

Adding connectivity and losing context with ICT: Contrasting learning situations from a community of practice perspective

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Abstract. The promise of information and communication technologies is that it increases connectivity. By providing a spectrum of technologies such as email, web conferencing, telephones, and chat, ICTs bring people who are geographically dispersed together in community. Such communities can provide a new context for learning; at the same time, the social, physical, and technical context of the community's members risks getting lost through computer-mediated communication. Design for online communities, especially design for learning in online environments, tries to find ways of re-inviting participants' contexts, as context has a great bearing on learning, in fact is inextricably linked to learning. In this paper we investigate the complex relationship of context, technologies and community design issues. We present three case studies of online learning communities and analyze the interplay of context and technology for each situation, using a community of practice perspective. Each case balances the demands of time, the need for context, and the demands of practice in a unique way. The insights gained can inform both educational design and design of community technologies.

Introduction

Information and communication technologies (ICT) are thought to promise great change in social practices and the learning that occurs through them – both inside and outside of organizational contexts. ICTs add connectivity: geographically dispersed people can form online communities within an organization, cutting across organizational boundaries or completely independent of organizational affiliation. Using the added connectivity to support communities indeed becomes an indicator in many fields as to how fully ICTs' potential is harnessed (cf. Brown and Duguid 1996 for the digital university). In many fields research projects investigate what sorts of designs are most conducive to producing and nurturing online communities (e.g., Paloff and Pratt 1999, Bielaczy and Collins 1999, Preece 2000). Other research focuses on what happens when a community's communication is transferred into the online space due to changing organizational structures (e.g., Kimble, Hildreth and Wright 2001). Research-practitioners such as Salmon (2000) show how new skills enable new social spaces for learning.

At the same time computer-mediated communication and communities that rely heavily on these new media are confronted with significant limitations: lacking social cues, making do with gaps or lags in feedback, and dealing with “noise,” for example. Communication becomes relatively “thin,” reducing the context that communication partners effortlessly share in face-to-face situations (Hesse, Garsoffky, Hron 2002). This loss of context and how it masks situations and identity so that one person can pass for another is pointedly encapsulated in the famous cartoon from *The New Yorker* magazine where one dog says to another, “On the Internet nobody knows you’re a dog.” Similarly, we normally don’t know the context at the other end of the messages we send (cf. Figure 1).

How does this possible loss or distortion of context impact communities and their learning? We understand learning to be a situated social practice that is inextricably linked with its context. But the context of social interaction through ICT is inherently difficult to see. The new possibilities and corresponding restrictions introduced by technologies for negotiating meaning or understanding others’ context become crucial issues when we design for online communities and facilitate learning within them. Up to now little consideration has been given to the intricate relationship between *participants’ contexts*, *design for communities* and *technologies* for communities and learning.

In this paper we explore this relationship in more depth. We examine three cases in which technologies enable learning situations. In each case the use of technologies is deeply intermingled



Fig 1. Email in context

with issues of losing context and re-constructing it through the design for learning and the community's actual practice.

We derive our theoretical framework for this analysis from a communities of practice (CoP) perspective (Lave and Wenger 1991, Wenger 1998). All three cases are examples of online communities that in one way or another focus on learning. Each case uses a different mix of technologies and each occurs in a different social context. In each case different ways have been found to deal with the fact that only a part of a participant's individual context is transmitted by ICT. In each case a new, emergent collective context is created through the technologies. The cases cover a broad spectrum of learning situations: a higher education *online class* designed according to CoP learning principles, a *workshop* offered for professional development that simulates a CoP online, and a students' *self-organized network* that relies heavily on internet technologies as students are dispersed distance learners.

As regards methodology, the case studies as such use an action-research approach and grounded theory methodology. We apply a CoP perspective for a comparative meta-analysis of the cases.

The purpose of this investigation is to unpack some of the inherent complexity of the interconnectedness of community design, technologies and context. Our results will inform educational design as well as the design of technologies that are developed to support learning, thus feeding back into our own contexts as researchers and designers who focus on community support and development.

The structure of the paper is as follows. In Section Two we elaborate on context, connectivity and learning and thus develop our CoP perspective for the analysis. In Section Three we present briefly three case studies, focusing on contexts, design and technologies involved. Section Four analyzes learning situations in the three cases and investigates the particular ways that technologies, design and context interact and shape the learning in each case. We conclude in Section Five by reflecting on the results of the analysis and their implications both for design issues and for further research.

