

# 7

## Video Analysis in Digital Literacy Studies: Exploring Innovative Methods

*Roberto de Roock, Ibrar Bhatt and Jonathon Adams*

### Introduction

#### Vignette Part A

Marta, an 11-year-old student, watches as Mrs Smith, her experienced language arts teacher, projects an image on the board of the digital poster creation app, Glogster.com. She walks students through the next part of their activity creating posters promoting pet welfare for a local animal shelter contest. As students upright their laptop screens and begin working, Marta dives into her class work with her friend and collaborator, with the app open on her laptop on a project that will eventually win the classroom contest.

#### Vignette Part B

Simultaneously, Marta clicks back to an open window to resume the massively multiplayer online game she had been playing during lunchtime, Movie Star Planet.<sup>1</sup> Here she continues composing her avatar's profile narrative, interacts with a friend in another classroom through their in-game characters and plays mini-games with dozens of other players among the thousands currently online. Nearly all of them are strangers to each other from all over the world, yet core participants in this online community. Marta quietly discusses what she is doing in the game with her classmate and will continue through private messages in Movie Star Planet during her next class.

The above vignette is taken from a classroom ethnography (de Roock, 2015) examining the 1:1 integration of laptops into the classroom

curriculum, exploring how students resist and respond to the 'official' curriculum along with their unofficial, or non-standardized, literacy practices (Barton and Hamilton, 1998), the latter largely exemplified in off-task activities such as social chat and game-play. Fairly 'standard' classroom ethnography methods (Watson-Gegeo, 1997) were used: the researcher took notes while a tripod mounted professional grade camcorder recorded student and teacher talk and movements over a period of eight months, along with semi-structured interviews. From these methods, data emerged which resulted in vignette Part A. These particular data uncover a structured and largely procedural engagement of the project, channelled through the dictates of the official curriculum.

Through software installed on the student laptops to record students' faces via webcams, talk through their laptop mics and a multitude of computer activities including video of their on-screen actions, a profoundly more complex picture of 'what happened' began to emerge, including data that informed vignette Part B. These data reveal Marta's complex and nuanced digital poster construction process along with a rich and varied digital 'underlife' (Goffman, 1961) within the classroom, including consequential engagement (Gresalfi et al., 2009) with literacy tools through digital composition and social interaction within a virtual world. Such salient insights gained about Mrs Smith and Marta were absent in vignette Part A and would have been overlooked in 'standard' ethnography, but were captured in the second layer of data (see Figure 7.1) reassembled in vignette Part B. This is a characteristic example of the kinds of insights we wish to explore and share in this chapter.

As technology rapidly develops, researchers are left with the challenge to adapt their methods and data analysis practices to address new research problems in a different light, and in ways that match the pace of change. As interactions and literacy practices are increasingly played out in digital environments (such as, online, through digital devices and mediated by software and hardware), new ways to examine them need to be explored. The *capture*, *analysis* and *representation* of multi-modal data pose many challenges and remain 'contentious and as yet unresolved' in much multi-modal literacy research (Flewitt, 2011, p.295).

In this chapter, we extend this discussion and address this lack of resolution by drawing together insights gained from three separate, yet methodologically, similar studies. Building on our previous work (e.g. Bhatt and de Roock, 2013; Bhatt et al., 2015), our intention is to bring the practical tools of our data collection, management, ethical issues and broader implications to bear on a much-needed theorization of



Figure 7.1 Transana's interface

*Note:* Clockwise from top left: audio waveform; two synced video streams including a screen-in-screen image of Marta's Movistar Planet gameplay; data management trees; and a unified transcript.

*Source:* de Roock (2015).

transformative digital methods. We hope – and have found in our own work – that this allows for deeper exploration of emerging digitally mediated practices and their theoretical and disciplinary implications in Literacy Studies and the social sciences more broadly.

