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reth – *New Voices* involves two strands, leaving open the possibility of others as follows:

New Voices and New Knowledge in Research Methodology

in the book series is dedicated to producing cutting-edge titles focusing on Methodology. While it might be generally acknowledged that educational research often tend to import methods developed in neighboring disciplines, this is not acknowledged in the literature on methodology. This series intends to contribute to the foundation in educational research by specifically seeking out those who work across disciplines and inter-disciplinary in terms of their methodological approaches. The overall focus is to develop a series focusing on those methods which are in dealing with the specific research problems of the discipline.

provides students and scholars with state-of-the-art scholarship on methodology, and techniques focusing on a range of research topics. It comprises innovative and rigorously rigorous monographs and edited collections which bridge schools of thought and the boundaries of conventional approaches. The series covers a broad range of research on not only empirical-analytical and interpretive approaches, but moreover on macro studies, and quantitative and qualitative methods.

New Voices and New Knowledge in Educational Research

of the series will focus on theoretical and empirical contributions that are unique and provide important insights into the field of educational research across a range of globally. This part of the series will collectively communicate new voices, new and new possibilities within the field of educational research. In particular the focus is on scholars, students and communities that have often been excluded or marginalized in educational research and practice.

Methodological Challenges When Exploring Digital Learning Spaces in Education

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3. TRACING RESONANCE

Qualitative Research in a Networked World

INTRODUCTION

As social networks, mobile devices, and other information and communication technologies (ICTs) increasingly transform educational spaces, researchers are confronted with the dual challenge of investigating how these tools are changing the face of education while also trying to mediate the use of these tools in the research process itself. This chapter focuses on how issues of interconnectivity and mobility are impacting learning spaces and shifting how we engage in qualitative research. The interconnection of people, ideas, modes, and spaces in combination with the increasingly flexible and mobile ways technologies are being taken up by users challenges researchers to develop multifaceted methods for capturing and making sense of these connections and movements.

We begin this chapter by highlighting some of the central challenges facing educational researchers studying networked activities and how scholars have responded by suggesting the expansion of our methodological toolkits (e.g., Baym & Markham, 2009; Beneito-Montagut, 2011; White, 2009). In the following section, we describe our attempts to address these challenges in our work with adolescents and teachers participating in an international, educational social networking project. We illustrate how these challenges of mobility and interconnectedness in networked communicative contexts manifested in our project as resonance (cf. Hull, Stormaiuolo, & Serponi, 2013), the intertextual echoing of ideas across spaces, people, and texts. We trace one example of resonance across our data, following how conversations around sexuality emerged across the networked community and how this emergence was crystallized in participants' semiotic activity. In the concluding section, we point to persistent challenges in addressing issues of resonance and, indeed, in capturing and representing the complexity of participants' learning and engagement across spaces. We conclude that while it remains important to continue expanding our methodological toolkits across interdisciplinary and technological frontiers, we must also work synergistically across research methodologies in order to account for the emergent dimensions of meaning making in networked contexts.

CHALLENGES OF STUDYING NETWORKED LEARNING

As educational researchers explore the ways that digital technologies are intertwined with people's connected learning (Ito et al., 2013), researchers bear increased responsibilities to develop complex methodologies that can move and shift with people as they participate in multifaceted productive practices across a variety of interconnected digital and physical spaces (cf. Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). Yet in studying the complexities of how people learn and communicate in networked spaces, researchers face significant challenges related to the features of networked publics (Stormshuhl, Higgs, & Hull, 2013). These features of persistence, replicability, searchability, and scalability have shifted the way we interact online (boyd, 2011), and researchers have called for expanded methodologies to address challenges wrought by these shifts (e.g., Beneito-Montagut, 2011). While scholars sometimes frame these expansions to be new methodological innovations, these extended toolkits often involve importing methods from other disciplines (Wiles, Crow, & Pain, 2011) or using new technologies in our research designs (e.g., Asselin & Moayeri, 2010; White, 2009). In this section we document what we consider three of the most prevalent concerns in conducting research in networked spaces as well as researchers' suggestions to address those challenges.

