

Understanding Classroom Culture Through a Theory of Dialogism: What Happens When Cheating and Collaboration Collide?

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Abstract: We consider tensions between collaboration, ownership, and appropriation in relation to Mikhail Bakhtin's theory of dialogism. We analyze examples of these tensions from our own research in an after-school, design research program and relate them to findings from other research that explored using collaborative learning systems in classrooms. We apply dialogism to describe factors that contribute to students' perception of these classroom experiences as ones that do or do not foster collaboration, including the culture of the classroom, the affordances of the technologies used to mediate collaboration, and the role of multivocality in the classroom. Students are using, reusing, and appropriating media in creative ways outside of their school settings while teachers are increasingly incorporating related emerging technologies such as wikis, blogs, and chat rooms into their classrooms. By understanding the factors that contribute to dialogism, educators will be better equipped to create classroom cultures and design environments to encourage collaboration among students.

Introduction

Youth are actively and enthusiastically creating and producing digital content in their online computer mediated environments. Recent studies have shown that 57% of teenagers have created a blog or webpage, posted original artwork, photography, stories or videos online, or remixed online content into their own new creations, 33% have shared what they create online with others, and 19% have created new works by remixing content they appropriated from another source (Lenhart & Madden, 2005). While youth are freely engaging in activities of content creation, media use, reuse, and remixing, the interplay of these practices and behaviors within the context of their schooling environments is more complex. Students' culture of sharing, copying, and pasting media in their daily informal practices online often lies in contradiction to the notions of plagiarism, stealing, and cheating that have been instilled in them within their classrooms. Even though culturally accepted literary masterpieces such as the *Odyssey*, the *Iliad*, *Mort d'Arthur*, the Sistine Chapel, and various works by Shakespeare are the products of appropriated and remixed content (Jenkins et al., 2006), students' online practices of remixing through blogging, manipulating images, audio remixing, making digital movies, and creating customized game modifications may be less well accepted in classroom environments.

Social communication sites on the web like MySpace, Facebook, and Wikipedia are rapidly growing in popularity. This growth, in combination with the increasingly globalized socially networked information economy, indicates a need for researchers, teachers, parents, and policy makers to better understand the influence of these media and activities on the changing dynamics of classroom collaborative culture. In this paper, we discuss the tensions that occur between remix culture and classroom culture, focusing on new media and computer science environments in particular. Our use of the term new media, in this context, refers to the many technologies and online environments that students use in their daily lives, including blogs, wikis, chat rooms, instant messaging, social networking sites, as well as their use of cell phones and handheld mobile devices. We highlight examples from our research which reveal how these contradictions played out in students' informal learning environments. We then apply Mikhail Bakhtin's theory of dialogism as a framework through which to address these tensions in order to design a culture of collaboration in classroom learning environments.

Collaboration or Cheating?

Researchers in CSCL have described ways in which the creation of artifacts such as words, texts, images, sound, and video can contribute to the collaborative knowledge construction process (Stahl, 2003; Suthers, 2005). One theory of learning that is used to describe this process is constructivism, which describes the importance of deriving meaning through learners' interactions with their environments (Piaget, 1976). Constructivism helps to explain how learning occurs through appropriation as the assimilation of concepts within a learner's internal mental processes of making knowledge his or her own. However, its intention was not to explicate appropriation as the borrowing, reusing, or incorporation of others' ideas and tangible artifacts during a learner's actual processes of

construction (Ackermann, 2004). In describing the nature of communication, Bakhtin describes all communication as consisting of continual acts of appropriation in the latter sense: “The word in language is half someone else’s. It becomes ‘one’s own’ only when the speaker populates it with his intention, with his own accent, when he appropriates the word, adapting it to his own semantic and expressive intention” (Bakhtin, 1986, p. 293). In the first use, constructivist learning through appropriation is encouraged. In the second use, in the context of Bakhtin’s definition, appropriation can imply copying, plagiarism, stealing, or cheating, even when used in the way that Bakhtin intended.

