conversational style); voice (narration in human voice); and image (no need for speaker's image on screen).

What is clear is that the online learning environment, particularly MOOCs, requires new ways of thinking about how we design and deliver learning activities. As Kop et al. (2011) state:

The type of support structure that would engage learners in critical learning on an open network should be based on the creation of a place or community where people feel comfortable, trusted, and valued, and where people can access and interact with resources and each other. The new roles that the teacher as facilitator needs to adopt in networked learning environments include aggregating, curating, amplifying, modelling, and persistently being present in coaching or mentoring (pp. 88-89).

Designing for MOOCs is a complex task if the variation in participation levels, intentions, capabilities and expectations within any given cohort of participants is to be effectively addressed. A key question is how to design to accommodate the diversity of participants, enabling those who want to actively participate, whilst also providing resources for those who want to observe and learn. In addition, how can the design cater for participants who do not have the critical or digital literacies required to successfully navigate MOOCs, and draw on the learning from related fields such as multimedia to create consistent and coherent experiences for participants. We argue that a 'participant first' approach can increase the likelihood of more participants developing the required literacies and potentially therefore feeling more able to actively contribute, and we demonstrate how we attempted to apply this approach in two MOOCs with very different groups of participants.

## **The Swinburne MOOCs**

Swinburne University of Technology recently designed and delivered two interactive MOOCs: the Carpe Diem MOOC (CD MOOC) in 2014, and the Autism MOOC in 2015. The CD MOOC, based on the work of Gilly Salmon (2011, 2013), was designed to offer educators the opportunity to learn about the Carpe Diem learning design process through relevant, authentic and experiential academic development (Salmon, Gregory, Lokuge-Dona, & Ross, 2015). The CD MOOC was designed to enable participants to work in groups to learn about, and apply, the Carpe Diem learning design process. The Autism MOOC was designed for a different audience, aiming primarily for participants who are carers and supporters of people with Autism Spectrum Disorder, while it also included some participants diagnosed with Autism Spectrum Disorder. The Autism MOOC was designed to engage participants by offering resources and activities in which participants could share experiences and support each other.

Participants in both the CD MOOC and the Autism MOOC were allocated to groups in which they would interact. In the CD MOOC, with enrolments of 1,426, participants were randomly allocated into groups with 30 members. Each group had its own area in the discussion forum in Blackboard Coursesites, and was allocated one facilitator whose role was to provide pedagogical support and enable discussions (Salmon, Gregory, Lokuge Dona, & Ross, 2015; Lokuge, Salmon, Gregory, & Pechenkina, 2014). The Autism MOOC was designed for a bigger cohort, with 15,596 registering for the course and 11,297 actually commencing. The Autism MOOC was set up so that the participants allocated themselves to a group with its own discussion forum, with each group designed to accept a maximum of 300 members. The Autism MOOC also allocated group moderators, however their role was not designed to be as active as the CD MOOC facilitators, but was primarily focussed on ensuring there were no problems in any of the discussion forums.

The design for each MOOC focussed on engagement, and established structures and activities to enable high levels of interaction among participants in order to foster support and collaboration. The structure of each MOOC was designed around a key principle relevant to the topic. The CD MOOC structure built on concepts of scaffolded learning (Salmon, 2011) and activities designed for interaction (Salmon, 2002, 2013). Learnings from the CD MOOC were applied to the design of the Autism MOOC, and the concepts of scaffolding and interactive activities were also aligned with the Autism MOOC's focus on a "person first" (Tobin, 2011) approach to supporting people with Autism Spectrum Disorder. The experience of designing with the "person first" model in mind highlighted the need to be explicit about how we design for all users, and the importance of thinking of the participant first when designing and delivering MOOCs.

### **'Participant first' design principles**

The 'participant first' approach discussed in this paper considers design from the perspective of the participant, and highlights the key design principles for engaging participants and enabling them to work effectively with others to gain the most from their MOOC experience. The 'participant first' design principles draw on the existing knowledge within many disciplines, including multimedia (Mayer, 2009; Churchill, 2011), education (Conradie, 2014), and online learning (Brindley, Walti, & Blaschke, 2009).

The initial design question for both MOOCs considered what the participants were likely wanting to get out of the MOOC. We considered that participant expectations would include access to resources, opportunity for interactions with others interested in the topic, establishing connections with like-minded people, and exploration of issues and ideas. As designers, we hoped to accommodate different needs and expectations as much as possible. For example, in the CD MOOC we expected participants would want to learn about the Carpe Diem learning design process, and how to use it in practice. As a result, we provided resources, examples, tools and techniques, and opportunities to use these within the CD MOOC, to experience the learning design process as well as discuss it with others.

