Measuring cognitive activity in online comments

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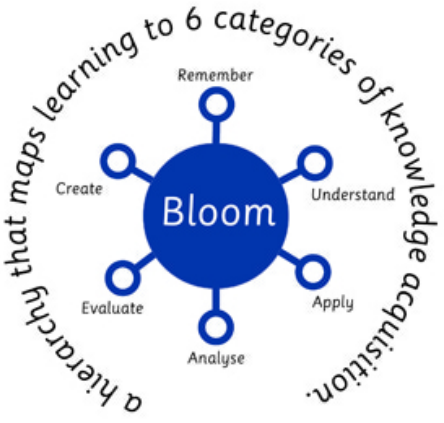
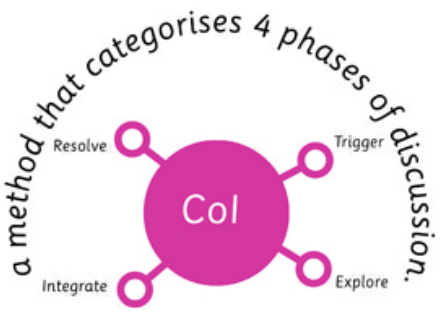
Motivation

Identifying and visualising 'attention to learning' supports feedback on learner progress[1], the development of collective intelligence[2], automation of metadata annotiation[3], and facilititates personalised learning[4]. In this study, participation in MOOC comment forums was evaluated using 4 different content analysis (CA) methods : the DiAL-e framework[5], Bloom's Taxonomy[6], Structure of Observed Learning Outcomes (SOLO)[7] and Community of Inquiry (CoI)[8]. Results indicate that different approaches to measuring cognitive activity are closely correlated and are distinct from typical interaction measures. This suggests that computational approaches to pedagogical analysis and visualisation of online comments may provide useful insights into learning processes.

Data and content analysis

A sample of 600 comments from 12 'steps' collected from a FutureLearn MOOC are analysed using 4 different content analysis methods.

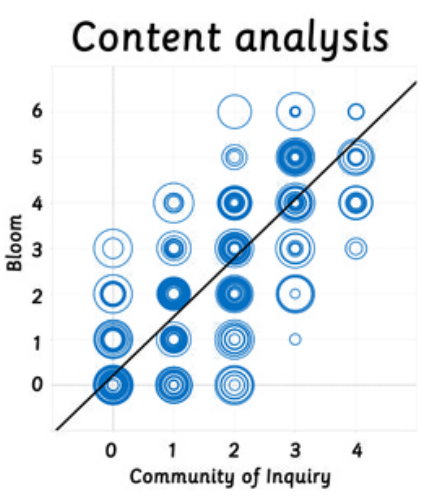




Comment semantic: words per sentence, sentiment and incidence of 'likes' are compared with content analysis methods.

Results

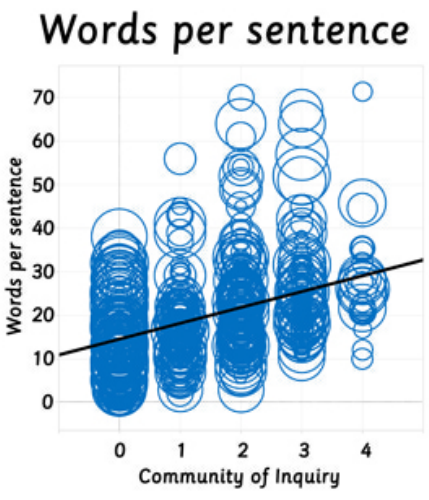
Content analysis



R= 0.83 p<0.001

Highly correlated, positive linear associations made between all CA methods (correlation between Bloom and CoI shown).

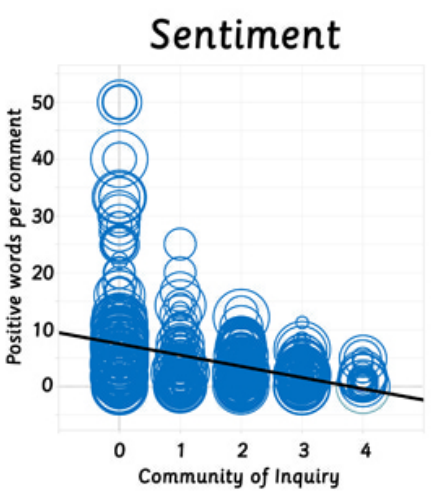
Words per sentence



R = 0.38, p<0.001

Positive linear associations between CA methods and wps suggest that these methods identify complex language use.

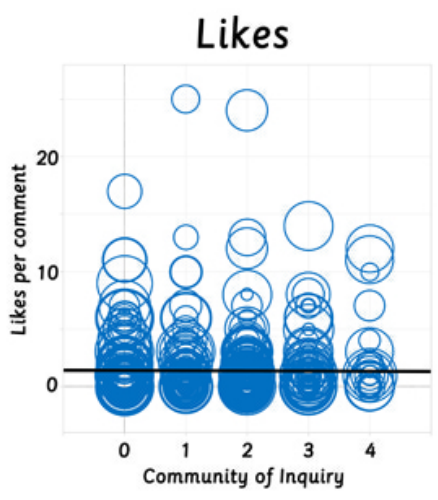
Sentiment



R = 0.32, p<0.001

Negative linear associations were made between all CA methods and positive word occurance (e.g. love, nice, sweet).

Likes



R = 0.0, p = 0.996

No statistically significant relationship between CA methods and 'likes' suggests ambiguious use of this feedback method.

References
1. Najar, Duval & Wolpers, 2006; 2. Shum, 2003, 3. Downes, 2004; 4. Beck & Woolf, 2000; 5. Burden & Atkinson, 6. Krathwohl, 2002; 7. Holmes, 2005; 8. Garrison, Anderson and Archer, 2001