Video for Active Learning and Teaching (VALT)

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Abstract

Video-based learning has promised a quality education for everybody. However, research on online education has flagged several challenges of video as an instructional medium. Low student engagement, high in-video dropouts, and the lack of prompt feedback are attributed to the uni-directional nature of video that puts students in a passive role as viewers. In video learning environments, promoting active learning requires a technical augmentation of video for capturing student input, offering rich feedback, and mediating interactions between learners and educators. In CHI, and its peripheral venues including CSCW, UIST, and Learning@Scale, significant attention has been dedicated to this core topic, but a unifying research agenda as a field of research is missing. This workshop aims to define a research roadmap for Video for Active Learning and Teaching (VALT). This one-day, multi-disciplinary event will bring together researchers, practitioners, and educators to collaboratively explore multiple aspects of VALT, such as novel learning systems, data analytics, instructional designs, and learning theories. A series of activities, including keynote speeches, panel discussions, and poster/demo presentations, will facilitate the cross-pollination of new ideas and the generative exploration of multi-disciplinary approaches. The outcomes will be increased awareness among attendees, new research ideas, and a driving agenda for future collaboration.

Author Keywords
Video-based learning; video interface; active learning; online learning; MOOC; flipped classroom

Background
Video-Based Learning (VBL) has been steadily gaining interest within and beyond the CHI community in recent years due to the rise of new forms of education, such as Massive Open Online Courses (MOOCs) and flipped, hybrid, and blended classrooms, which use pervasive online video technology [12]. Nevertheless, the effectiveness of student learning with instructional video content has been disputed, especially in the context of higher education [1]. MOOC studies show more than 50% in-video dropouts [8] even though videos are perceived as an attractive teaching medium. Evidently, more work needs to be done to improve the effectiveness of video in learning and teaching.

There are numerous challenges within VBL that are inherent to the current way video works. Videos are unidirectional, promoting one-way interactions between viewers and content, which may be well suited for instructor-to-student lectures, but less conducive for other types of interactions, such as student-to-student and student-to-instructor exchanges, as well as personalizing content. Furthermore, analytic tools and methods that can contribute to understanding the content of video has yet to be fully developed.

VBL research is taking advantage of different perspectives of learning with video on several fronts. On the design side, questions around accommodating active interactions with video has led to new, but still experimental, video-viewing systems that alter the general conception of video as a linear, and passive medium (e.g. collaborative annotation [4], or highlighting [5]). On the analysis side, the massive amount of user data that is now available to system designers and content producers is being probed to make sense of viewers' interactions with video and with their peers, in relation to collective understandings, affective responses, and engagement with content [8, 10]. Such interaction data provides one approach to evaluate how video viewing systems can be designed to structure video content and viewing behaviours with regards to pedagogical goals of particular VBL experiences, as well as to inform theories of education.

For this workshop, we invite individuals working in the multidisciplinary field of VBL to join us in exploring the current challenges and the potential solutions of designing effective video-based learning experiences that engage students through interactive content and user interfaces. Relevant research topics include, but are not limited to: new education-oriented video interaction for instructors and learners, crowdsourcing video learning, natural language processing for video learning content, computer vision for video analysis, learner analytics, instructor tools and dashboards, pedagogy and video, assessment strategies and active learning uses of 3D video, augmented/virtual reality, and information interaction and retrieval.

Our interest for organizing this workshop stems from our work at the University of British Columbia developing and evaluating a video player platform in partnership with Microsoft that focuses heavily on student interactions within a video player. In our own work, we have benefited greatly from discussions with a variety of researchers and practitioners to help design, create, evaluate, and analyze video for education. Thus, we want to organize this workshop to help foster this development for other like minded researchers at CHI.

