Live Media Places: Participation in Online Education through Composition

William Hamilton

Interface Ecology Lab | Texas A&M University

College Station, TX 77843 USA

bill@ecologylab.net

Abstract

Live streaming is an emerging form of social media, which affords sharing and participating in rich experiences. Through these experiences, live streams often serve as places supporting the formation of online communities. Meanwhile, MOOCs are rapidly expanding the scope and reach of online learning. However they struggle to engage students in participatory learning experiences. In this work, I propose an environment that supports the composition of live media to create places that foster expression and participation in online communities and education.

Author Keywords

Live media; composition; participation; MOOCs

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Research Situation

I am a sixth year computer science PhD student. My advisor is Dr. Andruid Kerne. I am currently writing my dissertation proposal and expect to defend it during the Fall 2015 semester. I plan to graduate in December 2017. The timing of the consortium fits well in my dissertation research schedule, as it is early enough that feedback from consortium mentors and peers could have a significant impact on the proposed work.

Context and Motivation

My research develops and evaluates new techniques for enabling new forms of participation through live media in online communities, in particular within contexts of online education. Live streaming is an emerging form of social media, which is fostering unique participatory online experiences. Participation is critical within the context of communities and is a basis for the *sense of community* shared among members [6]. Furthermore, Lave and Wenger argue that *legitimate peripheral participation* is the basis for effective social learning [7]. However, while massive open online courses (MOOCs) have expanded the reach and scale of online education, their employed modalities struggle to

engender participatory learning experiences and the formation of learning communities. This research works to transform online communities and learning through the design of live media places, which afford new opportunities to participate in live experiences.

Background and Preliminary Work

Harrison and Dourish, in their analysis of the role of "space" and "place" in collaborative systems, describe how media spaces are made into *places* by communities in order to accommodate activity and express the values of members [3]. They explain that different media have different spatial properties, and that their conscious arrangement based on these properties leads to the design of places [3].

In our recent investigation of the video game streaming site Twitch, we found that, together, live video and text chat sometimes function as online places supporting the formation of online participatory communities [2]. Live video affords the sharing of rich visual experiences, while text affords audience participation. We also draw from research on i*nformation composition*, a new medium that affords expression and ideation through the visual and spatial assemblage of rich media elements [4]. This research synthesizes our understandings of live media and information composition to enable participants to compose live media places that afford new opportunities for expression and participation.

Recently, Kulkarni et al. have explored how Google Hangouts can support small group discussion within the context of MOOC courses. They found that live media experiences helped students connect across geographic and cultural boundaries [5] and perform better on course assignments [1]. An objective of this research is to support expressive and participatory live media experiences beyond Google Hangouts.

Research Objectives and Questions

Our *long-term research objective* is to support participation in online communities through the design of live media spaces and experiences. The *objective of this proposal* is to engage in iterative design and evaluation of a live media composition environment, situated in contexts of online learning communities. The *principle research question* is how to enable participants to create live media places through the composition of live media. We hypothesize that a space that affords composition of a diverse set of live media forms will enable participants to construct live media places that support learning community activities. We plan to pursue these research objectives through the design and development of a live media composition space, which will be iteratively deployed and evaluated within a MOOC context.

Live Media Composition Environment

We will connect live streaming and information composition to create an environment that effectively supports broadcasting, communicating about, contributing to, and composing live media experiences. The tool will incorporate diverse live media forms. By supporting the composition of these media together, our goal is to help participants create online places, in which they can effectively express ideas and engage in community activities. We envision composition of live media as a new media form that will afford unique experiences and opportunities for participation.
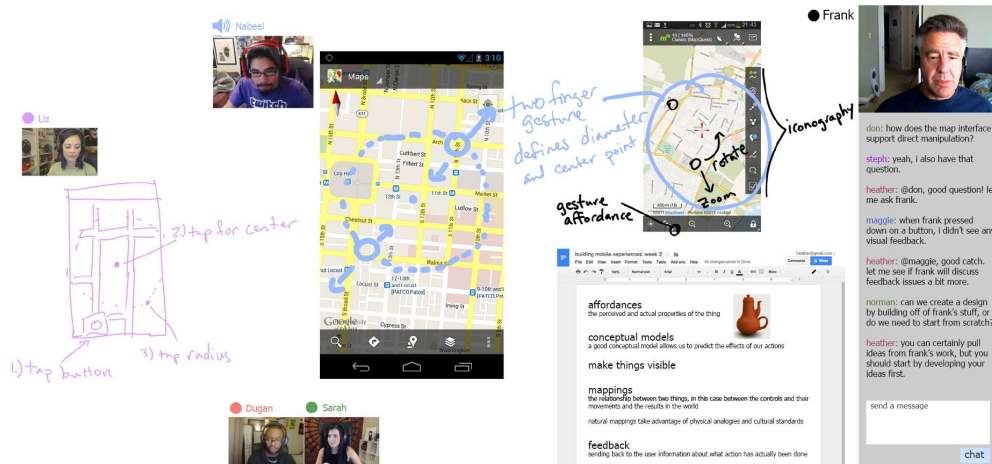
Figure 1: Mockup illustrates live media composition serving as a place to support a small group engaging in a learning exercise around mobile interface design. Participants collaboratively engage in and compose the experience through live video, chat, sketch, and rich clippings.

Live Media Composition

The proposed environment will provide a canvas in which to compose live media forms. Composition is a strategy from the arts, which focuses the discovery and synthesis of relationships among elements [4]. Figure 1 illustrates an example composition serving as a live media place supporting a learning exercise. The environment will incorporate composition techniques from diagramming, video production, and live streaming practice to support expressing ideas and participation in compelling ways.

