Some ideas for researching MOOCs

FutureLearn event, Camden
26th September 2013
Rupert Wegerif with Phil Durant
Graduate School of Education,
University of Exeter

UNIVERSITY OF EXETER

Overview

- Aims?
- Theory
- From theory to methodology
- Inside view: online experience
- KWIC analysis, idea and example
- Machine learning, idea and example
- L2L2 Proposal

What are our aims?

- Evaluation of 'success' in terms of
  - a) content knowledge?
  - b) general transferable skills and competence such as 'learning to learn together' or L2L2?
- Understanding new teaching and learning models for the Internet Age?
  - Is something new happening?
  - How do we theorise this?
- Developing new pedagogies and tools?
  - Design Based Research developing new models?
  - Awareness tools to support peer learning?

Some background theory

Siemens is right that current educational theories are pre Internet Age and so we need a new model

- Global (no boundaries)
- Peer to peer learning in open 'communities'
- New kind of educational dialogue, not one on one, not small group, not transmission – something new

But connectivism is not the theory we need – educational learning is not reducible to 'making connections'.

Education (as opposed to training) requires consciousness, it is about expanding consciousness, increasing the degrees of freedom, inducting students into fuller participation in the collective thinking of larger dialogues.

Theory to method

- Learning happens in dialogues. Dialogues have an inside and an outside: electronic traces on the outside BUT the actual experience of new horizons opening up on the inside
- The promise of analysing ‘big data’ is seductive but we can’t just look at the outside of learning we need to look at the inside as well.
- We need to integrate the outside view provided by electronic traces of learning with the inside view of participants
- To give human meaning to the statistics and to be able to generalise from experience

Some inside view methods

- Skype/email/chat interviews based on purposive samples representing different groups eg those who do well and those who drop out.
- Key Event Stimulated Recall Interviews for understanding learning process – eg you added a key new idea at this point, where did it come from?
- Video or audio diaries of MOOC participant observers
- Spaces in the MOOCs for reflection on the experience of learning.
- Detailed Conversation Analysis of the co-construction of meaning online (eg Gery Stahl's work)

KWIC and collocation

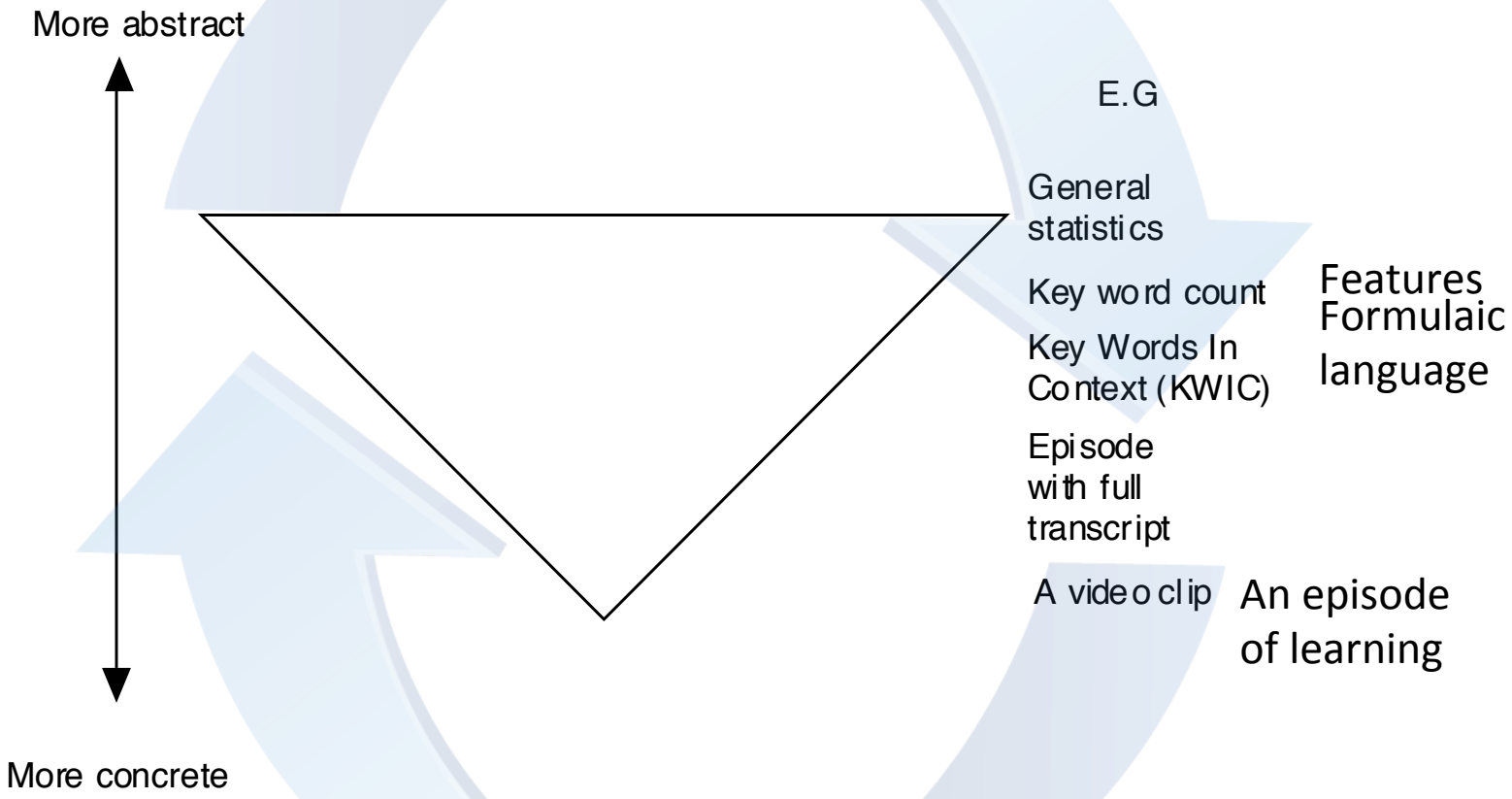
- Learning science is learning to talk science – the expert uses key words and phrases in an appropriate way and in an innovative way.
- We can follow the emergence and use of key words and phrases to show a trajectory of learning.
- Who originates this language use? How does it travel? What are the conditions for successful appropriation?
- Following from Rebecca Ferguson and Simon Buckingham Shum's work on Social Learning Analytics we could add analysis of the relationship between network position and density/type of formulaic language use including the creative use of formulaic language.

