Googling Physics: Social Media and Science Learning

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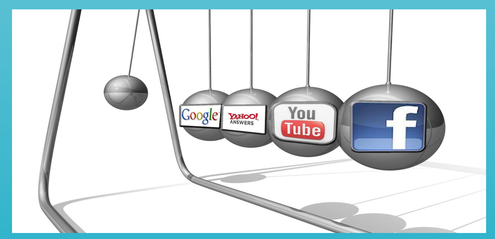
Introduction

This is the first phase of an international collaboration between Canada, Australia, and Sweden studying the implementation of social media in teaching and learning. The specific objective of this project was to explore students' and teachers' use of **social media** for learning **science**, employing a **complexity thinking** perspective on teaching and learning (Davis & Sumara, 2006).

New technologies, such as social media, have become ubiquitous, connecting learners to each other and information, and may be leading to a major shift in how knowledge is created, stored, and shared. Currently students are learning about technology from experience, not from education (boyd, 2010). Research has also shown that learners rarely take advantage of the collaborative and creative potential of Web 2.0 technologies and that the application of these technologies for learning are strongly influenced by teachers and instructors (e.g., Bennett, Maton, & Kervin, 2008).

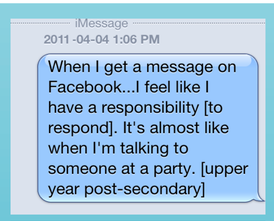


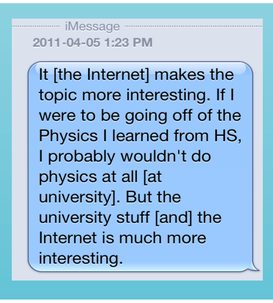
Research Question

What social media resources do secondary and post-secondary students draw upon as they learn physics? How and why?

Methodology: Phase 1

- Exploratory, interpretive, multiple case study design (Schwandt, 1998; Stake, 1995).
- 12 focus group interviews were held with 43 (28 male, 15 female) physics students:
  - 24 high school students (n=5 focus groups)
  - 12 1st yr university students (n=2)
  - 7 upper yr university students (n=3)
- Students were asked to describe their social media use as they worked on physics homework.
- Interviews were transcribed and analyzed using *Atlas Ti* for emergent themes.





Quotes from focus group interviews with upper year (above) and first year (right) university students.

Complexity Thinking

As a theoretical perspective in education, complexity thinking (Davis & Sumara, 2006) draws upon **characteristics of complex systems** - self-organizing systems that exhibit intelligent behaviours without a centralized controller (e.g., ant colonies, crowds) - to both **understand and prompt learning.**

With this perspective the interactive potential of social media was interpreted to provide "unprecedented opportunities and affordances for emergent learning" (Williams, Karousou, & Mackness, 2011, Knowledge Ecologies, para. 4).

Results

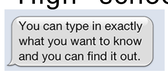
The main findings were:

- Students frequently used social media, particularly Facebook, videos, and online forums such as Answers.com, to support their physics learning but not in creative and collaborative ways (See Table 1).

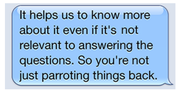
Technology	Code Frequency
Facebook	54
Videos (i.e., Youtube)	38
Online Forums (i.e., Yahoo Answers)	34
Google	27
Wikipedia	15
Bookmarking	7
Skype	6

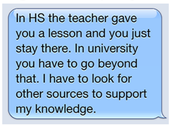
Table 1: Code frequencies to indicate social media tools that students used most frequently.

- Students used social media in similar ways to how they would interact with their friends at school or on campus.
- High school and university students used social media differently. High school students seek 'the right answer'.



- University students were more likely to want to deepen their understanding of a physics concept.





- Students enjoyed the ability to personalize their learning and adapted social media tools for this purpose.
- Physics instructors were also not using social media in Web 2.0 ways.

Conclusions

The main conclusions of the first phase of this project were that secondary and post secondary students, and their teachers were using social media, but not in ways that significantly improved the in-school or out-of-school learning environment. Both students and teachers need support to enhance the ways that social media are used for science learning. Complexity thinking can offer recommendations for strategies to manage emergent learning such as allowing for positive feedback loops and establishing enabling constraints.

Phase 2: Survey Instrument

Future phases of this project include:

- Focus groups with teachers to look for coherences between teacher and student responses.
- Development of a survey instrument (available in draft so far) to survey 1st yr university physics students in Sweden, Australia, and Canada on their use of social media for science learning.
- Identification of case studies of social media rich physics learning contexts for further study. [phase 3]

References

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Learning and the Brain: Web Connected Minds, Arlington, VA, May, 2012.