From Newcomer Enculturation to Fertile Zones of Cultural Encounter: A Bidimensional Metaphor for Schooling

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Abstract: Instructional approaches that rely on the theoretical concept of learning as a process of enculturation usually regard the teacher as the expert and the students as the newcomers. We suggest an alternative metaphor, where students are viewed as longstanding members of an overlapping yet different culture than that represented by the instructional setting. This metaphor allows for sensitivity to learning difficulties that arise when students' contextualization of the milieu is dominated by the other cultural viewpoint. We suggest the concept of fertile zones of cultural encounter as a pedagogical approach to bridging the gap between cultures by designing interventions appreciated by members of both cultures, while also encouraging students to engage in the practices of the professional culture. We demonstrate the usefulness of such conceptualization in two school subjects: computer science and history.

Introduction

This paper proposes the metaphor of a cultural encounter for conceptualizing students' performance in formal school learning environments. It draws on work done by Lave and Wenger (1991), who conceptualized learning as a process of enculturation into a community of practice (CoP) through participation by newcomers in peripheral yet legitimate, genuine activities of the CoP. The newcomers gradually increase their participation, ultimately becoming full-fledged participants with a holistic perspective on professional practice that develops over time (Lave & Wenger, 1991; Wenger, 1998). According to Wenger (1998), cultures consist of composite repertoires of shared capabilities created by interaction, borrowing, imposition, and brokering among its constituent CoPs. Roth and Bowen (1995) define *culture* as including both the resources and the practices of a given field. They define the resources and practices as follows:

> We use the notion of material, social, and conceptual *resource* to denote the instruments, facts, phenomena, and theories scientists draw on in their work. *Practice* is the label for the act of constructing (or deconstructing) physical and conceptual entities, the resources of the field. (p. 76)

Based on Schoenfeld's definition (1992) of a mathematical point of view, we can define having a viewpoint characteristic of any field as valuing the processes carried out by professionals (or full participants) in that field and having the predilection to apply them. One's cultural viewpoint determines what one considers important and unimportant in any situation; thus our viewpoint determines what we learn from a situation. However, it is a reciprocal relationship because our viewpoint evolves as we learn, i.e., as we participate in a culture (Wenger, 1998).

Instructional models that rely on Lave and Wenger's theoretical framework emulate "real world" participation in a culture in school, as expressed by the following description of the cognitive-apprenticeship instructional model: "Cognitive apprenticeship methods try to enculturate students into authentic practices through activity and social interaction in a way similar to that evident—and evidently successful—in craft apprenticeship" (Brown, Collins, & Duguid, 1989, p. 37). In these emulations the teacher usually represents an old-timer in the culture, whereas students are viewed as newcomers to the culture (e.g., Yackel & Cobb, 1996; Schoenfeld, 1992). For example, in the cognitive apprenticeship implemented by Schoenfeld (1992), it is clear to all participants in the milieu that he is the expert. This power relationship faithfully reproduces the power relationship between newcomers and old-timers described by Lave and Wenger.

Nevertheless, I claim that in certain domains the metaphorical view of the educational milieu as a "busy tailoring shop" (Collins, Brown, & Holum, 1989) where the expert tailor is the teacher and the students are merely apprentices (or newcomers) does not capture the complicated social fabric of the milieu and is therefore limited in its ability to explain and anticipate learning difficulties. Today's students come to school with a wealth of informal knowledge that includes learning practices that have proved useful in out-of-school learning experiences, such as their interactions with the Internet as consumers and producers of knowledge and their gaming experiences (for further discussion of the impact of students' computer experience on their cognitive skills, see Gee, 2003). As our expectations of schooling sociology shift so that we no longer assume that teachers are the authorities with the knowledge and instead expect students to assume responsibility for creating knowledge, our metaphors for educational milieus should reflect this change.

