

Becoming Together: Creating and Looking at Collaborations as Learning Products

Vishesh Kumar (Organizer), University of Wisconsin-Madison, vishesh.kumar@wisc.edu
Gayithri Jayathirtha (Organizer), University of Pennsylvania, gayithri@upenn.edu
Erica Halverson (Discussant), University of Wisconsin-Madison, erica.halverson@wisc.edu
Laura Carter-Stone, Vanderbilt University, laura.j.carter-stone@vanderbilt.edu
Kevin Leander, Vanderbilt University, kevin.leander@vanderbilt.edu
Mike Tissenbaum, University of Illinois at Urbana-Champaign, miketiss@illinois.edu
Nathan T. Wheeler, University of Wisconsin-Madison, ntwheeler@wisc.edu
Breanne K. Litts, Utah State University, breanne.litts@usu.edu

Abstract: Collaboration – the performance of working together – is a common construct in the learning sciences, though it is used almost exclusively as a strategy for improving learning of content or process outcomes. We often talk about learning *through* collaboration; we rarely talk about collaboration itself as learning. Talking about collaboration as learning shifts our focus on acknowledging diverse collaborative arrangements and on the design of the learning space, activities and tools that afford opportunities for the same. Instead of viewing collaborations as a byproduct of attaining a separate outcome, valuing certain collaborative behaviors as “productive”; considering collaboration as a learning outcome allows us to recognize diversity within collaborative styles and values brought into learning spaces, and their affordances and constraints for different activities. In this symposium, we bring together different ways of collaborating, as the object to design for and learn in an environment. Synthesizing these diverse bodies of work under the umbrella of learned collaboration, enables us to identify types and patterns of collaboration, which in turn, can allow us to actively support students to “learn to collaborate; as well as broaden perspectives of recognizing different behaviors as productive collaboration (which are often overlooked due to their lack of explicit service to other learning goals).

Overview

Collaboration is a common construct in the learning sciences, though it is used almost exclusively as a strategy for improving learning of content or process outcomes. Collaborative learning research looks at interactions and behaviors between subjects and communities (Lave & Wenger, 1991); with predefined rules or emergent divisions of labor (Strijbos & Weinberger, 2010); through tool and other artifacts (Hutchins, 1991); and typifies the kinds of interactions and which succeed (or fail) in attaining goals (Roschelle, 1992; Barron, 2003). These components align well with Engeström’s (1999) Activity Theory (CHAT) framework, where collaboration is a part of the inter-subject and subject-community connections, and a component of the network which enables attaining “objectives.”

We often talk about learning *through* collaboration, but rarely talk about collaboration itself *as* learning. In this symposium, we extend the limited work on analyzing *collaboration itself as a learning outcome* (Lee, 2007; Koretsky et al., 2014), by presenting different takes on this perspective. We also discuss what it affords us as researchers, designers, and educators. We examine how learning environments with different objectives mediate and render particular relationships and interactions between learners, communities, and the objective tasks. This is depicted in the modified CHAT diagram in Figure 1. Here, different collaborations are viewed as products of differently configured activity systems engaged in pursuing varying goals.

We are shifting our focus to recognizing collaborations that are not in service of prescribed goals, but arise in the pursuit of different goals. This new focus broadens our recognition of the different kinds of learning that happens in a learning environment. Relatedly, it validates forms of participation chosen by diverse groups of learners as learning outcomes, even when they appear tangential or unrelated to prescribed goals. This new lens opens up new ways to think about how we design and support learning, especially while considering different collaborations as learning outcomes to design for, rather than just an instrument to learn other things.

Objectives

This symposium brings together a diverse range of studies investigating the ways different learning environments afford differential creation and evolution of collaborative behaviors. Looking through improv, makerspaces, multiplayer games, and adaptive screenplay creation provides a uniquely broad spectrum of perspectives on collaborations as valuable learning products; and also provide guidelines on how to design other learning environments aimed at developing similar varieties of collaborations. The variety of work covered here is not only

diverse in context, but also in educational disciplines (STEM, Literacy Education, and Performance work), analytical methods, and the range of activities considered productive. In comparison to previous studies which had mostly examined collaboration as an outcome within problem-solving contexts, this symposium expands into other contexts such as embodied improv and maker activities, strategic game play and text-based art production to capture a diverse set of activity systems and broaden our understanding of collaboration as an outcome.

