Video Representations
and the Perspectivity Framework:
Epistemology, Ethnography,
Evaluation, and Ethics

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INTRODUCTION

In the first collected volume of essays on the use of visual representations in the social sciences, Principles of Visual Anthropology edited by Paul Hockings in 1973, Margaret Mead remarks that the "hazards of bias, both in those who film from their own particular cultural framework and in those who see their own filmed culture through distorting lenses, could be compensated for...by the corrective of different culturally based viewpoints" (p. 8). Having pioneered the use of visual anthropology with cybernetician Gregory Bateson in the late 1930s, her article challenges anthropologists to change their research practice. Her fear was that cultures would disappear with the spread of modernity and that valuable knowledge of cultural performance in worlds still untouched by industrialization would be lost forever.

Those who have been the loudest in their demand for "scientific" work have been least willing to use instruments that would do for anthropology what instrumentation has done for other sciences—refine and expand the areas of accurate observation. (p. 10)
The practice of anthropology and the study of education have several overlapping similarities—both are grounded in what people say and do when they are in the act of thinking, making, and creating. Both have a history of valuing “outcomes”—artifacts or material representations that demonstrate achievement and advancement. In both practices, there are communities of practice that point out the perils of valuing outcomes more than processes. And, both anthropologists and educators have moved from notions of the grand narrative to a focus on **local, situated knowledge** (Brown, Collins, & Duguid, 1996; Geertz, 1983).

Both disciplines also face an important complexity that Mead could not have foreseen in 1973—how the use of networked visual data, tools, and methods enable researchers not only to reflect more deeply on their observations, but also on the entire research process that has moved away from the solitary researcher to the community with multiple stakeholders. Within the global community, it is no longer possible to describe others as being part of a scientific endeavor without addressing what is commonly referred to as the crisis of representation—the dilemma we face when we try to represent others and ourselves as we cross the boundaries of gender, race, identity, culture, time, and location. We now take a more reflective and ethical look at what is involved in the scientific investigation of human meaning making. As researchers of learning, we now use video, text, and sound as elements that are put together in ways that resemble the collage movement in mid-20th century art. For example, a free web tool called a **wiki** becomes a community space for community members to represent their own voices in ways that were not possible when Mead first studied the Samoans. Video, text, and sounds are now pixels that can be manipulated, sized, shaped, segmented, layered, not streams of moving images from one filmmaker’s perspective. Nevertheless, as educational researchers, we still want to know that we have a way to come close to understanding what happens in the learning culture as we observe and participate within it. It is our human nature to make sense of what we experience. And, as researchers of learning, we want to be able to use theories, tools, and methods of investigation that will result in making learning not only sensible to ourselves, but also, more meaningful for learners. As we learn to participate in the global online community, we might want to consider that the full range of continually emerging media forms can and will be used to describe, interpret, and represent what was happening for the members of the community “by the corrective of different culturally based viewpoints.”

**FRAMING CHALLENGING QUESTIONS**

During these past two decades, I have written, almost exclusively, about the need to embrace diverse **points of viewing** (Goldman-Segall, 1990, 1996, 1998) to prevent the hazards of bias, misrepresentation, and missed-representation, emphasizing the affordances of using advanced video technologies. In the digital commons, knowledge is shared simultaneously, immediately, and sometimes without safeguards. Although this can be somewhat unnerving for educational researchers, the real hazard we now face, 30 years after Mead made her statement, would not only be the failure to use emerging video-based technologies to include diverse perspectives, but also the failure to take the time needed to reflect on how these technologies change every part of the
research process from the moment the camera is turned on. Perhaps we should begin the process of reflection from the time a researcher conceptualizes her study of others using video. Perhaps we should continue to examine how these emerging technologies are changing every part of the research process.

From the start of the video research process, educational researchers are confronted with five intertwined questions when using the video camera in research. The first one addresses the importance of understanding the affordances and problematics of using video in the learning sciences. What do we learn during our investigations while videotaping, editing, and analyzing video that we might not be able to learn without having this media form? Are these rich media artifacts a new way of understanding not only those we study, but also, ourselves as researchers as the camera is pointed in a certain direction tapping what the camera-person wants to display about these learning cultures? As you read the chapters in this book, you will notice the many affordances that video offers and how these affordances are often met with an equally strong challenge to overcome as researchers attend to the subtleties seen in every frame and in every stream of video. The authors selected for this book have experienced how repeated viewings, for example, are not only an affordance, but also a challenge. When does one stop re-viewing? What is enough viewing for a given study? How can we be sure? Another affordance is the ability to share with others what one sees with colleagues, teachers, and the learners themselves. The challenge is how to manage the rich commentaries and observations that others make on the video data. Another affordance that most every author in this book has had to confront is how the medium of video affects and changes the culture one is studying from the moment the camera is turned on. Can any of us, with real honesty, say that the camera is not affecting our actions? As Barron notes in her study of sixth graders:

Although it is possible that the video camera may have influenced student behavior, it is difficult to predict in which direction. Being recorded could as easily have been distracting as facilitating with respect to the attention of the student participants. (Barron, 2000, p. 397)

If we can learn not to act in front of a camera, how long does it take to establish that kind of composure? And, do we ever know, even when we seem comfortable with the camera taping us, if we are being true to ourselves? It seems obvious but necessary to state that we should not decide to not use video because our actions might be affected by the presence of the camera, but rather to accept the performative actions we demonstrate whenever we are being observed.

A second question to ask in our learning science community is whether the use of video in research is only an evidentiary tool or also a media form used to tell a story and convince viewers and readers of emerging texts so that they understand what happened to learners as the research was taking place. Let us use an ethnographic lens to address this question. Both modernist and postmodernist ethnographers have underscored the importance of being there (Geertz, 1973) or being with the community (Heshusius, 1994). The difference is that the postmodern
Goldman

ethnographer understood that convincing the reader that she was there was not the truth, but a partial truth (Clifford, 1986), a construction of what she experienced and how she interpreted that experience into a textual narrative. Traditionally, ethnographers used field notes to record what was happening as it happened, and, then retreated to an office close to their academic homes to write the compelling story. Often, field notes were gathered while the observing ethnographer sat at the back of a room or village huddled over her notebook. Later, during analysis and interpretation, the ethnographer constructed journal articles, chapters, and books. This was the way it was done. That is not to say that anthropologists did not engage in the life of a village. Many had deep relationships with informants and participants, sharing in the day-to-day lives of the places they studied.

Research with online digital video with easy access to online environments creates an even more complicated process in spite of the ease of pressing the record button on a camera and then downloading the video onto a computer. Each part of the research process can now be a community activity, with multiple feeds of data, shared video databases, and shared analysis tools. One can also predict in the very near future collages or blends from one “movie” to another, sharing databases (McWhinney, this volume). Researchers will be able to fluidly work either deductively (top down), inductively (down up), or by using both approaches simultaneously. They may also decide to explore themes as they review digital video records before the focus of the study is defined. Or, they may search video databases to build rich cases from large-scale quantitative or qualitative studies. The point is that video seems to put researchers not only in touch with the perspectives of those who design, participate in, and analyze the study, but also it puts them in touch with the multiple methods of conducting a study, a method we often refer to as triangulation. This will, no doubt, become more pervasive within and across research communities of the flattened world (Friedman, 2005).

This leads us to the third challenge we face. Each research community using video, even within the learning sciences, has a different epistemological understanding about what makes research valid, robust, and reliable. How each community uses and evaluates video will be different. Why? Each community uses video quite differently. Even within the ethnographic community, some collect video to create more closely grounded stories that include the full range of gestural, auditory, and contextual subtleties in the thick description of the event (Geertz, 1973). Others map video representations to “locate particular analyses in times and spaces” (Green, Skukauskaite, Dixon, & Cordova, this volume). Others design rich, multilayered stories that convince the reader that the author of the visual representations was “there.” Others use video because they find the medium pleasurable and compelling, a better way to tell stories that show readers what they mean (Tobin & Husch, this volume, Hayes, this volume.) In short, the exploration of how to use video in the learning sciences has just begun.

The fourth problematic area is evaluation. If the use of video in research practices is indeed as diverse as we now know it to be, how do we develop criteria that take into consideration the range of both evaluative measures and evaluative qualities for adjudicating the significance of research using video as a research tool?
Maple we do not need to use video when conducting a study of a learning environment. We should select the appropriate tools needed for a specific study in a particular setting—using whatever combination of media works best for data collection, analysis, and dissemination. What we need to understand is each method, whether qualitative, quantitative, and—what my colleagues (Goldman, Crosby, Swan, & Shea, 2004) and I refer to as—positive methods, will have a variety of evaluative criteria, sometimes overlapping, and sometimes not.

Over the coming decade, many of the authors in this book will have participated in two symposia sponsored by the National Academies in Washington. The press of the National Research Council produced a report called The Power of Video Technology in International Comparative Research in Education (Ullesicz & Beatty, 2001). Certainly the challenge of evaluating video—or what I more commonly refer to as eliciting the value of video research (e-Value-ation)—will continue to provide us with rich discussions on the changing nature of educational research. From my experience of presenting papers at these sessions (Goldman-Segall, 1999), I am quite certain that many diverse viewpoints of how to evaluate video research will continue to be examined with scrutiny, critical analysis, and rigor. And also with enthusiasm for this emerging methodological tool.