To this end, I suggest using the metaphor of a cultural encounter in which students are viewed as members of a culture intertwined with the CoP represented by the instructional setting. This bidimensional metaphor faithfully maintains students' newcomer-ness to the culture represented by the instructional setting but at the same time regards students as longstanding members of an intertwined culture, thereby adding to the picture by emphasizing the multicultural nature of the sociology of schooling today. In the rest of this paper, I first define the concept of a cultural encounter; then I describe an instructional approach called *fertile zones of cultural encounter* (FZCE), which uses the concept to address and explain certain learning difficulties; and finally, I demonstrate the usefulness of the cultural-encounter metaphor in two school subjects: computer science and history.

Cultural Encounter

Intertwined cultures are cultures that overlap with respect to some of their essential characteristics and usually with respect to some cultural resources, yet have different viewpoints regarding the same situation. I do not intend to divide people into cultural groups; rather, my point is that each of us belongs to many cultures and thus people act differently on the same resources in different contexts depending on the cultural perspective that dominates their contextualization (i.e., interpretation) of the situation (Wertsch, 1998). It is all a matter of contextualization; metaphorically speaking, people can choose which of many hats best fits the context. For example, the same historian would interact with the historical text of the Passover Haggadah in one way during the Seder and in another way in his or her professional work. The advantage of the cultural-encounter metaphor is that it helps us understand difficulties rooted in students' contextualization of educational situations that are not consistent with the goal of the milieu designers; i.e., it helps us identify the hat the students have chosen to wear. This conceptualization of students' interaction with the educational milieu can serve as a guideline for teachers and curriculum developers, encouraging them to help students recontextualize situations when necessary.

A good example of intertwined cultures is provided by Labaree (2003), who describes the encounter of educational researchers with experienced teachers who become doctoral candidates in schools of education as a cultural encounter and, moreover, as a culture clash. The cultures of teachers and educational researchers overlap, as both are interested in education. However, they have different perspectives on their common area of interest. Labaree claims that the shift from teaching to educational research requires that the teachers transform their cultural orientation "from normative to analytical, from personal to intellectual, from the particular to the universal, and from the experimental to the theoretical" (p. 16). The difference between these viewpoints is salient in their preferred responses to students who encounter learning difficulties. The primary commitment of teachers is to the students, and therefore they want to intervene *early*; in contrast, researchers "seek to clarify and validate arguments about the functions and dysfunctions, causes and consequences of educational practices" (Labaree, 2003, p. 17) and consequently may defer intervention. This difference can make teachers suspicious of and resistant to activities typical of educational research (sometimes subconsciously).

Labaree sought to narrow the cultural gap by urging researchers to emphasize the similarities between their culture and that of the teachers—such as their shared dedication to education—so that teachers could more easily come to regard the research culture as legitimate. Here I propose a different approach that actually strives to make the distinction between professional and other perspectives *visible*. To this end I introduce the concept of a *fertile zone of culture encounter* (FZCE)—a milieu whose design is sensitive to the alternative cultural perspective that students might adopt when acting within the milieu. The FZCE approach encourages and facilitates contextualization of the milieu from the perspective of a member of the professional culture and helps students to gradually "cross the cultural bridge." This does not mean abandoning their cultural heritage, but rather, broadening their perspective as their experience recasts the value of activities as either productive or unproductive in a particular context.

Three essential characteristics must exist to generate an FZCE: (1) The milieu, or metaphorically the encounter zone, should be designed in such a way as to look familiar to the students, thus inviting them to regard it as legitimate; this will lead students to adopt the goals of making sense of the milieu and challenges presented within the milieu. (2) At the same time, the milieu should be designed in such a way that as students strive to accomplish *their goal*, they come to realize that their current perspective and associated practices are limited. (3) The milieu should make it productive and feasible for students to recontextualize, i.e., to employ the professional perspective in the milieu.

The next two sections demonstrate the usefulness of this metaphor in two disciplines. First I demonstrate how treating computer science education as an encounter between two cultures of computer-oriented problem-solvers helped in understanding and addressing students' learning difficulties. Then I demonstrate how treating history education as an encounter among cultures of text readers led to the design of a milieu that helps students practice historical thinking.

