Whose Culture Is It? Modeling the Designs of Authentic Learning Environments and the Cultures They Mediate

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Abstract: A major theme of educational research has focused on cultural practices that are learned within formal and informal settings. Many innovative approaches to classroom design come with the intention that practices of the people who are experts in a domain are enculturated by classroom students. This idea, known as authenticity, has been carefully conceptualized in a large variation of educational settings. Cognizant of the inherent gap between conceptualizations and their implementation, we used a constant-comparative method to analyze different variations of authentic learning designs. With the aim of bridging this research-practice gap, our analysis resulted in a model of cultural interaction within learning environments based on different configurations of participants and settings. The conceptual contribution of our research is a refined framework of authenticity that foregrounds the role of human interaction in cultural mediation. Practically, our model contributes new insights into the design of authentic learning environments.

Keywords: Authentic; CSCL; culture; enculturation; human interaction

Introduction

The modern history of education has been shaped by two revolutions – the industrial revolution, which marked a transition between learning by apprenticeship in the agrarian age to traditional schooling in the industrial age; and the digital revolution, currently underway, from traditional schooling to learning in a networked society (Collins & Halverson, 2009). One of the most significant differences between learning by apprenticeship and traditional schooling has been a change in the interaction of the student with the practitioner. In the apprenticeship model, the student learned directly from the person who practiced a profession or skill. In traditional schooling, a teacher was introduced so that students could learn *about* one or more professions. This separation between the students and practitioner has been a long-standing criticism of traditional schooling as fundamentally inauthentic compared to the 'real' way society operates (Dewey, 1916; Sawyer, 2014).

The rise of the networked society has opened new opportunities to re-establish ties between the student and practitioner, addressing this year's conference theme of prioritizing equity and access in CSCL. Such revelations were dominant forces in the establishment of the field, expressed in ideas such as cognitive apprenticeship (Collins, 2006) and authentic learning (Edelson & Reiser, 2006). Socioculturally-minded researchers broadened this view beyond just the direct interaction of student and practitioner, but as giving students access to communities of practice (Lave & Wenger, 1991) or the culture and norms of a particular community (Rogoff, 2003). In this way, authentic learning has been conceived of as enculturation of the practices in a relevant domain (Brown, Collins, & Duguid, 1989).

The application of these ideas to the design of CSCL learning environments has been far reaching, particularly in classroom learning communities (Bielacyzc, Kapur, & Collins, 2013; Hod & Ben-Zvi, 2015). With an eye on contributing to these important advances, this research focuses on human interaction within learning environments designed for authenticity. Specifically, in this study we looked back at the past two decades of research in the learning sciences and CSCL communities to analyze the way different variations of student-teacher-practitioner interactions have been designed to mediate authentic cultural practices.

Designing for authenticity

The term authenticity has been taken up in disciplines both outside and inside education (Radinsky, Bouillion, Lento, & Gomez, 2001). In this paper, we refer to authenticity in the context of a large theme of CSCL research, informed by sociocultural perspectives of learning. While specific conceptions of authenticity vary, the motivation as it relates to the design of classrooms articulated by Brown, Collins, and DuGuid (1989) in their seminal paper, *Situated Cognition and the Culture of Learning*, is widely accepted. According to them, "Too often the practices of contemporary schooling deny students the chance to engage the relevant domain culture,

because that culture is not in evidence" (p. 34). Along these lines, CSCL environments have been designed to approximate the culture of the people who actually practice the domain – the authentic practitioners (Edelson & Reiser, 2006).

The constraints of human interaction in traditional educational settings

The inability for students to have direct, continuous interaction with authentic practitioners over meaningful periods of time is a constraint of educational settings (Lim & Barnes, 2005; Timmis, 2014). For example, the ratio of newcomers to old-timers found in classrooms contrasts sharply with learning in professional communities, where cultural maintenance and evolution have a higher balance of old-timers versus newcomers (Roth, McGinn, Woszczyna, & Boutonne, 1999). These distinctions highlight how real-world professional practice comprises of a distinct ecology compared with educational programs (Table 1). As such, educational programs require different types of innovative designs to prepare students for life *outside* of school.