One of the most well documented shifts in how we conduct research now involves the way we live our lives and make meaning across online and offline spaces, which necessarily complicates what we define as the "site" of our research (Leander & McKim, 2003), in an increasingly connected world that is facilitated by technological and physical links between individuals, spaces, times, and texts, classic understandings of what constitutes a research field site are being complicated (Gupta & Ferguson, 1997), with researchers calling for conceptual frameworks like connective (Leander, 2009) or multi-sited (Marcus, 1995) ethnography to redefine the settings (and boundaries) of research (e.g., Bagley, 2009; Gallagher & Freeman, 2011). For example, Dirksen, Huizinga, and Smit (2010) describe how their connective ethnography of a Dutch IT company required them to move beyond physically bounded, local events or places to study practices across face-to-face and digital modes of connection. By tracing the ways that participants created and interacted within a virtual community emerging across on and offline spaces, the authors constructed their "field sites" through a complex methodological network of log file data, interviews, participant observation, documents, and other relevant "spaces" and engagements over time. The multitude of physical locations where the network can be accessed as well as the offline spaces that provide context for interaction on the network adds an expansive layer of data for analysis. As people participate in networked contexts, it has become exceedingly clear that studying one context alone will not suffice if we hope to capture and represent 21st century lived experiences (Pierides, 2010), and our methodological toolkits must therefore be as multifaceted and mobile as the phenomena under consideration.

This expansion of sites and timescales for our research leads to a second major methodological challenge: negotiating the multiplicity of data available. Not only is more data available than ever before, including log file, screen capture, eye tracking, and mapping tools that require more multidimensional data collection and analysis protocols, but this data is available across longer and more complex timescales (Lemke, 2000) and requires us, as Soep (2011) argues, to account methodologically for the "digital afterlife" of participant created artifacts. Researchers must take into account this multiplicity of data across different contexts and over time, a challenge that also carries great potential for developing layered understandings of the complexities of people's meaning making engagements across multiple lived spaces. For example, different forms of log file data offer new windows into online participation, illuminating "lurker" and other less-visible participant roles and opening new avenues for multimodal analyses and visual display (e.g., Dirksen et al., 2010). Given multiple platforms of access, data generated by networked participation can be massive in scale and offer new challenges in managing such "big data", including questions of access to and use of such networked information (boyd & Crawford, 2011).

This rethinking of the contexts and tools for our research is intertwined with ethical entailments of conducting research with digital technologies in networked contexts. One of the most visible problems is how to situate oneself as a researcher in relation to others. The question of what constitutes a public space is still being negotiated—should researchers be able to observe online communities and digital interactions in the "public" domain? Concepts of public and private spaces and texts are contested, and researchers face ethical decisions about how to situate themselves within these spaces. Questions about protecting participants' anonymity grow when material is more easily searchable and identifiable, especially in regard to media that can be quickly distributed to multiple networks beyond the intended audience (Tilley & Woodthorpe, 2011). Whereas the scope and impact of researchers' work used to be fairly narrow, expanded audiences make researchers more accountable to participants and to a broader swath of the public. Networked contexts also add new complexities to persistent questions about the rights of researchers to represent others' experiences (White, 2009), especially when researchers are both members of online communities as well as researchers in these spaces (e.g., Black, 2008). The task of the researcher now is to negotiate access to diverse sites and people across multiple digital and physical spaces and to position oneself in these spaces and in relation to others thoughtfully and ethically.

CHALLENGES IN ACTION: THE SPACE2CRE8 PROJECT

We have experienced these challenges in our work with teachers and adolescents in an educational social networking project. This three-year design-based research study (Collins, Joseph, & Bielaczyc, 2004) connected young people at sites in Norway, India, South Africa, and the United States, with students and their teachers meeting weekly to create media artifacts to share with others via a private educational social network called Space2Cre8 (S2C8) (for more details, see Hull,

Stormaiuolo, & Sahni, 2010). The social network itself was created and customized over time in response to and coordination with youth and other key stakeholders. The S2C8 network was similar to commercial social networks in that it had a wall, profile pages, chat, private messaging, and other popular communicative features, but it was also multilingual, closed to the general public, and turned toward educational uses. In addition, the research team created a customized data analytics program that provided a variety of detailed log file data, including participation records (e.g., how often participants logged in, from which IP address, how often they viewed a page and for what length of time, their click histories, etc.) and all content generated on the site (e.g., blogs and their revision histories, wall posts, profile images, videos, etc.).