The fifth issue facing video researchers speaks to the main topic running throughout this chapter: How do video representations make us more aware of the ethical stances in our research practices? What are the ethical concerns of using video? Surely it is not just an issue of privacy and confidentiality, although those are important issues. What I propose is that by using video in research, researchers are faced with ethical issues in the research process that they might otherwise overlook. Capturing people on video reminds us of our colonialist past when early explorers collected plants, animals, and people during travels to exotic lands. If we use video representations as dissociated objects to display others, we are indeed repeating past mistakes. As I will discuss later in this chapter, facing the dark legacy of imperialism in educational research (Willinsky, 1998) may serve as a valuable warning to the next generation of video and media researchers in educational settings. As we critique the ventures of early explorers, botanists (Charles Darwin, for example), and collectors of cultural artifacts, we may think differently about how to design and use advanced video and media in the still mostly uncharted territory of learning environments. It is time to change our colonialist past, not only by designing more ethical tools, but also by changing our practices and beliefs about what we are doing when we use video in our research studies.

Frames for Video Research: Chapters in Part 1

What are we doing to address the challenges of using video research in the learning sciences? Although this book offers many diverse uses of video in classroom and informal settings as well as a range of tools used in empirical studies, in Part 1 of the book, authors address how they understand the nature and meaning of video research in the learning sciences. Each chapter takes a different epistemological outlook. Many offer frameworks. One offers a manifesto! And each of the authors has found a unique
way of describing how video influences their process of making meaning in and of educational settings and what particular challenges they each have faced in their use of video research. I have arranged these chapters with a narrative flow—a story of coherence within a broad range of diverse points of viewing.

**Jay Lemke**

[jW]e cannot understand the epistemology of video as representation unless we also understand the processes by which we make meaning with video when we experience it. I propose that we consider the semiotic uses of video in terms of the ways we meaningfully (and feelingfully) move across and through immediate and mediated attentional spaces. (Lemke, this volume)

Lemke uses an experiential and phenomenological approach to how video is used to study learning, pointing out the importance of materiality and the felt experience of using this “seductive” medium. He takes us on a journey that starts with the images we experienced inside that magic box called the television when it first arrived into our homes. He notes that the medium takes us beyond our living rooms and beyond ourselves into that other dimension, a dimension that is much more than the 2D images we are watching. He sets the stage for his main critique by warning that if we continue to follow Cartesian duality, we increase the separation between reality and representation rather than see them as intrinsically interconnected. We need to recognize that “all meaningful interactions with realities are also equally mediated by culture-specific interpretative codes, and thus share the feature that seems to distinguish ‘representations’ as such, but does not.” We need to understand how video and other emerging visual media such as electronic games demand (and offer) multiple attentional worlds to simultaneously experience.

Lemke suggests a provocative idea—we must begin to attend to the traversals, these “temporal-experiential linkings, sequences, and catenations of meaningful elements that deliberately or accidentally, but radically, cross genre boundaries” (Lemke, 2005). This is particularly true when, during our analyses of video records and inscriptions, we are “interacting with and interpreting in very specific ways a very partial (in both senses) record of an activity” (this volume).

**François Tochon**

François Tochon examines the voyage from video cases to video pedagogy as a path that can focus on the whole situated process of feedback. Viewers can reflect on their own process of learning and teaching by hearing the voice and watching the direction of the gaze. “The signs that organize knowledge construction can be decoded in video feedback” (Tochon, this volume).

In short, Tochon uses a semiotic approach for exploring the constructive meaning-making process. Tochon’s expertise is with video study groups. For example, experienced teachers videotape their language teaching methods, and then make video
presentations to show to student teachers in the teacher education program. Tochon then creates mini-cases for student teachers to reflect on their own cases. Supporting teacher professional growth through the use of video feedback "aims to objectify, conceptualize, and share practices, and then integrate the commonly developed theory into action (Tochon, this volume). However, this process is not about "consumption," but rather about shared exchange.

The frameworks—or the structures—Tochon applies to his video study groups are mastery, psychocognitive, sociocognitive, narrative, critical, and pragmatic. The key to integrating these various frameworks is to understand that readings of video texts must include a range of perspectives to achieve validation of meaning.

What stands out in Tochon's chapter is his discussion of the third construct, in addition to the first two, utopian ideals and aesthetics. "The third construct is emerging from visual and systematic feedback for reflective deconstruction and conceptual reconstruction. It uses video to educate in an attempt to integrate social change with aesthetic research." (Tochon, this volume).

Tochon, reviewing earlier research, reminds us of the connection among video research, signs, social effect, and social engagement. "If signs can have social effect, concepts have power. They can be used to transform society." (Tochon, this volume). This stance went underground for a decade with the advent of electronic media. Tochon contends, but now the conceptualization of using video in educational research seems to be taking a more integrative sociocognitive form based on shared reflections on present and future actions (Tochon, this volume). Video, for Tochon, becomes a mirror for those who are videotaped to reconsider their actions.

Joseph Tobin and Yeh Hsueh

Joseph Tobin and Yeh Hsueh have picked up the mantle of the importance of the pleasurable experience of using video. Tobin's earlier and groundbreaking video ethnography with Davidson and Wu (Tobin et al., 1989) established the importance of video as a form that gives pleasure. And, indeed, Tobin's work over 20 years now demonstrates how video productions of closely grained moments in the lives of young children in early childhood educational settings can be both aesthetically pleasing and effective social science research.

For videos of classrooms to function as provocation and stimulus, they must be hybrid constructions, blurred genres that are simultaneously social scientific documentary and works of art—if they come across as insufficiently systematic, they will be dismissed for lacking rigor; if they fail to be aesthetically artistic, they will be ignored for being boring and visually unappealing. (Tobin & Hsueh, this volume).

Listing ethnographies, documentaries, instructional videos, illustrations of best practices, and tools for critical reflection as specific genres, Tobin and Hsueh focus their lenses on both the ethnographic genre and the critical reflection genre as being essential for their video ethnographies.

As researchers, Tobin and Hsueh struggle with the challenge of coherence, among other challenges and trade-offs. One challenge is how to tell a narrative that is
engaging while editing the actual flow of events to a story that conveys meaning. For Tobin and Itsuch compelling narrative forms must have strong protagonists to engage the audience. Another other challenge is simultaneity of events. For example, how does one tell a story when events take place in more than one location?

However, what concerns them the most as they take us step by step through their process of making video ethnographies and sharing their excitement with us through the decision-making process, is that the pleasures involved in making and viewing videos need not be guilty pleasures.

Michael T. Hayes

Taking us on a journey into a school building in Northern Idaho, Michael T. Hayes tells us that each time he puts the camera to his eye, he gains "a different and new perspective on the building and the history that surrounds it" (Hayes, this volume). Although Hayes calls his chapter, "Overwhelmed by the Image: The Role of Aesthetics in Ethnographic Filmmaking," he is certainly not overwhelmed! He is simply viewing complex issues from a range of important perspectives, anddoes so with elegance and sensitivity. He conceptualizes aesthetics as a space where experience and representations of the world meet. For Hayes, experience and representation "overlap, merge, and blend in a shimmering movement."

He focuses on the aesthetic qualities of the image "to (re)present in visual form my physical, intellectual, and emotional encounter with the subject of my research" (Hayes, this volume). And indeed his textual representation not only describes two diverse ethnographic film events—the school in Northern Idaho and Waikok Beach in Hawaii—but also raises important theoretical and social issues. His most striking concern, and one I discuss later in this chapter, is the problematic nature of recording others—the danger of hegemonic practices when we point our camera and gaze upon others. Hayes notes that:

"[T]his terrain of power turns the persons,groups, or societies represented from the subject of the imagery into the subjected. They are entered into the ongoing legacy of the colonial project that defines the other thus entering them into a relationship of domination and subordination. (Hayes, this volume)"

Instead of continuing the legacy of colonization, Hayes uses the camera to "disrupt the conventions of authoritative voice and uncover the relationships of power that have quietly structured the ethnographic or documentary film style" (Hayes, this volume). His purpose is to enter the chaotic flow and to experience both difference and contradiction. In other words, by problematizing the images he represents, he "redirects the viewer's attention away from the content of the film and lodges it with the logic and the technique that guides its production" (Hayes, this volume, paraphrase).

Reminiscent of Marshall McLuhan's popular phrase "the medium is the message," Hayes refers to his technique and logic as the message. Yet, Hayes's intent is not to follow in the footsteps of McLuhan. Far from it. His intent is to disrupt the reader
and, through this disruption, connect the scientific and the artistic use of video in research.

My intent is not to degrade or abandon the scientific, because I find the intentions and purposes of scientific objectivity to be useful and important. By scientific, I am referring to the overarching cultural values of certainty, objectivity, ontology, and veracity. My intent is to harness the aesthetic qualities of the image and use them to repoint or redirect those aspects that conjure up veracity, reality, and objectivity (or perhaps it is to recapture and recreate the aesthetics that resides in the scientific). (Hayen, this volume)

Hayen opens the door for future educators to both conduct and represent research from an aesthetic perspective—and one must add, from a social conscience perspective, all the while searching for a new meaning of objectivity.

Shelley Goldman and Ray McDermott

Opening their chapter with the phrase by Goethe, “the hardest thing to see is in front of your eyes,” Goldman and McDermott describe a video case study of three boys—Boomer, Hector, and Ricardo—from their middle-school mathematics through applications project. The case study lives up to the words by Goethe that we do not often see what is right in front of us, making the point that what is needed is a close examination of “staying the course” with those we study, rather than giving up on them as learners. Theirs is a poignant discussion of the interactions among the group of boys engaged in learning mathematics and how assessment may miss what the video camera and the researchers do not. One will want to know more about Hector.