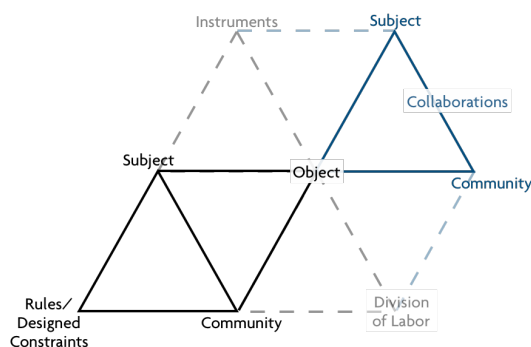


Figure 1. Shifting collaborations mediated through the environment as well as objective task(s).

Format

The structure of this symposium consists of three sections: each presenter will present their research for 12-minutes, providing their perspective on collaboration, methods and findings of their study. Our discussant will contrast and connect the different contexts, disciplines, analytical lenses, and collaborative products; and open up the panel for a discussion with the audience.

Implications

This symposium will begin an important new discussion within the learning sciences: what are the different forms of collaboration that can be recognized as valued learning outcomes; and how to design and assess learning environments when collaboration is an end goal, rather than a mechanism to support other forms of learning.

Making a promise: Breaking, creating, and sustaining collaborations in participatory management games

Vishesh Kumar, Mike Tissenbaum

In this study, we present data from *City Settlers* – a participatory game about ecosystems thinking and resource management – which supports emergent dialogue among players comprising of increasingly complex strategies, systems understandings, and attempts to collaborate to create certain *inter-player configurations*. I use the term configurations to describe short and long-term ways that learner-players play the game with respect to each other – for instance, agreeing to exchange resources with one team in return for other co-operations, and not allying with other teams similarly.

The mechanics in *City Settlers* make salient the need to develop and sustain particular configurations for easier success. In an ecosystem of limited resources, learner-players quickly recognize the advantage of pursuing separate specializations and sustaining a mutually interdependent growth track. Yet, manifesting these configurations is challenging, as players try to make promises, while others renege on them. We expand Antle’s *emergent dialogue* (2010) framework to look at *emergent discourse* – where different configurations that players achieve is reflected not only in their evolving talk, but also interactions with the interfaces and in-game decisions. Wanting to, and being able to work with other players in specific ways reflects understandings of the system, as well as knowhow in enacting some of these understandings. thus reinforcing the value of recognizing different collaborations/configurations as learning outcomes themselves, particularly in multiplayer games.

Theoretical framing

Procedural rhetoric describes how players develop understandings in dialectical participation with a game, its mechanics, and the choices they enact (Bogost, 2007). Antle (2010) extends this framework to develop complex systems understandings through emergent dialogue, where co-playing of multiplayer games enables inter-player interactions and conversations which enable a variety of negotiated and developing understandings about the game being played.

Games – particularly online, massively multiplayer games – have been studied as spaces of practicing and developing culture, especially in the forms of communities of practice (Steinkuehler, 2006) where developing expertise is enacted as different roles of authority in teams. Antle et al’s work with Youtopia (2013) – a co-located cooperative museum exhibit – looked at how *codependent access points* can trigger cooperative play coupled with shared development of system understanding and dialogue. City Settlers aims to extend this work by inspecting how *shared constrained game resources* in classroom gameplay invites the creation of goal-related collaborations which involves unique performances of hard to achieve coordination. Uniquely, how do learners attempt to create cooperative configurations when competitive advantages are an available choice – and how this reflects the enactment of critical ecosystems understanding (Wisconsin DPI, 2018).

Data sources and analysis

In playthroughs of City Settlers including 6 and 14 middle schoolers in a mid-size city in the Midwestern United States, we collected video and audio recordings of the students’ interactions (talk and gestures), and their gameplay data. Conducting interaction analysis on the video and talk data (Jordan & Henderson, 1995), and coding talk and gestures using the DCLM framework (Tissenbaum et al., 2017): to identify when and how players work with or “against” each other; how they ask for coordinations, and when it works. We also paired this with measures of gameplay actions which gave a picture of more or less successful coordination among players. A key mechanic of gameplay – a blind auction system to acquire factories for cities – created space for attempted coordination as well as space for competition and renege on promises by the players.

Findings and conclusions

A key learning goal for ecosystems education, City Settlers players are able to recognize the need for developing mutually reliant configurations, as articulated by a player – “We had a lot of food and gold last time [...], we could divide it so that one team takes care of, like cotton, [...] and then one team could start getting like steel early, and we wouldn’t bid on it, so they would get all that steel, and make it for us, so we could take the steel, set up our business to make cotton and food, and be able to make it so...”. This realization was coupled with relying more on verbal coordination evident in gameplay metrics – like fewer competing bids, and a reduction in average price for which factories were acquired. Teams became increasingly effective at short term coordinations – when “promises” or deals included exchanging resources or control of factories that were mutually beneficial. At the same time, one team which attempted to push others to coordinate over developing different specializations, gave up soon after other teams reneged on deals for their own benefits. This reflected a challenge in creating a specific kind of collaboration – the development and sustenance of trust within a game’s mechanics realistically reflects political scenarios, and also interacts richly with participants’ interpersonal abilities on negotiating trust, or designing systems which can support the same.