The dichotomies between these two interpretations of appropriation can lead to contradictory perceptions of what rules should guide their use of new media in the classroom. The historical transmission view of learning that has dominated classroom practice views dialogue as a one-way interaction (Heap, 1985). Knowledge is imparted from the teacher to the class, and students then apply that knowledge through the practice of “question, answer, evaluation,” which Lemke (1990) referred to as the Triadic Dialogue. Appropriation enters into the mix when students are encouraged to dissect, transform, and share artifacts and ideas as part of their individual and collaborative learning processes. While part of the learner’s process is to make content personally meaningful, what are the implications when a personally meaningful artifact, in fact, belongs to another person? In other words, what are the boundaries that define copying an idea versus copying an expressive form (1)? Researchers in computer science education have long questioned the role of collaboration in assignments, looking to understand at what point collaboration ends and plagiarism or cheating begins (Stewart-Gardiner et al., 2001; Sheard et al., 2002; Harris, 1994; Roberts, 2002). When should teachers encourage students to collaborate? Should the students discuss the ownership of that code? If ownership is not properly acknowledged or attributed, are they cheating? Where does the line fall between collaboration and cheating? In the following section we describe examples from our research which reveal how these questions emerged.

Backyard Transformations: A Case Study

We conducted a two-month, after-school program at a local public school as design research. Our goal was to determine requirements for an online, collaborative storytelling environment to help youth learn principles of non-linear, narrative construction using multiple digital and physical expressive media. Storytelling is a valuable educational activity through which learners explore and make sense of the world around them. The story creation process involves developing ideas, acquiring understanding, and constructing knowledge through personally meaningful forms of self-expression. Recent projects have looked to design interactive storytelling environments to support the creation, production, consumption, and sharing of stories (e.g. Antle, 2003; Benford et al., 2000; Cassell and Ryokai, 2001). In our study, we conducted hour and a half long sessions, twice a week, at the school’s computer lab (see Figure 1). We provided four Apple Mac OS X desktops in addition to the school’s lab machines. The study involved eight fifth-grade students, five boys and three girls, and a team of five researchers (2). Our lead researcher ran each session, with support from the other researchers, who played the interchangeable roles of participant observer, note-taker, videographer, and teaching assistant. We videotaped all the sessions and conducted interviews with the participants to better understand their use of digital media in their everyday lives outside of school.



Figure 1. Backyard Transformations sessions.

We designed the curriculum to teach fundamental storytelling concepts, with each session focused on a particular theme, such as non-linear narration or character development. Our curriculum was modeled after Backyard Transformations, a narrative story construction research project conducted by Jill Wright and Rachel Strickland at Apple Computer’s Vivarium Research Lab from 1988-1991 (Strickland, 1991; Strickland & Wright,

1990). They had filmed 174 video clips and had created a corresponding set of printed cards to be used as prototypes for storytelling games. Their scenes were designed to encourage children's imagination and play through evocative and unusual character scenes. We pre-installed the video clips into Apple iMovie at each station and also explored using alternative digital tools such as Comic Creator, and FlashCan Animator (see Figure 2).



Figure 2. Comic Creator, FlashCan Animator, and iMovie with Backyard Transformations clip.

In addition, we provided participants with a disposable camera, their “Personal Card Creator,” which they could use to take pictures outside of our sessions. We also provided a digital camera and video camera available for their use during each session. We encouraged them to incorporate drawings, paintings, photographs, and whiteboard sketches into their stories. Our activities ranged from highly structured, such as “extension of process of description to include techniques of association and relationship,” in which participants were dealt fifteen cards and had two minutes to sort them into three categories of their own choosing, to highly unstructured, such as their final project, in which they created a complete digital story using media of their choice. Our activities fostered a culture that strongly encouraged media reuse and sharing, however, we did not attempt to establish any norms or rules for sharing, attributing ownership, or claiming ideas, artifacts, and stories as one’s own. We thus observed that the participants struggled with a sense of uncertainty throughout their evolving storytelling processes. In our storytelling environment, who “owned” the components within their story sequences? In the next sections we illustrate the tensions that arose as participants appropriated and re-used each other’s ideas in their own storytelling. Then, in the second half of the paper, we reintroduce Bakhtin’s notion of dialogism as a way of resolving these tensions and thinking about the future of collaborative learning.

The “Creation” of Count Whistleboy: An Example of Appropriation

In the Backyard Transformations card deck, a series of cards were made using the same “character.” In one episode, Andrew came up with “Jackie, the Sumo Wrestler” from a card depicting a character its creators called “The Umpire.” He also pointed out another card in his pile with The Umpire in shadows, which he described as “Count Dracula with a whistle.” Toby then noticed that Jason had a similar card with the Umpire character, which he proceeded to describe during his presentation to the group (see Figure 3). During his presentation of “Count Whistleboy” Toby had appropriated Andrew’s idea for a “Count Dracula with a whistle” and conflated it with the card in Jason’s pile which contained a small person looking up with a whistle in its mouth.

TOBY: This is a human. His name is Count Whistleboy. He is ten years old. He is ten inches tall. ... And um it dislikes the ... the dark... the moon the most because it goes “raar” and becomes a vampire. And um... and um... his friends are his whistles.