The case study is embedded in a behavioral and social interactionist theoretical framework. Their framework addresses the nature of video records and their significance to the research agenda. Goldman and McDermott are unequivocal when discussing video records; they become data only after

... emergent analytic frames are documented and systematically plied across multiple viewings. Not until the discourse is dissected and aligned with the behavioral record, one act at a time, and across time, can the opinions and biases of initial viewings give way to more empirically demonstrable accounts. Only then can the word “data” take its place in a research program. (Goldman & McDermott, this volume)

They are similarly certain that this “analytical advance has not resulted in general ways to help schoolchildren.” They are outraged that schools are still places of inequity where the promise of democracy is still a promise and not an actuality. Schooling has become a place where more attention is paid to examining students than teaching them or, in the case of research, observing how they learn.

My reading of their chapter is that they hope that applying their analysis approach (situated in conversation analysis and social interaction) of video analysis will lead to
taking away the obstacles children face, and will provide new opportunities for their success. Although video will not make analysis easier, they warn us, it “makes communication visible and potentially reveals behavior nested across levels in precarious and contested interactions” (Goldman and McDermott, this volume). Certainly, that was the case with one boy named Hector.

**Judith Green, Audra Skukskiute, Carol Dixon, and Ralph Córdova**

Green and her colleagues continue the discussion on video records. However, they focus on *interactional ethnography*, “a theoretically-driven approach that enables us to learn from the social and academic work of class members.” In this chapter, they describe Arturo and Alex, two students in a fifth-grade class. In essays written “across times and events,” the boys describe their insider/outsider perspectives of being members of the classroom culture while reflecting on their role as ethnographers of that culture. In contrast to Shelley Goldman and Ray McDermott, they do not see ethnography as being “procedurally specific ways inside an emergent and well-documented analytic program” (this volume). In *interactional ethnography*, the participants become researchers. Referring to others’ scholarly frameworks, Arturo uses “contrastive analysis to make visible ways in which life in the classroom was socially constructed, local, and often invisible to outsiders who do not share the history, meanings, and language that members have in common.” Needless to say, this chapter is close to my heart. It underscores the importance of ethnographic border crossing that we have witnessed as students construct their own portraits and thick descriptions of the cultures within which they participate. I have applied a somewhat similar ethnographic framework—the first was a study of elementary school students from the Hennigan School in the 1980s. These children participated in reflective video-based analyses during and after the filming of *The Growth of a Culture* (Goldman-Segall, 1988). This documentary was about children at the Hennigan School in Boston becoming ethnographers and epistemologists of their learning cultures. The second study at the Bayside Middle School (1998) involved middle-school students using video as their ethnographic research tool, constructing their own media portraits and collaborative analyses of curricular innovations during the early 1990s. As I wrote:

> My audiovisual ethnography is about co-construction; those I view use the same tools to view me and to view themselves. As I elicit meaning from others and from myself, so they elicit meaning from me and from themselves; in this way we build cultural artifacts as a community of inquiry. Images are reflected back and forth as our gazes meet. And, in the end, we are all affected as our relationship grows. (Goldman-Segall, 1998, p. 105)

For Green and colleagues, the use of the interactional ethnographic perspective is not only to involve students as ethnographers studying the growth of their learning cultures, but also to “guide secondary analysis within our ongoing ethnographic cor-
pus in K–20 classrooms (1–12 years of data collection per teacher). “In short, in Green and her colleagues’ studies, the teachers become cultural guides enabling the researchers to follow the history of science teaching over a 2-year period. And, indeed, in this chapter, Green and colleagues meticulously describe the identification, collection, and analysis of Ralph Córdova’s third- and fourth-grade classes. They focus both on the discourse of the social collective as well as on the individual acceptance or rejection of the resources. Similar to many ethnographic accounts, they examine how the individual and the culture are interconnected. Yet, building on Bakhin (1986), they weave new life into this discussion by ‘analyzing chains of (inter)action to construct grounded arguments about intentions speakers and hearers signal to each other’ (paraphrase). “From this perspective, what is captured on video records of classroom (and other institutional) life, are intentional actions among members of a sustaining social group” (this volume). Certainly, Green and her colleagues have touched one of the core issues in any expression of ethnography—ethnographic accounts are thick descriptions, winks upon winks upon winks, and turtles all the way down, as Clifford Geertz (1973) so vividly notes in his seminal work, The Interpretation of Cultures.

Timothy Koschmann, Gerry Stahl, and Alan Zemel

Koschmann, Stahl, and Zemel provoke and shock our sensibilities (and sensitivities) with an erudite chapter they call, “The Video Analyst’s Manifesto (or The Implications of Garfinkel’s Policies for Studying Instructional Practice in Design-Based Research).” They ask how we should study learning in an already designed context and what vocabulary we should use to express our theories of learning, theories that will help practitioners. To answer their questions, they propose the use of conversational analysis within an ethnomethodological framework, based on the writings of Howard Garfinkel. They acknowledge that they have chosen to name their chapter with the word, manifesto, to be provocative. Noting that other leading researchers have conducted ethnomethodologically informed studies in classrooms, they state that their application of ethnomethodology spearheads a different intention—to improve education through design-based research.

The chapter follows Garfinkel’s five policy requirements; indifference; contingently achieved accomplishments; relevance; accountability; and indexicality.

Note that indifference does not mean that the researchers are indifferent to those they study.

Ethnomethodology’s policy of indifference stands in stark contrast to the assumptions underlying conventional experimental research in education. … The policy of indifference not only suggests that any change will do for the purpose of demonstrating some phenomenon of interest, but also that such a demonstration can be based on a single case. (Koschmann, Stahl, & Zemel, this volume)

Indexicality can be defined as expressions of ‘knowledge of the context within which the expressions were produced,’ rather than content-free expressions. Locating
the utterance of a conversation within a context enables the analyst to get a handle on what that utterance means. (Here, one can see the link to the semiotic lens of video analysts.) In short, these authors suggest that Garfinkel’s indexicality policy provides a framework to study actions, not as individual events, but as

...resources by which actors can produce the sense of prior actions in light of the current action, and make relevant and sensible possible subsequent actions. This clashes with the view of context as a given, as a container within which actors do what they do. Instead, it posits the task for the video analyst of rendering an account of how members in their capacity as “order production staff” (Garfinkel, 2002, p. 102) go about constructing context through their indexical actions. (Koschmann, Stahl, & Zemel, this volume)

Frederick Erickson

Frederick Erickson takes a phenomenological approach to video analysis. He asks what people notice when they watch minimally edited footage. But, let's step back a bit. Minimally edited footage is video that is almost completely unedited; the footage simply captures what is occurring as events unfold, without the usual cinematic techniques of jump cuts, montage, and cutaways layered seamlessly over a soundtrack to simulate continuity. Erickson reminds us that watching minimally edited video is not easy for novice analysts. Viewers are socialized to making meaning of multiple edits that infer the meaning of an event rather than describe the event itself.

Note that Erickson is not advocating the analysis of long video streams. Even a clip of one minute can overload a novice viewer. (What Hayes calls being “overwhelmed by the image.”)

Referring to Stanley Fish’s 1980 book, _Is There a Text in This Class?_, Erickson reminds us that no one person reads a text in the same way. And, therefore, we read the video streams quite differently when we are in the process of analyzing them. To make his point, Erickson recounts how he showed minimally edited video footage of classrooms to his students. The focus of the camera was on a teacher who did not reflect her voice or praise the students. It took inexperienced practitioners a long time to realize that cultural factors were at play. The teacher was not disinterested and indifferent; rather, she was a Canadian First Nations (what is referred to in the United States as Native American) teacher teaching in a Canadian public school for First Nations students. As a First Nations member, a large range of voice inflection and laudatory praise are not how one converses. In other words, what the inexperienced teachers and video viewer needs to know is the context to understand the text of the classroom. And, he argues, that experience is crucial—both as a viewer as well as a teacher.

However, as we proceed in these design research attempts, further research on the phenomenology of viewing seems warranted, as done by viewes with differing life experiences and differing pedagogical commitments. (this volume)
In short, analysis of video data requires community scaffolding that occurs when minimally edited video is seen and heard phenomenologically.

THE PERSPECTIVITY FRAMEWORK: EPISTEMOLOGY, ETHNOGRAPHY, EVALUATION, AND ETHICS

To open the door and provide space for new researchers using video and other new emerging technologies, I want to offer an alternative framework for using video research in the social sciences called the perspectivity framework. I aim to provide a framework that both embraces conceptual diversity and encourages the use of advanced digital media technologies.

The perspectivity framework encompasses four cornerstones: Epistemology, Postmodern Ethnography, e-Value-ation, and Ethics—each to be discussed in this chapter.

The perspectivity framework illustrates how emerging video technologies become epistemological tools, perhaps better tools than any we have had to date, for researchers, viewers, and those being videotaped to share what they are seeing, making, doing, and thinking while in the process of learning. In short, the focus is also on process and not only on results. Digital video research environments using emerging construction and analysis tools provide a collaborative space for exploring the process of construction (See Cornerstone 4, this volume). Using these tools, we have the opportunity to share our roles as researchers and learners, breaking the hegemonic practices of capturing video records and shooting others. We can share the shooting, editing, and interpretations with those we study. We may even decide to involve the community in the design of the study to ensure that each stakeholder group has an opportunity to represent a range of perspectives.

