

Linguistic Anthropology of Education

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Communicative Practice, Cultural Production, and Situated Learning

Constructing and Contesting Identities of Expertise in a Heterogeneous Learning Context

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In this chapter, I consider some ways in which linguistic anthropology can contribute to understanding "the cultural production of the educated person" (Levinson & Holland, 1996), to use a phrase that nicely captures an important focus in recent anthropological approaches to education. Work on cultural production is part of a broader project in the social sciences over the past three decades, a project that explores how both persons and forms of social organization are constituted through social practice. Among the major aims of this work has been to challenge conceptions of culture as a stable and relatively unproblematic body of knowledge that is transmitted from one generation to the next. Instead, culture is seen as a dynamic process in which agents create meaning by drawing on cultural forms as they act in social and material contexts, and in so doing produce themselves as certain kinds of culturally located persons while at the same time reproducing and transforming the cultural formations in which they act.

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Thus "cultural production" has a double meaning: it is concerned with how persons are produced as cultural beings, and with how this production of persons results in the (re)production of cultural formations. Recent anthropological approaches to education have been concerned with this process as it relates to learning and schooling. This work has focused on the interplay between social structure and human agency in sites in which "educated persons" are produced. In this view, becoming "educated"—or "uneducated," or even "uneducable"—however these might be locally understood, is an important way in which persons become produced within cultural groups, and thereby contribute to the production of the culture.

This chapter focuses on how local processes of interaction are related to broader, and often conflicting, conceptions of what it means to be educated. Specifically, I examine the negotiation of "identities of expertise" in one site designed to produce educated persons—a multi-institution undergraduate engineering project. This site is of interest for several reasons. First, the project was part of an attempt to challenge overtly what it means to be an expert in the discipline of engineering. It did this by attempting to elevate the status of traditionally devalued "practical" aspects of engineering activity. That is, practical, and not just theoretical, knowledge was taken as central to being educated. Second, and closely related, the consortium was challenging traditional views of how one becomes an expert by designing practical projects as privileged sites for learning, as opposed to teaching engineering science outside the context of "real world" activity.

This reconceptualization of the nature of expertise and the process by which it is attained drew heavily upon work by educational researchers and designers who have adopted and developed a view of cognition and learning that is itself grounded in theories of cultural production. This allows for an examination of the cultural production of identities of expertise, at a historical moment in which theories of cultural production are themselves used as a partial basis for defining what it means to be an "expert." The sponsoring consortium was also attempting to promote "boundary crossing" between historically separate institutions. In doing so, it had explicitly egalitarian objectives of providing participants from lower-status and less technologically well-equipped schools with access to the knowledge and the technological resources of higher status schools. However, this had another, unintended effect. It allowed for relationships to be negotiated among students who might otherwise never come into contact with one another, thus creating new possibilities for the construction of social identities. Thus, this project allows me to examine processes of "identification" and "contextualization"—that is, the mutual production of identities and contexts for activity—under conditions of overt conflict and transformation.

In analyzing this setting, I will draw on recent work in linguistic anthropology. Scholars in this field have been centrally concerned, as Duranti (1997) points out, with processes of cultural production, and have been developing sophisticated theoretical and methodological resources for understanding how language is involved in the construction of meaning and the production of persons and cultures. I will focus on how, in the detailed processes of moment-to-moment interaction, language is used to produce a world in which certain kinds of expertise are valued (or devalued) while at the same time speakers position themselves and others within those ways of understanding expertise.

The chapter is organized in the following way. First, I discuss recent theories of situated learning, which attempt to conceive of learning in terms of the kinds of processes of meaning-making that are central to theories of cultural production. I outline two general ways in which situated learning theories have been developed—which I call the "cognitive apprenticeship" approach and the "cultural production" approach—and argue that the second adopts a more adequate view of contextualization and identification, with consequences for how learning contexts should be examined. I then turn to a discussion of linguistic anthropological approaches to understanding contextualization, and outline a view of this process as involving a tension between "pre-supposing indexicality" and "entailing indexicality." Examination of the dynamic interplay between these two kinds of linguistic signs can usefully contribute to our understanding of the processes through which both cultures and persons are produced and transformed through activity, both within and across interactions. I then illustrate these points by examining communicative practices in two interactions that took place during the student project that was the site of my research.

SITUATED LEARNING

In this section, I discuss theories of situated learning in some detail. I identify what I see as two general directions in which these theories have been developed—"cognitive apprenticeships" and "cultural production"—and argue that while these positions are largely compatible and mutually informing, the second position more adequately accounts for learning as a cultural process. Specifically, I suggest that cognitive apprenticeships have tended to pay insufficient attention to some of the dynamics of contextualization and identification that are at the heart of processes of cultural production, and that this results in a somewhat limited and incomplete way of understanding the production of exper-

tise. I argue that careful attention to these processes is an important strategy to adopt in understanding activity within learning contexts.

Theories of situated learning have been developed largely as an alternative to individualist, and especially cognitivist, approaches to understanding learning and schooling. Briefly, cognitivism understands learning as involving individuals' movement away from the concrete, situated, and presumably faulty and inefficient forms of thought that it takes to characterize everyday life, and toward the acquisition of abstract, general, and universally applicable conceptual knowledge. In this view, learning is best brought about by separating learners from the complexities of everyday experience and providing them with instruction designed to allow them to acquire explicit decontextualized concepts that can be transferred to and applied at other times and in other places. Theories of situated learning have challenged cognitivism on a number of grounds. Two of these are of particular importance for my purposes. First, research on everyday cognition shows that cognition is not best viewed as the application of explicit abstract knowledge, as cognitivism maintains. Rather, cognition is mediated by culturally evolved semiotic and material artifacts and realized in the routine activities of a "community of practice." In this view, concepts are implicit in the organization of everyday practice. Everyday cognition *is* concrete and situated; it is *not*, however, faulty and inefficient, but powerfully adapted to the forms of activity in which it occurs. Of course, if cognition is inherently situated in these ways, then learning clearly cannot be a matter of acquiring decontextualized knowledge. Thus the first challenge to cognitivism is that it proposes an inadequate view of the nature of cognition and learning. The second is a critique of cognitivist views on schooling. The cognitivist account of learning implies that the production of "educated persons" can be explained in terms of individual acquisition of knowledge. This implies in turn that "uneducated persons" can be accounted for in terms of *failure* to acquire knowledge. From the point of view of some work in situated learning, this account fails to appreciate the ways in which both "educated persons" and "uneducated persons" are involved in processes of cultural production.

These limitations of cognitivist accounts have led to efforts to reconceptualize learning so as to account for the situatedness of everyday practice. I describe two general directions in which this work has proceeded. The first, which can be called the "cognitive apprenticeship" approach, has been primarily concerned with improving instruction by designing learning contexts that take account of the practical basis of cognition. The second, which can be called the "cultural production" approach, has been primarily concerned not with the design of better learning contexts, but with formulating a general theory of learning,

wherever it occurs and in whatever form, as an aspect of processes of cultural production.

It is useful to begin by briefly describing the important work of Lave and Wenger (1991), which has influenced virtually all subsequent approaches to situated learning. These authors, in challenging the cognitivist assumption that learning involves explicit transmission of abstract knowledge, examined successful practical apprenticeships in settings that involved little explicit teaching. Their specific focus was on how newcomers to a community move from "legitimate peripheral participation," in which they engage in the everyday practices of a community but with less than full responsibility for carrying them out, toward "full participation" in the community. In Lave and Wenger's account, learning takes place not through transmission of abstract knowledge, but through engagement in the "knowledgeable skills" that are realized in the everyday activities of a community; that is, people become good at the practices that they routinely participate in, gaining understanding of how to successfully engage under varying conditions by flexibly adapting their performance to the contingencies of particular occasions.