Figure 3. Images from “The Umpire” cards that became Count Whistleboy.

Throughout the course of the project there were other types of acts of appropriation. For example, Dionne created a story using a photograph of a cat that Iris had taken. Although Iris did not explicitly object to this use, did Dionne's act carry the same implications as the creation of Count Whistleboy? When was borrowing from a peer collaborating and when was it stealing?

You Stole My Idea!

Participants preferred to collaborate during the idea generation process, often struggling to produce ideas on their own. For example:

RESEARCHER: What do you like about working with other kids?

ANDREW: I think it would go faster if I worked by myself but Miguel has some good ideas....

Miguel watches a lot of TV and gets good ideas from TV. There's a lot of good ideas on TV.

IRIS: Giving me some ideas. Ideas are basically like all you need.

MIGUEL: I like working with other people better 'cause usually I don't have all the ideas and other people can help.

However, while they sought out their peers and other external resources for ideas, they also expressed a desire to be given credit for ideas that were used by others. Following the Toby's creation of Count Whistleboy, Jason also decided to use the character in his own story, leading to confusion as to who "owned" the character.

JASON: Wait, did you do Count Whistleboy or did you? [pointing first to Toby and then to Andrew]

TOBY: I did Count Whistleboy.

ANDREW: So did I.

Andrew initially showed little interest in Toby's use of the Count Whistleboy character, even though the character's visual appearance was modeled after his own Sumo Wrestler. However, Andrew's "so did I" in response to Toby's claim that it was his character indicates that he did in fact want to be given credit for his ideas. Toby did not object to this joint ownership and responded with a light-hearted expression of acceptance towards Jason's use. Their shared use of Count Whistleboy highlighted the important social aspects of building on and reusing one another's ideas as part of the development of group identity in their collaborative learning processes. However, not every conflict of ownership resolved without open conflict. In other instances, we heard comments such as "Hey, you stole my idea!" or "That was my idea!" In the following episode, Toby presented his story in iMovie to the group.

TOBY: This is Madame Peacock.

JASON: He stole the idea He stole the idea!

TOBY: She's crawling because she has no feet. How do I know? I can't see her feet. She is 13 years old. She is small as a squirrel. It lives in a wooden house. Its favorite thing to do is hunt the Invisible Woman. ... Their greatest hope is to destroy the Invisible Woman.

JASON: [under his breath] Oh come on. [reaches across the table and points at the screen] He stole that. [points finger in Toby's face] You stole that!

The conflict was resolved when one of the researchers played a mediating role:

RESEARCHER: [to Toby?] You stole that?

TOBY: [giggle in acknowledgement]

RESEARCHER: Well, I like it.

JASON: Yes. That was my narrative movie thing.

RESEARCHER: Well, I think that's a really good idea. Madame Peacock who chases the Invisible Woman... that's your character right?

JASON: Yeah... well, that's his character [referring to the Invisible Woman]

RESEARCHER [later, in the background talking to Jason] People use each other's characters all the time. It's not a bad thing. It's a good thing.

In this situation, Jason was less concerned that Toby had used the character of Madame Peacock and more concerned that he hadn't received credit for it.. In both stories, while tensions quickly dissipated when the "owner" was given public acknowledgement for his or her idea, character, or artifact, at the same time, their interactions brought to light the potential sources of complexity and confusion regarding the proper uses of shared artifacts. How should these practices, which are simultaneously individual and collaborative, be understood when the rules behind the sharing of ideas and artifacts are subtle or unclear? These examples both illustrate how the tensions played out in the classroom, but also point to a potential solution by suggesting a different lens for thinking about collaboration in the classroom that explicitly recognizes and appreciates acts of appropriation.

Dialogism in the Classroom

Bakhtin's theory of dialogism provides a framework through which to understand the culture of collaboration within learning environments. In particular, the perceived dialogic nature of a medium and how it is used in the classroom correlates to whether students will be inclined to use it collaboratively or individually. We use a definition of dialogue as consisting of one or more speakers, listeners, and the relationships between them (Bakhtin, 1981). Bakhtin (1986) used the term "utterances" to describe the situated act of dialogic discourse as a unit of analysis. Utterances begin and end with changes of speaker and they can only be defined in relation to other utterances. Each speaker's utterance "carries echoes" of the previous one as she appropriates and assimilates it into her own speech. We thus characterize dialogue as the inscriptions, implications, and intersections that accompany words, texts, gestures, intonations, voices, responses, and other communication utterances as they are interpreted and appropriated. While others have described the nature of dialogue as it occurs between man and machine (e.g., Meadow, 1970), we focus on dialogue as it takes place between man and man, where the machine is the mediating agent among two or more humans.