2 Context, connectivity and learning - a CoP perspective

The promise of connectivity seems to be neatly defined: ICTs enable us to communicate and cooperate with people living thousands of miles apart and to connect across different time zones, choosing between asynchronous media (such as e-mail, file-repositories, news-groups, web conferencing, or blogging) on the one hand and synchronous technologies (such as chat, telephone conferencing or application sharing) on the other. Having these different technologies available gives us the opportunity to choose individually and to collectively negotiate gradients of synchronization, "freeing us" from time and space to a certain degree. Online communities of various kinds come into existence, some deliberately designed for learning, others as networks around a topic that may develop a shared practice. In cases such as ParentSoup or PerlMonks, communities provide

a context for learning in the broad sense that learning is used in this paper (and on which we elaborate later).

Given growing connectivity (at least in western industrialized societies), information resources are available worldwide. With the proliferation of new technologies, choosing and combining resources and technologies becomes an increasingly complex task for the designer of learning situations. Similarly, choices between all the available media, resources and technologies that are available require and enable learners to act more like *designers* in the sense explored by Fischer (2002) rather than just being passive *consumers* (cf. as well Wiley and Edwards 2002).

However, there are caveats as well: Research on computer-mediated communication (CMC), on computer supported cooperative work (CSCW) and on computer supported cooperative learning (CSCL) reveals a far more complex picture. According to many studies in these fields, the "death of distance" or the "the end of geography" is a myth not a reality: communication and cooperation that are mediated by technologies are often still restricted in many ways. Some studies indicate that reduced information about personal context, the lack of social cues, cognitive overload and a lack of coherence in the exchange of messages can impair communication and cooperation. Trust building and social bonding in virtual communities seem to be more difficult than in face-to-face situations (Hesse, Garsoffky and Hron 2002, Kimble, Li and Barlow 2000). Presently there is no clearly established consensus of research findings. Contrasting results prevail, pointing to a large number of complex factors to take into account. The time dimension, for example, is problematic in this way: when minimal time is available, computer mediated communication tends to restrict the development of intensive interpersonal relationships, to dissolve social hierarchies and thus foster more egalitarian dialogue. In contrast, in online communities that exist over a longer period of time, the converse seems to be true in the sense that intensive interpersonal relationships can and do evolve online (Walther 1992; 1996)

Furthermore where technologies from a usability perspective should be transparent ("the invisible computer", Norman 1998), allowing the user to focus on the task at hand rather than on the technology itself, in fact they rarely are so. CSCL research points to many examples where attention is shifted from the cooperation or learning task towards the handling of technologies themselves (Reinmann-Rothmeier and Mandl 1998, Hara and Kling 2000). Technical flexibility is a key factor when introducing groupware into organizations (cf. Wolf 1999). In most cases many workarounds and improvisations are needed to make up for the various constraints and limitations of any given technology or mix of technologies. Specific, creative and complex ways of coping that are at work in the cases under investigation will form the empirical basis for our inquiry.

Connectivity thus leads directly to the importance of context for any given social practice. What exactly do we mean by context? There is a prevailing misconception of social context as a *container* - "a static, residual, surrounding 'container' for social interaction" (Lave 1993, 22). This misconception leads in turn to the widespread belief in the existence of decontextualized activity. If the concept of context is that of a separate entity that can be disconnected from social

practice itself, the notion that educational institutions like schools are a "privileged noncontext" (Lave 1997, 126) only seems logical. McDermott (1993, 282) describes this connection precisely:

"In all commonsense uses of the term, context refers to an empty slot, a container, into which other things are placed. It is the "con" that contains the "text", the bowl that contains the soup. As such, it shapes the contours of its contents; it has its effects only at the borders of the phenomenon under analysis [...] the soup does not shape the bowl, and the bowl most certainly does not alter the substance of the soup. Text and context, soup and bowl [...] can be analytically separated and studied on their own without doing violence to the complexity of the situation. A static sense of context delivers a stable world."