## Literacy Studies

In this section, we orient the general reader to the field of Literacy Studies to better understand the theory, context and research problems that steer our methodological considerations. Barton (2001) describes Literacy Studies as originating from scholars such as Giroux (1983), Willinsky (1990), Bloome and Green (1991), Gee (2000), Baynham (1995), Scribner and Cole (1981), Heath (1983) and Street (1984) who are united theoretically in using ‘an everyday event as a starting point’ (Barton, 2007, p.4) for examining literacy and therefore approaches people’s practices with texts ‘as much a part of learned behaviour as are ways of eating, sitting, playing games and building houses’ (Heath, 1982, p.49). This was a significant change in the direction of literacy research from earlier ‘autonomous’ models of literacy which framed literacy as a ‘uniform set of technical skills’ (Street, 2001) to be applied the

same everywhere. Literacy Studies acknowledges the breakdown of the 'dichotomy between oral and literate traditions' (Heath, 1982, p.49) and places considerable attention on local context.

Following other Literacy Studies research, we employed the lens of *literacy events* and *practices* to understand literacy practices as communities themselves understand them (Street, 2001) within our particular research contexts. The definition of *practice* adopted in Literacy Studies emerges from the broader field of Bourdieusian sociology (Bourdieu, 1977). Scribner and Cole (1981, p.236) define *practice* as 'a recurrent, goal-directed sequence of activities using a particular technology and particular systems of knowledge'. We are also influenced by a notion of practice as performances of realities from ordered patterns of relations between entities (Law, 2012).

Our notion of *events* draw from the foundational works in Literacy Studies (Heath, 1983; Street, 1984, 1993, 2009) and frame the interaction being analysed, which are embedded within broader *literacy practices*. *Digital literacy events* thus are empirical occasions in which digital text is central and is mediated, produced, received, distributed, exchanged and so on via 'digital codification' (Lankshear and Knobel, 2008, p.5). Taken together, our analytical and empirical task of investigating digital literacy practices involves the textual activities, their resultant texts, the patterns of behaviour surrounding their creation, attitudes and values that inform them (through broader ethnographic detail) and the overall material environment. With these sensibilities, an exploration of digital literacy events must incorporate an exploration of the practices being constructed and maintained across multiple modalities and timescales (Lemke, 2000).

## Research methods in Literacy Studies

While research on literacy phenomena takes on virtually every imaginable form (Duke and Mallette, 2011) from case studies to experimental designs to aggregate statistical analysis, Literacy Studies has usually taken an ethnographic approach, with methodological approaches that seek out naturalistic data (Heath, 1984, p.252). Heath and Street (2008, p.29) define literacy ethnographies as involving 'detailed systematic observing, recording, and analysing of human behaviour in specifiable spaces and interactions', with a wide variety of data collection methods including 'surveys, formal interviews, focus groups, photography, and activity logs along with spatial maps, video recorders, or audio recorders'. Therefore, much of the toolkit for data collection utilized and

theorized about in Literacy Studies involves non-digital materials and a central role of the researcher as an 'instrument' of data collection.

In problematizing ethnographic research in digital environments, we build on Hine's (2004, p.1) notion of *virtual ethnography*, which is 'adaptive ... to the conditions in which it finds itself'. Digital literacy events are, in this respect, multi-modal and made up of multiple resources such as video, text, sound and image. The wide range of communicative modes are subsequently united as a complete package and 'made of the same stuff and fabricated on the same plane' (Cope and Kalantzis, 2004, p.215). This is salient, as the kinds of data emerging from their exploration needs to reflect this complexity, in contrast to more traditional ethnographic traditions that rely on text-based transcripts supported by still images.

The tools used to capture such data therefore need to allow a wide range of communicative modes to be analysed together. The methodological shift in recording digitally rich data is reflected in the development of theories exploring communication under the general heading 'multi-modality'. Multi-modal research is where multiple forms of meaning making are considered beyond the spoken text and therefore require richer data than text-only transcripts of spoken data, such as gaze, gesture and proxemic relations of social actors. Through our work with digital literacies, we agree with Norris's (2002) contention that in order for 'adequate' multi-modal analysis, it is a prerequisite to develop multi-modal transcription methods for video data.