The perspectivity framework acts as a conceptual scaffold to address the journey from bits and segments (video data in the small) into meaningful stories and valid results (video interpretations in the large). This framework is open, flexible, and inclusive of the diverse theories and methodological approaches that have emerged (and will continue to emerge) as researchers use digital video in their research. In the learning sciences, the theoretical approaches include constructionism (Papert, 1991), situated cognition (Lave & Wenger, 1991), anchored instruction (Bransford, Sherwood, & Hasselbring, 1988), design theory (Kolodner, 1995), and computer-supported collaborative learning (Koschmann, 1996; Stahl, 2006), to name but a few. The methods run the full range from quantitative to qualitative, and to what my colleagues and I have been calling, qualitative (Goldman et al., 2004), a form of research that included multimodal and diverse research methods, such as mixed, blended, or complimentary methods.

At its core, the perspectivity framework is a structure that encompasses a range of diverse lenses to view what occurs in a given setting when the camera is turned on, knowing that every stakeholder in front and behind the camera and monitor has a different interpretation of the event, one that may change as the video is later shared, annotated, and put into new configurations. The perspectivity framework also acknowledges that negotiating the meaning of events from multiple points of viewing...
enables a layering of diversity producing a clearer understanding of the complexity involved in knowing what happened in a given time and place. It also addresses the need for interacting with the artifacts or representations that are continually being created in the process of communication about meaning. As Rowland points out:

We come to know through interpretation, dialog, and negotiation of meaning with ... others, through a conversation with manipulation of the materials of a situation. (2004, p. 43)

One problem with building frames, even open ones such as the perspectivity framework, is best presented by Trinh Minh-Ha (1992) who brings to light the fact that the framer is always framed—entangled and perhaps complicit in the act of framing others. Thus, the framer of others is a conspirator unless she continually engages the perspectives of stakeholders in her presentations and interpretations. This commitment to nonhegemonic practices where those in the frame of the camera are not "othered" is at the core of the perspectivity framework. Perspectivity is an open framework, continually transforming itself with each new viewpoint and each new additional layer of interpretation.

The perspectivity framework addresses the problem of surveillance video and its ability to "frame" and "freeze" learners' knowledge production in their continually evolving performance. As those of us who use video in our research practice are aware, video is a very good record of what happened, but, like most media forms, it is always an incomplete story, subject to misrepresentation. Some of these problems can be overcome by including multiple perspectives and by using analysis technologies to build configurationally valid accounts from emergent patterns of convergence (Goldman-Segall, 1995). However, even with the best possible video analysis technologies, video data will always be subject to misinterpretation and bias. The "trick" is to accept and appreciate that, regardless of the method used, data are always subject to some degree of personal framing of what the researcher experiences. Researchers expand the viability and validity of the video records by sharing viewings and interpretations within discourse communities that include the participants who are videotaped. Another vital action is to design video tools that not only shed light on what learners are doing, but also on what learning researchers are doing when using video. That is, researchers need to reflect on the reflections of their framing in a reflexive and, if possible, a critical manner.

As we will discuss in more detail, video-based research artifacts are not just external visual representations, but can also be re-presentations, presentations that can be reviewed, revisited, restructured, and recognized, from multiple viewpoints. They represent the perspectives of all participating members of the community. Video representations seem to be a different kind of re-presentation than textual representations. They display and illustrate a person's expression and experience in the context of a community as an event is taking place. In this shared presentation of the learning experience, video re-presentations are not only evidentiary artifacts, but, more importantly, expressive objects of inspiration, perhaps, as Tobin and Haush (this volume) state, they
are objects of pleasure. Creators of video texts display the story of people's experiences in a learning setting, stories that are continuously woven and rewritten into material artifacts. Audiences cannot only view what has been created within the research environment, they can participate and interact with the data. Yet, in the new flat world (Foucault, 2005), where participation is now the modus operandi, we can expect even more access to, not only the conclusions of research, but also, the processes of collecting and gathering data, instantly interpreted by communities for their own purposes. YouTube™ is but a small tip of an iceberg that has been growing for over a decade in video research communities.

In short, video re-presentations may never be raw data in the sense that we once understood that phrase, raw; nevertheless, they are data to be layered and saturated with interpretation, from the moment the video camera is turned on.

Epistemology and (Video) Representations

What are representations? Are representations things that are created or are they, as postmodern semiotician Stuart Hall proposes, processes? Whereas positivists postulate that the world is "out there" to be discovered and categorized, postpositivists have argued that learners construct meaning in their minds and knowledge must be relative. Postpositivists contend that there are no universal truths to discover or uncover, no fixed categories that uniformly describe the world, and no set structures and stages that define how the mind makes meaning, but rather, multiple lenses to apply as the learner interprets and expresses their understanding of events and states being experienced. Given the enormous gap between positivist and postpositivist perspectives in the various discourse communities of educational researchers, how do we reach any agreement about the nature of representation and its importance in knowledge construction?

To begin this discussion, we will start at the most basic definition: A representation stands for something else. A picture of a boat is not a boat, yet we interpret the picture as a boat when we "read" the picture. The sign and the referent become linked. With visual signs, the word and the object being referred to are, in most cases, unrelated. The word boat does not necessarily look like or sound like a boat. Hall addresses this particular issue, defining representations as "the production of meaning of the concepts in our minds through language" (Hall, 1997, p. 17.) Included in his definition is the link between concept and language that "enables us to refer to either the real world of objects, people, or events, or the imaginary worlds of fictional objects, people and events" (p. 17). In other words, without having a representation for objects, people, events, and concepts in our minds, meaning making is impossible. Moreover, Hall's definition of representations includes two related systems, the first being the correspondence between the people, places, things, and ideas and the ever-changing conceptual maps we form as we experience the world, and, the second, the more interesting, being the link between those conceptual maps and the languages (of signs) we speak. The relationship among
... things, concepts, and signs lie at the heart of the production of meaning in language. The process, which links these three elements together, is what we call representation. (Hall, 1997, p. 17)

Note that, according to Hall, representations are not things, but rather processes. If Hall is correct in his definition, then how do we understand the things, concepts, and signs that get materialized and shaped? How do we interpret what others speak, write, and transmit electronically to us? In other words, can representations be both process and objects? For Hall and other cultural anthropologists and scholars of semiotics, the answer is that being understood means that we agree to participate within the culturally determined codes that are established, not by "what is out there" as an objective reality, but by what we have collectively created within a social code or language as we participate in discourse communities. As a result, a learner cannot interpret meaning as a one-to-one correspondence between object and referent. Different people will always interpret the same "thing" differently. The key is to reach agreements to try to understand difference and to know how to negotiate difference, keeping the mind open to what may be a best interpretation given the full range of possible explanations.

The Galactic Metaphor

Given emergent technologies and emerging approaches on how to use video in research, how do we discuss the nature of video representations rather than attempting (and probably failing) to codify any particular method, or even a group of selected methods? How do we celebrate the diversity of methods, rather than recommend hard-and-fast rules about what video representations must look like in the learning sciences?

I use the galactic metaphor to describe the nature of visual representations. It provides a handle to enter the dynamic and continually emerging nature of how knowledge is both created and revealed to self and to other. The galactic metaphor applies to the young field of using digital video in educational research.

Postivist theorists discuss representations as either external artifacts or internal mental models. One could graph the bifurcated view of representations as a closed box. This approach divides the epistemological landscape in ways that no longer work in the digital world. (Internal and individual level representations were commonly referred to as mental models, or what Jean Piaget called schema [Piaget, 1950; Piaget & Inhelder, 1956]. When externalized, these representations become artifacts—objects created individually, and whose effect on the external world was considered as emerging from a subjective and personal construction.)

Internal collaborative representations are the kinds of representations that occur from interacting distributed mental models. One could think about this form of mental representation as a computer system with interactive components. When externalized, artifacts continue to be collaboratively produced. In doing so, the subjective and personal elements of the construction are reduced and the artifacts are now more "objectively" produced.
The problem is that our perception and knowledge-producing systems are not so neatly divided. The notion that any outcome can become objective or truthful by removing bias is close to a fantasy, as all representations are constructed through perceptual systems that are unique, personal, and complex, even if similar in structure. Postpositivists do not accept the notion of internal and external representations; when the postpositivist uses the representation, she does not mean ... "as a representation that can be stored and retrieved, but as perpetually constructed patterns of action based on self-organized, every day human interactions" (Rowland, p. 43).

In other words, there is no inside and outside, but rather dynamic, emergent, and spiral systems. It may be helpful to refer to Stacey's theory of learning as the "perpetual construction through the detail of interaction of human bodies in the living present, namely complex responsive processes of relating" (Stacey, as cited in Rowland, 2004). Rowland then adds "These processes are carried out in a similar way individually—as an internal conversation—and socially, so a distinction of individual and group or organizational levels is deemed unimportant" (Rowland, 2004, p. 56, italics added).

Let us now return to the metaphor of a galaxy consisting of constellations and stars, to make this point. From our perspective from any one location, constellations seem to be continually changing locations in the sky as one entity. Yet, they remain intact vis-a-vis each other, from our perspective. Actually, they are clusters interacting within larger dynamic systems. In fact, it is our standpoint that is gradually altering as our planet turns.