Steps for comparing data-sets linking inside and outside data

(eg successful and unsuccessful MOOCs and groups

1. an episode of interaction that seems to embody learning is selected and commented upon eg interactions leads one student to chang)e of view and appropriate use of formulaic language; (use inside data here if possible)
2. language features which seem significant in this episode are abstracted and all instances of the use of these features, in both sets of data are examined in their immediate linguistic context (we could apply machine learning here). For example, did focus example of break through follow chain of reasoning with logical connectors
3. the context of these features (eg chain of reasoning) in the one set of data is explored in more detail and compared to the context of the same linguistic features in the other set of data to see if these features really seem correlated with learning
4. If features deemed relevant to learning quantitative data compared eg how many chains of reasoning found in data set A as compared to B
5. Iterate steps above.
6. Result is a quantitative comparison of data sets rooted in qualitative experiences of learning (see diagram next ppt)

KWIC Method: Inter-relating different levels and types of data



Machine Learning eg

Wegerif, R., McLaren, B., Chamrada, M., Scheuer, O., Mansour, N., Miksatko, J. & Williams, M. (2010). Exploring creative thinking in graphically mediated synchronous dialogues. Computers and Education 54(3), 613-621. doi: DOI: 10.1016/j.compedu.2009.10.015

1. **critical thinking** with its focus on claims, counterclaims and reasons (D1)
2. **creative reasoning** understood as a sort of dance of perspectives (D2)
3. **dialogic engagement** which includes not only addressivity and expressions of empathy but also expressions of doubt, changes of mind, ventriloquation (the presence of another voice within an utterance) and elicitation of the views of others (D3).
4. **moderation** through encouragement and the scaffolding support of recapitulations, reformulations and evaluations (D4).

Machine test of creative widening

‘the DOCE (Detection Of Clusters by Example) algorithm is capable of finding examples of creative reasoning, given prior, annotated examples of such reasoning in earlier discussions. Therefore, the DOCE algorithm is a tool that either a researcher or a teacher can use to pinpoint and evaluate creative reasoning in the context of real e-discussions. This technique has the potential to inform moderators when creative thinking and critical reasoning is occurring in maps as well as when it is not occurring and it might be a good time to intervene with a stimulus or a challenge.’

Learning to Learn Together (L2L2): A key competence for success in MOOCs?

In the Metafora project we broke this down into four key aspect and many indicators

- Distributed leadership

- Mutual engagement (shared objects and material world provide a rich repertoire of referential anchors for mutual engagement and understanding)

- Peer assessment (One has to be disposed to learn, ready and willing to take learning opportunities, as well as able).

- Group reflection (Bakhtin's account of dialogue and the necessary role of the 'superaddressee' or witness position in dialogue.)

Participatory design research to improve machine learning of codes

1) Detect complex skills and competences in the data eg creativity, L2L2, resilience, constructive peer assessment etc and then feed back to users for them to rate the code and so refine it. OR, more bottom up:
2) Ask participants to research own learning and inform of times and conditions that work to stimulate new insights. Get machine learning to work on resultant 'cluster' examples.

Summary of ideas

- Track trajectory of learning and identity of individuals on MOOCs in terms of content expertise (formulaic language)
- Track development of interaction patterns and language use in groups to find 'learning to learn together'
- Use intuitive codes and machine learning to find 'Learning to Learn Together (L2L2)'
- End up with inside and outside views of successful MOOC learning to understand the learning process and 'mechanisms'
- Feedback to transform education system to focus more on teaching the skills required for successful MOOC learnings such as Learning to Learn Together

What do you think?

Some references and sources:

Siemens, **G**. (2004) **Connectivism**: A LearningTheory for the Digital Age (google it)

Wegerif, R. (2013) Dialogic: Education for the Internet Age. Routledge (see www.dialogiceducation.net)

Various methodology reports on www.argunaut.org and www.metafora-project.org

Ferguson, Rebecca and Buckingham Shum, Simon (2012). Social Learning Analytics: Five Approaches. In: 2nd International Conference on Learning Analytics & Knowledge, 29 Apr - 02 May 2012, Vancouver, British Columbia, Canada

Mercer, N., Littleton, K., & Wegerif, R. (2004) Methods for studying the processes of Interaction and collaborative activity in computer-based activities. *Technology,Pedagogy and Education, 13*(2), 195-212.

Wegerif, R., McLaren, B., Chamrada, M., Scheuer, O., Mansour, N., Miksatko, J. & Williams, M. (2010). Exploring creative thinking in graphically mediated synchronous dialogues. Computers and Education 54(3), 613-621. doi: DOI: 10.1016/j.compedu.2009.10.015

Wegerif, R., and N. Mercer. (1997) Using computer-based text analysis to integrate quantitative and qualitative methods in the investigation of collaborative learning. Language and Education, Vol. 11. (4): 271-287. ISSN: 0360-1315