This workshop will benefit the CHI community in three important ways. *Firstly*, the workshop brings together the

growing number of researchers working on the human-computer interaction aspects associated with video based learning. We plan to distribute the call-for-participation to researchers from computer science, psychology, education, information studies, design, and other fields that share a common desire to improve video-based learning tools and approaches. *Secondly*, the workshop itself will use active engagement to analyze, contrast, design, and evaluate new tools and techniques as part of a road map for VBL to become a helpful approach in active learning scenarios. And *thirdly*, through this meeting, we intend to publish a special issue paper reviewing how we can shift the role video may play in teaching and learning and the affordances needed to make this happen. The findings elicited during the workshop will be of use to industries, such as MOOC providers, instruction designers, and education technology companies.

Structure of Workshop

This one day workshop will be comprised of 4 keynote speeches, poster presentations, demos and a design activity. We will invite up to 50 participants from academia, industry, and the public sector.

The workshop will begin with keynote speeches to establish underlying themes of the workshop as an inspiration for further discussion. Each keynote speech will last about 20 minutes including questions and answers. After the keynote speeches, there will be a panel discussion with the speakers to draw up an agenda for ongoing VBL research based on the individual deliverables. After that, to increase peer awareness among the attendees, we will have a Two-Minute-Madness session where each attendee introduces their research interests and plans. What follows are poster and demo sessions. This 45 minute session will be a free-for-all discussion where everyone can walk around to get to know each other and have time to talk in detail about their work. In the afternoon, we will break into groups for the design activities around each of the four topic areas we have defined as mentioned above. It is worth noting that the topics are flexible and subject to fine-tuning based on results of the previous discussions. After the design exercises, we will reconvene for each group to cover their topic area. We will have a panel session to bring ideas together followed by a general synthesis session before concluding the workshop with next steps.

Workshop Schedule
The workshop structure is detailed as follows:

- **9:00 - 9:15 (15 minutes) - Welcome**

  The workshop organizers will introduce the workshop agenda, as well as the goals to accomplish during the workshop.

- **9:15 - 10:00 (45 minutes) - Keynotes + Q&A**

  - Brian Dorn (University of Nebraska at Omaha) (confirmed)
  - Juho Kim (KAIST) (confirmed)

- **10:00 - 10:30 (30 minutes) - Break**

- **10:30 - 11:15 (45 minutes) - Keynotes + Q&A**

  - Wendy Mackay (University of Paris-Sud) (confirmed)
  - Judy Kay (University of Sydney) (tentative)
  - Philip Guo (University of California, San Diego) (tentative)

- **11:15 - 11:45 (30 minutes) - Two-Minute-Madness**

Participants in the workshop will give two minute presentations related to Video Based Learning and Teaching.

- **11:45 - 12:30 (45 minutes) - Poster/Demo Session**

  Participants who submitted a poster or demonstration will be given time to present their work.

- **12:30 - 13:30 (1 hour) - Lunch Break in room**

- **13:30 - 15:30 (2 hours) - Activity**

  - *13:30 - 13:45 (15 minutes)- Goals/Format*
    The activity's outcome, as well as its agenda will be given by the organizers.
  - *13:45 - 14:45 (1 hour) - Group Discussion*
    Participants will break out into small groups to compare and contrast different methodologies to teach using video. In this activity, participants will be given examples of video, interfaces for video watching, as well as existing tools that are already being used in the field.
  - *14:45 - 15:30 (45 minutes) - Report Comments*
    Participants will volunteer the results of their discussion and provide take-away messages about the use of video in teaching and learning.

- **15:30 - 16:30 (1 hour) - Panel**

  Together with a panel of the keynote speakers will discuss the outcomes, thoughts, and issues brought up by the activity.

- **16:30 - 17:00 (30 minutes) - Closing/Next Steps**

  The workshop will conclude with a group discussion about the outcomes of the day, summarizing the take-away opportunities for research in the topic of using video in teaching.