Table 1: Comparison of professional communities and educational programs

	Professional Communities	Educational Programs
Quantity and ratio	Large membership, making the old-timer-to-newcomer ratio high. For example, the ratio of a newcomer to a disciplinary community can be 1:1,000's.	Small membership, making the individual-to-culture ratio low. For example, the newcomer (students) to old-timer (teacher) ratio in a classroom can be 30:1.
Continuity and duration	Membership changes rotationally. Members enter, often stay for a long period of time (e.g., career), then leave.	School membership changes rotationally. Members enter, often stay for several years, then leave; Classroom membership begins and ends together, for a greater part of a year.

Approaches to designing for authenticity

Given the constraints of educational settings, authentic learning environments have been designed and conceptualized as taking either a *simulation* or *participation* approach, with the crux of the distinction based on whether or not students have direct interaction with the practitioner, as well as in what context or setting the interactions take place (Cho, Caleon, & Kapur, 2015; Radinsky et al., 2001). Simulations refer to formal educational programs that aim for their culture to more closely resemble, align with, or approximate the authentic culture (Hay & Barab, 2001; Hung et al., 2008; Bereiter & Scardamalia, 2003). In this approach, cultural mediators such as tools, discourse, and artifacts "map to the activity of some professional community" (Radinsky et al., 2001, p. 406).

In contrast to the simulation approach, the participation approach provides students with opportunities for direct interaction with practitioners of the culture that the designer intends for their students to enculturate, typically in the context of out-of-school communities. In such approaches, the cultural mediation is embedded within these interactions. Students learn cultural practices as an outcome of these apprenticeship-like interactions. Even though the term participation is useful to describe this approach, we emphasize that this isn't full participation. These interactions are designed within the frameworks of the school setting and are typically regulated by a school instructor, may be limited to working on developmentally appropriate tasks, and/or have time restrictions. As such, we prefer to call them hybrids.

While the distinction between the simulation and hybrid approaches appear straightforward, a close look reveals its problematic nature. Hypothetically, if the teacher is a member of the intended authentic culture, then should the design be considered a simulation or hybrid? Alternatively, if a group of students learns in an authentic setting but doesn't have direct interaction with its actual practitioners, how should this categorized? This issue lays bare a fundamental problem with the way the design of authentic learning environments are conceptualized. Whose culture is really being enculturated? Stated differently, *whose culture is it?*

Given the primacy of human interaction and setting in existing conceptions of authentic designs and the problems they raise, we were interested to see if there was a way to refine these categorizations. Specifically, we asked: What are the different variations of simulation and hybrid approaches to authentic designs? How can a refined categorization help elucidate which culture is being enculturated?

Methods

To answer our research questions, we conducted a review of research designs for authenticity from the perspective that we have previously elaborated upon. To find a representative data set of existing research, we turned to the two official journals of the International Society of the Learning Sciences: *The Journal of the Learning Sciences* (JLS) and the *International Journal of Computer Supported Collaborative Learning* (iJCSCL). The foundation of our data corpus was built upon an exhaustive search of the entire catalogues of these journals, from their inception through 2014. We limited our search to articles that explicitly included derivatives of the word authenticity (e.g., authentic, authentically). We similarly broadened our search to include derivatives of the term enculturation (e.g., enculturative, enculturate, enculturating) to be inclusive of research that may not have been explicitly identified with the authentic concept, but maintained the related ideas.

Following an initial review of the contents of the 39 articles that we found, we further limited our corpus for formal, systematic analysis to 21 articles that clearly articulated the components of a clearly elaborated design where the purpose was for students to enculturate authentic practices (a list of these articles can be found at https://goo.gl/4l9ycz). Due to the high yield of articles in our final corpus as well as their distribution over time, we concluded this was a sufficient and representative sample of articles for our analysis, consistent with other such reviews (e.g., Ellis & Goodyear, 2016).

