

Designing for Virtual Communities in the Service of Learning

Edited by

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Introduction

Designing for Virtual Communities in the Service of Learning

Sasha A. Barab, Rob Kling, and James H. Gray

Currently, numerous educators and policy makers are advocating a move away from teacher-centered models of instruction and toward more learner-centered and community-based models. However, at present the word “community” is at risk of losing its meaning. We have little appreciation and few criteria for distinguishing between a *community* of learners and a *group* of students learning collaboratively (Barab & Duffy, 2000; Grossman, Wineburg, & Woolworth, 2000; Wineburg & Grossman, 1998). Given the proliferation of terms such as communities of learners, discourse communities, learning communities, knowledge-building communities, school communities, and communities of practice, it is clear that

community has become an obligatory appendage to every educational innovation. Yet aside from linguistic kinship, it is not clear what features, if any, are shared across terms. This confusion is most pronounced in the ubiquitous “virtual community,” where, by paying a fee or typing a password, anyone who visits a web site automatically becomes a “member” of the community . . . Groups of people become community, or so it would seem, by the flourish of a researcher’s pen. (Grossman, Wineburg, & Woolworth, 2000, p. 2, italics in original)

Too little of the education literature provides clear criteria for what does and does not constitute community; the term is too often employed as a slogan rather than as an analytical category. We also know little about the educational value of employing a community model for supporting learning.

While many of us are concerned with the loss of communal spaces and ties that broaden one’s sense of self beyond the “me” or “I” into the “we” and “us” (Putnam, 2001), less clear are the educational advantages of a community approach in terms of learning curricular content. We know even less about whether something resembling community can be designed, and how to measure whether it has emerged. This is glaringly apparent in terms of virtual communities where designers are employing

usability strategies to develop innovative designs but have not adequately taken into account issues of *sociability* – that is, how does the design make links to and support people’s social interactions, focusing on issues of trust, time, value, collaboration, and gatekeeping (Preece, 2000)? Regardless, there is a rapid growth in the efforts to create web-based learning environments to supplement or replace traditional modes and even institutions of learning.

Developing an online forum is not very difficult. Almost any “off the shelf” listserv or web-based conferencing system can provide an adequate underlying technology. However, attracting a group of people to the forum who will form a community is a considerable accomplishment. It is common for many people to visit and leave without posting messages and for many others to stay and only read public messages (lurking). Further, when online discussions are unmoderated, some debates can be transformed into hostile *flame wars* that all too easily spiral out of control (Sproull & Kiesler, 1986, 1991;¹ Herring, Sluder, Scheckler, & Barab, 2002). Nonetheless, there are many examples of sustained civil online groups, some of which have important communal dimensions.

According to Barab and Duffy (2000) a community has a significant history, a shared cosmology, a common cultural and historical heritage, social interdependence, and a reproduction cycle. With respect to fostering learning, many current educators are interested in creating new intentional online communities that support learning. The intentionality is often linked to the start of a new course or professional development effort. In these cases, identifying potential participants is usually easy. However, we know relatively little about how to develop such online (or online and offline) intentional communities (see Kim, 2000; Wenger, McDermott, & Snyder, 2002 for useful exceptions). Many such efforts end with fragile and even fractured groups communicating intermittently. It is yet another leap to have such communities support substantial learning (rather than other pursuits, such as conviviality). *Building online communities in the service of learning is a major accomplishment about which we have much to learn.*

As more and more of these online communities are being designed, we must ask whether they are succeeding and what exactly they are accomplishing. The chapters in this volume are frank in examining what we *do* and *do not* know about the processes and practices of designing communities to support learning. Some of the central questions addressed herein include: What constitutes community? How do these electronic environments relate to more familiar place-based pedagogical ones? How well do the techniques and constructs that are used to understand the processes of learning and enculturation in traditional face-to-face community settings suffice for these new settings? What is the educational value of a

¹ Flaming was identified in the mid-1980s.

community approach to learning? How do we capture and what are the relations among individual, group, and community trajectories?

Specifically, the chapters in this volume explore the theoretical, design, learning, and methodological questions with respect to designing for and researching online communities to support learning. We highlight what we mean by *community*, which is a core issue for each of the chapters in this volume and addressed with special emphasis in Part I. In fact, each of the words in this title can be thought of as a problematic issue for investigation. Moving beyond community and taking the term “virtual” as another example, the term implies something that is different from the “real.” However, given the fluency with which people are transacting with the technical world, one wonders how to distinguish between the virtual and the real. As a case in point, consider the telephone. At one time communicating on the telephone must have seemed like a “virtual” discussion. Today, most people who use telephones do not consider these types of conversations as virtual or “unreal,” yet these same people probably consider an online synchronous text-based discussion to be a virtual conversation.