## Video analysis

With the employment of new technologies, audio and video data collection has become common in the analysis of interaction (Heath et al., 2010; Knoblauch, 2012). The kinds of multi-modal data which emerge and their diversity of form present particular challenges, which require 'descriptive and analytical tools that can both accommodate their variability and reflect their complexity' (Flewitt, 2009, p.40). Knoblauch and Schnettler (2012) argue that video analysis – the sequential analysis of naturalistic interactional video data – requires methodological rigour along with a deep foundation in ethnographic fieldwork.

## Video recording

With rapid developments in digital media, a wide range of recording devices have become available to researchers in the form of inexpensive handheld video cameras, video-recording-enabled phones and

portable media players, as well as small, wearable video hardware such as GoPro and Swivl. The question of what these additions do to the ethnographic toolkit of literacy research is addressed by Kuipers (2004, p.167), who argues that rather than simply increasing the amount of data, video actually ‘forces us to confront ethnographic subjects as actors who are managing information in a multi-modal environment’. This framing of the employment of video highlights the questions we raised when deciding to employ video data and subsequently influenced later choices including what additional instruments we would adopt.

The role of video also needs to be understood in context. As a tool for the collection of data, its impact on the collection of data needs to be thought out. The use of video recording may seem straightforward, but there are many considerations beyond merely framing a lens for recording. According to Silverman’s (2013, p.62) guide to qualitative research ‘one camera is fine for most purposes’, which carries the assumption that ‘most purposes’ are the same. However, if the focus is on the interactions between gesture, gaze and other communicative modes alongside online textual practices, then multiple cameras and/or another dimension of viewing will be necessary. This is what leads us to adopt screen recording alongside video.

### **Screen recording with video**

Screen recording can be used as a tool to record the processes of on-screen composition (Geisler and Slattery, 2007). This can also be achieved with additional features from qualitative and quantitative dimensions using screen casting or usability-testing software such as TechSmith’s Morae (Asselin and Moayeri, 2010). Synchronously capturing learners’ complete interactions on- and off-screen was attempted by Bigum and Gilding (1985) some 30 years ago. For them, writing, movements and talk around a task required two monitors, a video mixer, a video tape recorder and a means of splitting the computer video signal. More recent and linguistically oriented studies that involve screen-capture include explorations of news writing production (Catenaccio et al., 2011), discursive analysis of Facebook chats (Meredith and Stokoe, 2014) and its use alongside think-aloud techniques in gauging Internet literacy practices (Asselin and Moayeri, 2010).

### **Computer Assisted Qualitative Data Analysis Software**

Software tools are virtually a necessity to organize and manage data produced by video ethnography and analysis. The use of Computer Assisted

Qualitative Data Analysis Software (CAQDAS) has become standard practice in many forms of qualitative analysis. The affordances of different CAQDAS products to manage and facilitate analysis emerges from the potentially overwhelming complexity of data in terms of files and density of data. For example, the combination of multiple video angles with screen-in-screen format we adopted naturally necessitated the use of the most appropriate CAQDAS tools particularly to aid transcription creation and manipulability.

The software we chose was influenced by the questions we formulated and sought to address (Cohen et al., 2007). We therefore turned to the various forms of ‘bleeding edge’ (Woods and Dempster, 2011) CAQDAS to aid our researches and prepare and present our transcripts. In our cases, these were ELAN (Wittenburg et al., 2006) and Transana (Woods and Dempster, 2011), which allow for deeper insights into the character of the interactions taking place during classroom activities.

These software enable all files to be viewed in one interface, so specific points in the recordings could be revisited, viewed at multiple speeds with both video angles simultaneously and transcribed on one or more transcripts. ELAN’s interface supports a transcriptional system along a horizontal timeline (Bezemer and Mavers, 2011) to represent multiple modalities whereas Transana is designed for more standard, detailed vertical transcriptions in the tradition of Conversation Analysis (Woods and Dempster, 2011).

An important point to remember with CAQDAS is that it organizes and structures data for analysis but does not *do* the analysis. Interpretative work is still necessary, and issues of CAQDAS epistemologies emerge, as researchers are bound by the biases and leanings of software designers in terms of coding and interface representation (Bhatt and de Roock, 2013), which influences the interpretation of data. For example, while Transana is biased towards more traditional Jeffersonian vertical transcripts (as shown in Figure 7.1), ELAN allows the representation of multi-modal data in ‘modal stacks’.