This constellation metaphor in the points of viewing theory (Goldman-Segall, 1998) revolves around the idea that each person experiences the world from a standpoint, a viewpoint, or what we might call a situated context emerging from years of perceiving and making meaning of experiences. (For a fuller discussion of this concept and the online digital video analysis tool called Orion, see R. Goldman, this volume; also see Goldman-Segall, 1998). Given that making sense of what is experienced is deeply enhanced by the viewpoints of diverse people, as Margaret Mead (1975) reminded us, this stellar and galactic metaphor provides a way to get a handle on understanding how one event or one particular perspective can also "live" (as a reconstituted entity) in another constellation when viewed from a different "galaxy," knowing that galaxies are also within dynamic and emerging systems. If we were to create an image of this system, we might use a galactic map of the Milky Way as seen from outside the Milky Way. (At http://www.astronomy.ca/CGFs/index.html, we can view a schematic image of the Milky Way along with both the sun and the spiral arms of matter. The image was created by the University of Calgary's Canadian Galactic Plane Survey.)

In a recent article published in the Epoch Times, David Jones (2005) on the website reports on research by astrophysicist Bryan Gaensler from the Harvard-Smithsonian Centre for Astrophysics. In describing the Large Magellanic Cloud, Gaensler relates that the magnetic field is both smooth and ordered in spite of "internal conflict." Describing a galaxy in terms of "having a birthday party ... for a bunch of 4-yeer-olds, and then finding the house still neat and tidy when they leave," Gaensler anthropomorphizes galactic behavior as human behavior. Gaensler also expands the
notion of the dynamo as "a process where the overall rotation of a galaxy combines and smooths the small magnetic fields created by whirls and eddies of gas." He adds: "Stars bursting out at random all over ... strengthen the magnetic field, not mess it up."

It may seem an epistemological leap to compare galaxies, constellations, and stars to conceptualize how representations of learning and conducting research with video data occurs. However, I offer this metaphor as a way to think about thinking, an extremely useful metaphor to use given the interactive and dynamic nature of galaxies. Interacting systems, both large and small, are ordered and patterned within the chaos of random creation. In effect, my comparison may be quite similar to one where Mitchell Resnick (1997) compared computer "creatures" such as dots on a screen called ants or viruses to explain how thinking occurs in more complicated systems, except that I recommend a large system, galaxies, to understand the smallest unit of representation.

Using the galactic metaphor provides a working metaphor for how multiple representations of thinking change our limited perspective. Thinking-in-the-large removes the current obsession with bifurcation into binary dualistic thinking, and replaces it with one that, at its core, systemic, multiple, interactive, and patterned.

**Video and Theories of Knowing**

In our continuing discussion on representations, we now turn to the intersection of learning theory and video research. In the early to mid part of the 20th century, behaviorists had an enormous hold on educational research; in fact, its core ideas are so compelling that the paradigm still flourishes in many instructional communities today. The behaviorist approach to learning theory, as derived from J. B. Watson (1913) and B. F. Skinner (1931), is probably the easiest way to measure learner and teacher achievement; it measures the acceptable and expected response to a stimulus rather than the creation of new knowledge representations and creations. It is easy to understand the connection between a theory of learning (such as behaviorism) and representation (such as giving the required answer). The examiner provides a stimulus; the learner responds with the answer that best fits into the mind like water pouring into an empty vessel or a blank slate, the tabula rasa. For the behaviorist there was, and still is, little need for the creative production of new knowledge in the process of providing the correct answer. And, it is still the easiest way to measure if someone has understood what has been taught. And, for this reason, primarily, behaviorist approaches to learning and even to conducting research have been heavily relied on for almost a century.

When considering the use of video technologies and learning, it is helpful to reflect on the first attempts at designing computing and artificial intelligence systems. These systems build on stimulus/response versions of mentality; using the cause/effect (if X, then Y) way of thinking. This behaviorist influence on the design of learning technologies in education is best exemplified by an early computer-aided instruction (CAI) project at Stanford University called PLATO directed by Patrick Suppes (1966). The project used computers to teach elementary school mathematics and science.
Suppes envisioned computer tutoring on three levels. [T]he simplest is drill-and-practice work, in which the computer administers a question and answer session with the student, judging responses correct or incorrect, and keeping track of data from the sessions. The second level was a more direct instructional approach. [T]he computer would give information to the student, and then quite the student on the information, possibly allowing for different constructions or expressions of the same information. In this sense, the computer acts much like a textbook. The third level was to be more sophisticated dialogic systems, in which a more traditional tutor-tutee relationship could be emulated. (Goldman-Segall & Maxwell 2002, p. 6)

The first and second levels are quite obviously connected to a behaviorist paradigm, there is knowledge instruction, not construction. No internal making meaning or interpretation, rather structures designed for input and output. Even in level three, the relationship of the computer to the learner is one of tutor/tutee with no emphasis on the creation of knowledge or invention of ideas and artifacts by learners.

Around this time, the theories of Jean Piaget began to take hold in technology design, offering quite a different way of thinking about the mind, and of mental representations. As we know, Piaget envisioned the mind as the builder of schemata (Piaget, 1930). Schemata are internal storage and interpretation systems for representing ideas and concepts. They provide the building blocks that enable people to solve problems and perform new tasks, yet they are, according to Piaget, limited to age-based stages whose clockwork is internally set. (Seymour Papert, years later, reframed constructivist thinking to what he termed constructionism. He rejected fixed age-based developmental stages and replaced stages with styles that learners, regardless of age, experience as they make things that represent their thinking about complex problems, Papert, 1988). Papert also avoided the topic of representations, using the term objects-to-think-with in numerous lectures and conversations with colleagues.

In the 1950s, a new way of thinking about the nature of representations was brewing in what became known as the cognitivist revolution—best described in The Mind’s New Science by Howard Gardner (1985). Gardner asserts, the cognitive scientist “... rests his discipline on the assumption that, for scientific purposes, human cognitive activity must be described in terms of symbols, schemas, images, ideas, and other forms of mental representations” (p. 39).

He goes on to note that with the renewed interest in neurosciences, mental representations may no longer be the core of cognitive psychology, even though among many psychologists, linguists, and computer scientists, a representational explanation of how the mind works is as close to “an article of faith” as one comes (Gardner, p. 40).

Linguist Noam Chomsky (1968) added that representations are innate internal mental blueprints or models—similar to a computer program, roughly outlined and filled in through experience over time. (Chomsky himself has changed his thinking offering a derivative of generative grammar with stronger focus on emergence and connection and less on the significance of representation. ) Rowland, describing Zadne, von Krogh, and Roos’s theory (1996) of representations, also described and then critiqued the cognitivist view, “... [I]n the cognitive view, ... routines, rules, understandings are de-
fined with respect to objective, universal ‘truths’ external to the individual and group; that is, knowledge is thought to represent more or less accurately an external pre-given world” (Rowland, 2004, p. 34).

Most cognitive scientists tend to agree that representations are internal mental constructs. For example, Spiro and Jhing’s (1990) explain how mental representations work in complex and ill-structured domains. They make a case that the mind, similar to a connectionist machine, processes schema rather than retrieves it. The mind is not only a retrieval machine as earlier behaviorists, and to some degree, the cognitive scientists, had proposed.

By cognitive flexibility, we mean the ability to spontaneously restructure one’s knowledge, in many ways, in adaptive response to radically changing situational demands … This is a function of both the way knowledge is represented (e.g., along multiple rather than single conceptual dimensions) and the processes that operate on those mental representations (e.g., processes of schema assembly rather than intact schema retrieval). (Spiro & Jhing, 1990, p. 165)

For Tzeng and Schwen (2003) mental representation can be broken into models and elicited models:

While the former [models] are constructed representations for mental calculations derived from analyses of collected data (e.g., Gentner & Stevens, 1983), the latter are intended to elicit the constructs of mental calculations and present them as “structural analogues to the world.” (Johnson-Laird, 1983, p. 165; text in parenthesis added)

Building on Anderson’s theory of knowledge propositions (1982, as cited in Tzeng & Schwen, 2003) being the smallest unit of knowledge representation—later called “semantic molecules” by Bickheit and Sichelschmidt (1999)—Tzeng and Schwen (2003) remind us that the essence of mental representations are not internal events, but dynamic “mappings” between the perception of an event and a person’s values and background.

This newer approach of mental representations—as mappings between a person’s perceptions of an event that are inextricably woven with the experiences of individuals—is not only a departure from previous ways of thinking about representations and how the mind learns, but an even more radical one when thinking about visual representations, such as the way visual sensations interact with our minds. After all, our experience of the world is strongly based on both visual sense and cortex, and the sense we make of the visual image—video and other moving images being perhaps the most compelling.

A theory that connects our perceptual system with our production of knowledge as a series of dynamic and interactive events trumps the linear, causal, and internal explanation of behaviorists or of cognitivists.

In other words, the discontent with both behaviorism and cognitivism is that they are embedded in thinking about representations as internal “things.” In the pre-
arious section, I tendered an invitation to consider a more dynamic, galactic metaphor of understanding representations—whether material, textual, visual, or aural—rather than a bifurcated and dualistic approach to knowledge representations. Raising the problematic of considering representations as only internal processes and external artifacts created by individuals or groups of people, I put forward an interpretation that representations are more akin to re-presentations, interactive and ever-changing processes that bridge the internal versus external divide of consciousness and experience.

