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HCI and the Educational Technology Revolution

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ABSTRACT
While educational technology has a long pedigree, the last few years have seen dramatic changes. These have included the rise and institutionalisation of MOOCs, and other web-based initiatives such as Kahn Academy and Peer-to-Peer University (P2PU). Classrooms have also been transformed with growing use of mobile devices and forms of flipped classroom; and educational progress and engagement has been increasingly measured leading to institutional and individual learning analytics. This workshop seeks to understand the interaction of these issues with human–computer interaction in a number of ways. First to ask what HCI has to contribute to these in terms of the design of authoring and learning platforms, and the wider socio-political implications of increasingly metric-driven governance? Second to discuss how will these changes affect HCI education? Together practice-based and theoretical approaches will help us build a clear understanding of the current state and future challenges for educational technology and HCI.

CCS Concepts
Applied Computing – *education*; **Human-Centered Computing** – *human–computer interaction*, *interaction design*

Keywords: HCI, Education, peer learning, MOOCs, learning analytics, open education, OER, flip classroom

1. INTRODUCTION
While educational technology has a long pedigree, the last few years have seen quite dramatic changes: including MOOCs, learning analytics and flipped class teaching. What has HCI to contribute to these in terms of the design of authoring and learning platforms, and the wider socio-political implications of increasingly metric-driven governance? How will these changes affect HCI education?

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In recent years we have seen the rise of MOOCs, first as 'disruptive' and, arguably, democratising forces in higher education and their movement into more established large scale platforms such as edX, Coursera and FutureLearn. Similar technology that enabled MOOCS had already given rise to more ground-up initiatives such as Peer-to-Peer University (P2PU) and Kahn Academy. Increasing costs of education have given new life to alternative forms of delivery and open educational resources.

In the classroom, lecture capture, first seen in early research initiatives such as Classroom2000 (eClass), has become ubiquitous and the commodification of audio-visual technology together with widespread availability of open educational resources has enabled new styles of teaching including flipped classroom. Some schools and universities are going 'digital only', basing their courses on eTextbooks and even having book-free libraries.

Data collected from digital media use, VLE engagement and online testing is being increasingly used to enable institutional and individual learning analytics allowing warnings to be raised potentially to help failing students, but also leading to an increasing metrics-driven environment.

The position papers accepted for this workshop address a number of HCI issues related to these recent changes and challenges in educational technology, including both those using HCI to study or design educational systems and those using novel educational methods to teach HCI.

2. BACKGROUND
Educational technology research and practice date back many years, including a long history of intelligent tutoring systems, more constructive learning approaches such as Seymour Papert's seminal work dating back to the late 1960s [14, 15], and lecture capture such as Classroom2000 (eClass) [1]. This has often overlapped with areas of human–computer interaction and related fields such as Ubicomp, for example, the Ambient Wood [16].

However, despite the many promises of technology, the reality, certainly in higher education, has often been more mundane: VLEs and the occasional clicker technology.

In the last few years, there have been a number of developments that have dramatically changed this educational landscape, many of which are mentioned in the call for participation above:

- *MOOCs* – Technologically assisted distance learning has existed for many years and institutions such as Open University have been widening educational participation

since the 1970s. However, MOOCs and related endeavours such as Kahn Academy and Peer-to-Peer university have both increased the volume of this effort and its public profile. While MOOCs may be over-hyped [9, 10], it is clear they have changed perceptions of education and starting to become a normal part of university activities [12].

- *reuse and open education* – Related to the above, there has been both a grass roots and governmental push towards the creation and use of Open Educational Resources [13]. While not always 'open', there has also been a convergence of simpler ways to share resources, such TinCan API / xAPI [18] potentially replacing more complex, albeit more expressive, forms of learning objects [11, 17]
- *flipped classroom* – Again, while forms of blended learning are not new, the ubiquity of the internet and cheap audio-visual technology have enabled growth (and hype!) in various forms of flipped classroom/learning [8,7]
- *learning analytics* – Unprecedented amounts of data are available about students learning and assessment. Combined with 'big data' techniques, this has led to large-scale adoption of learning analytics [3]. At best this may help identify potentially failing students, such as in Purdue's Signals system with 'traffic lights' style feedback for students on progress in each module [2]. However, the growing use of learning analytics also raises issues of surveillance and privacy for both students and teachers. Furthermore, it is not clear how academics can best deal with the massive volume of data they are expected to process [6].

These new developments raise several related challenges for HCI:

(i) What are the interaction challenges connected with the creation, delivery and use of these technologies? For example: Do we understand enough about the academic life or student life to know how these technologies fit with face-to-face university instruction?