As a design research study, the Space2Cre8 project included a wide range of data collected through an iteratively shaped process responsive to the context of the study. This research paradigm was particularly well suited for the study of networked learning (Stormaiuolo et al., 2013). For example, when the research team learned that youth wanted a way to ask a large number of other students across the networked community about their experiences, the team created a polling feature so that participants could ask the whole S2C8 population questions that intrigued them and then see the answers in multiple representational forms (for an example, see Figure 2). This feature contributed to a shift in the way students communicated, from a one-to-one model of individual question-response toward a more collaborative, connected ethic. The online analytics allowed us to trace who participated and to create response maps that helped us visualize student interactions. This is just one example of how we sought to gather a wide variety of data about participants' interactions in the networked community, which also included detailed online records, participants' multimedia work, formal, informal, and peer-based interviews, and a wide variety of other participant-produced reflective and interpretive artifacts (e.g., digital stories, T-shirt art, community maps).

In addition to serving as the research coordinator for the design based study, Amy conducted a multi-sited ethnography tracing five teachers' practices with educational social networking over two years of the project (Stormaiuolo, 2012). In addition to being one of the researchers at a New York site (for more about this site, see Smith & Hull, 2012), Matt conducted a qualitative study of students' multimodal composing during the intensive summer program. Thus, we were both "located" as participants in the multi-sited project in different ways, complicating and facilitating our work as ethnographers and participants in the networked community. Our own positionality within the research was constantly in our consciousness as we straddled the line between participants and observers. In Amy's study of the teachers in the project, for example, the teachers were part of the research team, members of their school and classroom communities, and participants in her study. The teachers negotiated across these multiple roles in ways that were both deeply enriching and complicated. For instance, two of the teachers kept written teaching reflections that served as useful research records as well as important internal documents guiding their practices (though one stopped

part way through the study), one of the teachers was reluctant to write anything, one kept written records private, and another put teaching notes on the web for stakeholders to see. This range of practices raised issues about fair representation and understanding of processes at work – participants take up different roles relative to the research and researchers over time and must be continually negotiated.

Similarly, students were encouraged to take up multiple roles as we asked them to help design the network, to record their own field observations via video, and to imagine new media projects to pursue. While some students took up these invitations to work with us in the field, our overlapping roles as teachers, colleagues, and researchers complicated these efforts and positioned us as the ones with the power to do the inviting. Consequently, some of the participants saw us as helpful collaborators, others kept more of a cautious distance, and still others willingly answered our questions but took no interest in participating in the creation of a research agenda. This constant negotiation of our own positions and identities within the research site is characteristic of multi-sited ethnography in which the researcher's role is itself being mapped "as the landscape changes across sites" (Marcus, 1995, p. 112).

We turn now to consider an example from our project that serves to illuminate the three challenges we identified above – tracing cross-contextual meaning making, managing data multiplicity, and negotiating ethical dimensions of networked research. In the next section we begin with an analysis of a number of conversations about sexuality that emerged in students' digital artifacts, classroom conversations, and online interactions during the summer of 2010, one of the most intense periods of networked participation in the project. We describe our attempts to trace the ways that these discourses around sexuality emerged and circulated across the networked community and how these intersected with students' literacy practices and teachers' pedagogical decisions. In the subsequent section we detail how these emerging and circulating discourses manifested as resonances, which we define as echoes or vibrations across the network, less tangible than intertextual references but identifiable by their reverberations across semiotic systems (cf. Hull et al., 2013). We discuss our efforts to trace these resonances through data collection and analysis, especially our efforts to do so using networked and multimodal tools and practices.

Networked Meaning Making: Exploring Sexuality

The topic of sexuality emerged from our initial thematic analyses of the data from this time period, captured primarily in youth created artifacts, youth chats and messages, and teacher conversations. We also were aware of the lived dimensions of these concerns at the time, as we talked to stakeholders like the project director in India who was concerned that explicit talk about sexuality could put her students, young women who faced tremendous pressure to conform to local gender expectations, at risk. We began to map how the conversations around sexuality emerged in the networked context by locating all of the artifacts

referencing the topic. We found that the first publicly posted artifact on the topic was a blog entry by a young woman in New York on "sexual orientation discrimination" (see Figure 1).