We began our review by carefully examining the designs of each study within our final corpus of articles using a constant-comparative method (Glaser & Strauss, 1967). This involved going through stages of (1) collaboratively negotiating the meaning of a concept and design, which often required interpretation and contextual inference, until we reached a consensus view; (2) going back and forth between our emerging conception and subsequent articles to integrate categories; (3) defining our conceptualization until we developed the tools necessary to model the design within each paper we considered; and (4) going through our entire data corpus carefully to verify our findings.

Findings

To show the categories and variations of the authentic designs which we reviewed, we start this section by explicating the refined conceptual framework and model that resulted from the analysis. Based on this framework, we describe the authentic design variations that we found. We note that although we present the refined conceptualization first, our analysis was recursive in that we went back and forth between our model and our conceptualization of the designs. We present the conceptual framework first because this provides us the language and symbolic tools necessary to communicate the model.

Refined conceptual framework and model

Our analysis resulted in four dimensions necessary to distinguish between the designs from our data corpus, including the number of participants (individual, group, community); types of participants (learner, practitioner, teacher, designer, cultural representative); culture (actual, authentic, intended), and setting (classroom, practitioner). While most of these were unambiguous as they were described in the research we reviewed, the different cultures described required us to clarify certain definitions that were based on the authors varied conceptions. Ultimately, we settled on these definitions:

- An *actual culture* is a pattern of activities that is developed over time for a community to achieve its valued purposes (Nasir, Roseberry, Warren, & Lee, 2014). It can be found within and across educational, professional, or practitioner settings.
- An *intended culture* is a designer's vision of one or more actual cultures that establishes the goals of the learning environment.
- An *authentic culture* is the actual cultures upon which the intended culture is based.

During our analysis we recognized the importance of applying the notion of intended culture for the analysis of all our cases, even though it was seldom conceptualized as part of the designs we reviewed (e.g., Bielaczyc & Ow, 2013; Hay & Barab, 2001; O'Neill, 2001). The intended culture is important because it acts as a conceptual bridge between actual classroom cultures and authentic cultures. The intended culture is based upon the designer's experiences, knowledge of learning, interpretation of authentic cultures, etc., that may not even be clearly articulated (McKenney & Reeves, 2012; Sandoval, 2014). It is necessarily imagined, representing a combination of one or more authentic cultures that the designer(s) may be a part of. The teacher, who can be the designer or the enactor of others' designs (Kali, McKenney, & Sagy, 2015), can vary between being a central member of an authentic culture or can just have knowledge of it without ever being a participating member. We are not saying that one situation is better than the other, as oftentimes practitioners

are bad teachers, or the best teachers are not authentic practitioners. But certainly, a defining characteristic of authentic learning environments is that the teacher represents the culture that the designers intend to foster. Based on this conceptualization of these cultures, and in addition to the other relevant dimensions described in our data corpus, we generated a model that shows their relationships (Figure 1).