Computer Science Education

Two Computing Cultures

The Israeli high-school curriculum in computer science (CS)—like curricula in many other countries—is oriented toward the academic CS world. As such, it centers on the algorithmic problem, and the main goal is to introduce students to the scientific principles of computation. Because technology is perceived merely as a tool for demonstrating those principles, it is recommended that the technology chosen be one that does not distract students. By the time students start their CS lessons, they are already veteran computer users (or as Nardi (1993) put it, "local developers"). A *user* is defined by Turkle as someone who is "involved in the machine in a hands-on way, but is not interested in the technology except as it enables an application" (Turkle, 1995, p. 32). However, the dividing line between using and programming a computer is not clear-cut (Goodell et al., 1999; Nardi, 1993), so it is likely that students will utilize their user-oriented experience in solving computer-related problems in school computer classes. Here I briefly characterize the two cultures—that of the teachers and the instructional setting and that of the students. A detailed characterization of the cultural differences, as well as other examples that demonstrate the strength of this metaphor for understanding and resolving teaching and learning difficulties in an advanced CS course (concurrent programming), can be found in X (Ben-David Kolikant & Ben-Ari, in press).

The cultural differences are best demonstrated in a situation in which a program produces unexpected output. In the context of software development, a programmer would set the goal of analyzing the error that caused this to occur and designing and implementing a solution. In the context of software use, an unexpected behavior by the program might be tolerated, especially if it does not prevent achievement of the user's goal. For example, when downloading pages from the Internet we might decide not to devote any effort to understanding messages that appear on screen as long as we can get the pages we want.

The interactions expected when one attempts to solve problems differ, too. An interaction dominated by the perspective of the professional culture involves a multi-layered approach to problem-solving, with back-and-forth movement between different layers of abstraction: the human-computer interface, the program being used, underlying software such as the operating system, and the machine that is executing the program (Aho & Ullman, 1992). An interaction dominated by the user's perspective is primarily on a single layer—that of the interface (Turkle, 1995). The underlying layers remain opaque and are not used in problem-solving.

Finally, these perspectives differ in terms of what one considers valuable knowledge and thus in terms of learning preferences. Users appreciate a development process based upon exploring technological artifacts; therefore, they tend to appreciate functional knowledge focused on the question "How can I make it work?" rather than on "Why does it work the way it does?" (Carroll & Rosson, 1987; Turkle, 1995). Within the professional culture, there is greater appreciation of abstract knowledge of data structures, algorithms, and computational models, as well as of formal development activities such as analysis, design, and documentation.

Utilizing the FZCE Framework for Design

Since we assumed that our students were used to the single-layer approach to problems, we designed an environment that would provide information regarding the three layers of the problem through its interface layer. Therefore, when a program was being executed the screen was divided into three parts: (1) the top of the screen displayed the input and output of the program, that is, the users' interaction with the computer; (2) the middle part of the screen displayed information on the state of the program and the values of the variables, i.e., the underlying layers; and (3) the line at the bottom of the screen allowed for manipulations such as step-by-step executions and resetting. The students could use the rapid feedback to check on their assumptions and verify the correctness of their solutions.

Furthermore, we designed the specific assignment described here in such a way that the synchronization problem that students had to solve originated in the shared interface resource, i.e., the input. Thus, solving the problem required contextualizing the interface in terms of the specific effects of errors in code that is executing on the computer, as programmers typically do it, in contrast to users, who perceive the interface merely as a means of interacting with the computer. Finally, we deliberately chose a simple calculation in order to minimize engagement in activities irrelevant to synchronization. The students were introduced to a program designed to calculate a student's final grade using three processes and were asked to synchronize the processes. Two of the processes, First and Second, compute the student's grade in the first and second semesters, respectively, by reading three grades and computing their maximum value. The third process, Average, should be blocked until the maximum values have been calculated (by First and Second) and only then compute the final grade as an average of the maximum values.