It is important to note, however, that the significance of Lave and Wenger's work goes beyond the claim that learning involves mastery of the "knowledgeable skills" of a community. This is because, as Lave and Wenger argue:

Activities, tasks, functions, and understandings do not exist in isolation; they are part of broader systems of relations in which they have meaning. These systems of relations arise out of and are reproduced and developed within social communities, which are in part systems of relations among persons. The person is defined by as well as defines these relations. Learning thus implies becoming a different person with respect to the possibilities enabled by these systems of relations. To ignore this aspect of learning is to overlook the fact that learning involves the construction of identities. (Lave & Wenger, 1991, p. 53)

Thus, as one engages in the practices of a community, she is not simply becoming adept at carrying out those practices; she is also becoming identifiable as a certain kind of person within the community. It is important to note here that identities are not determined by "the possibilities enabled by [the] systems of relations" of a community; rather, participants actively identify themselves and others in terms of those possibilities, in the process both reproducing and transforming the community. Here we see clearly that situated learning is an aspect of the same processes that have concerned theorists of cultural production.

While all who adopt a situated learning framework agree with Lave and Wenger's central claims, there are subtle but important differences in how these claims have been developed within different approaches. The following two sections describe two central approaches.

Situated Learning and Cognitive Apprenticeships

Lave and Wenger's work on learning in practical apprenticeships has been an important inspiration for educational researchers and designers who have identified serious limitations in cognitivist approaches to schooling, and who have attempted to design contexts for learning in schools, sometimes called "cognitive apprenticeships" (Brown, Collins, & Duguid, 1989), which are based on the claims of situated learning. Proponents of cognitive apprenticeships have faulted cognitivist approaches to schooling for their tendency to produce "inert knowledge" (Collins, Brown, & Newman, 1989), that is, abstractions that learners are unable to apply in concrete situations. In contrast, this work has aimed to produce "usable, robust knowledge" by situating learners in "authentic" contexts (Brown et al., 1989). Rather than aiming for learning that results in the acquisition of decontextualized knowledge, this work has attempted to provide students with access to legitimate peripheral participation in valued social practices.

Cognitive apprenticeships retain some aspects of cognitivist approaches to school learning while at the same time transforming them in fundamental ways. Recognizing the social value of mastery of such "knowledge domains" as science and mathematics, they have continued to emphasize these and other traditional school subjects. But cognitive apprenticeships fundamentally diverge from cognitivism by arguing for the inherent social and material situatedness of learning. For example, Greeno et al. (1997) point out that a major goal of their work is to "create environments in which students can learn to participate in practices of productive inquiry and use of concepts and principles that are characteristic of subject matter disciplines" (Greeno et al., 1997, p. 99). Rather than being understood as a body of abstract knowledge, however, these disciplines are understood as communities of practice whose "concepts and principles" are implicit in a range of "knowledgeable skills." Researchers and educators working within this approach to situated learning explicitly model these knowledgeable skills and use these models to design learning contexts. In this way, through participation in practices modeled upon those in a particular target community or discipline, students serve as apprentices in the social practices associated with that community; this process is intended to result in "improved participation" in those practices and

enculturation into the community (Brown et al., 1989; Greeno et al., 1997).

Proponents of cognitive apprenticeships have been quite successful both in designing new kinds of learning contexts in schools that overcome some of the major limitations of cognitivist approaches to educational practice, and, through their emphasis on learning as enculturation, in contributing to a broader theoretical movement that conceives of learning as primarily a cultural rather than an individual process. In recent years, cognitive apprenticeships have come to exert an increasingly prominent influence on educational practices and have become prevalent at all levels of schooling.

Situated Learning and Cultural Production

Besides its role in the development of cognitive apprenticeships, Lave and Wenger's work can also be situated within a broader project that aims to formulate a general conceptualization of learning as an aspect of cultural production. In this sense, "scenarios of apprenticeship learning are useful to 'think with'" (Lave, 1990, p. 311) in understanding how learning is related to processes of cultural production, no matter where or in what specific form learning takes place.

In understanding this aspect of situated learning, it is important to note that Lave and Wenger focused on communities of practice that they explicitly recognized as benign. That is, apprentices were willing entrants into communities of practice in which the development of positively valued identities was not only possible for and expected of all participants but in which activity was organized in such a way that newcomers in fact had ample support in developing these positively valued identities. This focus on benign communities was strategic. Lave and Wenger started with communities of practice that were arranged so as routinely to produce positive outcomes for virtually all participants and examined how learning was organized in these communities. The observed absence of explicit transmission of abstract knowledge, together with the successful learning of apprentices in these communities, provided important evidence against cognitivist accounts of how successful learning happens.

Lave and Wenger clearly recognized, however, that not all communities are benign, and this has important implications for developing a general theory of situated learning. It is important to be clear here that "learning," conceived as an aspect of cultural production, takes on a somewhat technical meaning, and one that differs in important ways from commonsense notions. Learning is not understood in this view as a special process that happens only some of the time and to some people; rather, as Lave puts it, it "is an integral aspect of activity in and

with the world at all times. That learning occurs is not problematic" (1993, p. 8). In this view, learning is inherent in the processes of active meaning-making—of contextualization and identification—that are central in theories of cultural production, and all participants in practice are learning at all times.

Of course, if learning is an inherent part of activity, then it is clear that commonsense notions about "failure to learn" are in need of rethinking. Thus, Lave and others have proposed a view of "failure" as simply another form of learning; that is, "failure" is one way of "becoming a different person with respect to the possibilities enabled by [the] systems of relations" of a community. In this view, some communities are organized so as to allow for, or even *require*, that some participants "fail," or "successfully fail," to use Varenne and McDermott's apt phrasing (McDermott, 1993; Varenne & McDermott, 1998). Schools are one prominent example of this kind of community in Western culture, in that within schools, as Lave puts it, "not-learning and 'failure' identities are active normal social locations and processes" (1993, p. 16). For some participants in some communities, then, movement toward full participation in the community can involve actively positioning oneself and being positioned within negatively valued identities. In this way, commonsense notions of "learning" and "failure to learn" are conceived of in what could be called *symmetrical* terms, since both are accounted for as outcomes of the same kinds of process. Such a view clearly fits within the project of theories of cultural production to account for how both "educated persons" and "uneducated persons" are involved in cultural production (Levinson & Holland, 1996).

This symmetrical stance is useful as an analytic lens for showing not only how cognitivist assumptions about the production of educated persons in terms of *individual learning* are fundamentally flawed, but also how schooling practices based on cognitivism are implicated in *cultural production*. Cognitivism adopts an *asymmetrical* stance on the production of educated persons by assuming that this process is explained by the movement of some, but not all, persons away from faulty "everyday" forms of cognition toward "higher" forms of abstract rational thought. This view is asymmetrical in that it accounts for "learning" and "failure" in different ways. In this view, "failure to learn," as Lave points out, "is commonly assumed to result from the inability or refusal on the part of an individual to engage in something called 'learning'" (1993, p. 16). The result is that cognitivism holds individuals, and not processes of cultural production, responsible for their success or failure (cf. Lave, 1996). From the perspective of situated learning as an aspect of cultural production, however, both those who succeed and those who fail in school, like Lave and Wenger's apprentices, are simply becoming good at what they are given the opportunity to do on a routine basis—

that is, at engaging in the kinds of practices through which they become identified and identifiable, to themselves and others, within the cultural categories of "educated persons" or "uneducated persons."