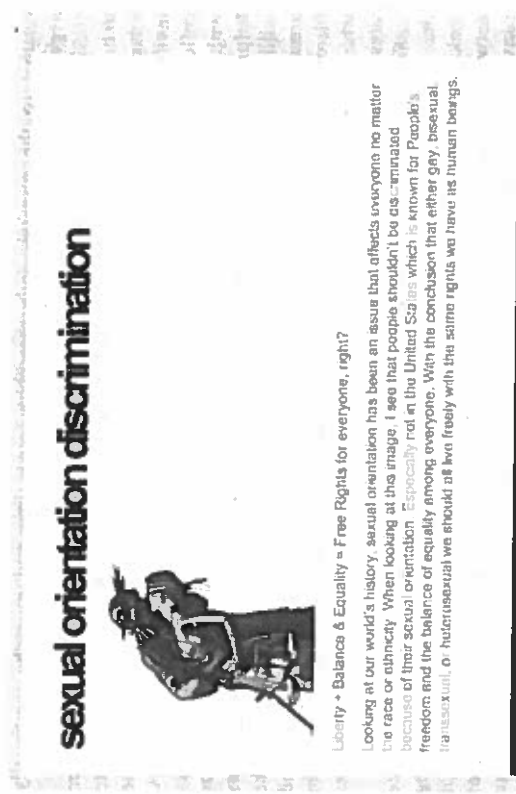


Figure 1. Elena's blog 7/7/10

In her multimodal blog entry, Elena argued that people should not be discriminated against for their sexual orientation and that the United States should be at the forefront of protecting these fundamental human rights. The accompanying photo of the Statue of Liberty kissing the Lady Justice helped to situate her argument about gay rights within a (US) nationalistic framework, but at the same time Elena positioned sexual discrimination as an issue that touched people "no matter race or ethnicity", that is, as a matter relevant to all members of S2C8. The topic remained an important one to Elena throughout the summer program, arising in class discussions about cosmopolitanism (cf. Smith & Hull, 2012) and as the topic of her final digital story. In an interview about her digital story, Elena spoke about how her ideas about sexual discrimination developed through her past experiences with her brother, interactions with her parents on the issue, discussions with classmates, and her participation in the globally-oriented program. In the film, Elena centrally positioned the photo from her blog (Figure 1) amid text slides and snippets of interviews with friends and classmates to explore how sexual discrimination was fundamentally unjust. The opening frame of her film echoed her earlier blog post in situating the issue of sexual discrimination as one that transcended traditional markers of difference, with yellow text on a black background: "Love comes from the heart and when there's love/fit does not look for race, age, color NOR gender".

Elena worked diligently to make her inquiry into sexual discrimination relevant to her local and global audiences, something that did indeed appear to be taken up by others in the networked community. For example, Shana, one young woman in the New York class, wrote a blog about gay marriage and others referenced Elena's blog post in their discussions of Appiah's (2006) text on cosmopolitanism.

About a week after Elena's blog post, one of Elena's classmates, Victoria, posted a poll about whether "Gay/Lesbian/Bisexual relationships [are] accepted in your society" (Figure 2):