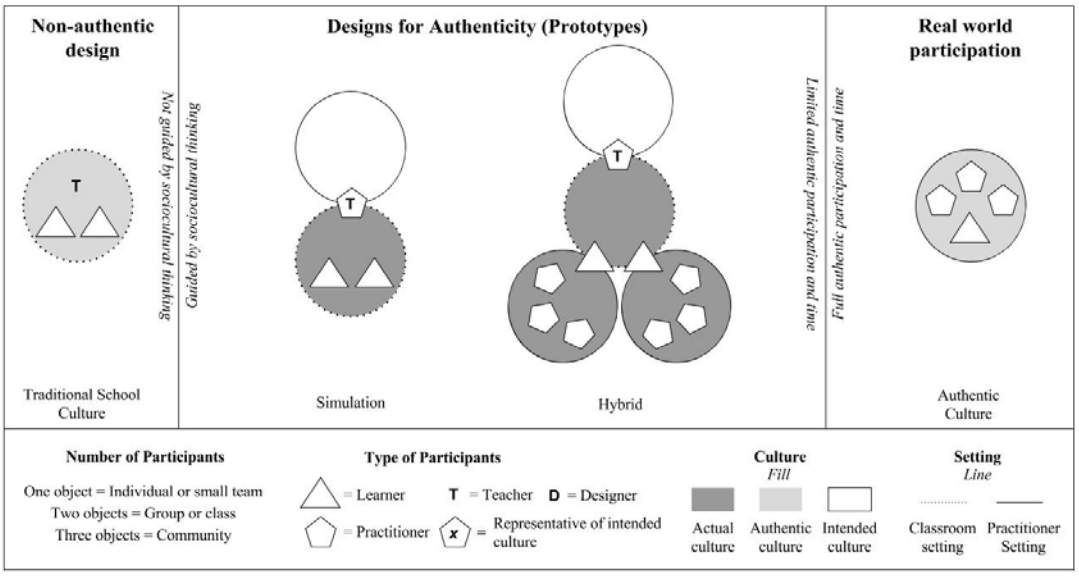

Figure 1. Refined model of authentic designs with simulation and hybrid prototypes.

Modeling the designs of authentic learning environments

Table 1 summarizes the two categories of authentic learning environments. Within each category, we have found a prototypical version along with three variations. Prototypical versions represent the simplest case. In cases where there were multiple designs within one study, we labelled the Design# alphabetically in the order they appeared in their publication (e.g., 11a, 11b) as specified in the online list (https://goo.gl/4l9ycz).

Table 2: Categories and variations of authentic designs

Category	Variation	Description	Design#
Simulation	Prototype	Interaction with authentic practitioners limited to teacher	2, 5, 12, 15, 18, 24, 25, 26, 28, 30, 31, 33, 34, 37, 38
	Variation 1	Interaction with practitioners from a single actual culture with a focus on classroom activities	1
	Variation 2	Interaction with practitioners from several actual cultures with a focus on classroom activities	11a
	Variation 3	Interaction with practitioners from the authentic culture with a focus on classroom activities	3
Hybrid	Prototype	Participation in an educational setting (e.g., classroom) reflexively related to interaction with practitioners from an actual culture with a focus on the practitioners' culture	14
	Variation 1	Participation in an educational setting (e.g., classroom) reflexively related to interaction with authentic practitioners outside of class with a focus on their culture	10, 22b
	Variation 2	Participation in an educational setting (e.g., classroom) reflexively related to interaction with authentic practitioners in and outside of class with a focus on their culture	22a
	Variation 3	Participation in an authentic setting with a focus on the practitioners' culture	11b

Simulations

Most of the cases (18/23; 78%) that we found were simulations. This is expected, as the simulation category requires the least dependency on and coordination with practitioners outside of the educational setting. In simulation approaches, interactions are predominantly in or about what is happening in the educational setting, contributing to its actual culture. This is true even when outsiders are involved in the designed learning environment, such as can be found in the variations. Figure 2 models the prototype and three variations that we found.

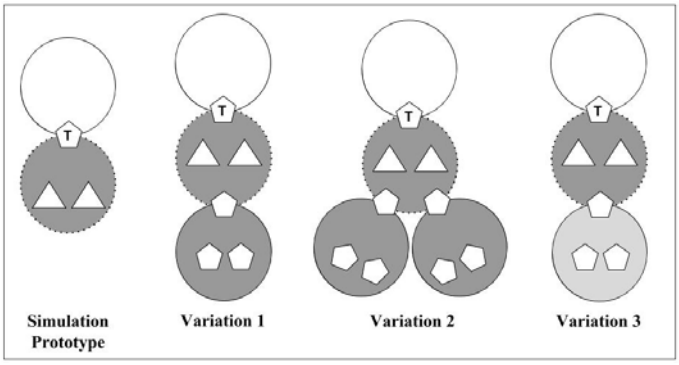

Figure 2. Simulation approach with variations.

The predominant case among all categories and variations that we found was the simulation prototype. While there are vast differences between these cases, all of them rely on one or more teachers being the representatives of an intended culture. For example, to get students to enculturate knowledge building practices, Zhang et al. (2009) adjusted the participatory structures within the classroom so that the students could opportunistically collaborate. In some cases, there may be outside experts, such as in one of Gordin and Pea's (1995) SciV models, where the teacher is also an expert member of the authentic culture. But this is in line with our view of the teacher as a representative of the intended culture and therefore can be modeled by the simulation prototype.