Diagramming is the act of expressing relationships and synthesizing ideas through graphical transformations, sketching, and text annotations. Through graphical transformations, such as position, scale, rotate, layer, group, and blend, we will support participants in expressing ideas and sharing experiences. We will also draw from video production techniques such as transitions, opacity blending, and background removal. Transformations will be synchronized, in real-time, across instances of a shared live media composition canvas. This will enable participants to collaboratively compose and communicate through evolving information structures and visual manipulations.

Different live media forms have unique affordances in terms of what can be shared through them, how they are perceived, and how multiple people can actively communicate through them. For example, it is easy to visually focus on one of several adjacent video streams, but understanding many people speaking simultaneously is more difficult. Visual, spatial, and aural composition techniques will help participants take advantage of each modality's affordances to create live media places that afford more expression and participation than the sum of their constituent media.

Live Media Forms

Broadcast video is the prototypical media form of live streaming. It affords sharing rich experiences. Live video is often captured from webcams, smartphones, and desktop applications. While video is often shared by individuals, we hypothesize that multi-stream experiences will better afford participation.

The proposed live media environment will incorporate text, audio, and video chat modalities to support active communication and participation. While text chat is low-fidelity, many people can simultaneously participate. Conversely, while it is more difficult for many people to engage through audio and video chat, these higher-fidelity modalities afford higher impact participation [2].

We will also incorporate media forms from our work with information composition such as rich clippings and sketches. Rich clippings are pieces of media (i.e. text, images, videos, and audio) linked with their source context on the web. Composition of these media have been show to effectively support students in collecting, thinking about, and communicating new ideas [4].

Deploying and Evaluating in MOOCs

Throughout the development of the proposed live media environment, we will iteratively design and evaluate the prototype system within the context of MOOC courses. The prototype will be developed using HTML5 techniques such as WebRTC, enabling us to develop a web-based prototype that can be integrated with existing MOOC platforms. We plan to initially investigate live media composition within the context of small group learning. However, we expect that live media composition will also support scaled up live learning experiences, such as live lectures or study sessions conducted by teachers and engaged students.

Initial formative studies will focus on isolated use cases of the prototype, such as a particular lesson or discussion group. These formative evaluations will inform the ongoing iterative design of the prototype. Later summative investigation will explore use over the duration of an entire course, with the prototype deeply integrated into course curriculum. Through these studies, we aim to investigate the following research questions: How will students and teachers use this new live medium? What media forms will be used in what kinds of educational processes? How are media spaces composed to create places that support small and large group learning experiences? What is the impact of participating in live experiences on learning outcomes?

We will take a mixed-methods approach to investigating these questions and understanding participant live media experiences. Quantitative data collection will include system logs and questionnaires. We expect analysis of this data to reveal high-level phenomena as well as identify particularly interesting instances. Qualitative data collection will include interviews with and journals from students, instructors, and researchers. We will also build tools to capture, playback, and analyze recordings of live experiences. To build a deeper understanding of observed phenomena, qualitative data will be analyzed using a techniques such as grounded theory and content analysis. We will also work closely with instructors to understand resulting learning outcomes.

Expected Contributions

Through this research we expect the following contributions: (1) new understandings of how live media composition supports engagement; (2) new methods for fostering legitimate peripheral participation in online learning activities; (3) computational techniques to support qualitative and quantitative analysis of live media experiences; (4) techniques for supporting rich expression in online remote CSCW.

Acknowledgements

References

1. Julia Cambre, Chinmay Kulkarni, Michael S. Bernstein, and Scott R. Klemmer. 2014. Talkabout: small-group discussions in massive global classes. In *Proceedings of the first ACM conference on Learning @ scale conference* (L@S '14). ACM, New York, NY, USA, 161-162. DOI=10.1145/2556325.2567859 http://doi.acm.org/10.1145/2556325.2567859

2. William A. Hamilton, Oliver Garretson, and Andruid Kerne. 2014. Streaming on twitch: fostering participatory communities of play within live mixed media. In *Proceedings of the 32nd annual ACM conference on Human factors in computing systems* (CHI '14). ACM, New York, NY, USA, 1315-1324. DOI=10.1145/2556288.2557048 http://doi.acm.org/10.1145/2556288.2557048

3. Steve Harrison and Paul Dourish. 1996. Re-place-ing space: the roles of place and space in collaborative systems. In *Proceedings of the 1996 ACM conference on Computer supported cooperative work* (CSCW '96), Mark S. Ackerman (Ed.). ACM, New York, NY, USA, 67-76. DOI=10.1145/240080.240193 http://doi.acm.org/10.1145/240080.240193

4. Andruid Kerne, Andrew M. Webb, Steven M. Smith, Rhema Linder, Nic Lupfer, Yin Qu, Jon Moeller, and Sashikanth Damaraju. 2014. Using Metrics of Curation to Evaluate Information-Based Ideation. *ACM Trans. Comput.-Hum. Interact.* 21, 3, Article 14 (June 2014), 48 pages. DOI=10.1145/2591677 http://doi.acm.org/10.1145/2591677

5. Chinmay Kulkarni, Julia Cambre, Yasmine Kotturi, Michael S. Bernstein, and Scott R. Klemmer. 2015. Talkabout: Making Distance Matter with Small Groups in Massive Classes. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing*(CSCW '15). ACM, New York, NY, USA, 1116-1128. DOI=10.1145/2675133.2675166 http://doi.acm.org/10.1145/2675133.2675166

6. David W. McMillan and David M. Chavis. Sense of community: A definition and theory. *Journal of community psychology* 14.1 (1986): 6-23.

7. Etienne Wenger and Jean Lave. *Situated Learning: Legitimate Peripheral Participation (Learning in Doing: Social, Cognitive and Computational Perspectives)* by. Cambridge University Press, Cambridge, UK, 1991.