Analysis of the Students' Work within the Milieu

We analyzed the work process of two pairs of students. One pair, Y and M, encountered an unexpected output due to incomplete synchronization. They then re-executed the program, and when the output refused to disappear they asked T (the author) for help. Up to line 9, the transcript shows no attempt to examine the

program code; rather, their interpretation of the situation was solely from the perspective of users who misunderstood the instructions provided by the interface:

1. Y *[pointing to two lines of unexpected output]*: The question is what are they [the processes] requesting? What are they asking for?
2. T: Can you explain what these two lines [of output] mean?
3. Y: They're telling me to enter the data from the second semester and then the data from the first semester.
4. T: How did you come to this conclusion?
5. Y: Because it [the computer] asked me to. *[Reads the line from the screen:]* Enter the second-semester grades.
6. T: What do you mean by "it asked me to"? Who is "it"? I wrote this program.
7. Y: I don't know, either you or the computer. It doesn't matter to me who wrote it [the program]. I'm coming to the computer now and that's what it's telling me to do. Right?
8. T: No, no. You know perfectly well why the computer wrote those lines.
9. Y *[looking at the printout of the program code]*: Mm… mm… because it started from this line *[points to "write statement in process Second" in the code]* and then moved over here *[points to "write statement in process First"]*.
10. T: OK!

Utilizing the FZCE metaphor, we suggest that the students' difficulty resulted from their perspective: instead of experiencing the situation as programmers encountering a problem to be analyzed and solved, the students were thinking as users interacting with an unfriendly computer artifact (lines 1, 3, 5, and 7). In fact, when the students were then asked to explain *why* the execution of the code brought about the unexpected output (line 8), as programmers ask when encountering unexpected output, they began utilizing the two underlying layers (line 9), the program code and the computational model, as programmers are expected to do in these situations. For a detailed description, see Ben-David Kolikant (2004).

FZCE-Based Evaluation

In this respect the assignment functioned as an FZCE, since Y and M could not survive the milieu as long as they viewed it from a perspective different from that of programmers. However, the other pair did not consider the assignment worth their effort because they found a way of detouring around the problem (without solving it) and objected to the teachers' refusal to accept their solution. They rightfully claimed that in the real world no one would use a three-part program to do something that a simple calculator can do.

Therefore, when the assignment was revised the problem was changed to one involving a computer game with missiles and aliens. The programming requirement remained the same. The newly worded problem won students' approval, as manifested by the fact that they all decided to spend their free time working on it and that they expressed enthusiasm about programming situations that might come up in the real work world. In fact, the metaphors of FZCE and cultural encounter helped us revise the entire course, and the next year we saw that students' achievements and satisfaction had improved (Ben-David Kolikant & Ben-Ari, in press). For example, being aware that students devalue abstraction, which is an important skill in the professional culture, we arranged the problems in a sequence beginning with contexts that could come up in the work world and let the students discover the similarities among them; this led to a discussion of the power of abstraction. Later in the course, problems were presented in abstract form, as they are in the professional CS culture.

History Education

Two Cultures of Text Comprehension

Becoming a historical thinker is not a trivial matter. The term *historical thinking* is defined in various ways, yet it is widely agreed that it encompasses the ability to see through the eyes of the people we are studying, the ability to evaluate historical sources while being conscious of author bias and the contextual nature of the text (in terms of social and cultural aspects), and awareness of the multifaceted nature of history as well as its interpretative nature (Seixas, 1993; Wineburg, 2001). Wineburg (2001) terms these abilities "unnatural." Learning to think "unnaturally" involves realizing that a "natural" interaction with historical material misses the rich subtexts, usually takes place on the scale of appropriation/resistance, and is (usually unconsciously) dominated by readers' emotions and sense of belonging (Wertsch, 2002). Examples of how emotions unconsciously mediate the ostensibly cognitive interaction with historical texts are common in the literature. Chambliss and Garner (1996) found that adults read texts selectively. They accept facts that support their beliefs, but meticulously examine and critique anything that contradicts their own perceptions. Similar results have been reported regarding students (e.g., Lord et al., 1979; Reynolds et al., 1982).