Variation 1 is a simulation where outside practitioners are involved in the classroom activities. Unlike in Gordin and Pea's (1995) design, these outsiders do not have roles as teachers. Roseberry, Warren and Conant's (1992) collaborative inquiry approach is an example of variation 1. The main focus of the design was for students to enculturate scientific discourse by planning and carrying out investigations in their local and home communities. As part of their investigations into the quality of water from their school fountains, students interacted with their local community to collect data and share their findings. Therefore, the design is a simulation that included interactions with practitioners from an actual culture.

Variation 2 is a simulation where outside practitioners are involved in the classroom activities. This variation represents Hay and Barab (2001)'s FC97 summer camp, where three groups of students were working closely with a pair of practitioners who were not part of the authentic culture. While the intended culture was that of disciplinary-based virtual-world designers (e.g., solar system virtual reality), the practitioners included one education and one technology-related graduate student. Therefore, the design was a simulation that included interactions with practitioners from two different actual cultures.

In variation 3, students in a classroom has direct interaction with authentic practitioners. This variation is exemplified by Magnusson, Templin, and Boyle's (1997) Dynamic Science Assessment. Specifically, the practitioners are researchers who practice the relevant domain culture. They come to the classroom to participate in doing dynamic science assessment, which is the basis for the intended culture that tries to approximate the scientific practice of continuously advancing conceptualizations. Therefore, the design was a simulation that included interactions with practitioners from the authentic culture.

Hybrids

We found four variations of hybrid designs that are modeled in Figure 3. Shared among all the cases was that in addition to the simulation, students had direct interactions with actual or authentic practitioners. In comparison to the simulation variations, the outside-of-classroom interactions in the hybrid models focused upon the practitioners' culture. This can be seen visually in figure 3 in the placement of the learners on the border between the actual classroom culture and the actual or authentic practitioners' cultures.

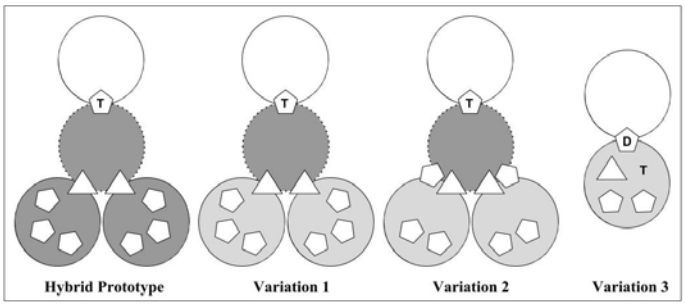

Figure 3. Hybrid approach with variations.

The hybrid prototype is exemplified in Barab, Barnett and Squire's (2002) community of teachers (CoT). In this case, the learners (who are teachers) not only participate in classroom activities (University seminars), but at the same time interact with the staff and students in an actual school where they have a chance to implement their ideas. As the purpose of the CoT is based on an intended culture of "expert teaching" (p. 491), the school is a setting that the teachers attempt to change. Therefore, the design has a simulation that is reflexively related to direct participation within an actual practitioner culture.

Fisher et al. (2007) and O'Neill (2001) provide two cases from different disciplines, age groups, and settings that both exemplify hybrid variation 1. In Fisher et al.'s study, students from the University of Seigen balance between "learning about" and "learning to be" as part of their practice-oriented education in information systems. Specifically, students learn to be by participating in local IT companies. They learn about by participating in a University-based community system that involves academic supervisors, guest lectures, and other students. O'Neill's (2001) design similarly involves a hybrid of simulation and participation approaches. High school students studying earth science develop self-directed research projects within the context of their classroom. Additionally, each student develops a long-term online relationship with a "telementor" who is an authentic practitioners (graduate student or professionals in the discipline). The telementors role is to guide and provide critical feedback to the student on their research. In both cases, there are two settings that are reflexively related. In comparison to the hybrid prototype where interactions in the outside-the-classroom settings are in an actual culture, in variation 1 the interactions are with authentic practitioners.