**Table 1: The proposed 'participant first' design principles for interactive MOOCs**

<b>Participant Perspective</b>	Consider your target participant group – a difficult task in MOOCs as participants can be very diverse. Consider how to introduce people to each other, the online environment and the material
<b>Accessibility</b>	Consider issues such as technical requirements and knowledge, technical assistance access for participants with disabilities, accessible language rather than technical jargon, etc
<b>Resources</b>	Consider types and availability of resources, and if they are easy to access, engaging, relevant and if they going to be openly available to people outside the course
<b>Task Value and Clarity</b>	Consider value and clarity of task if participants are asked to do something
<b>Information and Support</b>	Consider appropriateness, relevance and amount of information provided and the level of support provided
<b>Consistency</b>	Consider consistency of design, language, navigation
<b>Interaction</b>	Consider what level of interaction is desired in the groups, and what structures/activities/tools are in place to encourage interaction
<b>Purpose</b>	Consider clearly articulated purpose for the overall MOOC and for the component parts/activities
<b>Acknowledgement</b>	Consider how to provide acknowledgement of participant involvement
<b>Navigation</b>	Consider ease of navigation, including sign posting for resources and activities
<b>Tools</b>	Consider which tools will work best to enhance interaction, including discussion forums, social media tools, etc.

### Participant perspective

As in any design process it is imperative to consider the intended user. We were designing for different participants for the two Swinburne MOOCs – the CD MOOC was aimed at educators interested in learning design, and the Autism MOOC was aimed at carers and supporters of people diagnosed with Autism Spectrum Disorder. Whilst many of the design principles discussed apply to both, we did assume that most educators would have some experience of Learning Management Systems and be confident in working in the MOOC environment. We did not assume any level of technical experience for the participants in the Autism MOOC, so we developed additional resources to assist in navigation and understanding requirements. In both MOOCs, we wanted to establish a sense of community and trust early on, so the first activities were designed in line with the 5 stage model (Salmon, 2011) to provide a comfortable forum in which participants could get to know each other, and explore the learning environment, before focussing on the key content material.

The completion rates for both MOOCs were 23 to 24%, compared with a common MOOC completion rate of 10 to 13%. Nevertheless, whilst our completion rates were higher than many MOOCs, it was still a significant drop out rate.

**Table 2: MOOC engagement summary**

<b>MOOC engagement summary</b>	<b>CD MOOC</b>	<b>Autism MOOC</b>
Number of registrants	1,426	15,670
Registrants who started the course	71.6%	72.0%

Participants accessing MOOC in the last week of the course	23 %	24 %
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### Accessibility

The CD MOOC and Autism MOOC environments were designed to enable any participants unfamiliar with online learning, and/or with any difficulties in using the technology, to find it accessible. We referred to the World Wide Web Consortium (W3C) accessibility guidelines (<http://www.w3.org/standards/>) and also conformed to Swinburne web style guides. For example, we developed a short video resource that explained how to best access all the resources in the MOOC; we used simple, everyday language and avoided technical and educational jargon; and we created a range of resources to cater for different learning styles, including videos, audio and print materials. All print material was made available as word documents to enable higher accessibility. We also created transcripts for all videos and captions for the Autism MOOC videos. In designing the content pages we ensured plenty of white space and visuals to break the page and make it more appealing to read. In the CD MOOC, where we conducted synchronous webinars, we considered the impact of geography, as we had participants from around the world. Consequently, we ran the synchronous sessions twice a week in two different time zones, as well as providing recordings of all sessions for those who could not attend.

### Resources

Yuan and Powell (2013) suggest that most participants who join MOOCs look for resources, therefore, providing resources that can be easily accessed and that present relevant information is particularly important. In the CD MOOC, all resources (videos, booklets, guidelines) were offered as Open Educational Resources (OERs) and could be downloaded and re-used by participants. The Autism MOOC resources were made available as OERs through Swinburne Commons at the conclusion of the MOOC.

Video resources appear to be particularly popular as evidenced by the number of views of videos in both MOOCs. The CD MOOC had a weekly video to introduce each week's topic, and the Autism MOOC had an introductory video each week, including the Orientation Week (Week 0), and approximately two to three videos presenting additional information and ideas.