(ii) How do we visualise complex analytics in ways that motivate students? Can motivational techniques inform the design and facilitate the adoption of these solutions?

(iii) What are the wider societal implications of this, and how can HCI influence this? For example, positive effects in reaching marginal groups, or negative effects excluding those without access to expensive technology.

(iv) What are the implications of these technologies for teaching HCI? For example, one of the workshop organisers taught a HCI MOOC and then used the videos from this as part of flipped class teaching [5].

Often those teaching HCI using novel methods also use this as a way to understand that technology, linking (iv) with (i) and (ii). Also efforts to democratise digital creation (e.g. end-user programming or UK's recent inclusion of programming in the core primary curriculum) would also mean that user interface knowledge needs to be more widespread, linking (iii) and (iv).

We hope that the workshop will offer not only some answers to these questions, but also, and perhaps more important, identify key open research questions setting an agenda for on-going work.

3. PREVIOUS RELATED WORKSHOPS

Dix and Gabrielli were two of the organisers of an Interact 2005 workshop "Learning and Human-Computer Interaction" (Rome) and Dix was co-Chair of HCI Educators 2007 (Aveiro, Portugal).

There have also been a number of more recent workshops organised by others, for example, the CHI 2014 workshop, "Developing a Living Curriculum to Support Global HCI Education" and the (invitation only) 2013 HCI Education Luncheon related to the ACM SIGCHI "2011-2014 Education Project" [4].

This workshop is part of HCI Educators (http://hcied.org), a long-standing aperiodic conference/workshop series, sometimes held as standalone events, sometimes as workshops attached to other HCI conferences. It is held most often in the UK, but has also previously run in Ballina/Killaloe Ireland; Aveiro, Portugal and Rome, Italy.

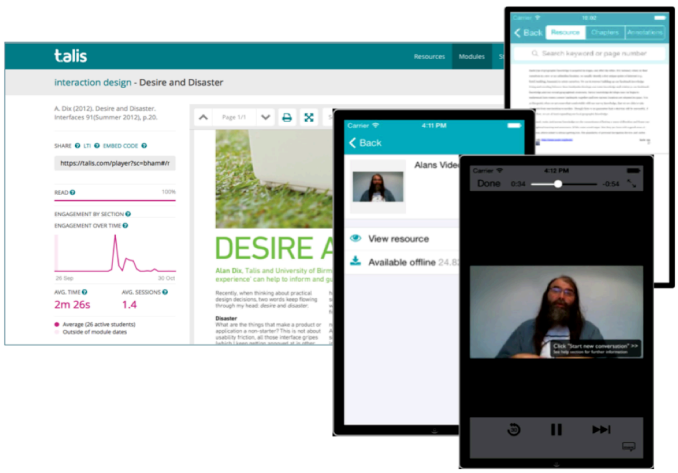

Figure 1. HCI MOOC material used in flip class teaching.

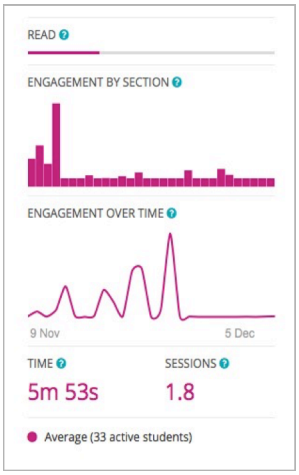

Figure 2. Document learning analytics.

4. SUBMISSION ABSTRACTS

Classroom Habit(us): Digital Learning Tools In a Blended Learning Program

Valeria Borsotti and Emilie Møllenbach
IT University of Copenhagen, Denmark

In this exploratory case study we map the educational practice of teachers and students in a professional master of Interaction Design. Through a grounded analysis of the context we describe and reflect on: 1) the use of digital learning tools in a blended learning environment, 2) co-presence as an educational parameter. We use the concept of habitus (Bourdieu, 1977) to engage with the empirical context, and we adopt the Reggio Emilia perspective of viewing space, both physical and social, as the third teacher (Edwards et al, 1998). This investigation has led to insights into the existing practice of educators and students, as well as the identification of emerging themes for future research.

Connecting: the semantic HCI textbook and cross-institutional learning analytics

Alan Dix
Talis, UK and University of Birmingham, UK

Open education materials related to the author's HCI textbook were released in 2013 as a MOOC, published on interaction-design.org, and used for flipped classroom teaching. Work is in progress to link these free open educational resources including substantial video and quizzes (some tutor-only) together with the (paid-for but open-to-all) book, to create a 'semantic textbook'. The author is also interested in the way learning-analytics can be used to create actionable insights, at the appropriate time for the academic. Bringing these together offers the potential for analytics using rich relationships across different educators and institutions use of the same material.