This approach to situated learning, then, is not primarily concerned with improving contexts for learning, but rather with understanding how cultural production can result in persons being positioned within different kind of identities, some of which are positively valued and some of which are not.

SYMMETRY AND ASYMMETRY IN THE ANALYSIS OF LEARNING CONTEXTS

In my view, adopting a symmetrical stance on the analysis of learning contexts is crucial in adequately understanding learning as an aspect of cultural production. However, proponents of cognitive apprenticeships have sometimes paid insufficient attention to the dynamics of contextualization and identification that are central to cultural production theories, and this has led in turn to a view of activity in learning contexts that is in subtle but important ways *asymmetrical*. For example, Greeno et al. (1997) argue that, in their approach to situated learning, "difficulties that students have in learning to think and understand are interpreted as impediments to their participation in social practices" (p. 99). From a symmetrical stance, in which all participants are understood to be learning at all times, this might well be understood as the student being positioned by the "possibilities enabled by [the] systems of relations" of the learning context into a "not-learning" identity.

A major source of this asymmetry is a failure on the part of proponents of cognitive apprenticeships fully to appreciate Lave and Wenger's claim that learning "implies becoming a different person with respect to the possibilities enabled by [the] systems of relations" within a community of practice. To see how, it will be useful to return to the work of Lave and Wenger, and to examine in more detail some of the characteristics of the apprenticeships they discussed.

Lave and Wenger portrayed communities of practice in somewhat idealized and simplified ways (cf. Engeström & Cole, 1997; Nesper, 1994; O'Connor, 2001). For example, participants in Lave and Wenger's communities, both newcomers and oldtimers, were treated in terms of their community-based identities or roles; this has the effect of backgrounding tensions that might be introduced by participants' membership in multiple communities. In addition, while Lave and Wenger clearly recognized that innovation is an inherent aspect of social practice, they nevertheless treated their communities as characterized by relatively well-established and non-controversial forms of mastery, em-

bodied in the practices of respected masters; and they assumed willing learners who accepted or at least did not resist prevailing community norms. In such a community, learning can be conceived of as a largely unidirectional process in which newcomers are guided toward full participation by recognized expert practitioners, and conflicts over the nature of expertise do not arise. Moreover, the cultural processes that direct certain kinds of people toward apprenticeships in certain kinds of communities of practice, and direct other kinds of people toward other kinds of communities, were not addressed, nor were differences among different communities in status or power.

These oversights most likely resulted from Lave and Wenger's strategic focus on benign communities of practice: in cases in which all participants are able to establish themselves successfully as valued members, tensions and conflicts within communities either do not arise or can be safely backgrounded. However, in communities that are not benign, schools, for example, attention to these conflictual processes is crucial in maintaining a symmetrical stance on learning, and failure to do so results in insufficient attention to important aspects of contextualization and identification. In this regard, it is important to note that Lave and Wenger were explicitly quite cautious about the possibility of using the apprenticeships they discussed as models for designing educational contexts to produce "successful learning" (Lave & Wenger, 1991, pp. 40–41). However, cognitive apprenticeships have by and large done just that and, in the process, have tended to assume that cognitive apprenticeships can be understood as benign, stable, bounded, and homogeneous.

As the cultural production approach to situated learning has become more clearly defined and developed in recent years, it has begun to move beyond Lave and Wenger's early portrayals of communities of practice as benign, stable, bounded, and homogeneous, and to pay increased attention to the heterogeneity of social practice, that is, to the ways in which activity is structured by the practices associated with multiple contexts and communities (e.g., Engeström & Cole, 1997; Lave, 1993, 1996; Nesper, 1994; Wenger, 1998; Wertsch, 1991, 1998). This work has begun to emphasize that participants in activity are never engaged simply and straightforwardly in a single practice or a single community. Lave (1993) for example, has argued that "local practices must inevitably take part in constituting each other, through their structural interconnections, their intertwined activities, their common participants, and more" (Lave, 1993, p. 22). According to this view, all activity takes place at the intersection of different communities, each with their own practices, norms, and values. Moreover, participants bring with them a history of participation in different contexts, and they will participate in still other contexts in the future. Actions performed and words

spoken by a participant in the past, identities adopted by or ascribed to them, can be made relevant in the present interaction, and the present interaction can in turn be made relevant in the future. It is important to note, furthermore, that these various contexts are not necessarily easily embedded within one another, and this introduces potentially destabilizing elements into social practice. This makes close attention to the dynamics of contextualization and identification important.

This more complex understanding of context and identity has important implications for understanding activity in cognitive apprenticeships. From the point of view of cultural production theory, research on cognitive apprenticeships has tended to pay insufficient attention to the dynamics of contextualization and identification. Through its emphasis on highly stabilized "subject matter disciplines," cognitive apprenticeships have tended to implicitly assume the homogeneity of learning contexts, and to privilege "official" understandings of learning contexts through their use of particular models of practice as the basis for understanding the meaning of participation and for assessing learning or "improved participation." This strategy, however, backgrounds some of the subtle ways in which participants in activity draw on heterogeneous resources, both "official" and "unofficial," as they negotiate the meaning of the context, their ongoing activity, and their own emerging identities (O'Connor, 2001). As a result, cognitive apprenticeships themselves offer promising sites for examining "the relationships between local practices that contextualize the ways people act together, both in and across contexts" (Lave, 1993). Insofar as these learning environments involve an attempt to reproduce in schools conditions that will allow students to participate in the practices of some "target" context, such as scientific communities of practice, outside of schools, they are inherently heterogeneous contexts. Adopting a symmetrical stance on the analysis of these sites would require more careful consideration of the various ways in which participants orient themselves to these contexts and negotiate the meaning of their participation, and of the consequences of these processes for all participants.

LANGUAGE AND CONTEXTUALIZATION

Recent work in linguistic anthropology and related fields has devoted a great deal of attention to how participants in interaction use language to contextualize their activity (e.g., Bauman & Briggs, 1990; Duranti, 1997; Duranti & Goodwin, 1992; Gumperz, 1982; Hanks, 1996; Ochs, 1996; Silverstein, 1992). Contextualization is understood in this tradition as "an active process of negotiation in which participants reflexively examine the discourse as it is emerging, embedding assessments

of its structure and significance in the speech itself" (Bauman & Briggs, 1990, p. 69). When speaking, participants constitute the interaction as being of a certain sort, while at the same time identifying themselves as persons of a certain sort. The contextualization process, then, is the process by which individuals take up positions, and position one another, with regard to the interaction and the broader communities in which they are participating. This view of contextualization has clear connections to the claims of situated learning theorists about the mutual constitution of persons and contexts. Work on linguistic contextualization has treated this process in considerable detail and offers useful theoretical and analytical resources for examining activity in learning contexts.