## Digital tools for digital literacies

In our own efforts to capture ongoing naturalistic interactions between social actors and mediating tools (computers, whiteboards, peers, teachers and so on), we utilize a range of software, hardware and theoretical resources to capture and analyse gesture, spoken language, textual practices and interactions with digital actors. What follows is

a combined reflection of three separate yet methodologically similar research projects conducted in uniquely different classroom contexts: a UK Further Education college (Bhatt, 2012), a Japanese university (Adams, 2013) and a US sixth-grade primary Mexican-American classroom (de Roock, 2015).

### **Capturing digital literacy events**

Our methodological setups were designed to capture and explore the construction of meanings and choreography of digitally mediated practices. We analysed 'social action' (Scollon, 2009, p.6) in the digital literacy events, which involved meaning making with mediating digital texts and the communicative resources available to the actors such as gesture, gaze and spoken language. Influenced by approaches to ethnomethodological video analysis (Koschmann et al., 2007; Heath et al., 2010), the focus was on the step-by-step construction of meanings through the microanalysis of communicative modes during the unfolding of student 'work' (the official classroom literacy practices) and 'play' (the unofficial literacy practices highlighted in vignette Part B) in the classrooms.

The screen-in-screen format (with synchronized audio) was captured using Blueberry Flashback Recorder on student laptops along with video and audio from an HD tripod mounted camera. Recordings were captured from students sitting in groups and later synchronized. Combined with researcher field notes, this generated a detailed data stream of ongoing interaction with, through and around the student laptops on multiple computers simultaneously with a wider shot to capture higher-quality audio and gestures, as well as facilitating ease of syncing. The ability to view and transcribe multiple video of on-screen and off-screen activity simultaneously was essential to explore the emergent digital literacy events and practices.

Video cameras were used to capture both the interactions of the participants with the computer screen (such as tracing the goal of deictic finger gestures) and to capture facial expressions and other activity between the students in front of the computer and, if necessary, the teachers. Screen recording software was incorporated into setups in order to capture all screen activity and audio using the computer microphone, which proved less physically intrusive than an external microphone. Due to their tight framing, built-in webcams did not prove particularly useful for analysis beyond data management and identification of speaker, but external USB webcams functioned much as camcorders with the advantage of being integrated into the screen-in-screen image by Flashback.



## Management and analysis

Data management when conducting video analysis includes a number of additional layers of decision-making than other methods. The video files were large and the Flashback files were in proprietary format, so had to be converted and reduced in size. This was a time-consuming process, but the resulting video resolution was clear enough for detailed analysis, and high-quality audio targeting interaction near the laptop was preserved. Supporting ethnographic field notes were also part of the methodologies to contextualize the video during later analysis (Knoblauch and Schnettler, 2012).

Data were managed using Transana to group recordings by session and create common gisting 'transcript' files. These summaries of the data were then coded using a grounded method (Glaser and Strauss, 1968) to focus on phenomena of interest and grouped thematically. Particular clips were then exported to ELAN where they were synced for multi-modal transcription and analysis. The subsequent representational systems that emerged (Figure 7.1, using Transana) integrate the combined modes of actors' activities as digital texts are created.

Multiple views of salient instances provided an opportunity for deep dives into the digital literacy events. CAQDAS tools afforded manipulability (slowing down, segmentation, etc.) and multi-modal conventions (Bezemer and Mavers, 2011) to account for the complex interplay of related of practices we see Marta engaging in (in vignette Part B). These include her gazes and movements, talk around the task and interactions with search engines, *Movie Star Planet* and other websites. Importantly, and as we have seen, these are not always work-related practices, but the subsequent representational system which emerged integrates these yet allows us to parse them out for analytic attention, as her work is being done (e.g. see Figure 7.1).

While this resulted in rich findings, transcripts (whether vertical or horizontal) and still images limit the presentation of the data in academic journals, although possibilities for sharing the multi-modal data online are being explored. Still images lose the richness of data, and detailed transcripts are difficult to understand. One strategy we use in presenting findings in digestible ways is rendering salient segments into vignettes (as we do in the opening of this article) to 'tell a story' of the unfolding of a digital literacy event. This proves useful primarily for written presentation style and ease of reading for analysis purposes.