Through this work, we extend the purview of collaborations to include participatory configurations in designed contexts like games – and how these designed constraints, coupled with a diversity of participation styles from learner-players, can produce changing collaborations which are valuable learning products themselves. Further discussion on this work can also extend specific design constraints in ways that support these kinds of collaborations to emerge in even broader sets of contexts.

Moving as a group: The development of affective attunement through practices of theatrical improvisation

Laura Carter-Stone, Kevin Leander

This presentation examines the role of improvisational practices in activity through an innovative analysis of adults learning theatrical improvisation. As a form of collaborative and emergent imaginative activity, theatrical improvisation offers a set of structured practices for engaging in proleptic world-making mediated through embodied and verbal tools. The theoretical framework for the paper is taken from social practice theories. We are particularly interested in attempts in such theories to understand the relations between personal positioning and the construction of cultural worlds, and thus to bridge psychological and anthropological perspectives on identity and learning.

Theoretical framework

While we are inspired and guided by practice theories and by community of practice perspectives, we find that these areas of work are not broad enough to account for the forms of affect-laden relationships that we observe and experience in theatrical improvisation. Unlike some forms of social practice, improv builds affectively intense

connections among performers, and uses imaginative world-making as a key resource in these connections. Performers, in emergent relations of world-building, “attune” to one another’s movements and affective energies, moment by moment. Moreover, over time of multiple iterations, they also build repertoires of how to accomplish such attunements. Thus, at the level of the group, what is learned and constructed through improv is the “ensemble” itself, as a type of assemblage of persons, movements, feelings, familiar and newly-imagined worlds. At the level of the individual, what is developed is a capacity for such attuning—a set of repertoires for listening-with, acting-with, imagining-with, and becoming-with. Deleuze & Guattari (1987) describe the relations within assemblages via the process metaphor of the rhizome. In the assemblage, temporary configurations of elements from entirely different categories of how the world is commonly organized—objects, ideas, elements, materials, humans and nonhumans—move into unpredictable relations.

Data sources and analysis

In this study, we assert that the analysis of collaboration is possible on the micro and meso levels by attending to the evolution of theatrical improvisational practices over the course of rehearsals, performances, and across the development of persons engaged in the practice. We analyze two forms of data: 1. autoethnographic data gathered during the first and second authors’ training in theatrical improvisation classes, and 2. ethnographic interviews with improvisational artists, teachers, and students enrolled in improvisation classes. Across these data sources, we trace the development of attunement and the co-development of the ensemble in practice at the individual and improv community levels.

Findings

Practices of affective attunement in the dramatic assemblage

Through this analysis, we discover several practices through which improv artists and teachers develop their ability to sense and embody circuits of distributed energy, including whole-group and small-group warm-up activities (“Pass the Clap,” “Becoming Machine”) and scene structures (“Three Line Scenes”). These attunements are saturated with affect; indeed, many artists and students wonder hinge upon shared emotional experiences. Instructors and artists enact structured ways of attending to and intensifying the experiences of sadness, joy, curiosity, and other sensations shared among the ensemble through embodied movements. Improvisational students describe learning new ways of *moving*, in three distinct but interrelated senses 1) through developing repertoires of physical and gestural movement in response to and with other players (e.g., through “mirroring”), 2) allowing themselves to be affectively moved in moments of intensity, and 3) moving within the ever-changing world of the scene as it is collectively authored into being.

Importance and contribution

This study weaves social practice theories with post-humanist process philosophies to illuminate moments of attunement among various dramatic ensembles. As our data seek to demonstrate, sensing the circuits of affective energy that are lit up as (dramatic and improvisational) worlding happens is one way to understand attunement (Stewart, 2011). Another metaphor of (affective) attunement illuminated by the practices of these dramatic ensembles is that of following lines (Ehret, 2018; Ingold, 2015). Lines, not points, become energized in circuits of affect; lines vibrate, lines have qualities of this type of connection rather than that, lines trace energy’s movement in all directions, lines lead toward becoming. We find that attuning is not merely action and reaction. When bits of the assemblage are taken up in relation to one another, are connected by rhizomatic circuit, that connection has some quality, some feel, some sense that this-connection-in-this-moment is unique, is singular. This study thereby expands traditional theories of social practice by attending to the idiosyncratic dynamism of learning in an improvisatory assemblage. Taking cues from our fellow improvisers who build and inhabit scene-worlds through the exchange of creative “offers,” we present empirical and theoretical “offers” that encourage new ways of collective attunement.