CSCL researchers have applied various dialogic theories to describe processes of meaning-making, knowledge building, language acquisition, and teaching thinking (Koschmann, 1999; Wegerif, in press; Roschelle, 1996; Wells, 2006; Wegerif, 2005). For example, Koschmann (1999), noting Werstch's (1998) prior work argues "utterances are not analyzable in isolation but must be studied instead with reference to the culturally-supplied mediational structures of which they are instantiations. Learning thus involves the process of multiple voices coming into contact, both within and across speaker-produced utterances." We draw from these studies to support our argument that increasing dialogism in collaborative learning environments can enhance students' knowledge construction processes. As noted by Bereiter:

"Classroom discussions may be thought of as part of the larger ongoing discourse, not as preparation for it or as after-the-fact examination of the results of the larger discourse... The important thing is that the local discourses be progressive in the sense that understandings are being generated that are new to the local participants and that the participants recognize as superior to their previous understandings" (1994, p. 9).

In this paper, we do not look to analyze the types of learning and knowledge construction that occurred within our case study (although there is much more to be explored there). Instead, as prior scholars of Bakhtin have done (e.g., Kozulin, 1996), we extend and generalize Bakhtin's theory of dialogism in text and language to apply it to multiple modes of communication that are used in the classroom, such as audio, video, verbal, spatial, and gestural. While dialogic theory is relevant across a range of academic environments, for the sake of clarity, we focus primarily on its intersections within computer science and emerging new media. The following sections describe three factors that influence dialogism in the classroom that stood out as we considered our project in relation to other work and to Bakhtin's theory: dialogism through culture, dialogism through technical affordances, and dialogism through multivocality. We conclude with recommendations for designing collaborative classroom activities based on these three factors.

Dialogism through Culture

While students negotiate their common sets of rules, standards, and norms in their everyday interactions using online media, when in more structured learning environments, they look to teachers for direction and guidance in establishing these norms. At times, students' expectations of a particular environment can clash with teachers' expectations. For example, Guzdial et al. (2002) found that faculty attitudes and models of collaboration presented a cultural barrier to collaboration. Additionally, when they introduced software to facilitate collaboration, students

from different disciplines had different experiences based on the culture within their discipline. Their findings supported those of Cohen (1994) who argued that students who perceive only one answer will not seek to collaborate, while open-ended and less structured assignments will encourage collaboration. Guzdial et al. found that students from computer sciences, who were used to grades based on individual coding assignments, resisted using CoWeb while students in architectural design, who were used to formal and informal dialogues, actively adopted the collaborative opportunities that were provided. CoWeb was successful when dialogue was a part of the disciplinary culture. *“If the culture of the context is not compatible, the medium will not succeed”* (Rick & Guzdial, 2006).

In our study, we generally did not seek to explicitly address or define rules for appropriation, although the example of Jason, Toby, and the conflict of Madame Peacock discussed above points to one exception. Additionally, we recognize that the way in which we structured our activities may have nurtured this conflict between our participants and their expectations in our project. In the case of Toby’s use of Madame Peacock, the researcher intentionally chose a strategy to resolve the tension that would not be critical towards Toby’s use of Madame Peacock, but would still ease Jason’s anxiety by acknowledging the role that he played in the character’s creation. This compromise, in a sense, reflects the tension in our own roles in the classroom. From one perspective, we played the role of teachers assigning them tasks within the familiar context of their school’s computer lab which normally followed traditional classroom rules and structures. However, from the other perspective, we were researchers running an after school program that was designed to encourage non-traditional explorations into creative media use. The participants therefore may have experienced conflicting notions of collaboration in the storytelling environment.

In this case, we might have avoided conflict and tensions regarding ownership by explicitly specifying rules and clarifying expectations to avoid potential misunderstandings. Many incidents of cheating in computer science courses have been due to the differences in awareness and expectations between students and teachers. If students perceive a clearly defined culture of dialogism, they will be better prepared to determine when collaboration is or is not encouraged.

Dialogism through Technical Affordances

The technical and material affordances of media influence the extent to which students perceive it to be collaborative in nature. For example, the interactions between Toby, Andrew, and Jason in their use of Count Whistleboy were undoubtedly aided by each of their abilities to pick up and physically manipulate the playing cards, point to cards in each other’s piles, and place cards next to each other. Affordances of new media provide other these as well as many other novel opportunities for collaboration.