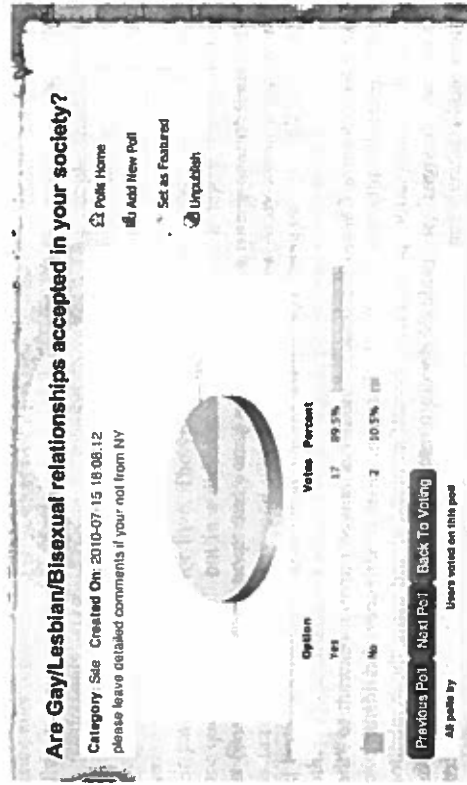


Figure 2. Poll on 1/5/7/2010

What appeared to be a local issue around sexual discrimination from a US perspective took a global turn in these online conversations and artifacts. Responses and comments on these artifacts revealed that participants from across the different S2C8 sites carefully considered Elena and Victoria's questions in the context of their everyday worlds. For example, responses to the poll from participants in the other New York site, the Oakland site, and the India site included, in part: "Of course they are but they cannot get married"; "In New York where I live these relationships are accepted and they are aloud by law to get married!! I hope the world becomes more open-minded in the near future!"; and "Gay and lesbian relationship are still frowned upon in India". These comments suggested that participants were thinking about issues of sexuality and gender rights in the context of their different cultural belief systems but also in the context of "the world" more broadly.

The ideas around sexual orientation began to blossom across the network shortly after Elena's posting, including a powerful blog in mid-July in which one young

woman from our second New York site, Jessica, came out to the networked community as bisexual (see Figure 3).

out the closet ; into the world.



I'm proud to say that I'm bi! I love supporting the Gaylez & I go crazy for Rainbows! ⁴³

Figure 3. Opening section of a student blog

Like Elena, Jessica framed the issue of sexual orientation as one relevant to “the world” more broadly, but Jessica drew on her own experiences and identity to anchor the conversation, pronouncing herself as bisexual and using the symbol of the rainbow to signal gay pride. We were interested in the ways that Jessica was influenced by Elena’s semiotic efforts and we sought to draw connections between their work in order to illuminate the circulating discourses at play around the theme of sexuality.

As we began to draw connections and intertextual links between students’ online texts in relation to our thematic focus, we faced a methodological dilemma. In many cases, we could not find explicit links between young people’s texts or online conversations – students’ semiotic work in relation to sexuality appeared to emerge in parallel during the same time frame, not clearly linked through the online data. For example, in Elena’s New York site, her classmate Shana posted a blog about gay marriage the day after Elena posted her blog, but it appeared from the online analytics that Shana never browsed to Elena’s blog page. We wondered about the connection between the two young women who were writing on a similar topic: how did their thinking and writing influence one another? What catalyzed their interest and participation around this topic? We looked at other online data that emerged during this time period across the sites, like the use of “sexy” in usernames in South Africa (e.g., sexyd, sexy_boy) and in compliments to one another or in the description of posted media (e.g., a picture of a pop icon was said to be “sexy”) or in the use the term “gay” as a kind of joking slur in private chats with each other in Oakland (e.g., “that’s so gay!”). We sought to understand in more detail what was happening around the issue of sexuality, why it appeared

salient at that moment in the project, and how the participants were involved in its unfolding. It is to that phenomenon of thematic emergence across networked spaces – what we began to call resonance – that we now turn.

Tracing Resonance

We found that the theme of sexuality was a resonant one for S2C8 community members during this time period, tied to broader discourses about freedom and gender rights that wove across online and offline spaces and permeated participants’ conversations. In other words, concerns about sexuality were rooted within widely circulating discourses around youth autonomy and identity that our participants were exploring in relation to other young people from around the world who did not necessarily share the same beliefs and experiences. For example, in India, the young women were quite concerned with early marriage, asking their global interlocutors via poll whether others could choose their partners or marry for love. The young people in South-Africa grappled with these questions as well but in a different way. The idea of a dowry, for example, was foreign, but the concept that young women could be forced against their will was familiar; indeed, one young woman wrote a fictional story about a girl who had been raped and her rough road toward achieving a “normal” life as a wife and mother. These discourses about whether young people had the right to control their bodies and hearts permeated the networked community and informed how the participants understood their rights in relation to cultural norms around sexual identities.