An important focus of this literature is on *indexicality*, or the ways in which linguistic meaning is related to context. One major aspect of indexicality involves the use of linguistic forms to point to aspects of context in a way that identifies those contexts as being of a certain sort. In this view, linguistic forms become associated with particular culturally recognized types of communicative event, or what have been called "metadiscourses" (Silverstein & Urban, 1996). Through habitual use, linguistic forms become associated with metadiscursive categories such as genres, social identities, types of speech act, and the like. As a result, the use of a particular linguistic form on a given occasion indexes, or points to, the kind of communicative event with which it is conventionally associated.

Silverstein (1992) has discussed this process, making an important distinction between *presupposing indexicals*, which index aspects of context that are presently understood by interactants to be "in play," or relevant for the purposes of the present interaction, and *entailing indexicals*, which index aspects of context not presently in play but having the potential to transform the currently presupposed context. Presupposing and entailing indexicals always exist in tension with one another in any stretch of discourse. Over the course of an interaction, participants establish the interaction as belonging to a particular metadiscourse, such as a classroom lecture or a project meeting. To do this, they might use various indexes of social identity (Ochs, 1996) to construct themselves within recognizable identities associated with that metadiscourse, such as professors and students, or bosses and employees. This metadiscourse comes to be presupposed by participants as the relevant context for subsequent interaction. At the same time, people have a history of participation in events associated within other metadiscourses, in which they act within other social identities. A given participant is not only, say, the project manager of a student project, but also is potentially identifiable as a student at a particular school, a resident of a particular geographical region, as well as many

other potentially relevant social identities. These other identities, even though they might be backgrounded in a given interaction, are subject to being made relevant for interactional purposes, and can come to have entailments or consequences for the meaning of the interaction, sometimes transforming it in unexpected and unpredictable ways.

Wortham (1994) offers an analysis of the tension between presupposing and entailing indexicality that is relevant here. Wortham examines what he calls "participant examples" in high school classrooms. These are interactional events in which teachers and students, in the course of discussing a work of history, literature, or the like, *enact* the work, taking on the roles of the characters who are the subject of their discussion. During this enactment, the participant example serves as the relevant metadiscourse, providing the presupposed context for the interaction. At the same time, however, participants do not stop being, at least potentially, teachers and students, or white adults and African-American teenagers, and these other social identities are sometimes made relevant with consequences for the interaction. Wortham provides convincing evidence that aspects of the interactions among the *characters* in the participant example are sometimes "transferred" to the interactions among *teachers and students*, with implications that extend beyond the example and come to organize classroom relationships. In such cases, the "imaginary" or "pretend" identities and relationships indexed in the participant examples have consequences for the relationships of the teachers and students.

Wortham's work is relevant for the purposes of this chapter in that cognitive apprenticeships similarly involve participants' enactment of what can be seen as "pretend" roles or identities in addition to their continued occupation of enduring institutional identities, such as "teacher" and "student," or even "higher-status student" and "lower-status student." Cognitive apprenticeships tend to assume that individuals engaged in a project are occupying their "official" project roles, and are carrying out "official" project activity. That is, these approaches assume that the metadiscourse prescribed by the researcher or educator is guiding the interaction of the participants. However, this is a largely unexamined assumption, and one that Wortham's work should caution us to examine carefully. If it is possible for "unofficial" interactional events to proceed "submerged," as Wortham puts it, within an "official" event, it is necessary to examine ways in which participants in situated learning contexts might also draw upon unofficial metadiscourses, as well as how they coordinate whatever multiple events might be taking place. In the analyses that follow, I examine interactions among participants in a cognitive apprenticeship, paying particular attention to how participants negotiate tensions between official and unofficial identities.

A SITUATED LEARNING CONTEXT: THE MICRO TRUCK PROJECT

The focus of this analysis is interactions among participants in a cognitive apprenticeship that was developed by the Production Consortium, a federally funded association of five universities attempting to "initiate a systematic reform of undergraduate manufacturing engineering education."¹ There were two major aspects of the Consortium's reform effort. The first was to challenge a traditional separation of design and manufacturing in both engineering education and engineering workplaces. This separation is related to a dominant model of engineering education, which values the "intellectual" work of engineering analysis and design over the "practical" work of manufacturing, and maintains that analysis and design can and should be taught outside of the complex conditions of "real world" manufacturing. Against this model, the Consortium aimed to "increase the understanding, and the standing, of manufacturing in the undergraduate curriculum," arguing that "manufacturing is a critical element in all engineering disciplines," and that "design and manufacturing are highly interdependent in the product realization process."

A second aspect of the Consortium's reform was the attempt to allow students to participate in "engineering workplaces of the future," in part by allowing them to work in "virtual organizations," which bring together different organizations on a temporary basis so that each can contribute its particular strengths or "core competencies" to the project as a whole. In addition, since the members of virtual organizations are often geographically separated, the Consortium provided students with various communication technologies, such as video teleconferencing, to allow students to "work with their peers at other universities as if they were in the same room."

A cornerstone of the Consortium's efforts was the use of geographically distributed "Product Realization Projects," which were intended to provide "an opportunity for engineering students at all levels to actually design and manufacture products." The Consortium's intention was that "this product realization experience will place the students' education in a new, relevant perspective," a goal that has clear links to the aims of cognitive apprenticeships of enculturating learners by situating them in "authentic" contexts (Brown et al., 1989, p. 32).

In this chapter, I analyze interactions among participants in the "Micro Truck Project," which involved twenty students from the five schools of the Consortium. The stated objective of the project was for these students to collaborate in modifying a small model truck to race in a competition. Before the start of the project, Consortium faculty divided the project into a number of subtasks, and these tasks were

divided among student teams representing the various schools. For example, a team from "Tech" was assigned the subtask of project management and integration, and a team from the "Institute of Science" was assigned the subtask of producing the truck's electronic controls. The idea was that students at each school were or would become experts at their assigned task and bring these "core competencies" to the project as a whole. In addition, several "experts"—Tech students who had recently successfully competed in a National Micro Truck competition—were recruited by Tech's faculty advisor to serve as consultants to the entire five-school team.

These goals and the organizational structure of the Micro Truck Project reflect an "official" metadiscourse or model of the project, in that they are based on typifications of communicative events that take place in "real world" engineering workplaces. In particular, the Consortium was modeling a common practice in professional engineering in which members of project teams, with diverse specializations, work together to accomplish a common goal. The project based on this official model was understood as the official context of participation, within which students would learn by participating within their official roles, which were based on their specific forms of expertise.

There are different ways in which the analysis of such a project might be undertaken. Cognitive apprenticeships have tended to examine how participation is "guided" by the official model, and to explore the extent to which this results in "improved participation" in the product realization process. This strategy, however, privileges "official" interpretations of project activity. Analyses of situated learning interested in examining processes of cultural production, in contrast, would start by assuming that participants draw on multiple resources in constructing themselves and their activity. For example, in the interactions to be examined here, the Micro Truck Project might be taken to be the official context, and thus to provide roles or identities for participants in terms of their specialized "core competencies." However, these official identities are not the only identities that are potentially relevant. The Micro Truck Project is not *only* a geographically distributed engineering project that brings together multiple "organizations" to meet a common goal. For example, for the Tech project managers, it is also a project they are completing to fulfill a requirement for graduation. This might make certain "unofficial" identities, such as professor and student, potentially relevant. For "the experts," who have been offered a substantial budget by the Consortium to produce their own vehicle in exchange for serving as consultants, it is also a chance to compete in the next national competition. Thus other potential identities, such as "competitor," become potentially relevant. In addition, project participants continue to be potentially identifiable within enduring institutional roles, such as

students at the Institute, a very high status university, or at Tech, a lower-status institution. And these various contexts and identities do not necessarily fit together easily. To the extent that these different contexts do fit together, it is through the active integrating work by participants in local interactions. In the analyses that follow, I pay close attention to these details of contextualization, and especially to the ways in which tensions between official and unofficial identities are coordinated as participants construct the project as a context for their activity.