To explain this idea using a more narrative discourse, let me provide an example from my own practice. As a digital video ethnographer, I struggle to make meaning of the nature of learning as I videotape, edit, and make "re-presentations" from my video selections. Using the points of viewing theory (1998) as a theory to frame an ethnographic approach to representation, I direct my focus to the act of viewing, perceiving, and interpreting my data, using the camera to layer more and more experiences on the subject under investigation during the experience of the event. I understand that my perceptions are based on perspectives gleaned over many years of experiences in learning experiences of all kinds. After all, meaning is made through multiple lenses—using our biological lenses (eyes) and minds or the lenses of the electronic devices, such as cameras, telescopes, and microscopes to amplify, refocus, and expand our sense making. In short, the use of video in research offers a panacea to the discontent with behaviorism and the cognitive revolution, demonstrating that learning is much more than an individual's mental input and output. It is the search for methods to bridge consciousness and experience.

The disillusionment with the cognitive revolution in the late 1970s started after the heyday of individualism. During these intellectually, socially, and culturally turbulent years following the 1960s, educational theorists found themselves on the cusp of a competing approach to understanding representations and how the mind learns—sociocultural. Deeply influenced by Lev Vygotsky (1962, 1978), Jerome Bruner (1990, 1996) and other leading cognitive scientists of the time, the discussion of defining knowledge moved from the individual mind to the collaborative, social, and cultural worlds within which individuals participate in knowledge creation. And, if knowledge construction was somehow linked to a sociocultural context, then what did this mean for the nature of representation?

Along with this sociocultural framework, computational technologies were also undergoing a dramatic change. The mainframe computer (the size of a small room) turned into Alan Kay's vision of the personal computer, a "desktop" with icons, and a Dynabook, a dynamic notebook that we now call a laptop using the Smalltalk software that would enable children and adults to construct knowledge while seamlessly using any media form (1996). Simultaneously, Papert and his research teams during the 1970s and 1980s immersed themselves in the use of a programming language, Logo—the program Papert has spent several decades designing for children to program a computer to get the turtle to act out the program's commands. Suddenly, the object, a small turtle on the computer screen—an object to think with or what we could say a representation of how the computer program was behaving—becomes a thinking tool. But, still most researchers, including Papert, focused on the individual child.
However, a shift, perhaps a paradigm shift, was occurring that offered users of new technologies to collaborate and layer their viewpoints. Video technologies were at the forefront of the changes because, even before the creation of the Internet and computer-supported collaborative communities (CLIC) emerged, video software and hardware enabled multiple viewpoints, repeated viewings, and, most importantly, it enabled the entire stakeholder community to view what was recorded and layer the database with commentary and description (Goldman-Segall et al., 1988, Goldman-Segall et al., 1998). Clifford Geertz's (1973) concept of thick description was now within reach of a videographer who could use a computer to control a laser disc player and more around the data chunks adding diverse and insightful comment to specific chunks of video data. Moreover, video technologies provided access, not by one researcher, but by teams of researchers, to explore the situational aspects within which learning was taking place. It was impossible to see the video of a child learning Logo in a classroom without also attending to what the teacher was doing, what the other kids were doing, and mostly, how the young person was gesturing while she spoke about her new creations.

In 1985, I decided to collect my “data” using a camcorder, VHS tapes, and a microphone. As a member of Papert’s team, I realized quite soon that video enabled the affordance of collaborative interpretation, what I later called thick interpretation (1998), and then years later called thick communication (2004). Although there was no Internet, networked electronic mail and file transfer programs (FTP) offered the promise of shared databases and collaborative interpretation. In a videotaped presentation in 1987, I presented my plans to the MIT community and our collaborating teachers from the Hennings School. I discussed how we would share and annotate the video database of, to my knowledge, the first longitudinal digital video ethnography with a specific computer software application to access video stored on video disks. By 1988, a working video analysis prototype enabled teachers and students from the participating school, researchers, and visiting scholars had the opportunity to traverse the video database, build clusters from selected video clips (stars) around themes, view each other’s comments, and add comments and transcripts. The dissertation was submitted in 1990 (Goldman-Segall, 1990).

During the same time, the sands were shifting, and a community of educational researchers were pushing the boundaries of how computer programs could be specifically designed for what Roy Pea (1985, 1987) called the amplification of knowledge, and Marlene Scardamalia and Carl Bereiter (1991) called knowledge building.

The appearance and use of online video technologies connecting individuals to each other and expanding knowledge production through collaboration went hand-in-hand with the emergence of theories of learning that embraced the creation of expressive artifacts designed by individuals and groups within situated communities.

One could ask a McLuhan-esque question Was sharing text and video across distributed computers the cause of our epistemological shift to what Lave and Wenger (1991) termed situated cognition; or, did the shifting theoretical views of learning and cognition create the climate for imagining connected viewpoints using technologies that could explore those boundaries? The question is, of course, flawed, given the na-
ture of a question based in causal dualities. Yet, one does have to consider the iterative impact of the digital revolution with the developing theories of the times.

Postmodernity put the nails into the modernist box internal and external representations.

Educational philosopher James Marshall critiqued linearity, especially any form of mental causality, such as when one first sees a boat and then sees it in the mind, before producing a boat on canvas. Traditionally, educators took the fixed process of a mental model of a boat being "reproduced" and modified on paper as a fixed truth. In other words, there must be a mental representation (idea, schema, or algorithm) that stays in the brain for us to draw on when we want to paint the boat. However, Marshall refutes the simplicity of this kind of causal relationship—from experience to mental model (with or without a blueprint) and then to artifact—stating that the act of writing, for example, creates thoughts, and in the process changes the self, the representation, and the thinking about the topic. For Marshall, the process of creating a representation changes thinking and ideas. In an interview reported by Ghiraldelli (2005), Marshall says:

I do not know what I think until I see what I write. Foucault would have put it more strongly when he said that if he knew what he would write about he would not have the courage to start writing a book. Writing also changes the person so that the author whilst writing both undergoes and reacts, changing both his thoughts and his self, but also the text. (Marshall, as cited in Ghiraldelli, p. 290)

This idea dovetails with Papert's epistemological approach that tinkering with an object created by a learner changes the learner's thinking (Papert, 1980 & 1991; the author (builder) is changed in the process. To paraphrase Marshall's comment substituting writing for writing of media texts, "Writing of media texts also changes the person so that the author whilst writing of media texts both undergoes and reacts, changing both his thoughts and his self, but also the [media] text" (Marshall, as cited in Ghiraldelli, 2005, text in parentheses added by author).

Obviously, one can easily apply this idea of the creative element of working with video to produce an artifact. Producing (and then reworking with video edits or clips) is not only the result of finding in and out points of the visual stream, but comprises acts of creation experienced by videographers who, through productions, reshape the material into something that has rich meaning and is reshaped in the process. Once again, the galactic metaphor provides us with a way to consider how consciousness and experience are woven together.

Video Ethnography

Quantitative studies often provide researchers with assessments and global predictions, but do not aim to explain the inside story—the meaning that people ascribe to the events they experience in learning environments. Ethnographic accounts tell rich stories that help us to understand the meaning of events. Ethnography is the description, interpretation, and a representation of what researchers experience when
they become involved with the day-to-day lives of people, carrying out their lives. In
short, ethnography is the study of cultures providing us with new ways to view and in-
terpret growth and change within and across cultures.

The task of the social sciences as is conceived by [anthropologist Charles] Tay-
lor is analogous to Wittgenstein's understanding of the aim of philosophy. In its
most general and positive form, this aim is to offer an Überblick suruven or peri-
spicuous representation. (Smeyers, 2005, p. 411; italics added)

Ethnography is best understood as a family of approaches to the study of culture
within the knowledge domain of anthropology and, over the past few decades, extend-
ing to educational research and other social science research. Ethnography encom-
passes the full range of traditional descriptive accounts of cultural groups to more
socially activist-oriented critical methods whose aim is the empowerment of nonmain-
stream communities through the study of hegemony and resistance. The incorpora-
tion of feminist and postmodern theories to traditional anthropological notions of
culture has broadened the intellectual landscape opening new questions and method-
ological concerns (Clifford, 1986; Luther, 1986; Roman, 1991, among others). Unfortu-
nately, these more progressive and social justice streams of thinking about knowledge,
for example—"whose knowledge" is being represented—have not been fully articu-
lated in the learning sciences community. One reason could be that researchers trained
in mathematics and science education are too often trained to think of their knowledge
domains as representing the truth. If not true, then at least the most truthlike one can
have using empirical evidence.

Video research, in particular digital video ethnography, has raised the conscious-
ness of learning scientists who would have once believed that research results should
be gleaned only from quantitative data and devoid of personal interpretation. As many
of the chapters in this book show, ethnographic video representations in the form of
video segments or video streams have provided many learning scientists with the real-
ization that to know and to re-present the process of learning requires a range of emer-
gent tools and techniques.

Video has played a significant role in the learning sciences by demonstrating what
constructivists have long contended—that our theories emerge through our deep en-
gagement with what we are by attending closely to the process of learning rather
by only attending to the results of a given treatment on a group of people in an experi-
mental lab-like setting. Video ethnography is personal, close-up, and affected by the
views of those who videotape and direct the video camera's lens. As I have noted else-
where and as should be restated once more, the word theory comes from the Latin
word, theoria, which means "a viewing."

Currently, the use of video representations, regardless of whether the analysis is
frame-by-frame, video case based, or documentary style movies of what is going on in a
learning environment, can be shared, discussed, interpreted, and "sensed into new
mixed by diverse communities of researchers and stakeholders anytime, anywhere.
Along with this collaborative approach, learning researchers seem to agree that valid
interpretations of video representations are the result of dynamic interactions among,
on the one hand, ideas and concepts, and, on the other hand, collaboratively constructed artifacts—texts, videos, software—that emerge within a community of practice. Reed Stevens (this volume), places his emphasis on ideas that people "embody and share within public, material ways": "At least with regard to learning from and with others and most likely also ourselves, the kinds of ideas that we need to attend to are those that people embody and share within public, material ways ...." (Stevens, this volume).