By mapping the emergence of the topic of sexuality, we began to see new patterns that linked these broader discourses to the local conversations around Elena’s advocacy for gay rights or Jessica’s discussion of her bisexuality. In order to “trace” these conversations, we tried to take into account their emergent nature. That is, we were attentive to what Leander and Boldt (2013) call the unbounded, rhizomal relations of literacy practices that are not linear or chronological but emergent in activity. The conundrum, we found, was rendering a process or emergent activity in representational form, preserving the dynamism of movement through time and space without being text-centric. To address these concerns, we drew upon the work of Smith (2013) in layering our data onto a dynamic timeline. Building up layer after layer on this timeline, we began with the log file and network data and added to it data from our ethnographic video, audio, and fieldnotes, our interviews, the students’ creative work, the teachers’ memos and notes, and our own memos and notes (see Figure 4 for rudimentary example).

What is not clear from this textual representation is that we used multimodal tools to layer the data in relation to one another; the video data from the classroom observation thus articulates with field notes and teacher memos to help us understand how these discourses around identity and autonomy emerged during this period. We wanted to account for how the themes of sexuality emerged over

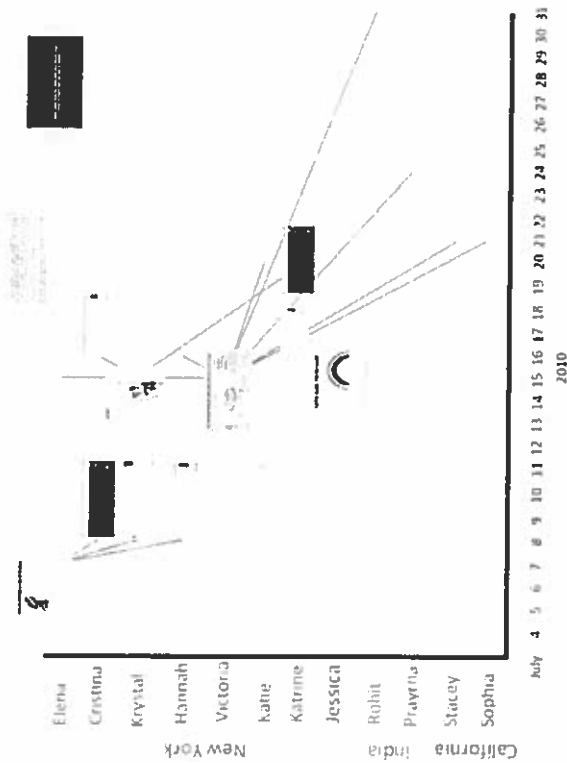


Figure 4. Example of dynamic timeline excerpt

time in ways that were not necessarily connected to one another and that reflected our own positionality. For example, in one of the layers we included how the teachers discussed the issue of sexuality when I (Amy) asked about it during our August meeting, prompted by concerns voiced by teachers in private conversations with me. During that meeting, Amit referenced a conversation with his students about the issue of sexual orientation, which had been precipitated by Jessica's blog about her bisexuality:

Do you remember that blog entry, Amy? The one about bisexuality? ... We had to come out and make a statement and some of them were unsure what it was. Well, for some of them it's quite a shock, like ... [one girl] was not able to wrap her head around it. (25/8/2010 Teacher Call)

This recounting by Amit was then linked to the field notes and video from the session in which the Indian students discussed bisexuality and Jessica's blog, as well as linked to earlier conversations around sexuality and to young people's online interactions.

This kind of thematic unfolding that we have tried to render methodologically is a central characteristic of what Leander and Boldt (2013) call the constant movement and flux of meaning making, which always involves "a rhythm of continuity and discontinuity, with some possibilities moving toward closure even as others catch fire" (p. 43). We hope to have illustrated how the theme of sexuality

"caught fire" in the S2C8 community, not necessarily through direct or implicit referencing across sites, individuals, or artifacts. Rather, we found that the emergence of this theme was tied to historically situated and temporally relevant discourses circulating in the various communities in which S2C8 members participated. These discourses touched an emotional chord, resonating with participants' personal experiences and feelings that amplified the meaning and importance (Immordino-Yang & Damasio, 2007).