Learning in and through art-making: Collaborative Literary Adaptation (CLA)

Nathan T. Wheeler

Human beings desire to communicate and represent meaning through storytelling, or narrative. According to Bruner, “narrative organizes the structure of human experience” (1991, p.21). Harari (2015) notes in *Sapiens* that the unprecedented success and power of our species actually lies in its unique ability to collect and organize around belief in shared fictions, or imaginative stories, and cites religion and nationhood as examples. Hutcheon (2013) forwards that people congregate around stories for adaptive reasons, because they contribute to the

development of social cohesion in unstable conditions. Thus, centralizing learners collaborating around the telling and showing of stories in formal and informal educational contexts speaks to both evolutionary and societal needs.

Many cultures unfortunately tend to recognize creative contributions as individual pursuits, and not as products of artistic collaboration. Schooling, too, traditionally valorizes the autonomous student, perpetuating the idea of a singular genius. Adaptation Studies scholar Sanders encourages a paradigm shift “away from the idea of authorial originality as a definer of value to a more collaborative and societal understanding of the production of art and meaning,” which aligns with the interconnected, participatory and distributed nature of our rapidly changing world (2016, p. 192; Jenkins, 2009; Lankshear & Knobel, 2006).

What happens in terms of learning when groups of people adapt a narrative text, or any “configuration of meanings” (Smargorinsky, 2001), and then transform it into an entirely different modality, like ‘from page to stage,’ or screen? How does this creative production process, scaffolded by an existing text, function to support the optimal conditions for learned collaboration, conceived here in simple terms as “a change in mental state,” or conceptual change (Scardamalia & Bereiter, 2014, p. 397)?

The purpose of this presentation is to introduce Adaptation Studies – specifically the notion of *collaborative literary adaptation* (CLA) – as a maker practice. This study examines how the complex, text-based learning activity of collectively transforming an existing narrative into a different modality scaffolds learned collaboration. Furthermore, collaboration emerges as an outcome of the creative production process because it effectively mirrors the distributed nature of group art-making itself.

Theoretical perspectives

Firmly rooted in the educational theory of ‘constructionism,’ the maker movement places *embodied, production-based experiences* at the core of how people learn (Harel & Papert, 1991). Despite its obvious ties to the arts, constructionism has not heavily influenced domains beyond STEM in making (Peppler, 2010). Adapting literature, however, offers a potentially powerful arts-based platform for making, multiliteracy exploration, and learned collaboration.

CLA entails learners collectively analyzing, designing, creating, and producing innovative texts from other texts using a range of meaning-making resources and materials, which culminates in a public presentation of value for a community. It utilizes the creative production process, mapping seamlessly onto the New London Group’s (NLG) design framework for multiliteracy learning (see Figure 2.)

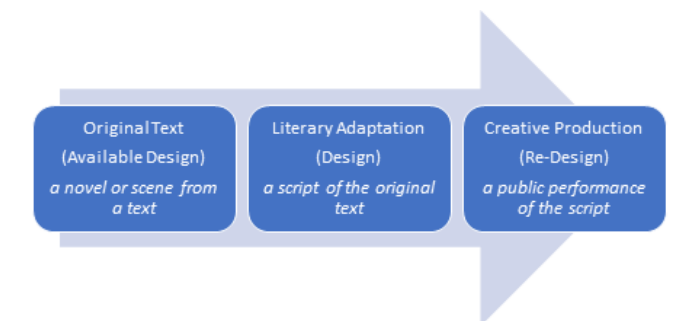


Figure 2. CLA as learning by design.

During CLA the ensemble negotiates numerous representational, social, structural, intertextual and ideological decisions related to meaning making which fosters collaborative activity (Cope & Kalantzis, 2009).

Data sources/Methods

This study demonstrates how the art-making process reframes collaboration as a learning outcome, and not just a learning strategy. I examine multiple groups of adult expert theater makers at work adapting young people’s creative narratives over the span of a week, resulting in a professionally staged performance for the student playwrights’ (Grades 3 & 4) public school community.

Using bidirectional artifact analysis (Halverson & Magnifico, 2013), I trace how collaboration emerges (Sawyer & Dezutter, 2009) and evolves in and through collective meaning-making around the transformation of text. To document and measure collaboration as a process outcome, audio/visual data of interactions and shifting relations between the participants, tools, and activities are analyzed over time for verbal, gestural, and other examples of collaboration. The role of the young playwright(s) and live audience as co-designers is also analysed

to develop a more expansive definition of collaboration which values the adaptive, shared, and distributed nature of all artistic production, consumption and meaning-making.

