Design Based Research Approaches Towards Enhancing Social Learning Practices in MOOC Platforms

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Abstract: The MOOC context challenges social learning theory to perform at scale, and in an informal setting, but platforms may not have functionality which affords this. This study examines an intervention engineered into the social learning environment intended to increase this performance: The Comment Discovery Tool. Results from the initial iteration of this tool suggest positive impact, but further work is suggested to iterate in line with the stigmergic design paradigm.

Introduction

MOOCs are online courses which typically a thousand or more learners will enrol. Kizilcec et al. demonstrates that contribution in forums is strongly linked with 'completing' learners. and suggests that platform designers features promoting pro-social behaviour (Kizilcec, Piech, & Schneider, 2013). Other studies (e.g. Brinton et al., 2014) conclude that discussion features are not fit for purpose.

Tubman, Oztok, & Benachour (2016), discovered that conversations in the FutureLearn MOOC platform consistently decrease dramatically after the first reply, regardless of course size or subject matter suggesting that sociomaterial factors (i.e. the actual interactions afforded by the platform) are important.

Another design paradigm for social e-learning environments is based on the principle of 'stigmergy', or "communication through signs left in the environment" (Dron, 2006; Elliott, 2016).

This paper understands social learning in a MOOC context as a collection of miscellaneous conversations that together make up the learning space and focusses specifically on the material 'affordances' which mediate these interactions. MOOCs by their nature do not have the privilege of high tutor to student ratios, so it is important that platforms are developed with peer supported, self-directed learning at their heart.

Theoretical framework

Laurillard's 'conversational framework' builds on Vygotskian ideas that learning is emergent through the interactions between tutors, learners, and peers. It is through structured conversations and guided practice that conceptions and misconceptions emerge (Laurillard, 2002).

In smaller group activities there is greater potential for consensus about the shared objects of inquiry, which creates a fertile space for learning through participation. Lapadat (2006) argues that written participation achieves good learning experiences, however positive outcomes only occur when expectations are set in terms of the quality and quantity of contribution.

The MOOC scaffolds a 'networked individualism' (Castells, 2001). Participants must discover conversations which interest them through their mediated interactions of the online environment.

The challenge for platform designers, therefore, is to create an environment where learners are able to co-ordinate social participation in such a way as to avoid the pitfalls of densely packed, noisy discussion areas, and allow for collaborative activity within the system as a whole to be emergent, accessible, and scalable, in line with the 'stigmergic' design paradigm.

We have designed a tool which affords new interactions and propose to use a design based research approach to appraise it. We propose a taxonomy of 'conversation types' based on unique participants in a conversation, a social dimension based on turn taking and also the length attribute of a conversation to measure the efficacy of our intervention. These act as a proxy for diversity and collaboration which is important in a sociocultural analysis.

Chua et al. propose a taxonomy of comments based on the affordances of the FutureLearn platform. Each comment on the platform can only be one of 5 categories (initial, lone, first reply, further reply, initiator reply) (Chua, Tagg, Sharples, & Rienties, 2017). Our research extends these categories onto the whole conversation and breaks the initiator replies into 'first' and 'further', in order to place focus on 'going further' in a conversation. There are only 9 possible types of conversation according to the material affordances of the platform, but we suggest simplifying this into 4 broad categories to identify conversation with a greater potential for collaborative activity, and to act as a heuristic measure for the efficacy of the intervention (Lone, Q&A (1

post > 1 reply), Limited Social (initiator returns but nothing 'further'), Extended Social (anything with further replies).

The length attribute represents how likely the conversation is to have evidence of collaborative activity. It is hypothesised that a proportion of 'Lone' posts do not receive replies because they become lost.

This paper analyses the first iteration of a platform design intervention: an interactive 'word cloud' called 'Comment Discovery Tool' (CDT). The tool functions by visualising all the comments into a 'word cloud'. The comments are listed in full at the bottom of the cloud, and a link to each comment is presented, so learners then have the ability to contribute to that conversation.

Results

10,515 conversations were analysed. An ANOVA analysis showed that the unique learners variable was significant, $F(1, 10513)=116.47$, $p=0.00$, and also that the conversation length variable was significant, $F(1, 10513)=87.82$, $p=0.00$. Cohen's d scores were also calculated for a measurement of impact, and generated a score of 0.21 for unique learners, 0.18 for conversation length. This suggests the CDT has had a modest impact in its first iteration. The breakdowns of conversations by type demonstrate that the run with the CDT has a larger proportion of the heuristic groupings associated with higher levels of social constructivist learning: extended social conversation, conversations with more members, and fewer lone conversations. It can be tentatively concluded that the CDT is creating a modest increase in social interactions and contributions.

Discussion

The intervention does appear to have an impact on the social dimensions of the course. It is important to note that data should be collected from more MOOCs before concluding that the platform intervention has consistent impact across the board.

Some users suggested that some words in the CDT were not very meaningful, so didn't add value to the activity. An interesting development in MOOC pedagogy could be to encourage learners to hashtag their comments and generate a smaller corpus of themed words. It is hypothesised that learners would feel a greater sense of ownership over the MOOC if they had the means to enrich these datasets and visualisations.

Conclusion

The challenges for social learning online are not new, but they are 'flipped' in the MOOC context. In MOOCs, the challenge is to 'train' contributions so the buds of collaboration do not shade each other out, and that they are openly visible to all learners. We believe that visualising participation into meaningful and interactive units, according to learner preference, something new can be added to the pedagogy of scale.

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