In contrast to this restricted and misleading concept of context we argue with Chaiklin and Lave (1993) that context must be conceptualized as a social world in relation with persons acting, as practice itself, inextricably linked to human activity. Context is the social world of a person:

"A more promising alternative [to deal with context] lies in treating relations among person, activity, and situation, as they are given in social practice, itself viewed as a single encompassing theoretical entity." (Lave 1993, 7)

Learning then is contextual. It happens in space and time, is informed by the context of the past, is validated with one's current context, and context shapes the future (through "the living present", Shaw 2002). Context in this understanding – like a window into a learner's social practice – bears on a learner's intentions, assumptions, interpretation of terms, and style of participation. Although context has such a huge impact, normally it is invisible to us until we engage in processes of interaction or of reflection (Maturana and Varela, 1992, 210) where we can look at "where we stand" – on an issue or in a social space.

From what has been said so far it is obvious that we don't support the common and very narrow concept of learning as merely a cognitive process. In contrast to cognitive learning theories we look at learning as a situated social practice. To take a communities of practice perspective on learning in detail means to conceptualize learning as participation in ongoing social practice, moving from legitimate peripheral participation to full participation in a given community of practice. Learning in this broad sense can be understood as "part of the subject's moving, changing participation across multiple contexts of their daily lives" (Lave 1997, 123). Serendipity and improvisation play a much larger role in this movement when "learning" is seen as more than a cognitive process, always being inextricably linked to identity building.

What role does instruction play in a CoP perspective on learning and what does a teacher look like? Instruction in this view becomes one of many learning resources. As Wenger (1998, 266) points out: "Instruction does not cause learning; it creates a context in which learning takes place, as do other contexts." Hence the teacher or instructor constitutes one of many learning resources. The intricate structuring of a community's learning resources comprises the actual practice, shared between the instructor and other learners, involving the entire social network of the community. As the technologies and processes for coordinating their use become more complex, we argue that learners and teachers collectively engage in a design process that goes far beyond the social interactions in a traditional classroom.

An important point distinguishing this approach to learning (and the resulting approaches to the design for learning) is that learning environments cannot and should not be sequestered from practice environments – somehow the different contexts of different members of a community of practice must be visible as members interact with each other and with the community's practice. We see the setting for learning, whether consciously designed or inherited from forebears, becoming a shared context with its own meaning and potency. Learning then occurs within an improvisational process of engagement in collaborative problem solving in that shared context.

In our comparison of the three online learning cases we use the scheme described by Wenger (1998) of the constitutive elements of a community of practice. Domain is the subject of a community, the knowledge area around which the community gathers and which the community's practice exercises. In the concept of community we include the people, their relationships and their trajectories toward the development of knowledge and competence at an individual and collective level. By practice we refer to the habits and activities that the community uses to apply its knowledge domain or which are involved in being together as a community. Practice entails the learning that happens in a community, changing and transforming member's identity and at the same time being transformed and changed as members manifest their identity within the community. Practice and identity are used here as two complementing analytical perspectives to assess the learning in the three cases (for the complementary nature of identity as a dimension to analyze learning cf. Wenger 1998, 45). These dimensions together provide a helpful lens to examine the issues of technology, connectivity and context.

In summary, connectivity, context and learning seem deeply tied to each other. In the following sections we examine in which ways design for communities can mitigate the potential loss of context and can foster learning by allowing members to develop a community's practice as well as their individual identity.

3 Increased connectivity: three case studies of online communities

Although we emphasize the problematic nature of ICTs, it must be clear that none of the cases we examine here could have been possible without the increased connectivity afforded by new technologies. Each of these cases have been treated in more depth elsewhere (for the *online class* cf. Putz & Arnold 2001, for the *workshop* cf. Smith & Coenders 2002, for the *self-organized network* cf. Arnold 2003). Neither the many rich contrasts between them nor the methodological details of the case studies can be exhausted in this paper. Our interest here is focused on the theme of context and technology: how the individual learner's context is included in the online learning environment and how the collective context of the learning community is made explicit, becoming a resource for the community. In this section we introduce each case by providing basic descriptive information. We then use the Wenger (1998) framework to briefly describe

domain, practice and community elements for each case. Finally, we characterize the design for learning and summarise available data sources and our connection or involvement in each community. To make the discussion of context easier to follow, we provide an overview in Table 1.