The potential of using of new media in schools is not a new discussion and its limitations in the classroom have been addressed within the field of CSCL. Researchers have long warned about the dangers of technological determinism caused by blindly introducing a medium into the classroom without considering its limitations (e.g., Pea, 1987). For example, new media environments such as distance learning and one-way communication tools like audio and video broadcasting were touted as powerful new tools for learning in the classroom. However, they also required substantial interactional structures through which to establish common ground and enable transformative communication rather than just transmissional communication (Pea, 1994, p. 291). CSCL thus emphasizes the importance of considering *how* the medium is implemented in the classroom based on its constraints and affordances. Dialogism is not embedded in the medium itself but instead emerges through the specific ways in which the medium is implemented and used within the learning environment.

Some educational software environments have been explicitly designed to encourage collaborative learning through carefully constructed uses of the medium’s technical affordances. For example, DIVER is a “cultural remix tool for web video” that fosters “point of view” authoring for sharing, collaboration, and knowledge building around a common ground (Zahn et al., 2005). WebDIVER is an online version that allows DIVERs to upload a DIVE and share it with others who can then comment on the DIVE (see Figure 5). Through this process of “guided noticing” one participant guides the interaction and the other receives it. Although such prescribed roles will inevitably experience fluidity and an interweaving across boundaries during the collaborative knowledge construction process, the structure offered by the system provides an explicit and direct sense of ownership based on who is doing the guiding and who is the participant. Another example is Scardamalia and Bereiter’s (1994) Computer Supported Intentional Learning Environments (CSILE). In CSILE, anyone can add a comment to a note but only authors can edit or delete notes (see Figure 5). The sense of ownership of a particular note is therefore made explicit. To copy a note and use it as one’s own would be equated to stealing or cheating.

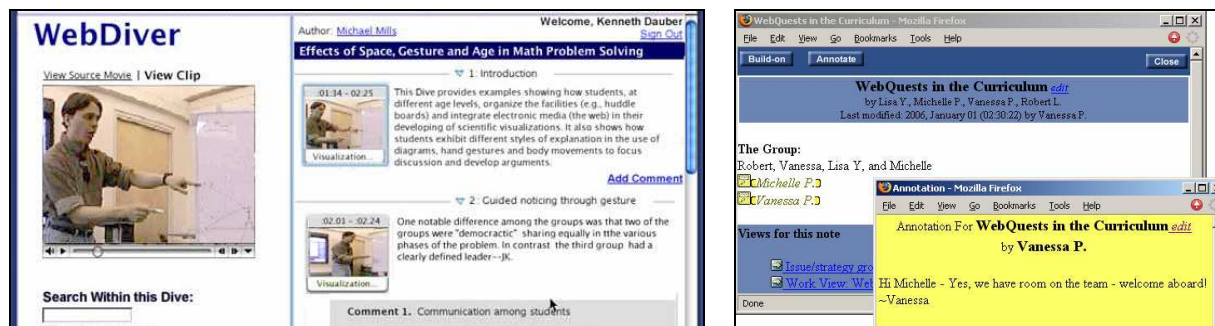


Figure 5. Guided noticing in WebDIVER and author edit box in CSILE.

Dialogism through Multivocality

The third important factor in designing for dialogism is multivocality. Multivocality is defined by Bakhtin as the ways in which multiple voices can be discerned in a text (Bakhtin, 1981). The role of multivocality in collaborative learning spaces is less clearly understood in these emerging new mediums. What happens when there are multiple voices, listeners, and possible interpretations in a given utterance? What implications, if any, does the speaker's original ownership have as the utterance evolves through multiple dynamic and untraceable states? In our study, for example, Miguel discovered a built-in sound pattern in iMovie and proudly maximized the volume to broadcast his find to the computer lab. Toby crossed the room to see the sound source and promptly incorporated it into his own story (see Figure 6).

According to Bakhtin, "Language is not a neutral medium that passes freely and easily into the private property of the speaker's intentions; it is populated—overpopulated—with the intentions of others" (1981, p. 294). One of the challenges we faced was that, in contrast to text and language, which offer a more binary distinction between speaker and listener (although of course they are not always explicitly delineated), the boundaries are less obvious when the utterance continues to be used and reused beyond the speaker's original intention, as was the case in our multimedia environments. Multiple layers of meaning are added and interwoven as the utterance is appropriated throughout its lifecycle. Perhaps the sender's original message remains embedded somewhere in the medium but it will become convoluted and masked over time. The ability for messages to be mediated through both the students and the medium can influence the ways in which its dialogism evolves. What are the roles of the sender and receiver within these mediums?