**Table 3: Video resource usage: CD and Autism MOOCs**

Resources	CD MOOC		Autism MOOC	
	Viewed	Downloaded	Viewed	Downloaded
Week 0			27,908	236
Week 1	1,217	31	29,345	622
Week 2	2,225	108	15,022	388
Week 3	1,204	36	11,031	329
Week 4	513	21	7,511	249
Week 5	244	11	5,309	163
Week 6	220	22	2,934	93
Additional videos	1,552	65	5,841	446
Total views	7,175	294	104,901	2,526

### Task Value and Clarity

The activities within both the CD MOOC and the Autism MOOC were designed to provide opportunities for social interaction, recognising the value of discussion focussed on real life issues (Marra, Jonassen, Palmer, & Luft, 2014), and to motivate participants to assist each other to solve the issues raised. The MOOCs aimed to engage participants by providing resources along with opportunities to share experiences and develop knowledge and skills. A

key focus was on designing tasks that were clear and engaging to encourage people to participate and thereby set up the condition for valuable interaction – a core element of an interactive MOOC. With both MOOCs, we based the design of tasks on the e-tivity structure (Salmon, 2002, 2013) to make the tasks as clear as possible, and facilitate interaction and discussion to enhance the value of the task for participants.

### **Information and Support**

The coherence effect suggested by Mayer (2009) suggests that participants learn more deeply when extraneous material is excluded rather than included, so only necessary information should be presented. In designing our MOOCs, we focussed closely on the specific information required for participants to learn about the topic. Within the CD MOOC, information and links to resources were normally contained within the structure of the group activities, and were specific to the purpose of that activity, with the exception of introductory videos. We developed a different structure for the Autism MOOC, where the resources were provided separately to the activities, as they were not specifically linked to the activity tasks and therefore could be read and/or viewed separately. The Autism MOOC structure did add an additional step in navigation, however, as it enabled participants to easily re-visit the resources at any time. For example, in the Autism MOOC there was an introductory video for each week, as well as videos of people talking about their experience and/or strategies, and these could be viewed before moving to the activities.

We provided several support mechanisms for MOOC participants, specifically a generic email address for enquiries and support that was open throughout the MOOC, including weekends; an FAQ section with help guides and answers to commonly known issues; and help discussion forums that were monitored by technologists to support MOOC participants with technical issues. We found it particularly important to provide support to participants in the first two weeks of the course whilst they became used to the MOOC environment and learnt how to navigate the MOOC Learning Management System effectively.

### **Consistency**

A consistent “look and feel”, and particularly consistency of language, was an important aspect of our design as we wanted to establish an environment that participants could easily navigate. This consistency means that as participants progress through the course, they become comfortable in that environment, knowing what they can expect in terms of structure, navigation, tools and language (Churchill, 2011), thereby leaving them free to focus on content and participation (Mayer, 2009). Consistency was also built into the design of the MOOCs by sequencing content with clear sign posts and symbols. For example, in the Autism MOOC we used jigsaw pieces to represent each week and demonstrate progress through the MOOC, and in the CD MOOC we used the e-tivity structure to provide a consistent layout for the activities and location of resources. Consistency of language is particularly important, and our experience demonstrated the importance of checking carefully to ensure that language and instructions presented in one week were aligned and replicated in later weeks to avoid confusion.

### **Interaction**

The CD MOOC and the Autism MOOC were both designed with interaction in mind. We established a group structure with group sizes of up to 30 members in the CD MOOC, and up to 300 in the Autism MOOC. The activities within the groups were designed to encourage social learning (Conradie, 2014) and allow participants to provide support to each other and assist with solving issues or developing knowledge.

The CD MOOC was designed for participants to discuss tasks in their small groups, as well as providing a community area in which they could interact with all members of the MOOC. This appeared to work effectively as participants worked on tasks within their small groups, but also accessed the larger group. It was particularly beneficial in the case where small groups had high attrition rates and became too small, as the remaining members could interact with the broader MOOC community. The Autism MOOC groups were designed to be much larger (up to 300) due to the higher enrolment numbers. Despite anticipated attrition rates, the groups of 300

were expected to remain large enough to provide participants with a large community to interact with. Given this, a decision was made that an additional MOOC community forum was not needed. One of the difficulties of these large groups was the number of posts in the first two weeks. It possible that some participants may have withdrawn due to difficulty in navigating so many posts. The ideal group size within a MOOC is still unknown, mainly due to dynamic participation and enrolment/withdrawal patterns. The types of MOOC participants mentioned by Hill (2013) make identifying a suitable number of members for groups even more complex. It is interesting to note that there were more posts in the smaller groups in the CD MOOC, raising the question of whether the smaller groups encouraged greater interaction or whether there were differences in the type of participant. Table 4 shows of the number of discussion posts in the CD MOOC and the Autism MOOC.