Feature/Case:	A Online Class	B Online Workshop	C Students' Network
Participants	Full time student	Working professional	Part-time student
Institutional framework	University class offered for credit toward a degree	Training offer from CPsquare with no official "credit"	Self-organized community within a special distance education degree program
Technologies used	BSCW for asynchronous, web-based discussion groups and file sharing	Web Crossing for web conferencing, file sharing, chat, and instant messages; also phone conferencing, email, Groove, etc.	Listserv, newsgroups, websites, and web-based discussion forum
Authors' roles	Guest experts, researcher	Designer, producer, facilitator, participants, researcher	Researcher

An Invited-Aligning Community: An Online Class in Higher Education

This online class on knowledge management in an Austrian brick and mortar university has lasted 10-15 weeks, has involved 12-15 students each time (it's been offered twice). The design includes no face-to-face elements. All of the learners in this case are within one time zone, selecting the class to enjoy the greater flexibility of an online seminar and to acquire competencies and experience with new media. The community's domain is knowledge management from a scientific or scholarly (rather than applied) perspective. The practice is scientific investigation of various aspects of knowledge management, applying academic procedures such as analyzing texts, engaging in written debate, and producing individual summaries and contributions. Compared to the other cases, the domain aspect receives much greater emphasis and the community element receives somewhat less. Our analysis of this case is based on participating as guest experts, re-reading the logged communication and analyzing evaluation data (the reflection circle and a questionnaire; cf. Putz and Arnold 2001). The technologies involved in this class include an object-oriented groupware platform (BSCW) with asynchronous communication tools such as newsgroups, data repositories, and e-mail. No synchronous technologies are used, although work is scheduled in important respects by the assignment of discussion topics and individual tasks, which are due by specific dates.

The design of the class aims at enabling the legitimate peripheral participation of students in a larger scientific community (which is present through its

publications, the field's canonical stories, the instructor, and the guests) and provides trajectories to fuller participation. The design tries to integrate a community of practice perspective into the existing organizational culture and value system of higher education. Initially, students begin by reading finished products (the class readings), and gradually take more responsibility for producing their own comments and expressing their own understanding of the material. The schedule provides time for the discussion of emergent themes. There are several explicit social roles in the community that are identified at the beginning and are enacted during the course of the class. These include: the instructor, guest experts, student-leader (specific tasks for which students volunteer), and student participants. The proximity of this class to a traditional classroom context is palpable in many ways: students are of similar age and they are receiving credit toward a degree. They are invited to reflect on scientific procedures (both those they are carrying out and the procedures that are established in the field), comparing the way these procedures connect and shape each other mutually.

An Encouraged – Negotiating Community: an Online Workshop for Professional Development

The second case is an online workshop on communities of practice that currently lasts seven weeks, has between 20 and 40 participants, and has been offered about 10 times in the last 5 years. It draws a wide variety of people from many economic and social sectors (and many time zones) for professional development and has no face-to-face components. Originally developed in an entrepreneurial mode by its organizers, it is now part of CPsquare, a non-profit organization focused on communities of practice. The domain of this community is communities of practice. The practice is a collective, practice-oriented inquiry about communities of practice in an online environment. The community aspect receives a great deal of emphasis in this case, through planned activities (i.e., an opening and closing circle, community meetings on a telephone bridge, and student-hosted guest visits), spontaneous activities (i.e., games, weddings or holiday observances or chat parties), nominal groupings (i.e., groups of four people who form into “households” and sign up for leadership tasks, discussion tables composed of people from different households, and project teams self-organized around a topic), and the differentiation of “teaching” roles (that include a domain expert, a community organizer, a practice coordinator, guest speakers and mentors). The authors have had ongoing participation in this workshop (Smith as a participant, designer/technologist, and community organizer; Arnold as a participant and researcher). Archives of web conferences, surveys, meeting transcripts, and interviews form the basis of our analysis in this case.

The technologies involved in this workshop are built around Web Crossing (which provides web-conferencing, instant messaging, email notification, shared files, and chat). Audio conferencing via a telephone bridge provides another mode of conversation and email is used for announcements and back-channel exchanges. Small project groups can use other technologies for collaboration.