The Micro Truck Project offers a useful site for adopting this analytic strategy, since the Production Consortium was overtly attempting to challenge traditional values about what it means to participate in engineering practices. How participants in this project orient to, for example, the Consortium's attempts at elevating the status of manufacturing, or at sharing information between institutions, has consequences for their participation in the project, their "home" institution, and their trajectories in the broader field of engineering. In my analyses, I show how participants, through their interactions in the "conversational borderlands" (Rymes, 2001) that characterize the Micro Truck Project, negotiate the multiple contexts of their activity, and in the process produce unanticipated kinds of social identities and relationships. The analyses examine the interplay between indexical presupposition and indexical entailment in interactions among participants in the project. As we will see, in "self-introductions" by participants at Tech, a relatively lower-status school, this process results in the validation of the working-class identity of one student, as subsequent participants indexically align themselves with him and construct a local understanding of expertise consistent with his identity. In contrast, in a later project meeting involving Tech students and students from the Institute, a higher-status school, Institute students draw upon available but unofficial contextual features in a way that promotes their own view of expertise, in contrast to and at the expense of the identities of Tech students.

Self-introductions and the Local Construction of Identity

In this section, I analyze the "self-introductions" of several participants in the first meeting of the Tech Micro Truck Project team. These introductions are of interest here for several reasons. First, self-introductions involve overt identity work on the part of participants, and thus they are useful in examining some of the dynamics of contextualization and identification that theorists of situated learning have argued are central to the cultural production of persons. Second, and related to this, self-introductions are not simply a matter of reporting some "given" identity; rather, self-introductions involve identifying

oneself in terms of some perceived common purposes or interests of the group or groups of which one is a part. Thus, in identifying oneself to others, one must also make choices about what the relevant context is, and so identity and context emerge together in the act of a self-introduction. Third, while there might be an "official" context, participants might not be equally committed to that official context as the framework for their activity. In such cases, participants might draw on "unofficial" identities in ways that can come to have entailments for the emerging interaction.

I focus here on the self-introductions of three participants. Two of these, Joe Ryan and Katherine Steel, are seniors participating in the project in order to fulfill a Tech requirement for a Major Qualifying Project (MQP). The MQP is a major part of Tech's curriculum and is intended for students to display expertise at the level of a beginning professional engineer in their major field. The MQP is seen at Tech as the culmination of one's student career; students are drawing on the already substantial knowledge that they have built up through their participation in courses, other team projects, co-ops, and the like. The third participant, Bill Lewis, is also a senior at Tech, and had a few months earlier completed his own MQP as part of a team that had produced a vehicle to compete in the National Micro Truck Competition. On the basis of that experience, which resulted in a third-place finish nationally, Jack Sanders, the project's faculty advisor from Tech, has recruited Bill and his MQP teammates as "experts" to assist the entire five-school Consortium's team in producing their own truck.

The first student to introduce himself in this meeting is Joe Ryan. Joe is a mechanical engineering student in his late twenties who has recently returned to school after working for several years for the plant maintenance team at a food processing plant in the region. Jack Sanders, Tech's faculty advisor, recruited Joe for the Micro Truck Project largely because of his extensive hands-on experience with real-world engineering problems. Joe, for his part, was interested in this project because of its emphasis on "hands-on" manufacturing, as opposed to what he saw as the sterile and ungrounded theoretical work of engineering science and design. After being prompted by Jack to start, Joe begins to introduce himself in line 101:

- 100 Jack So. We'll get to you guys now, we'll just go ((gestures
counterclockwise)) (...) Joe?
- Joe: Uh, My name's Joe Ryan, uh (...) mechanical engineering student,
(.) I graduate in December of ninety six, I transferred last year, (.)
courtesy of Major Foods closing my plant,
- Jack: ((laughs))
- 105 Joe: U:m (...) I just- that's about it.

- Jack: (..)
 Jack: But you've been *aro:und*.
 Joe: Yeah. I worked for Major Foods for about seven years in uh, the juice division. And we made uh, Fruity Punch, and Sunshine Orange Juice, in Kingsfield [state name]. And I had a choice-choice to transfer to Houston Texas, Anaheim California, or Ohio. And I decided to finish [my degree].
 110 Jack: [(inaud)]
 Joe: ((slight laugh))
 115 Jack: But you have degree:s~
 Joe: I have a bachelor's degree (.) in uh business, (.) associate's in civil, (.) and I'm trying to finish my bachelor's in mechanical so I can just (.) quit school altogether.
 Jack: ((laughs))
 120 Jack: ((laughter))

Beginning in line 101, Joe first states his name and his position at Tech, that is, mechanical engineering student. He goes on to mention his graduation date and his recent transfer to Tech after the closing of the plant he had worked at, before apparently finishing by saying "I just that's about it" in line 105. To this point, Joe has not yet identified himself in terms of his official role in the project, and in line 107, Jack responds to this by treating Joe's self-introduction as incomplete and prompting him to say more by saying, "But you've been *aro:und*." Here, Jack is attempting to elicit more information from Joe about his background and experience, aspects of Joe's identity that Jack takes to be quite relevant for his role in the project. Joe goes on here to state some of his work experience with Major Foods. However, he does so in a way that still does not integrate this experience into a project-relevant identity. In line 115, Jack responds by further prompting Joe to foreground his relevant accomplishments: "But you have degree:s~" Joe then provides information about those other degrees before completing his introduction in lines 117-118, saying that he is "trying to finish my bachelor's in mechanical so I can just (.) quit school altogether."

Joe's introduction is of interest here for several reasons. First, he introduces himself with a great deal of hesitancy and tentativeness. It seems not to be entirely clear to him just what to say about himself that would be relevant on the present occasion. This suggests quite clearly that his identity is not simply a matter of stating some straightforward facts about a "core identity" (cf. Packer & Goicoechea, 2000); instead, he must orient himself to local standards of what identity is appropriate in the present context. This task is, of course, made more difficult by the fact that the "context" has many potential dimensions. For example, is this a "real-world" project, as in the official model, or is it a project to be completed for graduation? And how are potential conflicts between

project identity, school identity, relationships among peers, and the like to be reconciled?

A second interesting aspect of Joe's introduction is how he constructs an opposition between the theoretical world of school and the practical world of work, and places primary value on the practical side of this opposition. For example, in lines 101-102, Joe adopts an identity of "a laid-off worker who is trying to make the best of it by returning to school," thus presenting school as clearly not his first choice. In addition, in lines 116-118, Joe says that he is "trying to finish my bachelor's in mechanical so I can just (.) quit school altogether." Here, he playfully resists Jack's efforts to get him to frame his various degrees as project-relevant experience, instead framing his school experience from the apparent perspective of a worker. And Joe is indexing an identity not only as a worker, but as a particular kind of worker, that is, one involved in the practical, manufacturing side of production. He says that his transfer to Tech was "courtesy of Major Foods closing my *pla:nt*," not only stressing the word "plant"—the site for the manufacturing of products—but also identifying with it—"my plant." He goes on, in lines 109-110, to indicate that "we made uh, Fruity Punch, and Sunshine Orange Juice," with the use of "made" further indexing his identification with the practical side of the production process.