So what is it that constitutes something as virtual? Is it an extension in time and space from that which we directly experience with our senses? It is a significant question when one considers the design of an intimate space in which, as pointed out by many of the authors of this volume, trust is fundamental to participation. Another problematic term is *design*, a topic that is central to Part II. In fact, the problematic nature of designing something such as a community led us to change the title of this volume from “Designing Virtual Communities . . .” to “Designing *For* Virtual Communities . . .” While a seemingly trivial change, it captures the overriding assumption of each of the authors that someone external cannot simply impose a pre-designed community onto a group, but rather community is something that must evolve from within a group around their particular needs and for purposes that they value as meaningful. In fact, a core struggle emerges when one designs something for someone else to use, especially when the desired outcome of community participation is to support the learning (or even reform) of another group.

Following the sections on community and designing for community, the next set of authors focus on fostering community/member participation. They explore questions of volunteer versus mandated participation, and ways of supporting participation and collaboration without stealing ownership and intrinsic buy-in. The final set of chapters, in Part IV, focuses on research in online communities. These authors each present methodological approaches and begin the process of applying these methods to a particular case so as to illustrate the value of the approach being advocated. Taken as a collection, these chapters, whose authors come from diverse academic backgrounds (computer science, information science, instructional systems technology, educational psychology, sociology, and anthropology), point

to the challenges and complex tensions that emerge when designing for an online community, especially when the focal practice of the community is learning.

PART I: COMING TO TERMS WITH COMMUNITY

There is a long social-theoretical history of the concept of community. Different social scientists have characterized communities in different ways in order to understand different social phenomena and also based on different underlying social philosophies. Anthropologists traditionally studied pre-industrial societies, which involved village-scale communities where kinship was a basic organizing element. In the early twentieth century, sociologists who studied urbanization were especially interested in the contrasts between tightly woven village life and the more multicultural and possibly alienating cities. In the last few decades, sociologists have examined communities that are not place-based – art worlds whose participants form strong ties across national boundaries and professions whose communities often constitute standards of good practice nationally, rather than only locally (Becker, 1984;² Wellman & Gulia, 1999). Political scientists have been interested in political groupings – from local to national scale – including those “imagined communities” that could fuel nationalistic political movements. Progressive urban planners have been interested in place-based communities to identify those who should have a voice in planning or to create “urban villages” where neighborly relationships provide important kinds of sociality as well as safer neighborhoods.

A conception of community that helps to advance one of these research or action agendas may not be as helpful for understanding communities that can support learning. For example, anthropologist Sharon Traweek (1988) defined a community as a “group of people who have a shared past, hope to have a shared future, have some means of acquiring new members, and have some means of recognizing and maintaining differences between themselves and other communities” (p. 6). This conception worked well for her study of experimental particle physics collaborations; it is less helpful in understanding, for example, the core issues and challenges involved in supporting a group of students in a ten-week online course (i.e., little shared past, perhaps no shared future, no need for recruitment or even differentiation from other courses). However, it may be more relevant to understanding relationships among teachers in an ongoing open-ended professional development group. Building on the definition advanced by Barab, MaKinster, and Scheckler (this volume), we view an online community as “a persistent, sustained [socio-technical] network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history

² Wellman builds on Becker, H. (1984). *Art Worlds*. Berkeley: University of California Press.

and experiences focused on a common practice and/or mutual enterprise" (p. 23, italics in original).

Political sociologist Robert Bellah and his colleagues conceived of a community as "a group of people who are socially interdependent, who participate together in discussion and decision making, and who share certain practices that both define the community and are nurtured by it" (1985, p. 333). This conception may be helpful for identifying key issues for learning in both the ten-week course and for the ongoing professional development group. Lave and Wenger (1991) advanced the term *communities of practice* to capture the importance of activity in fusing individuals to communities, and of communities in legitimizing individual practices. Lave and Wenger define a community of practice state thusly:

[Community does not] imply necessarily co-presence, a well-defined identifiable group, or socially visible boundaries. It does imply participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities. (1991, p. 98)