Miguel's re-broadcast of his iMovie tune throughout the lab is a type of "indirect speech," which Wertsch & Toma (1995) describe as instances in which speakers incorporated text from prior talk. They discuss examples of indirect speech in their analysis of fifth grade students' discussion of a balance beam experiment:

"It is reasonable to expect that when the dialogic function is dominant in classroom discourse, pupils will treat their utterances and those of others as thinking devices. Instead of accepting them as information to be received, encoded, and stored, they will take an active stance toward them by questioning and extending them, by incorporating them into their own external and internal utterances, and so forth" (p. 171).

Because the students are actively interpreting these utterances, the boundary between speaker and listener—and unanticipated future listeners—is not clearly demarcated. It is instead an inclusive dialogic space in which multiple forces mutually construct and re-construct one another. Wegerif (in press) argues that "any sign taken to be a mediation between self and other, a word or a facial expression, must pre-suppose the prior opening of a space of dialogue within which such a sign can be taken to mean something." Similar to Wegerif's description of these meaningful signs in dialogic spaces, we found that the affordances of audio and video mediums can enable "shoulder-to-shoulder collaboration" (Benford, 2005), even when participants are spatially located across the room from one another, as was the case with Miguel's broadcast. Thus, the implementation of the media and the multiple voices it may contain, which are also fluid and can evolve dynamically over time, will influence the ways in which the students choose to use it in their collaborative activities.



Figure 6. Examples of multivocality in Backyard Transformation activities.

Dialogism Out of the Classroom

Many of today's new media technologies are highly social in nature. These environments, such as MySpace and YouTube, have multiple social and communicative characteristics. For example, the explicit culture of sharing in YouTube is conveyed through the URL and Embed links that are prominently displayed next to each video segment, in which embedding linking can be explicitly enabled or disabled (see Figure 4). This external representation enables a fluid interaction through a shared understanding among users. It is made clear that new content can be shared by others who are free to adapt and appropriate the material to generate their own meanings. These features are designed to be used by multiple parties who contribute to or participate in the community, whether as active contributors, readers, or lurkers. Technical features like linking, tagging, and commenting can help to create a culture of dialogism within the software environment.

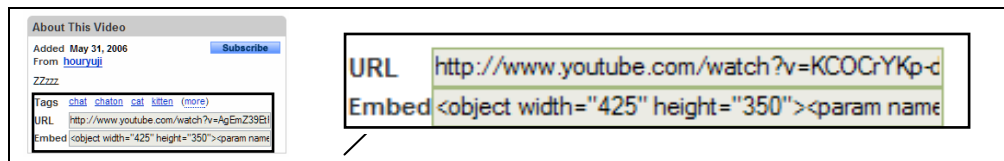


Figure 4. YouTube URL and Embed features.

Although the contexts of use of the environments we have discussed, from digital storytelling tools to online social communication sites to educational software, differ significantly, there are common threads across them as dialogic mediums. It is useful to ground our discussion of these varied learning environments by describing them in terms of categories of genres. Bakhtin described speech genres as characteristic patterns of speech within the realms of dialogue and text, which can vary from simple forms such as greetings, farewells, congratulations, or information about health, to more complex forms such as novels, dramas, or scientific research (Bakhtin, 1986, p. 69). Again, we extend Bakhtin's theory to describe various modes of dialogue across multiple media. If a software coding environment in computer science is consistently perceived to be a dialogic genre, the technical affordances that are core properties of that genre can convey to the student how it should be used, according to the designers of the software. Embedded features such as "publish my code to the class" or "download module from group" can help the students to perceive their actions using these features as collaborative, rather than cheating, as they engage in a dialog with the software designers through the medium. Koschmann (1999) states that this "involve[s] understanding not only the degree to which learners appropriate particular genres... but also the degree to which the genres themselves afford opportunities for the expression of the multivocal aspects of learner-produced utterances." The genre might provide the option for students to associate their name to a section of code—their "utterance"—in order to maintain a sense of individual ownership within the group's final artifact. If the authorship option is disabled, students will be made aware that their code contribution will be incorporated into a group-owned artifact that may not acknowledge individual ownership. In each of these examples, if the teacher can control these types of features by enabling or disabling options during certain phases of students' projects, the students will be more clearly cued into the extent of the dialogic, and accordingly, the collaborative, nature of their activities.