Although in several regards the workshop is very carefully designed, in many ways it is *under-designed* (in the sense developed by Fischer 2002). That is, although some elements such as telephone meeting times are set in advance, much design occurs spontaneously, during the workshop. For example, many of the topics of conversation are drawn from individual interests of participants, from cases they bring for discussion, or from events in the workshop itself. This evident under-design is used to encourage participants to bring their individual context, experience and perspective into the workshop. A barometer (Smith & Coenders 2002) and an ongoing discussion about “reflecting on our experience” (which is facilitated by a group of participants who volunteer for the task) are important ways of pointing to the collective context that evolves in the workshop. The availability of project reports produced by workshop participants in subsequent workshops is another way in which the emergent community context becomes visible and available as a community resource.

An Enacted-Developing Community: Grassroots Student Network in Distance Education

The third case is a grassroots students’ network of between 500 and 800 students. Distance learning students who are enrolled in a specific distance education degree program set up an online community structure beginning in 1995, using basic Internet tools. It is set up, run and administered technically by the students themselves, independent of the distance education provider. It is an ongoing community that also organizes regional, informal face-to-face-meetings. Additionally, students meet face-to-face in small subgroups in daylong residential seminars as part of their degree program and when taking exams.

The domain in this community is primarily expertise and “survival” as a distance learner, obtaining a degree over 3 to 5 years, while holding full-time jobs. Business informatics and business administration, the content of the study programs, are included as occasional sub-topics. Practice is the mutual support in becoming a successful student at a distance (exchanging materials, reflecting on study strategies, jointly preparing for exams, etc.). The community element is strong as students deliberately join the network to reduce their isolation as distance learners. Relationships and collaboration, however, develop in very diverse forms (as strong and weak ties in the sense of Granovetter 1973), dependant of the individual student’s choice, situation or needs. The community communication is complemented by a lot of personal communication, both computer-mediated and face-to-face.

The primary community space is a listserv. It has been supplemented by other tools (including a Yahoo Group, with a web-based discussion forum and data repository, individual web pages with community related data-repositories, etc.) in a completely decentralized manner. All resources and communication spaces are completely open.

The author’s connection to this case is that of researcher: within her doctorate research project, Arnold was a participant observer in this community for one and a half years, conducted qualitative interviews with students and analyzed

community documents from data repositories as well as information material from the distance study program.

The students' initiative to organize the community can be seen as a response to the restricted educational design in place in their distance-learning program. This program is entirely individualized, based on print materials, with no group activities or cohorts being part of it. Students' influence on course content (and choice of fields of specialization) is very limited. The design of the program does not regard learners' products or students' peers as learning resources. In contrast, the situation within the students' community is the reverse: students' interim products in their studying activities, their reflections and professional experience are salient learning resources. Since there is no predefined community design in place, leadership roles are fully emergent. Students take up facilitating roles spontaneously. The same applies to context: there is no special "invitation" of context into the community, students enact their context in their actual practice of mutual support by giving advice, sharing background and expertise in a way they deem necessary to adequately answer a request. As the tools used in the community only support "thin" communication (e.g., plain text email) and all data is completely decentralized, successful practice relies on the right people spending the right amount of attention at the right time. This way the community context is open to frequent re-negotiation which also renders it somewhat fragile and dependent on a kind of systemic serendipity. Fragility is counteracted, however, by the comparatively long history that the majority of members share at a given time.

4 Learning opportunities – restricted and enhanced by community technologies

The three cases clearly illustrate the dilemmas of interest: ICT adds connectivity, offers new forms of negotiating identity and engaging in practice, thus supporting new forms of community and new learning experiences. But the visibility of context – individual and collective – is limited by ICT and therefore manifesting identity and engaging in practice gets impaired. Although self-description is important, the most effective means of inviting identity into a learning situation is not merely to provide for information *about* identity: being able to *manifest identity* and to engage in *practice* turns out to be far more important. In this sense *practice* is a test bed for a person's action in context. Our use of the term *identity* in this discussion goes considerably beyond the usage of the term as it's used, for example, in the context of member profiles in an online community (Kim 2000, 76). We see identity as being formed and transformed in communities of practice, a full reflection of a person's context in the social world.

In this section we explore how the mechanisms in the design and the improvisations of learners affect the learning in each situation, using identity and practice as central dimensions of our assessment.