Keynote Speakers

We recruited 5 renowned field experts who have strong expertise in the VBL research (3 confirmed, 2 tentative, detailed in the Keynote Speakers section of the Workshop Schedule). In the recruiting process, we made sure to include a diverse set of expertises, approaches, seniority, and backgrounds. The intention was to provide our attendees with a wide coverage of distinct discussion topics.

Brian Dorn: Brian created a strong thread of research in promoting interactive video-based learning for flipped classrooms. His group built and deployed a series of innovative web-based systems designed to foster rich online collaboration between students and instructors. With fresh insights on video watching patterns, student-to-instructor interactions and peer collaboration behaviours [3, 4], Brian's projects have had significant impact on HCI and online learning communities. In this workshop, these topics will lead to an in-depth discussion on the dynamics between video-based social learning, system affordances, and instructional supports.

Philip Guo: Philip's research is at the crossroads of human-computer interaction, online learning, and computing education. In 2014, Philip published one of the earliest sets of studies on large-scale video-watching behavior in Massive Open Online Courses. He is also the creator of Python Tutor (http://pythontutor.com/), a code visualization and collaborative learning platform that has been used by over 3.5 million people in over 180 countries to visualize over 30 million pieces of code. Philip's website http://pgbovine.net/ contains over 400 articles, educational videos, and podcast episodes, which gets over 750,000 page views per year. In this workshop, his insight will attract keen attention from practitioners who aspire to promote student engagement in video learning.

Judy Kay: As an accomplished researcher in the areas of personalization, teaching, and learning, Judy has always been pushing the boundaries of using personalized computing to support people in learning and collaboration. Her creation of the Personis user modelling framework [7] has been a distinctive foundation for building personalized learning systems. Her interface projects and research for Open Learner Models [2] and Cruiser Natural User Interaction have provided useful and creative ways for long-term learning and collaborative learning. With extensive experience and insight on personalized computing and novel interfaces, Judy will be able to share her unique perspectives on online education systems and the increasingly large data generated by online video learners with workshop attendees.

Juho Kim: Juho's research focuses on building interactive technology to enable more interactive, collaborative, and data-driven learning. His frustration with existing video interfaces is that they are not designed to support learning, with limited interactivity and lack of information about learners' engagement and content. Juho takes a data-driven approach to addressing this challenge, using large-scale learning interaction data to dynamically improve video content and interfaces [6, 9]. Specifically, his research has introduced learnersourcing, a form of crowdsourcing in which learners collectively contribute novel content for future learners while engaging in a meaningful learning experience themselves.

Wendy Mackay: Wendy brings a wealth of insight from her vast array of pioneering HCI research including deep experience with understanding how people learn, live, and work with technology. Her ground breaking work from her time at DEC lead, to the first commercial interactive video system (IVIS) as well as a pre-Hypercard multimedia authoring language and over 30 other multimedia software products in the 1980s. Video technology has evolved since then and some of her insights about how the technology has advanced sufficiently to support some of the forward looking interaction paradigms, which she has been working on for over 30 years [11] will provide workshop attendees with an excellent starting point in re-thinking the role of video in education.

Organizers

The organizers of the workshop are a combination of well known researchers in the fields of human-computer interaction, learning analytics, and computer-supported cooperative work, and graduate students working under their supervision. The multidisciplinary backgrounds that the organizers bring to the workshop offers perspectives that may encourage lively debate and establish connections across fields; as one of the objectives of the workshop is to foster new and existing research relationships across practitioners and academics from education, information science, computer science, and engineering, among others, who are working towards the creation of innovative systems for online learning, especially those that use video.

Sidney Fels (PhD, University of Toronto) is a Distinguished University Scholar at UBC. He is internationally known for his work in human-computer interaction, bio-mechanical modeling, neural networks, new interfaces for musical expression and interactive arts. He is currently leading the video for learning project at UBC in partnership with Microsoft Development Center in Vancouver.

