MOOCs and peer interaction

Steve Draper, Glasgow University

http://www.psy.gla.ac.uk/~steve/talks/mooc1.html

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Part A: Introduction: MOOC quality depends on peer interaction

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Why have a course at all?

Why do a course at all, rather than publishing a web page or book? (apart from adding an exam and certificate)

After all, a book or software contains the considered SM (subject matter) expertise of the chief teacher, and their expertise at teaching, and at creating exercises.
AND it allows self-paced learning (huge advantage: why print is much better than audio recordings)
AND it allows flexible asynchronous learning.

There are, broadly, only two answers:

- Personal interaction with a subject matter expert (teacher)
- Personal interaction with peers (fellow students)

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Can't be the teacher

The point of MOOCs, at least for management, is teaching gigantic numbers of students at once.

If this means hiring gigantic quantities of GTAs or other teaching staff, the value goes away.

So learning quality in MOOCs is probably going to depend mostly on the quality of peer interaction.

(In what follows I discuss "peer interaction" only as kinds of rational discussion. In reality, people are also affected by being part of a group (mob), picking up emotions and purpose, rather than conceptual information.)

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If peer interaction then what preconditions? (1)

Access to peer learners

One dimension governing this is the gradient of expertise:
Expert (SME), senior student / mentor, peer (fellow learner), inferior more ignorant learner.

These afford different qualities of interaction.

Since teaching someone else is about the most powerful mathemagenic (learning-producing) activity that is known, the supply of junior students to teach is a valuable resource which most courses fail to provide.

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If peer interaction then what preconditions? (2)

A synchronous cohort of learners
A second dimension governing this is whether the course has a cohort structure or a dojo structure.

Conventional courses have a cohort structure: all the learners start at the same time and are periodically "resynchronised" by deadlines e.g. at tutorials, exams, etc. even though typically they have flexibility over learning time in between.

Julie Clow's course (at Google) notably had a cohort structure and a weekly synchronous small group event. Not only providing peer interaction, but resynchronising learners who had separate different full time jobs (perhaps on different continents).

In contrast, a postgrad course at a nameless university had no cohort structure: "flexible learning" meant each student started at any time. Consequently there could be no useful peer interaction on that course since learners would have no topic in common at any time.

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If peer interaction then what preconditions? (2b)

Another even older course structure is that of the dojo.
The class may be scheduled regularly e.g. weekly (or daily);
but students start at any time and indeed may not attend all the time.
The curriculum is typically spiral (or circular): a set number of topics will be rotated through, and students get progressively more expert with each lesson in each topic.
At any given session there is a considerable spectrum of expertise; and learning from senior students and teaching junior students is the main experience.
One main reason underlying this design is that you cannot practise a martial art, or scuba diving training without a willing partner who must be physically co-present.

Dojo structured courses (cont.)

This violates the cohort-structure.
But has the built-in advantage of both peer interaction and learning by teaching.
Could it apply to HE subjects?

Surgical training: "See one, do one, teach one".

Perhaps fluent speaking to an audience; particularly reactive speaking (true debates, not prepared monologues that have no dependence on others' speeches).

Would this be a novel but worthwhile new MOOC structure?
Learners turn up (connect) at a set time each week / day, and are paired off on the spot, with someone of different knowledge of the day's topic, for practice overseen (?) by the master.

Part B: Jigsaw designs, and scaling up numbers

Jigsaw and scaling up

Jigsaw is a learning design originally created by Aronson for school classes.

The fundamental difference between a Jigsaw design and conventional teaching is that the learners, not the teacher, function as subject matter experts and the source of knowledge.

The fundamental difference between Jigsaw and other methods of group work is that each learner is a member of two different, cross-cutting, groups:

- A *jigsaw* group for reciprocal teaching and
- An *expert group* for preparing the teaching they must do themselves.

When numbers get huge, a design conflict emerges...

Jigsaw with 5,000

If you prioritise original authoring (of student-generated content), so that all students are involved in novel creation, then this content can only be used by a fraction of the class.
The interesting issue may then be that of social networking and whether news of the most interesting content spreads across the whole class.

If you prioritise real, interactive cross-tutoring and learning by students then different groups will create materials on the same topic with limited potential to converge on one best set. So their pride in doing original work will be somewhat less; but the whole class gets the same topics.

In both cases, each student personally does some teaching and some learning.

See: http://www.psy.gla.ac.uk/~steve/localed/jigsawpresent.html

Why bring up Jigsaw here?

One reason is a general research heuristic, which MOOCs motivate: to ask of every proposed learning design: what would this be like with huge numbers? (or with tiny numbers?). With Jigsaw, this brought out issues that had been hidden.
(This heuristic is related to Bloom's 1984 paper; and to Chi08's investigation of watching videos of 1:3 tutorials. Both papers reason about cost and learners-teacher ratios.)

The other reason: Jigsaw is a particularly strong form of peer interaction, and embodies the "learn by teaching" principle.
It does take a bit more admin. than other groupwork, so embracing it might require some group allocation tools to be created.
(It is easy to randomly allocate each student to one group. It is not so easy to allocate them to two different group types s.t. no two members of one group also share another, and so that between them they maximise second-order contact with other groups to get some report-back benefits, ...)