Wineburg (2001) studied differences between historians and students in terms of how they interact with historical texts. He found that the two groups differed in what they *do* when they read a historical text as well as in what they consider knowing the text. He termed these results *different epistemologies of text*. In fact, Wineburg portrays two cultures of text readers who have different goals when interacting with texts and consequently approach the texts differently. The historians view a text as a window to understanding the human being behind it, a means of seeing through her or his eyes. They were therefore interested in the subtext, trying to reconstruct the authors' intentions and goals and to bring to the surface the author's worldview, assumptions, and beliefs. This interest governed their interaction with historical texts, such as their decision to employ the heuristics of sourcing, meaning "the practice of reading the source of the document before reading the actual text" (p. 76). In contrast, although the students worked seriously, they rarely compared the sources. Instead they employed heuristics similar to those employed in reading comprehension tasks. Their goal was to elicit the true story: "for students, reading history was not a process of puzzling about authors' intentions or situating texts in a social world, but of gathering information with texts serving as bearers of information" (p. 76). Therefore, it is no surprise that students became "flustered in the face of contradictions" (p. 67).

Wineburg uses the metaphor of a courtroom to depict the differences between historians and students. Historians reading texts resemble attorneys working with testimony. Attorneys actively draw out testimony by placing documents side by side, finding discrepancies, questioning sources, and delving into the sources' conscious and unconscious motives. Students read the way jurors work with testimony: they patiently listen to testimony, question themselves about what they heard, but do not question witnesses directly or subject them to cross-examination. This metaphor reinforces the portrayal of history education as a cultural encounter of intertwined text-reader cultures.

Indeed, the concept of a culture clash has come up before in the context of history education. Barnett et al. (2000) discuss it in describing the difficulties of college students who were given a collaborative research assignment in a history course. The clash was between two different viewpoints on what counts as learning and knowing history. To the instructor, knowing history meant developing your own voice. He viewed the assignment as an opportunity to emulate historians' work, and especially to experience how historians express their voice, by constructing well-defended arguments that are presented to the community not as the true story of what happened, but rather as an argument inviting discussion and debate.

The students found the assignment inefficient for achieving what they considered learning history. Their contextualization of the situation was derived from their experience in school, and thus their goal was one that would have been legitimate in similar educational milieus in the past: mastering a set of facts and dates, and more importantly, knowing what the teacher wanted them to know (i.e., repeating the teachers' voice). To this end, the most efficient milieu is a lecture by the teacher; a research-based milieu is highly inefficient. Furthermore, the goal of expressing their own voice was alien to them and was regarded as illegitimate. Hence the students objected to the milieu. By the end of the course, however, some of the students expressed different insights into the nature of history and the work of historians and even came to appreciate the collaborative effort.

The FZCE as a Design Framework

Designing such a milieu using topics from the Israeli history curriculum, where the milieu was developed, is quite a challenge. Much of the curriculum is devoted to the early history of the Zionist movement, the founding and early history of the State of Israel, and the ongoing conflict with the Arabs. These topics lend themselves to teaching students to think historically, because the Jews, the Arabs, and the British (who conquered the country in World War I) have different perspectives on the historical events. Nonetheless, the ongoing conflict associates the unnatural aspect of historical thinking with feelings of betrayal of one's collective. Putting it in the cultural-encounter framework, students—longstanding members of their ethnic collectives—might regard the instruction to look through the eyes of the "enemy" as illegitimate and immoral (Kelman, 1999). We believed, however, that it is important to use these topics to teach historical thinking because such thinking will help them deal with the numerous contradictions that they encounter when exposed to diverse opinions through the electronic media.