Conclusion

Many schools and universities are actively designing innovative teaching pedagogies and curricula by applying new media to traditional academic disciplines. For example, Harvard Law School is teaching its Law in the Court of Public Opinion course in an online 3D virtual world called Second Life (3), the Georgia Institute of

Technology is teaching computer science through an innovative media computation undergraduate course (4), and Byrd Middle School is teaching medieval history through a MySpace-like socially networked blog (5). This paper contributes an alternative perspective for designing and analyzing collaborative learning environments through the framework of dialogism. At the same time we explored open questions about the framework's applications in emerging mediums.

We propose that educators and designers can construct collaborative learning environments by considering the interdependent issues of culture, affordances, and multivocality through the lens of dialogism. These insights can help enable researchers in CSCL to guide students to make more informed and educated decisions in their individual and collaborative activities. Given the growing ubiquity of new media as a part of students' lives outside of school and the increasing use of these technologies as a part of classroom activities, we need to teach students the skills for developing digital literacies and critical reflection. As they transition into today's media rich, globally networked professional economy, they will need to understand the implications of sharing, collaboration, ownership, credit—and cheating—in these emerging interwoven environments of their everyday lives.

Endnotes

- (1) The question of the implications of copyright issues and the division between transformation of a work versus simple derivation of a work is an important, but separate, discussion.
- (2) Pseudonyms are used to protect the identity of the participants. All media is reproduced with the consent of the participants and their parent(s).
- (3) <http://blogs.law.harvard.edu/cyberone/>
- (4) <http://coweb.cc.gatech.edu/mediaComp-plan>
- (5) http://byrdmiddle.org/richard3/?page_id=2

References

- Ackermann, E. (2004). *Piaget's Constructivism, Papert's Constructionism: What's The Difference?*, from http://learning.media.mit.edu/content/publications/EA.Piaget_Papert.pdf
- Antle, A. (2003). Case Study: The Design of CBC4Kids' StoryBuilder. In *The Proc. of the 2003 Conference on Interaction Design for Children*. 59-67, Preston, England.
- Bakhtin, M. (1981). Discourse in the novel (M. Holquist & C. Emerson, Trans.). In M. Holquist (Ed.), *The dialogic imagination* (pp. 259-422). Austin: University of Texas Press.
- Bakhtin, M. (1984). *Problems of Dostoevsky's poetics*. Minneapolis, MN: University of Minnesota Press.
- Bakhtin, M. (1986). The problem of speech genres (V. McGee, Trans.). In C. Emerson & M. Holquist (Eds.), *Speech genres and other late essays* (pp. 60-102). Austin: Univ. of Texas Press.
- Benford S., & O'Malley, C., & Simsarian, K., & Stanton, D., & Sundblad, Y., & Taxen, G., et al. (2000). Designing storytelling technologies to encouraging collaboration between young children. *Proceedings of ACM CHI 2000 Conference on Human Factors in Computing Systems* (pp. 556-563). The Hague, The Netherlands.
- Bereiter, C. (1994). Implications of postmodernism for science, or, science as progressive discourse. *Educational Psychologist*, 29(1), 3-12.
- Cassell, J., & Ryokai, K. (2001). Making Space for Voice: Technologies to Support Children's Fantasy and Storytelling. *Personal Ubiquitous Computing* 5(3), 169-190.
- Cohen, E. (1994). *Designing group work: Strategies for the heterogeneous classroom* (2nd ed.). New York: Teachers College Press.
- Guzdial, M., Ludovice, P., Realff, M., Morley, T., and Carroll, K. (2002). When Collaboration Doesn't Work. *Proceedings of the International Conference of the Learning Sciences*. (pp. 125-130). Mahwah, NJ: Lawrence Erlbaum Associates.
- Harris, J. (1994). Plagiarism in Computer Science Courses. *Proceedings of the Conference on Ethics in the Computer Science Age*. (November 1994), 133-135.
- Heap, J. L. (1985). *Discourse in the production of classroom knowledge: Reading lessons*. Curriculum Inquiry, 15(3), 245-280.
- Jenkins, Henry. Clinton, K., Purushotma, R., Robinson, A. J., and Weigel, M. (2006). Confronting the Challenges of Participatory Culture: Media Education for the 21st Century. An Occasional Paper written for the MacArthur Foundation.
- Koschmann, T. (1999). Toward a dialogic theory of learning: Bakhtin's contribution to understanding learning in settings of collaboration. In *Proceedings of the 1999 Conference on Computer Support For Collaborative*