It is important to note that even though Joe has repeatedly resisted Jack's attempts to get him to "officialize" (Hanks, 1996, p. 244) his identity by relating his experience to his role in the project, Joe's self-introduction is nonetheless treated as successful. Jack, the faculty advisor and the primary representative of the official context, responds with laughter to Joe's account of his transfer to Tech in line 104. In addition, in lines 119-120, first Jack and then other participants in the meeting laugh at Joe's statement that he wants to "quit school altogether." Thus, Joe has constructed a successful identity for himself within the emerging norms of this interaction. And, as we will see, aspects of Joe's self-introduction are taken up and made relevant by other participants as they construct their own identities in their self-introductions.

When Joe has finished, two Consortium staff members introduce themselves, and then it's time for Katherine, Joe's partner on the MQP team, to take her turn:

- Jack: Katherine.=
 Kath: =Okay I'm Katherine Steel, I'm a mechanical engineering student, I'm supposed to be graduating at the end of the summer term this year so (.) doing the MQP will be *great*.
 190 ((slight laugh)) Get it over with as *soon* as possible.
 Jack: Just back from co-op wi[:th~
 Kath: [U::h Design Technologies? Then

- 195 ProCAD for six months? >I was< on the technical support li:ne so (.)
 I'm pretty familiar [(.)]=
 Jack: [Sh-
 Kath: =with that [package.
 Jack: [she's our ProCAD (.) guru.
 200 Kath: ((slight laugh))

In her initial turn, Katherine shows little of the uncertainty and hesitation that we saw in Joe's introduction. Katherine seems much more certain than Joe had been about what information about her identity is relevant in introducing herself. It is important to note in this regard that Katherine begins her introduction by using the same three "slots" that Joe had used, and in the same order: name, major, graduation date. In this way, Katherine seems to be drawing on the structure of Joe's self-introduction as a model in constructing her own. In fact, as this sequence of self-introductions proceeds, the structure of participants' introductions becomes stabilized, and all participants use the same slots as those that Joe had used.

While the structure of Joe's self-introduction seems to be mediating Katherine's own introduction, she uses that structure flexibly to situate herself explicitly with regard to the MQP, which Joe had not done. Katherine uses the "graduation date" slot explicitly to motivate her participation. In saying that she is "supposed to be" graduating in the summer, Katherine expresses some doubt about this outcome. The doubt is due largely to the fact that the MQP is a necessary hurdle to get over in order to graduate; as Katherine says, "so doing the MQP will be great." It is important to note that Katherine is here adopting a positive orientation to the project; that is, she is identifying with the MQP as an aspect of her own "identity-making life project" (Lave, 1996). However, perhaps realizing that in so doing she might potentially alienate herself from her partner, she goes on to say, "Get it over as soon as possible," indexing the same kind of orientation to school expressed in Joe's wish to "just quit school altogether." Thus, without explicitly saying so, Katherine is indexing an identification with Joe and his values.

However, while Katherine has adopted a positive orientation to the project, at least in part, her identification with the project is in terms of what it means within her identity as a *student*, rather than her identity as an *engineer*. And so, immediately after Katherine's apparent completion of her turn, Jack attempts to elicit a different identity from Katherine, one situated within the official context in which she is a project manager and design integrator of a team engineering project. In line 193, Jack says "Just back from co-op wi:th," starting a sentence that Katherine is clearly supposed to complete. Jack has recruited Katherine

for this project because of her experience working with a variety of CAD (computer aided design) software programs, experience that Jack expects to be quite crucial in completing this project. Jack thus guides Katherine toward a statement of her identity that is more appropriate for what he treats here as the relevant context. In line 194, Katherine completes the sentence started by Jack, and goes on to report, somewhat modestly, her CAD experience. Jack then, in line 199, goes on to explicitly locate this expertise in the project, saying "She's our ProCAD (.) guru," with the use of "our" implying that Katherine's expertise in CAD is relevant for the entire project team. It is worth noting Katherine's slight laugh in response to this turn, perhaps in discomfort at being singled out by Jack as a "guru."

After the turns of four other students, two of whom are participating in a similar MQP, and two of whom are "experts," Bill Lewis, one of the "experts," takes his own turn:

- Bill: Um I'm (.) Bill Lewis, I'm a manufacturing student, graduating this year, (.) u:h I worked on the MQP (team) last year, (.)
 I co-op'ed at Aerospace Inc., so if you need any turbine blades for your car,
 [I know how to make them.=
 240 (((laughter))
 Bill: =Um (.) I know a lot about off road type vehicles of (.) a lot of sorts so (.) I a- I'm familiar with this type of racing. And so um (.) I wou- I would be good resource (.) if you have any questions. (.) And um (.) I want- just wanna build another truck too mostly though.
 245 ((laughter))

Bill is faced in his self-introduction with the rather sensitive task of constructing an identity as "expert"—his official role in the project—and thus differentiating himself from Joe and Katherine, who as fellow Tech students, and even fellow seniors, are his peers. He is, after all, only slightly ahead of them in the curriculum, having completed his own MQP just three months earlier. I suggest that Bill uses his self-introduction to both construct and minimize this potential split in ways that index alignment with both his official role and the emerging norms of the Micro Truck team.

We can clearly see elements of others' self-introductions in Bill's own introduction. For example, he uses the opening three "slot" structure used by other participants by stating his name, major, and graduation date. In addition, like Katherine, he mentions his co-op experience, and jokingly relates that to his role in the project. In addition, Bill's fellow "expert," Rob, has just completed his turn by saying that "I've worked on the truck before and now I just want to build another one and keep

playing because I got a lot of good ideas that we didn't get to do." Bill uses aspects of Rob's turn when he says, in line 244, that "I want- just wanna build another truck too mostly though." In these ways, Bill's identity on this occasion is clearly locally constructed, in that "who he is" depends in part on the local context, right down to his position at the table.

Bill uses this emerging framework in interesting ways to orient himself to the kinds of oppositions that Joe and Katherine were orienting themselves to. An important aspect of Bill's self-introduction is his construction of relationships to others, and specifically to Joe and Katherine. Bill sets up an explicit opposition between himself, on one hand, and Joe and Katherine, on the other. He accomplishes this largely through the use of an *I:you* pronominal opposition (Wortham, 1994; cf. O'Connor, 2001). The use of these pronouns indexes a division between two interactionally relevant groups. Moreover, Bill "characterizes" (Wortham, 1994) the groups he has indexed in terms of expert and non-expert identities. For example, in lines 238-239, he says, "so if you need any turbine blades for your car, I know how to make them," where *I* is associated with knowledge, and *you* is associated with lack of knowledge. Later, in lines 241-243, he again indexes these knowledgeable and non-knowledgeable "epistemic stances" (Ochs, 1996), when he says, "I know a lot about off road type vehicles of (.) a lot of sorts so (.) I a- I'm familiar with this type of racing. And so um (.) I wou- I would be good resource (.) if you have any questions." Here, he refers to himself as "knowing a lot," while presupposing that Joe and Katherine might know less, and might therefore have questions that he can answer.