Note Stevens's focus on the creation of shared material constructions when he refers to learning from and with others. Certainly there is a good reason for this change of heart in the learning sciences. First of all, most technology-rich learning and research environments are comprised of a range of people with diverse levels of involvement and contribution ranging from planning large cross-university and interdisciplinary research projects. Learning Scientists regularly collaborate in the collection and analysis of multiple forms of data and the design or modification of tools and web environments. Learning Scientists share ideas, artifacts, tools, and presentations with each other at professional meetings, as do other researchers. Moreover, they can no longer afford to agree with either the cognitivist or behaviorist view of learning, or a bifurcated view of representations being either internal or external. Instead, they need to explore what ethnographers and other social science researchers call the crisis of representation in order to reformulate research methods using all forms of media to create participatory communities of practice that are, by their nature, inclusive. Using postmodern ethnographic lenses, learning scientists need not only attend to how they could conduct research of others using methods that could "other" those they study; learning scientists must develop a critical eye on their own practice while making decisions about who they represent and how they represent what they have learned, knowing that any representation of others has ethical implications.

Capturing the Crash of Cultures

A dark side of ethnographic representations of worlds we do not often enough bring to light—especially when discussing the early scientific and anthropological studies of foreign cultures—began with the desires for expansion, trade, and treasures by mostly British, French, and Spanish monarchies. Monarchs commissioned explorers to navigate and chart the distant seas to make future travel easier, ensuring that the appropriation of lands and their resources would become a viable marketplace (Lutz & Collins, 1993). From their journeys to distant lands, explorers brought back cultural artifacts and drawings and, later, photographs of the exotic, frozen for all time in daily rituals of dancing, hunting, and preparing food. It was not uncommon for explorers to entice and coerce the peoples they met. First Nations Peoples along the now-British Columbia coast of Canada became objects of display (Clifford, 1988). Then they were forced to partake in the performance of cultural identity, often displayed in full head-dress and costume.

With the rise of the bourgeoisie in Western Europe along with the technological improvements of 18th century industrialization, travel and transportation methods improved and created easier access to far-away lands (Fussel, 1987). Established routes
were used to transport enslaved Africans to the vast lands of the Americas to grow crops and mine natural resources, contributing to an ethical and moral devastation from which Western civilizations have yet to recover (Willinsky, 1998).

Once again, people's cultural artifacts were stolen or traded for trinkets; artifacts thought to be valuable or culturally curious were placed in museums or simply destroyed. Missionaries who accompanied the expeditions destroyed artifacts of non-Western worship, especially those that suggested differing sexual values and practices. It is a story we know too well.

In the long term, however, traces of these representational objects and ideas exist in shared memories—sometimes emerging in expressive forms such as art, dance, music, storytelling, medicine, and even in community conversations. Expressions of cultural clashes also continue to be acted out. These artifacts and memories continually morph and blend as experiences and new expressions layer to become part of an intra, inter, and transcultural conversation.

In a global crashing of diverse worldviews is where we find ourselves: views described brilliantly in the 2005 motion picture movie, Crash, directed and written by Paul Haggis. This movie depicts the crashing of immigrant cultures in Los Angeles as individuals of all socioethnic backgrounds carry out their day-to-day activities. However, the epistemological crashes we face as learning science researchers are neither local nor only national. Epistemological collisions are global and historical and we cannot pretend that these precedents do not impact our perspectives. And so—as is the theme of the movie—we have to deliberate on how to find antidotes for our research crashes to prevent culture wars. We need to renew opportunities for negotiating shared viewpoints.

Easy-to-upload digital video artifacts—assuming that one has access to a camera and the Internet, knowing that this assumption of access should always be on the forefront of our minds—for collaborative inquiry and viewing, may provide this antidote, or at least a relief, from the practices of misrepresenting others' views and privileging our own. Wherever we are on our planet, we witness a global desire to download and upload images on the web; and this desire is still in its infancy. The framework of shared perspectives has become evident with the advent of the Internet. The Internet as a shared visual and text-based space where people can make public, share, navigate, and use each other's artifacts has generated a new worldview of mixed communities, thereby moving from exploitation to placing value on transcultural representations of self, identity, community, and culture.

For educators who study learning, one possible negative consequence of creating ethnographic platforms and databases is that our practice of gathering video could allow unfettered video surveillance. The camera becomes a data collector and an evaluative eye, rather than a tool for researchers and those being videotaped to construct compelling documentary-style stories. At some point, as concerned citizens, we must begin to be more critical of methods and technologies used to trespass the privacy rights of individuals and groups. If we believe that learners need to expand their horizons and see the world with the multiple frameworks required for an open flexible global community, it is time to reframe our methods and include diverse research modalities. In doing so, we need to ask ourselves what we are collect-
ing and for what purposes. And, for whose benefit? Are we conducting research that emancipates and empowers learners to become increasingly independent, decent, and collaborative citizens of this planet, or are we conducting yet another kind of imperialism by capturing not only the learning of our students, but learning in other cultures as a means of trying to compete and eventually take over their unique contribution within the global community?

E-Value-action

As educational researchers, we need to ask ourselves how to be accountable (not counting but being accountable), reliable, and rigorous while using video to build theories of learning. It is easy to believe that the answers lie in the quantity of tapes piled high, the terabytes of storage space used on the hard drive, or the computer tool used to conduct analyses. It is so seductive to be enamored with the resolution of the image, the close-up, the young boy slapping his hand on his knee telling us stories about how you press a key on the keyboard and words pop up on the screen. “Now, how does a computer do that?” he asks. Yet, as a viewer of learning science video data, one has a right to expect compelling signals that whatever we are viewing represents the best interpretation we can make, given the state of individual perceptual systems that see the world differently. We want to trust and, yet, we also need to be critical of what we see. We know too well the experience of visual technologies as compelling storytelling tools throughout our lives as moviegoers. So, we are left with the question of how we come to know. Rowland provides us with a metaphorical explanation of how we come to know what is valuable:

We come to know by dancing—by being creative, active, and responsive, and depending on the type of dance, the context, the tempo, the rhythm, and so on, by following predefined patterns in general and taking ad hoc actions in particular. We come to know by making choices about the dance, such as when to be present and where to be present, participate, and follow patterns or not, and by making judgments using wisdom, borne of experience, in the here and now of doing. (Rowland, p. 44)

Any monothetic viewpoint of conducting research within the learning sciences as well as any attempt to reach completely valid conclusions is not only problematic, but also erroneous. Instead, we need to search for ordered patterns within the collaborative conversation among the various research traditions to expose the gaps and the crevices that need to be overcome when searching for new ways to solve emerging phenomena. The most we can have, as James Clifford (1986) reminds us, is partial truths, partial insights, and partial knowledge. The most we have, as astrophysicist Gaensler reminds us is a galaxy “thriving on chaos.”

Similarly, any search for a “best video representation” of an event is flawed from the start, given my arguments in this chapter. Instead, when using video representations, we need to provide room for the creation of critical cultures of inquiry where
emerging methods, tools, and artifacts are placed on a platform for multilogaing (1998, p. 32), that is, if we are serious about improving our discourse in the (art and) science of learning.

Jerome Bruner, in an invited lecture at Harvard in 1990 (later published in 1991), presented a list of qualities for understanding narrative in educational research. Inspired by his thinking and the work of Clifford Geertz (1975), and Ivan Illich (1975), I have created a list of criteria for e val u e - a ting (eliciting the value of) video research projects in the digital video ethnography courses I have taught over the last twenty years.

Criteria for Evaluating Media Texts

1. Wholeness/Particularity—The video research artifacts provide the reader/viewer with "enough" detail without taking the viewer/reader through the entire body of research. Events are fully presented. Details are meaningful descriptions that bring the reader/viewer "inside" the event. The cases are presented as a microcosm of the range of events and elements that create the exemplary classrooms. These cases do not exist in isolation but in interdependence. (Bruner calls this hermeneutic sensitivity.) And yet, the particular case becomes a "token" of a broader and more general view of the culture. Geertz (1975) states that we cannot know God through the details, but we can know the world of people. With online digital video excerpts, researchers may need to be shown how to edit a 1.5-min sequence that captures the essence of a particular event. In my experience with students, they move from 15-min sequences to 1.5 min in a few weeks and produce stirring digital movies.

2. "Being there/being with"—The research products convince viewers that these viewers are "there" and "with" the videographer, or at the very least, "there" in a metaphorical sense of being connected to what is happening in the video. Postmodern ethnographers have contested the notion that we can ever "be there" with others in their situations. Louis Heschusius (1994) states that it is more important for readers to "be with" rather than "be there." Geertz was not to be taken so literally, "being there" is a device used to describe the effort that authors make in composing texts for readers. Just as we cannot find the whole truth of any given situation, although we can search for verisimilitude, so we cannot expect readers to "be there" with the students and teachers. Video researchers, however, can aim for a connection with others in their place. The videographer has a toolkit of devices including zoom cut aways, pans, wide-angle shots, and narrative voice-overs.