Predicated on work in anthropology (Geertz, 1983; Jackson, 1996; Lave & Wenger, 1991; Rogoff, 1990; Traweek, 1988; Wenger, 1998), sociology (Shaffer & Anundsen, 1993; Wellman, 1999), and education (Bradsher & Hogan, 1995; Brown & Duguid, 1991; Lipman, 1988; Quartz, 1995; Roth, 1998; Scardamalia & Bereiter, 1993; Sergiovanni, 1994; Tanner, 1997), Barab and Duffy (2000) identified four features that are consistently present and, they argued, requisite of communities. First, they conceptualize a community as having a significant history, a common cultural and historical heritage. Second, they describe communities as having a shared cosmology, especially related to shared goals, practices, belief systems, and collective stories that capture canonical practices (Brown & Campione, 1990). Third, the notion of community suggests something larger than any one member; as a part of something larger, the various members form a collective whole as they work toward the joint goals of the community and its members (Lemke, 1997; Rogoff, 1990). Fourth, a community is constantly reproducing itself such that new members contribute, support, and eventually lead the community into the future; new members move from peripheral participant to core member through a process of enculturation (Lave, 1988, 1993; Wenger, 1998).

Barab, MaKinster, and Scheckler (this volume) introduce additional characteristics: a common practice and/or mutual enterprise; opportunities for interactions and participation; meaningful relationships; and respect for diverse perspectives and minority views. Still others have different lists (see, for example, Wenger, McDermott, & Snyder, 2002). The important point is not the specifics of the list but developing an appreciation for the complexity of community, a complexity that is only exacerbated when one wishes to intentionally design for its emergence.

A central focus of this volume is to better understand what constitutes community in ways that are especially relevant for learning and to investigate the difficulties of designing for the emergence of one online. Following this introduction, Riel and Polin (this volume) further take up the delicate task of defining community, especially those communities designed to support learning. More specifically, they distinguish among three types of learning communities (task-based, practice-based, and knowledge-based), providing rich descriptions of each type and advancing a typology for categorizing different types of learning communities.

While Riel and Polin readily acknowledge the difficulty in categorizing different forms of community, at the same time they provide a useful distinction for others interested in understanding and characterizing communities explicitly designed to support learning. Moving beyond theoretical arguments, they draw on a wealth of examples, especially technology-rich innovations, to clarify and illuminate the distinctions being advocated. Last, they provide a more synergistic vision of a learning organization that aggregates these different forms of communities into a comprehensive structure to support learning. Offering this vision as the ultimate goal, they then describe how graduate education provides a fertile setting for the task-based, practice-based, and knowledge-based learning communities to co-exist. All chapters return to this issue of what constitutes community.

PART II: DESIGNING FOR WEB-SUPPORTED COMMUNITY

Introducing Part II, Barab, MaKinster, and Scheckler discuss the challenges of supporting the development of the Inquiry Learning Forum, an online community of practice for grade 5–12 mathematics and science teachers. Their project involves the design and evaluation of an electronic knowledge network through which in-service and pre-service mathematics and science teachers can create, reflect, share, and improve their inquiry-based pedagogical practices. Their research examines the interplay among a variety of variables that characterize the dynamics of building a social network and in understanding the challenges associated with fostering, sustaining, and scaling a web-supported community in which the value of sharing one's practice and engaging in the dialogue outweighs the "costs" associated with participation. Toward this end, they adopt and expand Wenger's (1998) notion of dualities to characterize the emergent design and use struggles. Their research suggests that designing for virtual communities involves balancing and leveraging complex dualities (Participation/Reification; Designed/Emergent; Local/Global; Identification/Negotiation; Online/Face-to-Face; Coherence/Diversity) from the "inside" rather than applying some set of design principles from the "outside." This chapter provides an illuminating case study from which others can more readily identify patterns occurring in their own interventions and navigate the challenges they face more intelligently.

Kling and Courtright, also researching the Inquiry Learning Forum, critique the oversimplification of some authors' use of the word community, distinguishing between empirical observations of groups in practice and theoretical aspirations or assumptions. Their analysis further suggests that rather than thinking about "instructional technology-led group development," designers would be more usefully served by thinking about "instructional technology-supported group development." They also show how developing a group into a community is a major accomplishment that requires special processes and practices to develop trust among the participants, and the experience is often both frustrating and satisfying for many of the participants. This argument is consistent with the arguments being advanced by Schlager and Fusco (this volume) and Schwen and Hara (this volume) as well.

Over the past several years, Schlager and Fusco have been developing and refining the socio-technical infrastructure of a virtual environment called Tapped In (www.tappedin.org), intended to support the online activities of a large and diverse community of education professionals. While they have succeeded in growing and supporting a thriving community of thousands of education professionals, in this chapter they question whether the users of the Tapped In environment collectively constitute a *community of practice* and whether their participation in the Tapped In environment fundamentally changes their teaching practices outside of Tapped In. Consistent with Kling's argument, they similarly propose that an effective model of design would not begin with the virtual environment but with locating existing functioning groups and determining how to best use technological infrastructures to support their continued growth. This model is also consistent with the findings of Barab et al., whose data suggest that the Inquiry Learning Forum was most successful in supporting existing groups of inquiry rather than growing new ones.