Hybrid variation 2, exemplified in Fisher et al.'s (2007) University of Colorado Center for Lifelong Learning and Design Research Apprenticeship Program, is similar to hybrid variation 1 with an additional type of interaction. Each student works in a research team that includes doctoral students, post-doctoral researchers, and faculty. This 'vertical integration' provides interactions with authentic practitioners for the graduate students. At the same time, the graduate students enter into the 'horizontal integration', which is a course that consists of graduate students along with their colleagues from each research team. The goal of this hybrid is "crossing different knowledge spaces and nourishing a fertile middle ground between disciplines" (p. 19). Therefore, the learners (graduate students) are members of both a course (simulation) and authentic culture (participation) along with authentic practitioners.

Hybrid variation 3 involves designing to provide direct interaction with practitioners *without* an educational setting for the learners to convene as a group, such as in a classroom. In this design the focus is on the practitioners' culture. Because there is no classroom, there is no intended culture outside of where the student participates. This variation is exemplified in Hay and Barab (2001)'s SAC97 summer camp, where "apprenticeship was operationalized as simply putting students into a real laboratory with a practicing scientist" (p. 288). Their design consisted of small groups of students working directly with a mentor scientist (with guidance of a K-12 teacher) on authentic research problems in the settings where the research took place. Because there was no classroom, the teachers in this case were not representatives of an intended culture, but helped students enculturate the practices of the authentic culture. Still, there was a role of a designer (the camp director) who created this educational opportunity.

Discussion and conclusion

This research examined the different ways that learning environments are designed to foster authentic learning. It is interesting to note that the most common design (65% of those we found) are the simulation prototypes, where the learners interact only amongst themselves and the teacher(s). This testifies to the creativity of designers who find unique ways to provide students access to authentic discourse, practices, tools, and alike given the common limitations of educational settings and the large investment of resources required. To be clear, we are not making any judgments regarding the quality of the enculturation that is the outcome of any

model or specific study. We even note others who purposefully stepped back from near complete participation by having teachers serve as intermediaries between experts and students, such as in Hay and Barab's *SAC*97 (2001).

The project that we have taken upon ourselves to model these different designs is an attempt to rise above a broad array of educational designs which we hope provides clarity on the similarities and differences among them. In particular, we have focused a great deal on developing a parsimonious set of symbolic tools (bottom of Figure 1) which takes into account the relevant dimensions underlying the interactions between participants, cultures, and settings. Beyond the theoretical contribution, this research can be beneficial for designers by giving them a framework to identify the constraints of their programs and the aspects of their designs that can facilitate enculturation. Beyond this, using the tools we have identified can help designers imagine different variations that may not exist.

While our research is based upon widely held notions of authentic learning (e.g., Cho, Caleon, & Kapur, 2015; Radinsky et al., 2001), it has a different emphasis and conceptualization, exemplified by the definitions we have articulated. We recognize that authentic learning can happen in simulated or hybrid designs, and that there is no hard barrier or restriction on anyone, in any setting, to engage in forms of authentic practice. Even when there is no direct interaction with authentic practitioners, students in classrooms can have access to an authentic culture through the use of developmentally appropriate tools, discourse, participatory structures, or other culture mediators within the classroom (Edelson & Reiser, 2006). Having direct human interaction with experts or practitioners in the relevant domain is not a condition of authentic learning; it is just one potent way to foster authentic learning through apprenticeship, such as modeling, coaching, and reflection (Collins, 2006).

Where we conceptualize things differently is that we see simulation and hybrid approaches as two forms of guided participation of school students into authentic cultures. Instead of there being a single authentic culture that students in learning environments can enculturate, educational constraints, where there *is* a hard barrier between participation in schools and participation in actual cultures, require that designers provide interpretations or visions of the authentic cultures. Consequently, notions like the intended culture become a vital part of the conceptualization, as is the relationship between the role of the teacher and designer, actual and authentic cultures, and school and professional settings. We are not saying anything that hasn't been said before; our contribution is modeling these ideas within one integrated framework.

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Acknowledgements

This research was supported by the I-CORE Program of the Planning and Budget Committee and the Israel Science Foundation (1716/12)