## Findings

Our methods brought careful attention to the ecology of digital practices and interactions. We were able to uncover aspects of the complex

and close relationship between the communicative resources employed by social actors and mediating tools in digital literacy activity, the features of the texts being written and the construction of meaning making surrounding it, and the influence of web-based actants (search engines, virtual worlds and so forth). Through video transcripts, high amounts of deictic gesture (both through gaze and hand use) were employed in meaning making and structuring the interactions. The spoken content was also shaped by the text types, with spoken meanings directed to what could be observed in the videos with minimal personal input such as summarizing or expressing feelings.

Added to this, screen recording brought a dimension that forced us to rethink how classroom activities are carried out. We discovered literacies of typically outside-of-classroom origins being mobilized as resources inside of the classroom, such as Marta's creative distribution of attention evident in vignette B, which blurs the distinction between her digital literacy practices construed as either 'work' or 'play' in nature; these are precisely the interactions between the official and unofficial digital literacy practices highlighted in our introduction.

Deep exploration into digital literacy events, each with a particular focus, found the girls' enactments of literacy and identity transformed when laptops facilitated their peer network's entanglement with a pre-existing assemblage of other adolescents, software developers, hardware and software, which they in turn transformed through participation in the online multiplayer world. A mindful combination of theory and video technology allowed a detailed analysis of the network's various 'moving parts' that interfaced with the girls in the emergence of the literacy events.

In one of our research projects (Adams, 2013), ELAN made possible the analyses of hand gestures in combination with the spoken language. As some gestures were under 0.5 seconds long, identifying and analysing these and their relation to particular speech events yielded various insights into multi-modal meaning making, something which would not have been possible through field notes and observation alone. In another of our studies, through the transcriptional system of ELAN a student's use of Google search to guide composition was conceptualized as an interaction (Bhatt and de Roock, 2013).

In the instance of Marta's practices (de Roock, 2015), the Glogster.com digital poster created by her and her partner, while winning the class competition for best design, largely echoed the teacher/classroom discourse while contrasting sharply with both community norms and the relatively complex design of their online profiles and avatars in

*Movie Star Planet*. From a pedagogical perspective, such practices address broader digital literacies and participation skills (Jenkins et al., 2006) that were generally lacking with in-school and less complex informal practices, indicating the importance of understanding and drawing on the non-curricular digital media practices of students, video games in particular (Gee, 2000, 2004, 2010; Gee and Hayes, 2010).

## Expanding the discussion on digital methods

Technologies for digital methods have the potential to ‘expand the perceptual capabilities’ of researchers, ‘enabling them to see or hear... in more detail’ (Greeno, 2009, p.814). The insights outlined above demonstrate the complexities and diverse range of issues that need to be considered when employing digital methods in research into communication framed within Literacy Studies. But the implications are potentially much wider than Literacy Studies and can be considered in the broader area of social sciences where human activity is being captured and analysed in a multitude of contexts.

### Key lessons learned

As Flewitt (2009) suggests, a critical stance on the impact of new technologies on communication is necessary, and this stance applies to each step in the choice of methods, analysis, data management and preferred representation of data. The following section offers a summary of key lessons learned in our application and reflections on the choices made with our digital methods.

First, in the set-up of screen recording software, installation was carried out either on the researchers’ personal computers or on those of the students. When installed on student computers, security and software issues posed some barriers but ultimately allowed recording multiple instances at once and facilitated ease of students starting and stopping recording at will (Asselin and Moayeri, 2010). Using the researchers’ computer posed other problems as participants were using different computers to those they were familiar with in their classroom practices. This was reduced by introducing the researchers’ computers for a period of time before the data collection sessions. In both setups, issues such as the software crashes or students prematurely shutting down the computer resulted in loss of data for that session. This risk can be reduced but never eliminated by, carrying out several trial runs before the main data collection, perhaps as part of a pilot study, or using multiple redundant data sources for high stakes recordings.