Ido Roll (PhD, Carnegie Mellon University) is the Director of the Institute for Scholarship of Teaching and Learning, the Senior Manager for Research and Evaluation in the Center for Teaching, Learning, and Technology, and an adjunct fac-

ulty in the Information School at UBC. His work focuses on supporting the development of sense-making and critical-thinking skills using adaptive technologies.

Dongwook Yoon (PhD, Cornell University) is an Assistant Professor at the Department of Computer Science, UBC. He focuses on building rich collaboration systems that offer expressive interactions through multiple communication channels (e.g., speech, gesture, and grasp). Dongwook deploys and evaluates high-fidelity systems in real world contexts (e.g., classrooms), from which we can obtain ecologically valid user data.

Negar M. Harandi (PhD, University of British Columbia) is a Teaching and Learning Fellow at UBC. Her work looks into effective learning technologies for large classrooms, primarily in Electrical and Computer Engineering.

Matthew Fong (University of British Columbia) is a PhD student in the Electrical and Computer Engineering Department at the UBC. His research explores the behaviours of students using educational video interfaces in and out of the classroom.

Samuel Dodson (University of British Columbia) is a PhD student at the iSchool at the University of British Columbia. He investigates the effects of shared audio, text, and video annotations on learning processes and outcomes.

Min Li (University of British Columbia) is a masters student in the Electrical and Computer Engineering Department at UBC. Her research focus on the design and evaluation of user-created libraries of video play-lists.

Pre-Workshop Plans

Before the workshop, the organizers and workshop committee members will actively advertise and recruit participants. This component includes strategically contacting leading members of the video learning and teaching community and posting to relevant email listings. The materials of the workshop will also be posted on the workshop website, including a reading list. We plan to release the website as soon as the workshop decisions have been made. The website will include an introduction to VALT, the call for papers, and the names of the organizers, and workshop committee. We also plan to begin a public document of interactive video systems as a type of living review of the literature.

Workshop Website

We have put a starting website with information about the workshop, including instructions for submissions at research.hct.ece.ubc.ca/videolearning. Further information about the schedule, keynote speakers, and a 15-20 member program committee will also be made available on this website as we receive confirmation from our invitations.

Post-Workshop Plans

Following the workshop, we plan to create and maintain a repository of projects and systems designed for interactive video learning. This allows researchers to review the latest work in the field. In addition, we plan to archive the workshop papers in a freely accessible online resource, possibly in the CEUR Workshop Proceedings. We anticipate writing a special interests paper on the emerging areas within the field.

In summary, the specific post-workshop goals for VALT are:

- develop a research agenda for the different streams of video learning to work towards a common goal;
- collaborate on developing promising technological and pedagogical innovations identified during the workshop;

- refine guidelines for future video learning content and systems for active learning based on the workshop discussions;
- prepare a co-authored special interest paper from the workshop;
- provide an online forum for ongoing discussion and networking; and
- provide a growing resource repository for those working in the field and those interested in participating in it.

Call for Participation

We invite position papers for the CHI 2018 Workshop on Video for Active Learning and Teaching (VALT). This one-day workshop offers an interdisciplinary forum for those interested in interactive systems for video based learning. The workshop aims to encourage discussion of the potential research directions, survey state-of-the-art systems, and build community around this important research area. Five leading scholars will present keynote talks and participate in a panel discussion on the future of interactive video systems for education. Furthermore, all participants will engage in a design activity exploring the ways in which advancements can be made in at least four streams including, interface design, data analytics and learner-based crowdsourcing, social aspects of online learning, and education theory.

We welcome submission of 3-4 page position papers in the CHI Extended Abstracts Format (excluding references). Position papers may include preliminary reports of research, proposals for new work, demos of innovated systems, or follow a more traditional position paper format. All papers will be single blind peer reviewed by members of the program committee and assessed for their relevance to the workshop and their likelihood to encourage sharing of ideas and a lively discussion. At least one author of each accepted paper must attend the workshop in Montréal on Sunday, April 22, 2018 and all participants must register for both the workshop and for at least one day of the conference.

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