We therefore developed a computer-supported collaborative learning (CSCL) environment in which Israeli Jewish and Israeli Arab students read historical sources that interpret a historical event relevant to their past and jointly wrote their interpretation of the event. The event in question is the issuance of the Balfour Declaration on 2 November 1917. At that time Britain was still engaged in World War I, and Palestine, like the rest of the region, was under the control of the Ottoman Empire. The Balfour Declaration was addressed to Lord Rothschild. Lord Balfour, the British Foreign Secretary, conveyed the British Government's 'sympathy with Jewish Zionist aspirations' for a national home in Palestine. A team comprising two historians (one Jew and one Arab) and three educational researchers (one Arab and two Jews) chose five secondary sources (by two Jews, two Arabs, and one Englishman) that discuss the event in order to present a wide range of interpretations.

The decision to engage students from the two conflicting groups was prompted by a need to amplify the voice of the "other" in the past. This need originated in our hypothesis that each side's interaction with the historical texts would be highly emotional as well as a symmetrical inversion of the other side's interaction on the scale of appropriation/resistance (Wertsch 2002); thus, each side would automatically ignore or resist the voice of the past agents of the other. However, the present agents of the other would most probably appropriate that voice and thus amplify it during the group discussion. We assumed that students would prove the milieu effective. Wishing to 'show the light' to the other agent, they would strive to master both sides' reasoning and find rational ways of communicating their viewpoint, fearing that otherwise their voice would not be considered. The interaction in which each agent pinpoints the issues that the other agent, being unconsciously mediated by his/her culture, has chosen to ignore, resist, or appropriate "automatically" would make the agents conscious of the fact that their interaction with their common past, like the interaction of the authors of the five sources with that same past, is mediated by their sense of belonging. This was the purpose of the milieu.

Our design utilized contact theory (Allport, 1979; Amir, 1969) and particularly applications of contact theory in designing encounters between Israeli Jews and Arabs that showed that when certain conditions are fulfilled, participants' perceptions of the other side evolve (e.g., Stephan et al., 2004). This step was necessary in order for students to listen to each other's voices and continue the interaction. For example, in order to encourage *collaboration* rather than competition—one of the conditions necessary for a fertile encounter—success in the group assignment did not necessarily depend on a group consensus. Instead we allowed the students to present two different opinions, as long as they analyzed the differences between them. Another example was the decision to use secondary sources so that students could shift the moral judgment onto the historians who wrote the texts; in other words, they could say harsh things without saying them in their own names. In addition, these sources provide examples of the norms of scholarly communication in the field of history. Finally, we based our environment on Wiki technology, which permits joint asynchronous writing; i.e., anyone can add, change or delete a Web page. The use of Wiki technology provided the flexibility to collaborate at a distance or face to face.

The assignment was carried out in groups and consisted of two two-week phases: In the first phase, students worked in ethnically homogeneous groups. Each student read two sources and summarized them for the group. Then each group jointly composed an essay addressing the assignment questions. Next, the Arab and Jewish groups commented on each other's essays. In the second phase the students formed an inter-ethnic group and were given two options: they had to write a joint essay that either answered the assignment questions or explained the essence of the disagreement between them that prevented them from writing one answer.

FZCE-Based Evaluation

We followed four Arab students and five Jewish students as they contended with the assignment by analyzing all the essays they had produced. We also recorded the face-to-face meeting at which the nine students finalized their joint essay, and we interviewed four students (two Arabs and two Jews) shortly after they had finished working on the assignment. Below is a synopsis of the relevant results. For a detailed description, see Ben-David Kolikant and Pollack (in press).