Findings and significance

With evidence of learned collaboration in and through group art-making, we aim to underscore a curricular and instructional need for integrating learning activities and tasks like CLA into text-based education. These results are also meant to empower educators working in the arts and humanities to develop vocabulary as well as observation methods for identifying valuable learning taking place in their work. This is critical in light of increased accountability measures and decreased funding, which have increased pressure on academic departments to demonstrate their impact, value and relevance in 21st century learning.

Defining collaboration as an outcome of maker-based learning

Breanne K. Litts, Erica Halverson

This paper extends our initial framing of collaboration in maker-based learning as a distributed, emergent phenomenon that functions both as a process for learning and an outcome of participation (Halverson, Litts, & Gravel, 2018). Specifically, we seek to understand how collaboration emerges in makerspaces and functions as an outcome of the learning process.

Theoretical framing

Sociocultural theories of learning frame learning as an act of participation (Lave & Wenger, 1991; Barron, 2006; Miyake & Kirschner, 2014). From this perspective, learning is not about obtaining discrete content knowledge, but instead learning is enacted through participation in a broader ecosystem. In this paper, we draw on two related concepts to further frame learners' participation: collaborative emergence as a way of describing improvised interactions (Sawyer & DeZutter, 2009) and the way learners pick up each others' ideas "through the air" (Kafai & Harel, 1991).

Data sources and analysis

The data for this paper come from a series of studies documenting what youth learn from their participation in maker activities (e.g. Litts, 2015; Sheridan et al., 2014). Across studies, we collected over 200 hours of ethnographic jottings, fieldnotes, and memos (Emerson, Fretz, & Shaw, 1995) and six design experiments (Brown, 1992) in four maker-based settings: a makerspace inside a museum, two standalone after school makerspaces in urban neighborhoods, and maker activities within a public library. Across data, we examine moments of emergent collaborative participation through learners' work with peers, tools, and processes.

Findings

We present two examples of collaboration as an outcome in maker-based learning environments.

Collaboration as innovating new possibilities

Many maker activities are marked by an open-ended approach that does not prescribe a particular end. To illustrate how this approach facilitates distributed, emergent collaboration, we present our findings from a design experiment at a museum-based makerspace. We challenged a group of fifth graders to 'make something that lights up.' One student, DiVonte, figured out how to make an on/off button by introducing a brad into the circuit for control. While he worked on this, the boys on either side of him noticed what he was doing and asked him how they could do this too. They also used the brad innovation to add buttons to their circuits. When we asked these makers, "What would you want [people] to know about what you made?", DiVonte wrote: "I made it light up. I made a swich [sic] go on and off." Cameron wrote, "That it is a buttin [sic]. There is tape on the wires so it cannot harm you." On the one hand, the artifact that lights up is an outcome of the activity, but on the other hand a key outcome is the emergence of the brad innovation, which was traced across learners in the workshop. This illustrates that learning in maker-based activities is more than finishing a project or performing well on a task, but also sharing knowledge to innovate new possibilities.

Collaboration blurs ownership

To illustrate how distributed, emergent collaboration blurs ownership, we present the shared endeavour of constructing a community foosball table at public library over the course of weeks during the summertime. A facilitator, Jamie, describes that the foosball table began as one kid's idea supported by his peers and persisted

through a collaborative effort in which a couple kids drilled holes, a group of kids painted, still others contributed materials (e.g., action figures), and everyone playtested and refined (Interview, Jamie, 07/31/2014). Thus, the foosball table functioned as a hub of collaboration and became an artifact of a distributed, emergent collaborative effort. Curiously, a tension around ownership arose, when it came time to name the artifact for presentation at the summer festival. Jackson, the 10-year-old boy who spearheaded the initial idea, wood burned his name onto the final piece, which itself is named “Sunnydale Foosball,” and he further explained “...they’ll be like ‘this is awesome! Who made this?’ And then I’ll be like ‘me!’” (Interview, 07/24/2014). In community makerspaces, individual and community learning become deeply entangled, which fundamentally shifts our conceptions of learning and knowledge as being an individual activity.

Importance of the work

Collaboration persists as a critical practice across learning contexts, which in turn challenges learning scientists to establish a shared understanding of what collaboration is, how to design for it, and how to measure it. While some scholars explicitly examine how to design *for* collaboration, here we explore *distributed, emergent collaboration* as an outcome of learning in maker-based learning environments to extend and contribute to current understanding of collaboration.

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