Collaborative Media-Making as Agent for Identity and Learning

Eric Hamilton, Sandra Sarmonpal, Traci Garff, Kip Glazer, Antha Holt,
Hiroo Kato, Janice Samuels, Helen Teague, and Kim Welch
eric.hamilton@pepperdine.edu, sandra.sarmonpal@pepperdine.edu, traci.garff@pepperdine.edu,
kip.glazer@pepperdine.edu, antha.holt@pepperdine.edu, hiroo.kato@pepperdine.edu,
janice.samuels@pepperdine.edu, helen.teague@pepperdine.edu, kwelch.pepperdine.edu
Pepperdine University

Abstract: This poster presents results from qualitative research exploring and testing conjectures on how the process of media-making collaborations between secondary school students and teachers can precipitate a cascade of highly desirable and pro-social phenomena. These phenomena include important shifts in identity, agency and autonomy that bear deeply on the evolution of mathematical and scientific conceptual systems. The US National Science Foundation supports this work.

Keywords: maker movement; mathematical cognition; metacognition; identity

Introduction

This poster furnishes preliminary analyses of a body of interview transcripts from exploratory research involving workshops in which secondary school mathematics and science teachers and students collaborate to produce short videos and other media for the purpose of teaching students mathematical and scientific concepts. The workshops have taken place in the USA, Kenya, Ghana, Namibia, and Uganda. This particular exploratory work is supported by research grants from US National Science Foundation (NSF) (Hamilton, 2010, 2011); it seeks to create conditions that test conjectures related to creativity, intergenerational collaboration, mathematical and scientific cognition, and high engagement or flow-like experiences. The workshop activities track closely with the ascendant maker movement, and connect that movement to formal classroom settings (Hamilton, Chaves, Chaves, & Harding, 2011).

As described below, these interviews confirm well-established findings about the value of phenomena such as peer-tutoring and self-explanation. They also take place in the context of what is now a commonplace practice of making instructional videos for repositories such as YouTube. The research repeatedly suggests the viability of media-making in school settings as a means to routinely attain deeply engrossing flow states by both teachers and students, a worthy and humane goal for design of educational environments.

Methods

This research now involves approximately 22 separate workshops in the US, Africa, and Australia, in addition to several dozen follow-up sessions. In these workshops, the research team introduces participants to the process of creating video media to represent rich mathematics. Among workshop features are opportunities for teachers and students to collaborate in design and editing of video media and subsequent use of technologically-adapted Japanese-style lesson studies (Isoda, 2007; Lewis, 2002) for reflecting on and improving those videos.

Structured interviews served as one of several methods for identifying and observing these processes. The 22 workshops have produced approximately 250 interviews, of which approximately 80 have been exposed to coding book and inter-rater reliability scoring and are in aggregation and relational analyses.

Initial findings related to flow, conceptual growth and identify shifts

Several prominent patterns have emerged that are independent of how the participants structured their media-making activities. It turns out that each teacher and each student reported experiencing the sensation of loss of a sense of time consistent with deeply engaging activities, in a manner consistent (though not always as viscerally expressed) with the earlier interview excerpt. Additionally, their reports are consistent with other phenomena that track closely with classical features of flow experience (Csikszentmihalyi, 1996; Weber, Tamborini, Westcott-Baker, & Kantor, 2009). Deep engagement and flow were in repeated evidence across international boundaries. One USA student commented, "when making the video…you slow down, and you re-evaluate everything that you have worked out, so then you have to process it more and more and more, and the more you look at it the more you are understanding … it." Another, also from USA, commented "… as I did more videos, more I guess ways of doing math got stuck in my head, so my scores went up to advanced proficient, like to the highest in the class." This particular student is instructive in describing relational changes. Immediately

preceding the comment above, he explained, "my relationship with my teacher has changed…. (making videos together) brings us closer now to talking about a subject that I enjoy and she enjoys and we could work together because we could both give each other advice…And, it's really great, just working with a teacher, to know that wow, like I am working with my teacher to improve this class and this subject." Student 1, from a workshop in Uganda, illustrates assimilation of new aspects of identity empowering shifts in perspective about learning. Student 2, from rural Kenya, voiced similar observations.

> Student 1: This workshop has made me feel like a teacher. A teacher to my first student, so, I've gained a lot from it...I thought of leaving this school ... but, due to the introduction of this workshop, I feel more… interested to come back to my school and teach…
>
> Student 2: I think it is good, if you have ever been in a place (where) there are students, where there are adults, where they are the same, where they are at par, we are doing things together, they are showing us what …(they) are doing, (we are) …(showing them what we) are doing, I think the interaction is very good, and I think I'd love more of this.

This sentiment of these students has arisen repeatedly in preliminary analyses of participating students reporting in interviews that they see themselves as agents of learning and teachers to others. During video-making workshops, students and teacher collaborations disrupt conventional classroom hierarchies, restructuring familiar paradigms. Environmental feedback provides continual reinforcement of this empowered role in learning as students learn from each other, and perhaps, most significantly, as they see teachers learning from students. This appears to have catalyzed a self-reinforcing cycle: teachers begin to view students as knowledge sources, interacting with students differently, which in turn affects students' self-perception, triggering agency in their learning, leading to increased skill and proficiency. These complementary socio-perceptual shifts in students' view of teachers and teachers' view of students interact to create a dynamic system that reinforces the developing student identity as a knowledge agent triggered by the collaborative task of media-making.

Conclusions

Interviews from these workshops suggest that structuring a space for creative media-making in service of a school curriculum can precipitate positive, pro-social and pro-learning mechanisms. These begin with processes of known intrinsic power, such as self-explanation and peer tutoring. In this particular context of intergenerational collaboration, preliminary evidence suggests assimilation of new aspects or dimensions of self-awareness or identity in ways that materially benefit mathematical learning. One important direction the data appears to suggest is that the deeply immersive experience of creating and editing videos may function as a scaffolding or staging for growth in self-regulated engagement in learning. What is unique to this learning context is how the additional factors of autonomy, mental focus, and a tangible sense of personal control over the creation process in addition to the prompt, intensify an individual's level of engagement, precipitating a state of flow. While the acquisition of a new skill inherently expands self-concept, the state of flow produced in the video making process endows an individual with an intrinsic sense of accomplishment that uniquely employs seamless and continuous metacognitive reinforcement.

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