Part C:
Video Games

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Video Games (1)

Some people, including my PhD student Matt Barr, have a profound conviction that education and VGs are deeply related. Here is what I've made of this, for current purposes.

Video Games (VGs) are big business (e.g. a current BBC estimate is that $12,000,000 are spent every 90 mins worldwide on VGs).
That is convincing evidence that they are motivating, somehow.

Most VGs are about learning: players set themselves big learning objectives, and when all are achieved, tend to move to another game. This is the intrinsically motivated learning which HE teachers seldom see, but wish they did.

Video Games (2)

So we could say: VGs are the real MOOCs: huge amounts of learning are done from and about VGs, with distributed (and non-cohort-structured) learner populations.

The scale is bigger than any other MOOC so far.

And we know it is learning: no-one knows a new game before they get hold of it.
And the amazing thing is:

1) What they learn isn't academic knowledge, but mostly made-up fictional knowledge for an imaginary world.

2) The game is designed to make this learning hard: the information the player needs is NOT delivered when it is wanted.

Video Games (3)

Could any of this be relevant to traditional HE learning content?

There are two opposite senses of "gamification".

The trite sense is imposing surface game features on to traditional material and pedagogy e.g. leader boards, flashing lights instead of gold stars....

The deep sense is Jonathan Baldwin's (and Kapp's?): take the deep pedagogical features of successful VGs and apply them to a course that looks conventional on the surface. (Baldwin has done this on at least one HE course.)

Video Games (4): my own mad idea

Be that as it may.

The essence seems to me to be immediately converting all learning into behaviour (with feedback, though often opaque "you have failed" feedback).
You have to turn any declarative learning into behaviour, which has immediate effects and so feedback. Have to show the learner they are learning at each step.
(If you like, you can call this neo-neo-behaviourism, but that's what we would have to do. Not for theory reasons, but to get the rewards and so motivation of VGs.)

How could this be possible with a subject (e.g. psychology, history, philosophy, political science, management training) that is:

a) Focussed on declarative not procedural knowledge?
b) Essay-based. ?

The answer for face to face "teaching"

[I've trialled this once.]

Divide students into groups of 3.
Each group gets a list of topics they probably know a bit about.
And a handout giving rough guidance on the kind of feedback.
Cycle (say 6 times in 50 mins.):
- Group picks (randomly more or less) a topic.
- Each takes 2 mins to prepare a 1-min talk on that topic
- In turn,
  - Each gives their 1-min talk
  - Gets immediate feedback from the other 2 (prompt sheet for this) on how "like a psychologist" it sounds, how professional
- Then group discussion on what they each now think is best and worst point on how to do this

Clear enthusiasm and rapt-ness.

How to do this in MOOCs?

The previous slide outlined a F2F peer exercise which has near-instant feedback from peers, and a very short "exercise" (a 1min. talk) compared to the normal coursework essays.

I'm assuming we need human judgement in the target disciplines to give learners feedback; and the exercise does this using peers. It is using a form of Reciprocal Peer Critiquing (RPC).

Could we do this in MOOCs? If so, it might have the deep properties of VGs from a learning viewpoint. The challenge is the feedback turnround time:
VGs: ≈ 1 sec.
In that F2F exercise: ≈ 1 min. [60 secs]
In a typical Aropa RPC exercise: 1-10 weeks [0.5 Msecs (604,800 secs)]
I.e. > 10,000 times slower than the F2F case.

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Thurstone / APR (Pollitt, 2012)

A final note on providing rapid feedback from humans to learners.

Assessment by pairwise ranking (APR), has recently emerged as an alternative way of doing marking. Instead of reading one script and calculating a mark directly, the marker is presented (by software) with many pairs of scripts, and makes a single judgement each time of which is better. After a while, a scale is calculated for the whole set of scripts, and converted to marks (if a few "standard scripts" were in the mix). This showed advantages when trialled with professional markers.

The point is, its theoretical basis is that the psychological basis of our marking is hypothesised to be primitive pairwise ranking judgements. Could this be a way forward here? Certainly each judgement can be done quickly, and is computer mediated.

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Summary

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Summary of suggestions

Quality of the learning experience in MOOCs is likely to be largely dependent upon the quality of the peer interaction on the course.

A. Try a dojo structure for MOOCourses?
B. Use Jigsaw
   - Provide group allocation support tools
C. Can we do deep gamification: and capture that intrinsic learning motivation? Even for essay-based subjects?
D. Perhaps yes, if we can organise synchronous peer feedback.
   - Aropa but 10,000 times faster.

E. Lastly: don't forget Mazur type use of classroom voting systems with big (900) classes. A paper in Science showed how effective this was at deep learning. Synchronous peer interaction required; but not really co-presence. Smith et al. (2009)

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A place to stop

For the slides, handout etc. see:

http://www.psy.gla.ac.uk/~steve/talks/mooc1.html

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