The first phase, in which each ethnically homogeneous group dealt with the secondary sources alone, was dominated by practices of appropriation/resistance. This phase yielded two different theses, each of which focused on the relationship between the main agent (Britain) and one co-agent (the group's own people), and minimized the role of the third agent, i.e. the other people. As expected, each group resisted the other group's thesis, probably due to the mediation of their ethnic identity. Interestingly, the Jews' text reveals a lot of emotions (e.g., "it's a shame"), whereas the Arabs constructed rational, well-warranted arguments to dispute the Jews' thesis.

Furthermore, both groups addressed the historical sources from the cultural perspective of reading comprehension. Like Wineburg's students (see above), they sought the "one true story." This approach was salient in each group's written review of the other group's essay. Both groups believed that if only they had sufficient information they could know what had really happened but that, in any case, the other group's viewpoint was wrong. Moreover, each group accused the other side's authors of being subjective. For example, in the following excerpt, taken from the Jews' written critique of the Arabs' essay, the Jews simply claimed that the Arabs had missed the truth that "appear[s] in the historians' articles explicitly":

> There are too many assumptions that you disagree with and claim are incorrect. On what basis??? They appear in the historians' articles explicitly, [so] what makes you decide they are wrong? You can't argue with facts.

In the second phase, however, a change was already evident in the first joint draft, in which the groups explicitly described the differences between their theses as the result of ethnic identity and inherent human subjectivity. Additionally, the students used different tools for addressing the texts and the disagreement. For

example, in the following excerpt the Jews again critiqued the Arabs' thesis, but this time unemotionally and with a rational, well-warranted argument that weakened the Arabs thesis. Specifically, the Jews critiqued the Arabs' acceptance of the thesis offered by one of the Arab sources while ignoring the counter theses offered by the British source and the second Arab source (note that they avoided using the Jewish sources).

> The Arab Group are adamant that Britain knew the implications full well and do not raise any doubts about the matter…. Of the entire spectrum of historians' opinions on this question—from Bian al-Chot, who says the British were naive, to the decisive Sykes, who alleges that the British undersecretaries acted knowingly—the AG chose to side more with Dr. al-Chiali.

We also observed collaborative work in a friendly atmosphere in the face-to-face meeting at which the students produced their joint essay. In fact, the students were engaged in learning by doing history. First, they put a lot of effort into adding the appropriate references to their text, as historians typically do. That work required verification of their text by checking it against the historical sources. This change was quite radical, since the essays by the two groups had included only a few references. More importantly, they read the texts—even texts to which they had objected before—out loud together. Although they did not agree with the text, that did not prevent them from clarifying the points made in it. We thus concluded that the milieu was useful in leading students to adopt a more historian-like work style than they had had in the first phase and helped make them aware of the bias inherent in the practices of historians and in historical texts.

However, we also noticed that the joint efforts focused on producing a decent presentation. The students operated on the assumption that they agreed in general and ascribed what they considered the minor disagreements to their different ethnicity. Yet they decided that the differences could not be bridged, and therefore there was no point in further exploration even if they knew of facts that might weaken the other group's argument—and we observed two such situations. We thus concluded that further work is required to design an FZCE that supports the adoption of historical methods to deal with contradictions.

Conclusions

This paper suggests that when we adopt a sociocultural perspective on schooling it could be useful to view students not only as newcomers to the professional CoP or culture of the discipline taught but also as longstanding members of cultures that overlap that culture. Students' interactions within the educational milieu are thus viewed as cultural encounters. The usefulness of this metaphor was demonstrated in two domains, computer science and history; I believe, however, that this metaphor is relevant to the broad educational community and that many disciplines would benefit if the cultural-encounter metaphor were applied to them. For example, here CS was used to demonstrate the user culture. But computers are becoming common resources in school and students are likely to contextualize computer-related situations from a user perspective, which would lead them to set goals and employ practices that might not be consistent with those of the teachers. For example, students who work with interactive computerized simulations in physics class might contextualize the milieu based on their (computer) gaming experience (Gee, 2003). The concepts of cultural encounter and FZCE are therefore broadly relevant and are becoming more so as we enter the age of pluralism, digitalism, and the information explosion.

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