3. Perspective—The research products make clear the videographer's point of view or what I call, the multiple points of view (R. Goldman, 2004, and this volume). The author's point of view is readily apparent to the reader/viewer. The perspectives of the participants being recorded and the treatment of the larger educational context can be easily identified by the reader/viewer, allowing the reader/viewer to locate his or her own viewpoints about the subject being discussed.
4. Genre consistency/breach—The "form" of the research products breaks convention but is situated in a genre. In research, as in art, film, or literature, the author of the print or media text uses a particular style or genre to keep the flow consistent. Usually one genre is followed. However, mixing genres can work if there is a reason for the breach. In fact, the breach of genre is what creates and inspires visual media texts. If we only see what we think we are going to see, we stop looking.

5. Authenticity—Research video data lead to new interpretations that are grounded in both the rigor of content and the innovation of new connections. They might not be "original" works or completely new approaches. Yet, video researchers create products that shed new light. It may mean that the works produced are artistically based. However, an argument, discussion, or a theorem could as easily represent authentic thinking about a subject.

6. Chronological Verisimilitude—the research representations are not an accurate chronological account but are truthlike. The reader or viewer can comprehend an ordering of events suited to the topic being addressed. The product is in sync with the meaning of the events. (Bruner calls this diachronicity—the patterns of events are not clock time but human time.)

7. Conviviality—The video artifacts are accessible for both public and scholarly consumption. Illich (1975) defines convivial tools as being easy to use, assessable, and beneficial to humanity. Educational research that is convivial should also be created for the public good, serving the larger interests of the community. Often the products assembled for public consumption by researchers are inaccessible. Translating the research for the public good without diluting the content is one aspect. Another is to build tools for real and virtual community building where the public can participate in the debate and the construction of theory.

8. Resonance—The research video data are presented in such a way that the reader or viewer of the research is able to make connections to his or her situation (Bateson, 1984). For example, in an annotation by a student named Ashley who accessed my book’s online video: "I was really touched and my eyes were opened on the way the young boy spoke of respect and how science teaches you to be a friend. I am in my teens myself and I never noticed how the world and environment taught you about friends and respect. I feel that in the way he used friend and respect that he truly was touched." At http://www.pointsloving.com (circa 1997), you can “Participate" and then "Go To" page 225 to read Ashley’s annotation of 12/07/1998 (11:02:15 AM) after viewing the video.

9. Immersion (Murray, 1997)—The research products demonstrate a deep level of engagement and involvement with the topic. Readers/viewers of the products can easily enter into the context that was created by the videographer. Immersion is not to be confused with the mindlessness one might experience when being "lost in space watching a motion picture." Mindfulness (a term
Gabriel Salomon coined in 1979) requires a critical awareness of the process of creation and a deep understanding of cultures studied. Video researchers have the opportunity to work closely with the entire learning culture, paying special attention to the broader learning environment.

10. **Commensurability** (Geertz, 1973)—The research video data provide a toolkit for sharing concerns, beliefs, attitudes, and pedagogical practices. Researchers learn to richly describe a particular culture to make diverse cultural practices understood. The products created with networked media technologies can be shared, but can they also be felt? Can they inspire others to take action and to engage with others whose practices are different from their own and learn? The video artifact created is not a recipe or a formula; it is a snapshot, a context, and a culture for sharing ideas about what happens when the camera is turned on. And, in the best-case scenario, it inspires viewers and participants in the study to create their video representations of what they experience in learning cultures.

In short, video is an epistemological tool, perhaps a better tool than words, for displaying learners' ways of thinking as they engage in learning. This visually based medium called video, which has the power to display nuance and subtlety, provides us not with the traditional split between process and product that emerged after the industrialization of learning, but rather with a postanalog technique to navigate the interactions among individuals and groups as they reflect on their experience and actions in the world, thus creating personalized and shared viewpoints of ideas that they continually transform by the act of interacting with the created works of others engaged in a similar journey.

**Ethics**

In closing this introductory chapter, let us return to the theme of the voyage and the story of Charles Darwin, the consummate voyager who changed our ways of thinking about science. Our final story is about the collection of representations by naturalists (ethnographic precursors) who were invited to accompany the surveying expeditions in the early 19th century, especially those who came onboard to sketch, collect, and later photograph diverse peoples, species of plant and animal life, classify them, and theorize their origin. Darwin, the most famous of these naturalists, traveled on the H.M.S. *Beagle* to South America and the Pacific including the Galapagos Islands in the late 1820s.

Perhaps influenced both by his father, the physician and naturalist Erasmus Darwin, and by the intellectual milieu of the early 19th century—Darwin is the most celebrated of the traveling naturalists. His theory of evolution was based on natural selection, a concept both he and anthropologist Alfred Russel Wallace1 arrived at simul-

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1For more about Wallace’s contributions see [http://www.nhm.ac.uk/nature-online/evolution/how-did-evol-theory-develop/evol-wallace/alfred-russel-wallace.html](http://www.nhm.ac.uk/nature-online/evolution/how-did-evol-theory-develop/evol-wallace/alfred-russel-wallace.html)
Theodore Herbert Spencer later applied this conceptual framework to human nature and called it social Darwinism. Social Darwinism uses the theory of evolution to develop the “survival of the fittest”—a theory that Darwin would probably not have approved of as it condoned a hierarchical class structure glorifying the survival of the strong over the weak within a species, rather than simply explaining an evolutionary development of diverse species over thousands of years. That said, Darwin was deeply influenced by his reading of Malthus’s Population, a treatise calling for the end to overpopulation while basically blaming the lower classes for overpopulations. As Darwin put it:

In October 1838, that is, 15 months after I had begun my systematic inquiry, I happened to read for amusement Malthus on Population, and being well prepared to appreciate the struggle for existence that everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances, favorable variations would tend to be preserved, and unfavorable ones to be destroyed. (Darwin, 1876)

Looking back on Darwin and Spencer’s theories, one has to reflect on how these theories of continued and sustained development interacted with the technologies of transportation, justifying the potential for increased exploration, exploitation, and cultural imperialism (Fussel, 1987).

In a similar vein, in order to keep a balanced view that tempers our enthusiasm for the “riches” and possibilities that new video technologies offer to our research practices, we also have to ask ourselves how our new online digital technologies not only promote shared perspectives and the appreciation of each others’ cultural representations, but also how they create a new kind of cybermarket, exporting and importing virtual cultural artifacts, creating a silicone elite class, and transforming existing cultural mores in alignment with cultural imperialism. Are the same kind of people who viewed foreign lands as markets and resources still laying claim to virtual worlds as they buy and sell virtual property as, for example, in the game, Everquest? Is this a game or a harbinger of a new world?

As travelers and tourists in unknown classrooms, educational researchers are now armed with cameras and hand-helds to explore every nook and cranny of the classroom, zooming here and there, observing the real lives of children and teachers in their habitat, not realizing that some element of what we do has a long history based in a worldview that encourages us to shoot, capture, dissect, and organize the bits and pieces of embodied chunks in systemic and ‘objective’ practices—to build one best Truth bespoke by the gathered evidence. Being trapped in a culture of evidence-based research, we, too often, cling to an interpretation of evidence that entails reproduction, as if we can simply learn the best practices in one situation and scale and reproduce it in another. We forget what we know about cultures and communities, that they are situated contextual organisms. As much as we would like to control and change what we put into the classroom Petri dish so that the outcome is replicable and scaleable, we know that the real world of learning is more akin to complex biological systems that can adapt morph, reconfigure, and interact with
events and the experience of those events, over time. Akin to the ever-changing galactic metaphor.

Educational researchers have, throughout the years, critiqued how media tools can privilege certain mainstream perspectives (Bryson & de Castell, 1994; de Castell, Bryson, & Jensen, 2001). This occurs even when our research is conducted with the honorable intention of improving the lives of "others" in our classroom. The problem is that colonialism and the material benefits gained from this exploitation too often permeate the educational system, treating the underprivileged as end-users of products rather than as creators of knowledge that will provide them with the tools to be free from the oppression of generations of poverty, lack of educational and health benefits, and lack of opportunity.

When we videotape our subjects over and over again in classrooms and informal learning environments, we face an ethical challenge to not repeat with these powerful visually based electronic tools what the tall ships of yesteryear did to others—capture, collect, dissect, categorize, and construct hierarchies. Our history as learning researchers is one that has aimed to include full participation and diverse viewpoints. And, yes, we do collect material artifacts, including still and moving images of others not like us. The point is that we do our best to use these material shared re-presentations to build strong bridges between what we know and what others know to make changes across the borders and boundaries of diverse educational and social systems. Bridges that will provide learners with greater understanding of each other’s cultures. Still, there is much more to be done. Perhaps it is time to ask how we can use digital video and postmodern ethnographic sensitivities and sensibilities to create the kinds of stories, cases, and examples of learning that will produce a new generation of learning scientists who, in their future studies, will not use video as a tool for capturing others for personal gain, but rather for the purpose of building convivial learning communities, as Ivan Illich (1975) would propose.

The legacy of our video research in the learning sciences should not be a repeat of colonial survival of the (finest and) best practices that can be marketed to other nations, but rather to rethink the role of technologies as a force for greater equity and opportunity. Video research should comprise the histories that live in shared memories and experiences of all the participants of the learning community. Video research in the learning sciences should become a method that integrates the art and science of creating meaning. Video research should provide us with an approach where we can always question our methods, tools, and theories; where we consider how our actions as designers and members of a research community affect those we study. Postmodern and postcolonial ethnographic frameworks—including the perspectivity framework—offer important cues as to how, using video research, we represent the points of view of others, and, in that process, how such knowledge is best re-presented to each other.

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