- Learning* (Palo Alto, California, December 12 - 15, 1999). C. M. Hoadley and J. Roschelle, Eds. *Computer Support for Collaborative Learning*. International Society of the Learning Sciences.
- Kozulin, A. (1996). A literary model for psychology. In D. Hicks (Ed.), *Discourse, Learning, and Schooling* (pp. 145-164). New York: Cambridge University Press.
- Lemke, J. (1990). *Talking science: Language, learning, and values*. Norwood, NJ: Ablex Publishing Corporation.
- Lenhart, A., & Madden, M. (2005). *Teen Content Creators and Consumers*. Washington, DC: Pew Internet & American Life Project. Available at http://www.pewInternet.org/PPF/r/166/report_display.asp
- Meadow, C.T. (1970) *Man-Machine Communication*. Wiley, New York. CR 12, 4(71)20, 918.
- Pea, R.D. (1987) "Integrating human and computer intelligence." in Pea, R.D. and Sheingold, K. (eds.) *Mirrors of mind: Patterns of Experience in Educational Computing*. Norwood, New Jersey: Ablex: 128-146.
- Pea, R. D. (1994). Seeing what we build together: Distributed multimedia learning environments for transformative communications. *Journal of the Learning Sciences*, 3(3), 285-299.
- Piaget, J. (1976). *The grasp of consciousness*. Cambridge, MA: Harvard University Press.
- Rick, J., & Guzdial, M. (2006). Situating CoWeb: A scholarship of application. *International Journal of Computer-Supported Collaborative Learning*, 1(1), 89-115.
- Roberts, E. (2002). Strategies for Promoting Academic Integrity in CS Courses. *32nd ASEE/IEEE Frontiers in Education* (November 2002).
- Roschelle, J. (1996). Learning by collaborating: Convergent conceptual change. In T. Koschmann (Ed.), *CSCL: Theory and practice of an emerging paradigm* (pp. 171-186). Mahwah, NJ: Erlbaum
- Scardamalia, M. & Bereiter, C. (1994). *Computer support for knowledge-building communities*. *Journal of the learning sciences*. 3(3), 265-283.
- Sheard, J., Dick, M., Markham, S., Macdonald, I., & Walsh, M. (2002). Cheating and plagiarism: Perceptions and practices of first year IT students. *ACM SIGCSE Bulletin, Proceedings of the 7th annual conference on Innovation and Technology in Computer Science Education (ITiCSE 2002)*, 34(3), 183-187.
- Stahl, G. (2003). Meaning and interpretation in collaboration. In B. Wasson, S. Ludvigsen & U. Hoppe (Eds.), *Designing for change in networked learning environments: Proceedings of the international conference on computer support for collaborative learning (CSCL '03)* (pp. 523-532). Bergen, Norway: Kluwer Publishers.
- Stewart-Gardiner, C., Kay, D. G., Little, J. C., Chase, J. D., Fendrich, J., Williams, L. A., and Wolz, U. (2001). Collaboration vs plagiarism in computer science programming courses. In *Proceedings of the Thirty-Second SIGCSE Technical Symposium on Computer Science Education* (Charlotte, North Carolina, United States). SIGCSE '01. ACM Press, New York, NY, 406-407.
- Strickland, R. (1991). Notes on Projective Construction. *Presentation to CHI 1991*.
- Strickland, R., & Wright, J. (1990). *Backyard Transformation-An Interim Project Report*. Research report at Apple Computer's Vivarium Research Program. Cited with permission from authors.
- Suthers, D. (2005). Technology affordances for intersubjective learning: A thematic agenda for CSCL. In T. Koschmann, D. D. Suthers, & T. W. Chan (Eds.), *Proceedings of Computer Supported Collaborative Learning 2005: The Next 10 Years!* (pp. 662-671). Mahwah, New Jersey: Lawrence Erlbaum.
- Wegerif, Rupert (2005) Reason and creativity in classroom dialogues. *Language and Education*, 19, (3), 223-238.
- Wegerif, R. (In Press) Dialogic or Dialectic? The Significance of Ontological Assumptions in Research on Educational Dialogue. *British Education Research Journal*.
- Wertsch, J. & Toma, C. (1995). Discourse and learning in the classroom: A sociocultural approach. In L. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 159--174). Mahwah, NJ: LEA.
- Wells, G. (2006). *Dialogic Inquiry: Towards a Sociocultural Practice and Theory of Education*. New York: Cambridge University Press.
- Zahn, C., Pea, R., Mills, M., Rosen, J., Hesse, F., & Finke, M. (2005). Advanced video technologies to support collaborative learning in school education and beyond. In D. Suthers & T. Koschmann (Eds.) *In Proceedings of the International CSCL-05 Conference*, Taipei, Taiwan. Mahwah, NJ: Erlbaum Associates.

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