It is interesting that, in addition to his use of his self-introduction to differentiate himself from Joe and Katherine, he also uses it to construct himself as the same kind of person as Joe and Katherine, identifying himself in important ways with the values they have indexed in their own turns. First, in his first use of the pronominal opposition to position himself as knowledgeable and Joe and Katherine as lacking knowledge, in lines 237-239 he does so by jokingly referring to his knowledge of how to make turbine blades as a result of his co-op. This knowledge is irrelevant to this project, and so does little to differentiate Bill from the others in any way that is meaningful or threatening here. It is also noteworthy that the knowledge that Bill is referring to here is *practical* and not purely theoretical knowledge; that is, it is knowledge of how to *make* turbine blades. This aligns Bill with the practical identity adopted by Joe in his self-introduction.

Bill further mitigates his claims to expertise in the final line of his turn, saying that "I want- just wanna build another truck too mostly though." Here, as he had earlier in stating that he knows how to "make"

turbine blades, Bill, like Joe, aligns himself with the practical side of the theory/practice opposition. Moreover, he does so in a way that distances himself from his official identity as an "expert." That is, his *primary* interest is to "build another truck," and not to serve as an expert consultant to Joe and Katherine. Just as they are using the MQP as a means to the end of practical goals—leaving behind the school-based world of theory for the work world—so Bill is using the knowledge he gained from his own MQP for his own practical goals—building another truck.

One further source of alignment between Bill and the MQP students is relevant for my purposes here. That is, when Bill says, in line 243, that "I would be good resource (.) if you have any questions," he is indicating that the separation between himself and Joe and Katherine is only temporary. He is willing to share his knowledge to help them complete their own MQP, and thereby attain the expert status that he has achieved. We will see in the next section that this orientation toward the difference between expert and novice is not shared by all.

This first analysis has been intended to show how, as an interaction proceeds, participants use language to construct identifications and alignments both with and against the official model of the project, and how this contributes to the making and remaking of the context of the interaction. From an official perspective, successful participation in self-introductions involves relating oneself to the official model of the project, and specifically, as suggested by Jack's efforts to guide students' identifications, to do so by making clear what expertise or "core competencies" each participant is bringing that will benefit the project as a whole. However, these official identities do not exhaust the possibilities for successful participation, as we saw through the emergence of other, unofficial, criteria for successful performance of a self-introduction. That is, participants also oriented to the project from other perspectives, most notably from the perspective of the kinds of persons who de-emphasize expertise and "professionalism," and who instead align themselves with working-class norms, values, and activities. These unofficial identities, rather than being rejected as inappropriate, were instead validated by Jack and by other participants. In fact, throughout the Micro Truck Project, Tech students continued to align themselves with the practical, "hands-on," aspects of the project, and continued playfully to resist more academic and school-affiliated kinds of identities. In this way, the Consortium, with its attempt to elevate the status of activities that are traditionally devalued in engineering, was offering a place for students with these kinds of working-class affiliations to form positively valued identities. However, these identities are not equally valued in all contexts, and in the next section I examine what happens when these locally

constructed identities are made relevant in interaction with students from a higher status school, who adhere more closely to some of the more traditional values of engineering.

Contesting Identities of Expertise

In this section, I examine segments of a videoconference that took place about three weeks after the initial project meeting at Tech that was analyzed in the previous section, and about two months before the scheduled end of the project. The videoconference is between Joe and Katherine, the Tech project managers, and Alex, Tina, and Luis from the Institute. The Institute students were recruited for the project with the understanding that they would be in charge of the Consortium truck's control system. These students were interested in working with sophisticated, state-of-the-art microprocessors in designing the truck's control system, and they were offered substantial financial resources by the Consortium for this task. Tina, in an interview, made it clear that this offer was important in persuading the Institute students to participate.

My aim in this section is once again to show how unofficial identities are made relevant in the interaction, and how, over the course of the interaction, this results in participants identifying themselves and others with regard to some of the central goals of the consortium. This time, however, rather than resulting in alignments being constructed among participants, as in the Tech meeting, participants from the two schools differentiate themselves in ways that line up with traditional views of engineering expertise and traditional status differences between the two schools. This is an active process in which Tech students become identified as less "educated" persons than their counterparts at the Institute.

Before turning to the transcript, it is worth clarifying that the Micro Truck Project is scheduled to culminate on April twenty-seventh, with a race at Tech that is modeled after the annual National Micro Truck Competition. The Tech competition is scheduled to include the five-school Consortium truck, as well as vehicles entered by another Consortium team, by the experts at Tech, and by any Consortium sub-teams that choose to produce their own vehicle. At the start of the first segment to be examined here, Tina, from the Institute, asks a question that aims to clarify this point:

- Tina: I have a question though. Um on April twenty seventh (.) who are we actually going to race (.) against? Um if all five of us (scho:ols)-
 990 Joe: Our experts are currently building their o:wn (.) super car, (..)

- u:m plus I believe some of the other schools'll be making their own to bring up and- to race against (.) the actual consortium car.
 Kath: Right so if you wanna make a car, you're welcome to bring it and race against it.
 995 (..)
 Tina: So there's other schools that (.) are gonna like- (.) you're gonna invite or something?
 (.)
 To- to participate (.) in this particular race on April twenty seventh?
 1000 Kath: Right. We're gonna invite [all the consortium scho:ols,
 Tina: [(like)
 (.)
 Kath: um as well as our experts from last year, and anyone at Tech who wants to make a car. They're welcome to come down (.) and test it on our track.
 1005 (.)
 Uh for the quadfest o:n the twenty seventh.
 Joe: Yeah. These schools are makin- de- they're desi:gning their parts, but at the same time I think they're also building their own cars also to come up.
 1010 (..)
 Alex: And now now there's something that's- that's sort of bothering us right here. Uh (.) y- you call- the- the- the two- the two guys that were there that you called experts, (.) they are building their own vehicle. And we- (.) we're sort of uh (.) a bit uh touchy on sharing information, as far as u:h what- what sort of processor we're actually gonna use, and (.) its speed. Uh because I believe that they were actually gonna use a microprocessor themselves. (.) And uh (.) since we are- tha- that was my question that was geared towards uh (.) when I- when I asked you u:h (.) what do you want to actually acco- wuh- what do you want us to accomplish, as far as (.) uh is it gonna be a competitive vehicle, or is it just (.) to assemble something and (.) sort of (.) he:y compete. Because if it's- if it's- if it's actually gonna be a competitive vehicle, (.) u:h I feel that we shouldn't share anything with uh (.) the experts.
 1025

Tina's question at the start of this transcript in line 988 brings up a topic that the Institute students have been trying to introduce for several minutes—that is, the arrangements for the final competition. By asking, "Who are we actually going to race against?," Tina is trying to establish the identity of the five-school team's competitors. Joe and Katherine respond in lines 990 through 1010 by explaining who the other participants will be. What is important here is that several of the participants in the Consortium's five-school team, including the ex-

perts, are also expected to be building their own truck to compete with the Consortium truck. These participants, then, have multiple potentially relevant identities, which include not only their project identities, such as "expert consultant," but also "competitor" identities. It is important to note that, while these multiple identities might be viewed as reflecting a conflict of interest, Joe, Katherine, and Jack Sanders, the Tech faculty advisor, regarded this possibility as irrelevant to the official model of the project. They emphasized collaboration, not competition, among the various teams.