Flipping HCI

Dr Chris Evans
University College London (UCL), United Kingdom

This paper presents the results of two studies involving "flipping the classroom". Teaching material was delivered via interactive "e-lectures", allowing face-to-face sessions to focus instead on practice. The e-lectures were designed according to standard usability principles coupled with recent research into the effect of interactivity on learning. The effectiveness of the use of e-lectures was then evaluated using an online survey. The results suggest that students prefer the flexibility offered by e-lectures compared to conventional lectures. The results contribute to our understanding of how this technology fits with face-to-face teaching in the digital age.

Empowering HCI Students to Better Manage their Learning Process through a Flipped Classroom Experience

Silvia Gabrielli
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This position paper presents observations from a flipped classroom experience of teaching an HCI bachelor course at the University of Trento (Italy) in Fall 2015. Students were provided with conventional lectures, digital learning materials in Moodle, and a collaborative prototyping platform for supporting project work over the 2-months course duration. Overall, students highly appreciated the flexibility of having access to a combination of digital and conventional teaching resources. However, we observed a rather slow adoption of the remote collaboration features offered by the prototyping platform during the project work. This shows students' initial reluctance and lack of familiarity with using asynchronous communication-collaboration tools for better managing their group work and learning in blended education programs.

A Human-centred Tangible approach to learning Computational Thinking skills

Alessio Malizia and Tommaso Turchi
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Computational Thinking has recently become a focus of many teaching and research domains; it encapsulates those thinking skills integral to solving complex problems using a computer, thus being widely applicable in our society. It is influencing research across many disciplines and also coming into the limelight of education, mostly thanks to public initiatives such as the Hour of Code. In this paper we present our arguments for promoting Computational Thinking in education through the Human-centred paradigm of Tangible End-User Programming, namely by exploiting objects whose interactions with the physical environment are mapped to digital actions performed on the system.

The Importance of Emotional Design to Create Engaging Digital HCI Learning Experiences

Denise McEvoy[1] and Benjamin R. Cowan[2]
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This paper explores the theory of applying emotional design via Technology Enhanced Learning (TEL) tools within an educational environment for positive student engagement. It aims to explore how emotionally designed interface can engage the learner on a positive level. The past decade has seen major advancements in technology acceptance; the current generation of learners are technology active within the stream of virtual communication (social networking, texting, messaging etc.) but fail to transfer these skills into an academic environment when learning. This paper explores how emotional design can be used to improve the learning experience for digitally engaged students.

Creating Educational Technology Curricula for Advanced Studies in Learning Technology

Minoru Nakayama
Tokyo Institute of Technology, Japan

Curriculum design and content are key factors in the area of human resource development. To examine the possibility of using a collaboration of HCI and Educational Technology to develop innovative improvements to the education system, the curricula of these two areas of study were lexically analyzed and compared. As a further example, the curriculum of a joint course in HCI and ET was also lexically analysed and the contents were examined. These analyses can be used as references in the development of human resources for use in advanced learning environments.

HCI challenges in Dance Education

Katerina El Raheb, Vivi Katifori and Yannis Ionnidis
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Dance learning is by nature multimodal, while dance practice presents a wide diversity across genres and contexts. Choreography and artistic contemporary dance performances have been using interactive technologies to support their creative process for several decades. Nevertheless the use of interactive technologies to support dance learning and education is still relatively immature and raises many challenges and interesting questions when it comes to choosing the appropriate human computer interaction methods. In this paper, we present the characteristics of dance teaching and learning in relation to interactive technology and we highlight the points/feedback that

dance, as a field of mastering expressive movement, can bring to the design of whole-body interaction experiences.

Understanding persuasive technologies to improve completion rates in MOOCs

Adriana Wilde
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Advances in computing technologies are revolutionising education. Specifically, advances in Human-Computer Interaction facilitate a conceptual shift from traditional face-to-face instruction towards a computer-mediated paradigm, which is increasingly student-centric. Massive Open Online Course (MOOC) providers can now predict and facilitate student success using learning analytics on the large amount of data they hold about their learners. More than ever before, key information about successful student behaviour and context can be discovered and used in digital interventions. This is a complex issue, which is receiving increasing attention amongst MOOCs providers as it can reduce attrition rates. This position paper discusses the relevant challenges in the use of learning analytics to support persuasive technologies in MOOCs and suggests that the development of dashboards may be key in improving completion rates.

5. FURTHER INFORMATION

Full position papers for all of the above and other outcomes from the workshop can be found at the workshop website:

http://alandix.com/hcied2016/

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