Along similar lines, Schwen and Hara further challenge the overly simplistic assumption that communities can just be built, online or face-to-face. Their chapter summarizes and then compares and contrasts four cases that describe rich patterns of online and face-to-face workplace community. Based on their interpretations from these cases, they challenge some of the theoretical optimism around building online community by presenting five "cautionary notes" to designers attempting to build communities of practice regardless of whether they employ technical supports.

PART III: FOSTERING COMMUNITY/MEMBER PARTICIPATION

Renninger and Shumar begin the next part of this volume by describing their research examining The Math Forum, a highly successful, inquiry-informed digital library, or virtual resources center, for mathematics education. More specifically, they problematize notions of culture and community, arguing how the collaborative Math Forum site culture facilitates the

ongoing development of community. They demonstrate how site interactivity and substantial mathematics content engages learners. Because the design of the site includes many paths and opportunities, it is responsive to the needs and interests of a diverse set of participants. In their chapter, they argue that the internet provides an expanded possibility for different forms of community. Central to building community are myriad services, yet while members appreciate the site complexity they simultaneously have a simplistic path through which to use the site. Members frequently begin by using just a few resources on the site, then expanding their work as they become aware of other resources and services with an established culture that encourages taking on responsibility for the evolution of community.

Hewitt, illustrating Riel and Polin's theoretical discussion of knowledge-building communities, takes up the empirical challenge of examining a knowledge-based community in action. His chapter begins with a discussion of knowledge-based community and how this relates to the more general notion of community. From there, he carries out an activity systems analysis of a grade 5–6 classroom implementing the Knowledge Forum, a networked educational software program that supports learners' dialogue through publishing multimedia "notes" in a collaborative technical space. Hewitt's analysis is based on three years of data collection and includes both face-to-face and online interactions. These interactions are examined at both an individual (subject) and social (community) level, using activity theory to examine the relations among subjects, tools, objects, rules, community, and division of labor. His analysis illuminates the power of networked technologies to support a knowledge-building community through which members develop more sophisticated understandings about the processes and products of learning. Further, his chapter reveals how the particular learning community he investigated emerged out of the multiple, interrelated ways in which knowledge advancement was facilitated by the sociocultural context of the classroom in combination with the online environment. This chapter suggests that the goal of knowledge construction was interwoven into both the cultural fabric of the classroom community and the participant structures of the online environment, resulting in a knowledge-based learning community.

Bruckman describes the design of an online learning community for children in her chapter. A core challenge facing this project has been to determine how to encourage participation and learning, yet maintain the self-motivating, constructivist context that underlies the development of the project. The environment is primarily a self-motivated context, with a decentralized process in which anyone can create virtual spaces in a simple programming language and anyone can read the code underlying their creations. Participants can easily create spaces and add objects and interactive elements to their spaces with which other participants can interact. The

online environment is unique in that it has attracted a large following of girls and that everyone is considered a participant/creator. However, participation in the space is mostly voluntary and has resulted in highly uneven participation as well as participant programming achievements. Central to the challenges of designing for community, Bruckman's work directly addresses the tension between facilitating self-motivation and structuring (even requiring) participation.

In the next chapter, Derry, Seymour, Steinkuehler, Lee, and Siegel also examine a knowledge-building community. They share their research and development of a socio-technical system, the Secondary Teacher Education Project, a problem-based learning web environment, designed to facilitate the continual evolution of a knowledge-based community to support pre-service teacher education. Focusing on their own conceptual and technical development, they share insights on both the challenges of supporting shared collaborative work and how this might be scaffolded using a web-based environment. To help the reader understand the complexity of the task involved in designing a web-based community that has practice as its core – knowledge building through a problem-based learning framework – they begin with an overview of their initial vision and how this process occurs in a face-to-face context. It is because of an appreciation of the challenges involved in face-to-face social contexts that they began to examine social processes within the newly developing program, trying to gain a better understanding of what kinds of interactions their socio-technical design must mediate. Their discussion includes a contextual analysis of their existing teacher education program as well as an interaction analysis of a representative, face-to-face discourse from a group learning activity that occurred in that program. From there, and consistent with many of the other chapters in this edited volume, they then discuss how a deeper appreciation of the complexity of this task led to a modified goal from developing an “online community” to structuring and supporting group learning through which something like “community” might develop.