Resonance, as echoes and parallels across activity systems, are not easily traced, since they emerge in rhizomatic fashion and do not follow a linear trajectory. To wit, we might examine how videos "go viral", catching fire and spreading because they resonate with people in a particular way, for a specific moment in time, and instantiate broader and more widely circulating cultural, historical, and ideological discourses. Meaning making in networked contexts is characterized by such resonances, which serve to build affinity and highlight connections between people. They can be interactionally built over time between interlocutors (Hull et al., 2013; cf. DuBois, 2007) or emergent from semiotic activity in networked contexts. In the S2C8 community, the topic of sexuality, and by extension youth autonomy and identity, resonated with participants beginning in July 2010, creating a rich semiotic environment that helped to build affinity and foreground connections between participants. Over time, as multiple people took up ideas around sexuality in different forms and ways, the echoes and parallels became amplified, creating tremors in the entire system and leading to youth and teacher action (e.g., the Indian participants led a march against gender violence and made a documentary about their efforts). Resonances from these artifacts and interactions have continued to ripple outward even three years later, as new participants find these archived conversations and returning participants revive conversations. While we studied resonances after they occurred, we believe that identifying and following resonance as it occurs has the potential to enrich analysis of networked interactions and reveal important insights about networked communicative practices. Our task, as we see it, is to reframe our methodological lenses to take into better account how meaning making resonates in networked spaces.

CHALLENGES IN TRACING RESONANCE

It is clear that the complexity of researching meaning making in a world characterized by global, networked flows and constantly emerging technologies requires that we expand our methodologies accordingly. Whether adopting creative (Buckingham, 2009) or visual methods (Pink, 2001), borrowing methods from disciplines like art (Barone & Eisner, 2012), or extending ethnographic methods (Coleman, 2010; Hine, 2000), educational researchers have made a compelling case for how to expand our methodological horizons by becoming what Denzin and Lincoln (2011) call "methodological (and epistemological) bricoleur[s]" (p. 681) who choose from an array of possibilities for developing knowledge of the social world. What we hope to have illustrated here is the need to weave those multiple methodologies together, to create synergy between data collection and

analysis and to employ multimodal, networked technologies to do so, in order to address the multidimensional complexities of meaning making now.

One of the most pressing challenges that we attempted to illustrate by tracing resonance across the S2C8 community is the difficulty of tracing movements of people, texts, and ideas across space and time. This cross-contextual meaning making, which often manifests as resonances in networked contexts, remains difficult to address methodologically. Part of the challenge rests in understanding the varied and dynamic perspectives that emerge in networked spaces, especially the resonances that ripple and echo across multiple mobile and interconnected meaning making contexts. When we frame such a dynamic process in two dimensions or render the data collection or analysis static in order to make sense of it, we run the risk of losing the emergent and emotional dimensions of the process. The S2C8 network, with participants making meaning across multiple languages, modalities, and spaces, provided a complex testing ground for exploring this cross-contextual tracing across online and offline spaces using multiple methodologies over time. We suggest that tracing resonance in recursive cycles might be well suited to meaning making's emergent and emotional dimensions, something we could not address because we only came to our realizations after the data was collected.

The second challenge we highlighted was related to the first, and that involves how to address the multiplicity of data available to us. While methodological multiplicity – working across qualitative and quantitative data and using new technologies to collect and represent data – is increasingly supported and encouraged (e.g., Denzin & Lincoln, 2011; Robinson & Mendelson, 2012), it raises difficult questions about how to make sense of the data in relationship to one another. As people make meaning across vast networks of people, spaces, and texts, relying on one method, even an expanded one, does not offer the same explanatory potential as a hybrid cross-section of methods from a diversity of traditions. Since networks are themselves hybrid spaces, characterized by resonance and other complex phenomena, we need methodological approaches that are similarly multidimensional and that help us make sense of complex phenomena like resonance via synthesis across methodologies.

Finally, we must take into account how our participation in these networked spaces implicates us ethically in new ways. One way to address these ethical considerations is for researchers to adopt a reflexive position and to articulate that positionality for the reading public and for our participants. A second way is to make visible our methodological decisions, justifying how and why we navigated the methodological landscape in the way we did (Baym & Markham, 2009; Smagorinsky, 2008).

We hope that by illustrating the difficult challenges we face as researchers investigating practices that are constantly in flux (Gallagher & Freeman, 2011) – using ICTs even as we study others using them – we have extended the notion of an expanded methodological toolkit. No longer merely participant observers, researchers are now technologically complicit, and acknowledging the

complexities that this raises offers new possibilities for innovation that require critical dialogue about traditional qualitative practices.

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