It is important to note that, in contrast to the Tech team's emphasis on collaboration, the Institute students have already shown signs that they are not particularly aligned with the collaborative goals of the project. In fact, at one point relatively early in the project, the Institute students suggested in an email message to another Consortium school—the only one approaching the Institute in prestige—that the five-school project be disbanded, and each school produce its own truck for the competition. This resulted in a firm rebuke by the faculty advisor at that school, and the Institute's students continued as members of the five-school team. However, they repeatedly resisted efforts by other sub-teams to include them in their design work. Even in a case in which there was a question about a serious potential conflict between the Institute's control system and another team's steering mechanism, the Institute students repeatedly failed to respond to the other team's emails attempting to work out the problem.

In light of this, it is significant that, beginning at line 1012, Alex uses the experts' multiple possible identities as a basis for challenging the official model of the project. He foregrounds a role for "the experts" that is not a part of their official identities; that is, the experts are not only "consultants," they are also "competitors." He uses this as a rationale for why he does not want to "share anything" with the experts. This is of interest here in that it challenges the direction of the flow of knowledge that was behind the use of "experts" in this project to begin with. Alex is effectively questioning just who is in a position to learn from whom. It is important to note that the students from the Institute have made very clear earlier in this meeting that they have access to their own "experts," that is, electrical engineering faculty members at the Institute. What seems to be going on here is that the Institute students are protecting their privileged access to the expertise of their own faculty. In their view, the expertise of Tech students is in no way the equal of the expertise of Institute faculty members, and, thus, the Tech "experts" are in a position to "learn from" the Institute students. This challenge to the expertise of "the experts" is quite overt when Alex refers, in lines 1013–1014, to "the two guys that were there that you called experts," suggesting that, although Katherine and Joe might take

"the experts" to be experts, Alex is not so willing to accept their expertise. It is important to note that Alex is apparently holding Katherine and Joe accountable for the designation of "the experts."

In addition, Alex is adopting a different orientation to the nature of knowledge and expertise than is reflected in the official model of the project. That is, in assuming that the experts are not necessarily benign guides and that they might instead attempt to gain some personal advantage from their position, he is treating knowledge as a valuable commodity that is the source of power and is therefore to be protected from others rather than freely shared.

Finally, I briefly consider Katherine and Joe's response to Alex's challenge. After a short exchange in which Joe responds to Alex and Alex elaborates on his position, Katherine provides a rationale for the participation of the experts:

- Kath: I think the experts are more there for you to ask questions?
They're not gonna be- (.) (say) when you send (.) Jim and
myself (.) things about your car, we're not gonna share it with
1050 them. I mean (.) if they ask we'll (.) give em general knowledge,
but we're not gonna give em- these are the blueprints to what (.)
the Institute's doing. We're just gonna- you know (.) it's more
for y- it's a one wa:y- (.) more for you to ask them questions
than for them to ask you questions.
- 1055 Tina: Okay.
Kath: It's just their expertise cause they did it once. (.) They're not
really-
- Tina: Okay.
Joe: Right. (.) They've- they've been there, they've raced a car, they
1060 know what the atmosphere is, they know what some of the other
cars are like, (.) you know you can plug em questions about
that, (.) but other than that I mean (.)
- Kath: Right.
Joe: It's f- basically between (.) us and you.

Here, Katherine responds to Alex's challenge by reasserting the official structure of the project. In line 1047, she echoes Jack's assertion that the experts are "people you can go to with questions" when she says, "I think the experts are more there for you to ask questions?" She goes on to establish a basis for the experts' designation as experts when she says, "It's just their expertise cause they did it once." Here, she establishes a very limited basis for the status of the experts. That is, their expertise is grounded in practical experience, in that "they did it," that is, raced in the competition, and in limited practical experience at that: "they did it once." Joe, in lines 1059–1062, provides a similar justification for the status of the experts when he talks about the experts' experience

at the competition. Thus, both Katherine and Joe are grounding the experts' status not in their having demonstrated their competence as engineers—the rationale for Tech's MQP requirement—or even in knowing “a lot about off road type vehicles of a lot of sorts,” but rather in the highly situated conditions of the Micro Truck Competition.

This is particularly interesting in light of the fact that the Institute students are not treating the Micro Truck Competition as any special basis for expertise. In fact, one of the Institute students, Tina, told me in an interview midway through the project that she and her Institute teammates were quite certain that the design they were interested in pursuing would not be possible within the time constraints. Rather than changing their intended design to meet the deadline, however, Tina claimed that her team planned to pursue this design for as long as it took, regardless of whether they had finished in time for the competition. It was clear that the intellectual aspects of the design experience, and not collaboration with other schools in the “project realization process,” was what primarily motivated the Institute students. Thus the limited practical basis Katherine and Joe give for the experts' status as experts is largely meaningless to the Institute team.

CONCLUSION

In this chapter, I have attempted to illustrate one way in which some of the concepts and methods of linguistic anthropology can be used to inform analyses of learning contexts, and to contribute to our understanding of processes of the cultural production of educated persons. My specific aim has been to show how the construction and contestation of “identities of expertise” takes place through the interplay between presupposing and entailing indexicality in a learning context.

In the analysis of the Tech students' construction of identities during self-introductions, I showed how participants used language to construct identifications and alignments both with and against the official model of the project. Through their playful resistance to the efforts of their faculty advisor to guide their participation toward a statement of their identities in terms of the official model, students aligned themselves with practical, “hands-on” aspects of the project, and constructed working-class identities for themselves, against the norms of “professionalism” that would typically characterize this genre. These identities came to have entailments for the interaction, as they were received positively, both by other students and by the advisor. In this way, participants renegotiated the possibilities for successful self-introductions and positively valued identities in this context. I also showed,

however, that these working-class identities, constructed against typical views in engineering of what it means to be an expert, were later devalued during a videoconference with students from the Institute, a higher-status school. This devaluation was itself an emergent feature of the interaction, as Institute students brought “into play” potential but backgrounded—and to the Tech students, irrelevant—identities of the “experts,” and used these as the basis for rejecting claims to expertise grounded in practical experience. Thus, in these interactions, participants were “learning relations among the major social identities and divisions” (Lave, 1996, p. 151) in their chosen profession of engineering, and at the same time participating in reproducing some of those same social identities and divisions.

A central point here is that when we do not privilege official understandings of context, it becomes possible to examine how participants not only act into an official context, but also orient to it from the perspective of other, unofficial and sometimes competing contexts. These negotiations are a central part of processes of cultural production, and attention to them can help us to maintain a symmetrical stance on the analysis of activity, and thus to adopt “an inclusive focus on all participants equally, as each contributes to the making of differences of power, salience, influence, and value of themselves and other participants” (Lave, 1996, p. 162).

NOTES

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1. All unattributed quotes in this section are taken from the Production Consortium's grant proposal.

APPENDIX: TRANSCRIPTION CONVENTIONS

Symbol	Significance
.	Falling pitch
?	Rising pitch
,	Slight rise in pitch, indicating “more to come”
~	Falling-rising pitch
-	Truncation
(.)	Pauses of less than 0.5 second

- (..) Pauses of greater than 0.5 second (number of dots indicates relative length of pause)
- = Latching of speakers' utterances
- [Onset of segments of overlapping speech
- :: Lengthened segments (e.g., I don't kno::w)
- {{()}} Non-lexical phenomena that overlay the lexical stretch (e.g., {{(laughter)}} text).
- (()) Non-lexical phenomena, vocal and nonvocal, that interrupt the lexical stretch (e.g., text ((laughter)) text)
- (inaud) Unintelligible speech
- di(d) A good guess at an unclear segment
- (did) A good guess at an unclear word

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