**Table 4: Number of Discussion Posts: CD and Autism MOOCs**

MOOC Name	Discussion posts	Number of participants	Average posts per participant
CD MOOC	10,791	1,029	10.4
Autism MOOC	42,011	12,467	3.4

### **Purpose**

As with any learning experience, clarity of purpose and learning activities are important in MOOCs. For the CD MOOC and the Autism MOOC, their overall purpose of the MOOC was decided in advance and clearly stated to potential participants. The purpose of each week – the stages in the Carpe Diem learning design process and the steps in the “person first” approach to Autism – was clearly written with details of the aims of the week. The activities, again based on the e-tivity structure (Salmon, 2002, 2013), also had a clearly stated purpose for each activity so that participants understood the value of the tasks.

### **Acknowledgement and reinforcement**

An interesting finding in the research conducted on the CD MOOC was the expectation by participants that the MOOC facilitators would be actively involved (Salmon et al., 2015), thereby highlighting the value of acknowledgement and recognition of participation. This is not easy in a MOOC environment given the large participant numbers, however it guided our view that at least a ‘light touch’ facilitation would be important in the Autism MOOC. Whilst regular facilitation may assist in acknowledgement and reinforcement, other tools are also available, including badging. In the CD MOOC, badging was used very effectively, with participants commenting that the badges added to their overall motivation to complete the MOOC (Lokuge-Dona, Gregory, Salmon, & Pechenkina, 2014; Salmon et al., 2015).

### **Navigation**

As discussed previously in this paper, ease of navigation is important to enable participants to easily find and access resources and activities, and interact with others in the MOOC. We used the concepts of signalling and sign posting (Mayer, 2009) to improve navigation and accessibility. In the CD MOOC, we included a link to each activity to indicate how to navigate to other sections of the MOOC, and we used regular announcements to guide participants. The Autism MOOC design was kept very clean, with only two key areas for participants to access – the content section and the activities section. This kept navigation to a minimum and allowed participants to access resources and discussion forums very easily. One of the lessons learnt from the Carpe Diem MOOC was that introducing additional tools required additional navigation requirements that confused participants, so in the Autism MOOC we decided not to use additional tools and to keep navigation as simple as possible.

### **Tools**

There are many tools available to facilitate interaction in online environments, however in our design we kept to the principle that ‘less is more’ and aimed to use key tools that would achieve our purpose without confusing participants. As both MOOCs were run through an open Learning



Management System, the primary tool used for interaction was the discussion forum. In addition, we used Blackboard Collaborate (virtual classroom) in the CD MOOC for synchronous discussions. In both the CD MOOC and the Autism MOOC, Facebook and Twitter streams were also active, providing a social media presence for participants who already used and liked these tools. Interestingly, participants within the CD MOOC requested Google + as an additional tool for effectively sharing materials, so whilst we were actively designing for simplicity, participants also had their preferred tools for sharing and interacting.

## Discussion and Conclusion

The design principles discussed demonstrate some of the elements for consideration when developing MOOCs where interaction and collaboration is a key focus. The CD MOOC and the Autism MOOC had very different enrolment numbers, hence different group sizes were established (30 and 300 respectively). An interesting issue for future MOOCs is finding a group size that can accommodate significant drop out without groups becoming too small to be viable, but not so large that it is overwhelming in the beginning. The completion rates for the CD MOOC and the Autism MOOC were very similar, however the number of posts per person was much higher in the CD MOOC. Whilst smaller groups in the CD MOOC offered greater opportunity for dialogue, some groups became so small that the remaining participants had less opportunity to collaborate with others. In the larger groups in the Autism MOOC, the number of posts in the first few weeks may have overwhelmed some participants, and may also have reduced opportunity for meaningful discussion leading to the lower overall posts.

Designing to ensure the experience is valuable for all participants – whether they complete the MOOC or not – is clearly important, and requires consideration of many of the elements discussed in this paper. We suggest that support through guides and resources, and access to email for technical support, is important particularly for participants who are unfamiliar with the learning tools and techniques used in MOOCs. Accessibility, clarity of task and structure, ease of navigation, and effective use of purposeful tools and resources improves the user experience, and enables participants to focus on the content and the interaction rather than struggling with the environment.

The experience of designing two different MOOCs, with the intent of facilitating as much interaction as possible between participants, has highlighted the importance of careful consideration in applying design principles. In particular, we suggest that taking a 'participant first' approach focuses the attention of MOOC designers on the needs, aspirations and attributes of the intended MOOC participants, and may help in increasing the completion rate within MOOCs and particularly enable participants to interact with ease.

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