PART IV: RESEARCHING ONLINE COMMUNITY

In this section, we present four methodological approaches to the study of virtual community, learning, and related issues of design. Each chapter addresses, from its own perspective, the complexity of these topics. Collectively they call for the use and further development of multiple methods to grasp the myriad aspects of community that span the boundaries between online and offline activities.

First, Koku and Wellman employ social network analysis as an approach to understanding the structure of relations underlying a community of practice. The authors present methods for describing the kind of loose ties and distributed interaction networks that increasingly characterize

collaborative work relations in present-day society. By describing the complex patterns of social networks such as density, tie strength, clustering, and multiplexity, the authors are able to examine the specific social contexts of the interpersonal relationships that comprise the larger community. Rather than seeing virtual communities as separate from face-to-face ones, the authors suggest that designers of online educational communities need to look at the broader social networks of community members – both on- and offline – and how their internal structure and media use affect peer-to-peer learning.

Next, Herring presents a detailed examination of computer-mediated discourse analysis (CMDA) as a kind of methodological toolkit adapted from language-oriented disciplines and applied to one or more domains of language: structure, meaning, interaction, social behavior, or participation patterns. Through adherence to five conceptual skills of scientific methodology (e.g., crafting empirically answerable research questions, defining and operationalizing key concepts), CMDA can bring a “fine-grain empirical rigor” to social-psychological questions like the existence of community. However, despite the potential analytic power of CMDA, Herring is careful to acknowledge its limits. Drawing inferences about participants’ inner states or experience of something as abstract as community is best approached by combining CMDA with other methods such as surveys, interviews, and ethnographic observation.

Building on Herring’s work, Job-Sluder and Barab then provide a methodological process that can be used to identify and characterize shared group identity. More specifically, they provide a coding scheme for identifying and comparing shared group identity of an online environment. Describing two types of discursive strategies, linking and contrasting identity, they advance a methodology for evaluating the sociability of learning environments. Specifically, they describe three stages of computer-mediated discourse analysis: beginning with procedures for carrying out contextual analysis, then describing the process of conducting content analysis, and last, building a qualitative case characterization. Their approach, while still in its infancy, provides a much needed mixed methodology for evaluating shared group identity and, thereby, building an argument for the occurrence of something like community.

Finally, Gray and Tatar present a four-part sociocultural approach to the study of learning and development online. They analyze the complex interplay of individual, interpersonal, community, and technological aspects of activity (cf. Rogoff, 1990) through a case study of “Robert,” a highly active participant in the Tapped In environment. Key to Robert’s professional development is the connection he maintains between his online and offline professional worlds. Based on their findings and related literature, Gray and Tatar offer several design suggestions. For example, they recommend a multidimensional needs analysis to understand target community

members in terms of personal identity and life trajectory, existing patterns of interpersonal interactions, and community affiliations as they relate to the goals of a new online environment. This sort of analysis might lead, for instance, to the design of private “whisper” functions and personal office space that motivate new teachers to discuss professional challenges they face during their first year of teaching.

SUMMARY

We are currently in an exciting time in which pedagogical theory and technological advances have created an opportunity to design innovative and powerful environments to support learning. We also have this enthusiasm and have had the luxury of researching and designing a number of interventions based on a community approach to support learning. However, as researchers in the learning sciences community, we need to be careful not to get caught up in the whirlwind of theoretical aspirations and the current zeitgeist. We need to be visionary while at the same time examining empirical data. As educators and research scientists, we need to be critical about our claims. Nonevidenced-based claims can lead to over-simplistic interpretations and, to the extent that these claims result in designs that impact real people, damaging consequences for those we are trying to help.

In this edited volume, the authors have worked to balance their claims, remaining optimistic and visionary while at the same time avoiding hyperbole and unsubstantiated assumptions. Just as design work is filled with tensions, so is advancing new theory. We hope that readers will develop useful insights into their own work, sharpening their critical gaze while at the same time advancing their thinking about what can be done. Innovation is not a simplistic practice; it involves taking risks and making mistakes. However, good research involves examining these risks and what is being learned. Each of the authors has worked to present his or her struggles and lessons learned in a manner that not only captures the local struggles but provides them in a manner that could be useful to readers in their own work. To the extent that this book can support the field in designing for new communities and facilitating new groups of learners, we have accomplished our goals. We look forward to hearing reactions and learning from you, the reader, as you engage in your design struggles and successes as well.

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