
Learning Innovation at Scale

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Abstract

The rapid developments in online education raise new issues for the future of learning and universities, practical questions about what counts as good design, and new opportunities for research. This workshop brings together practitioners, learning platform innovators, and researchers who draw on a multi-disciplinary range of theory and methodology. We will share insights about the current state and next directions for research and practice in online learning and technology.

Author Keywords

Online learning; online education; MOOCs; massive open online courses; learning technologies

ACM Classification Keywords

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The Potential & Challenge of Online Learning

The disruptive power of the Internet may be poised to change the traditional channels through which people learn and are educated [6]. There has been a tremendous proliferation of platforms, products and educational resources through the recent emergence of platforms for higher education Massive Open Online Courses (MOOCs), Khan Academy for K-12, and a rise in e-learning for the workforce and use of the Internet

for informal learning. This could reduce educational barriers concerning accessibility, scale, and synchronicity, potentially disaggregating typical higher education experiences. But while 2013 was hailed as the “year of the MOOC”, education has been disappointed in the past by promises of “revolutionary technology” that produced quite modest benefits.

Leveraging existing Research & Practice

As recently outlined [5], people have been learning online before the emergence of MOOCs and insights can be gleaned from work on distance learning. More generally, innovation in measuring and improving online learning may be accelerated by bringing to bear theories, methodologies, and practices from disciplines that study learning and education, such as the cognitive [1, 8] and learning sciences [3, 7], and the design of interactive technologies, such as HCI [6, 4].

Goals of the Workshop

Given that research and practice on designing online education is in a rapid state of change, now is a critical moment to foster knowledge sharing and lines of communication: between practitioners, platform innovators, and interdisciplinary researchers from HCI, education, and the cognitive and learning sciences.

The workshop presentations, discussion and website/wiki (www.chionlinelearning.com) will be organized to exchange key knowledge, such as the practical challenges and research affordances of current platforms, relevant scientific discoveries about learning, and useful methodologies for investigating how people learn, and how learning technologies can be improved.

This workshop will foster communication and collaboration between platform innovators and interdisciplinary researchers. Participants will share and learn insights for mutually advancing practical innovations and scientific knowledge about online learning.

Topics could include broadening participation, peer and social learning, feedback and reward structure, alternative formats, richer interactivity, machine learning, and motivation. Here are examples of themes and questions workshop presenters could tackle.

1. New Research on Online Education

The novelty of online learning at scale has naturally driven a research focus on how technologies are being used, as well as their novel affordances for interaction and learning. These are two examples of questions in this spirit:

How are people interacting with MOOCs? How is learning measured? What factors predict learning?

What are new kinds of interaction & education supported by online learning technologies?

2. HCI Research on Online Education

The arrival of large-scale data and varied usage of online educational resources also raises important HCI questions. These might concern how to design interfaces that maximize people’s learning from online video and exercises, which instructional features are easily used to perform educational tasks like review and synthesis, and what kinds of interactions and internal mental processing lead to the construction of knowledge about a topic that endures and is used in relevant future situations. For example:

What are new HCI questions that arise in online learning environments?

How might an HCI perspective on design, theory and methodology guide work on online learning?

3. Practical Resource Development & Improvement

While it is to be expected that many interesting research directions in a new field may not have immediate applications, research on basic questions that simultaneously identifies practical improvements can be more readily supported by platform developers. To foster such mutually beneficial work:

What should researchers know about the contents, dynamics, and technical affordances of a platform? What are the data schemata, and which data are available? Which components of a platform are malleable -- technically easy to change or A/B test?

What are priorities in terms of practical goals and challenges, and how might researchers' involvement in the development process help in tackling these?

How can researchers be productively involved in the platform & resource development process?

4. Applying Scientific Research on Learning

One relatively untapped resource for practical improvements to learning interfaces is to engage researchers who can help apply the largest and most robust practical findings from decades of cognitive and learning sciences research [1, 3, 5, 8]. These include topics like collaborative learning (e.g., [7]), intelligent

tutoring systems (e.g., [3]), multimedia learning (e.g. [1]), and other established lines of research [8].

How can applying known theories and findings from the cognitive and learning sciences improve practical outcomes? E.g. In measuring learning, increasing motivation, designing effective learning technologies.

5. Advancing the Science of Learning

In addition, online learning resources can provide a new context for cognitive and learning sciences researchers to extend ongoing investigations of learning and education [9]. Digital online resources support randomized experiments and automatic data collection, and allow researchers to interact with diverse learners at a large scale.

In turn, the expertise of the thousands of members of these communities can begin to be leveraged to produce scientific insights and practical improvements to online learning that can be iteratively implemented and provided to learners. Such interdisciplinary online education research avoids reinventing the wheel, instead going beyond previous work by combining different quantitative and qualitative methodologies, as well as sharing the administrative and grant resources that currently support such learning research.

How can ongoing research on learning be conducted (and extended) using online learning environments?

What are promising research topics at the intersection of cognitive science & education research with HCI & online learning?

In what ways is learning online and learning "offline" similar, and in what ways different?

What novel opportunities does online learning provide for simultaneously conducting research and improving practice?

Workshop Activities & Resources

The website/wiki www.chionlinelearning.com will support digital knowledge sharing and collaborative discussion between workshop participants before, during, and after the workshop.

Workshop participants (& others in the CHI community interested in online learning) will be added to a mailing list/discussion group on the website. Each participant will contribute 3 to 5 key references/resources from their area or discipline of expertise to crowdsource an online bibliography. Papers will be posted on the website in advance, slides uploaded dynamically, and notes & ongoing discussion will be captured in shared Google Documents by scribes & participants. www.chionlinelearning.com will therefore remain as an enduring digital resource (with the potential to evolve).

The wrap-up of the workshop will consider interest in future directions for broadening participation in work on online learning. These could include future CHI SIGs, Communities, focused panels & workshops on selected topics, a workshop report in the SIGCHI Bulletin or ACM Interactions, or a journal special issue.

The challenge of developing excellent online education and understanding people's interactions with these learning technologies is a substantial one, with far-reaching practical impact. This problem of designing

effective online learning technologies is likely to require productive bridges between research and practice, and the interdisciplinary blend of design, computational, and behavioral science that is a core strength of CHI.

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