For the capture of audio, boom microphones attached to the cameras and wireless versions were employed for one of our projects. The internal microphones of the computer were also used to capture participants' audio as they worked on their class projects. We recommend high-quality omnidirectional microphones that work via the computers and screen recording software thereby syncing automatically and picking up talk around the task and even the entire class if required.

The number of cameras and angles were decided based on the focus of capture and research interest. Camcorders enabled a wider angle of recording to capture the space around the participants. They are also small, reducing the possible intrusiveness of such equipment for the participants. Positioning the camera at an angle to the participants (instead of directly opposite them) also appeared to make the cameras less intrusive as the recording 'eyes' did not 'stare' directly towards them in their immediate field of vision. These decisions, of course, are influenced by a range of research concerns including the extent to which features such as gaze, paralanguage, interaction with peers and so on are central to the research questions being explored.

## **Ethics**

Ethical practices around video material are less established than with numerical and text-based research (Prosser and Loxley, 2008) and remain fairly undefined and ambiguous in institutional guidelines for ethical approval. With informed consent, for example, permission regarding the collection of data involves not just the site of the recording but the reproduction of the material including the potential altering of images, followed by editing of sequences of video, which could frame the actions of a participant in a different light. In our research, care was taken to avoid any potential problems by using screen recordings and clearly stating the context of the still images as extended sequences of interaction in representing the data in the write-ups. One way of avoiding this was giving the option for participants to have their faces concealed if they were to be used in publications outside of the initial project.

Also, related to screen recording is the issue of 'incidental data' (Asselin and Moayeri, 2010) and the potential invasive nature of detailed and continuous screen recording. With the screen capture software chosen, participants can have the option to pause and restart the recording during the recording process using a pause/restart icon in the taskbar menu. Participants were also able to inform us if there were any sections of the recording that they wanted to delete. In one

of our studies, this was achieved by a review of the recording in a follow up interview in which the recording was discussed. Also with such data capture, complete anonymity can be difficult to maintain, as participants' movements and screen activity are of importance for analysis and evidence. To address security concerns, data were kept in encrypted, password-protected folders when stored both offline and in cloud storage.

We suggest that protocols surrounding approval of such digital methods become more clearly defined with the following guiding questions:

- Should data be stored *only* in a secure, encrypted, password-protected digital environment with commercial data security protection, even if not housed at the researcher's institution?
- Should incidental data of non-participants be continually obscured or deleted?
- Should participants be allowed the option to pause and restart recordings, then to review and delete recordings?
- Should participants be allowed the option that their faces be pixelated or blocked out in screenshots?

## Conclusion

At a time when social lives, interactions and literacy practices are increasingly played out with mediating digital technology, new methods offer different ways of addressing research questions, stimulate researchers to ask new questions and in so doing generate new forms of data. Our work is grounded in Literacy Studies and its ethnographic commitment to carry out 'descriptions that take into account the perspectives of members of a social group, including the beliefs and values that underlie and organize the activities and utterances' (Schieffelin and Gilmore, 1986, p.viii). With our sites of investigation framed as 'digital literacy events' and located within the broader social and literacy practices such events build and maintain, Literacy Studies presents a theoretical approach to explore a wide range of interaction across a wide range of evolving social practices. As Barton (2007) states, literacy is 'ecological'; it is embedded in other human activity, social life and thought and position in history.

The approach we have detailed builds on other ethnographic traditions committed to better understanding human activity in digital environments. Some examples include online and Internet ethnography (Hine, 2004), 'connective ethnography' (Leander, 2008) and other

ethnographic approaches to researching computer mediated communication (e.g. Barnes, 2002; Konijn, 2008). In placing ourselves within such lineage, we stress that, while proficiency with digital research tools are a prerequisite to effectively carry out digital data gathering, management and analysis, it is only one aspect of the research process. Traditional analogue interpretative work by researchers remains at the heart of the process and this is unchanged, if potentially enhanced, with digital methods.

## Note

1. A Danish fashion themed free-to-play massively multiplayer online game (MMO), [www.moviestarplanet.com](http://www.moviestarplanet.com).

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