We will first summarize the main contrasts in the cases in regard to the relationship under investigation and then present detailed results of the analysis:

Case	Contrasts discussed
Online Class: Context Invited-Aligning	<ul style="list-style-type: none"> • Less apparent need to bring in context, as students' individual context is assumed to be homogenous • Limited time restricts sharing of contexts and creation of group context • A single platform limits learner's choices, focuses on study materials
Online Workshop: Context Encouraged-Negotiating	<ul style="list-style-type: none"> • Comparatively higher need to expose context as participants are assumed to be heterogeneous • Different invitations at different points in time gather past, present and future context • Wide spectrum of communication modes gives many choices, some of which are confusing
Student Network: Context Enacted-Developing	<ul style="list-style-type: none"> • Self-organization and voluntary contributions make contributions reflect member's context, so it is enacted based on an assessment of personal value • Help given and received over long period accrues context • Providing resources such as summaries, websites, or archives takes initiative and demonstrates competence

Sharing and elaborating identity in online learning situations

Inviting identity in an online class

The design of the online class regards identity as being an important part of learning. The online space was carefully designed to enable students to describe their personal identity in the space at the start of the class. In the most recent offering, BSCW's facility for individual identity information (a personal card file with a picture, name, profession and contact information) was augmented by inviting students to pick a picture and then comment on their choice in their personal introductions. By choosing a picture and sharing it with the community for one's personal introduction, the text-only mode was augmented and invited richer and more emotive introductions.

Private journals that others could read were another mechanism to show the development of identity (and for this development to be a resource for the learning community). The journals were to be a means of experiencing a changing identity with growing expertise in scientific inquiries and procedures. This element did not find much acceptance, possibly because of the technology, the institutional context (i.e., the program included direct assessment of students' writing) or the fact that its social aspect was under-developed.

In a university class offered for credit toward a degree, the scope for negotiation around group context and identity is restricted, just as it is restricted around the scope and definition of the domain. As the community's context isn't negotiable as such, debate and reflection upon it is weakened.

The same applies for personal identity, even if not as strongly. Given clear instructional objectives – the acquisition of academic work procedures – participants’ trajectories tend to evolve in “pre-designed” ways. In addition, BSCW’s lack of support for spontaneous synchronous communication leaves comparatively little room for negotiation. The software platform’s strength in supporting diverse and sophisticated asynchronous written communication, on the other hand, contributed substantially to the creation of entirely new forms of contributing to scientific debate: during the class the instructor, the guest experts and some of the students began to use a special style of “online keynote” to open up a thematic debate. Intended for an online space it was a “short and snappy” introduction, an unexpected innovation.

Encouraging identity in an online workshop

Because of the diversity of workshop participants, surfacing identity during the workshop’s seven weeks is especially important. Both the workshop design and choice of technologies work towards this goal. Web Crossing’s group awareness features include a clickable personal photo that heads written contributions; clicking on it retrieves an author’s background and their five most recent postings. Functions that show “who’s here” and make it easy to send “instant messages” help to connect people and build relationships through spontaneous encounters in the virtual space. By showing participant time zones as well as the time of their last visit to the online space the workshop’s directory adds current contextual information (and gives clues about non-participation).

Several workshop design elements encourage the expression and discovery of identity. A “six degrees of separation” game, where each participant is challenged to identify connections and commonalities that link them in a chain to a given other participant, requires a lot of practice with the software, generates a great deal of information about the group and provokes a lot of good will. Small nominal groups (dubbed “households” with public “front porches” and private “kitchens”) encourage postings that are directed to specific small groups, avoiding the impression of sending text into empty cyberspace. These groups create social context and take on significant community tasks. Small group discussions and self-selected project teams with different membership provide the opportunity for additional negotiation and learning in small groups.

The fact that there was neither certification at the end of the workshop nor a unifying organizational context with an aligning influence during the workshop shaped identity formation in its own way: the personal “standing” in the online community as well as individual satisfaction with what was achieved in the period of being together was the only reward for participation. This and the overall negotiability in place worked as an inherent incentive to learning as personal growth and an enriched identity.

However, identity formation and thus learning opportunities in this setting clearly favours people who are versatile in online communication (or become so very quickly). Non-native speakers of English found the pace and volume of interaction to be challenging. Surveys and interviews suggest that getting acquainted with the Web Crossing platform and contributing to the community

took up time and resources that theoretically might have been invested directly into engagement with the community or the subject matter. Again, opaque technology together with a tight time-schedule restricted learning opportunities or resulted in a bias of learning that discriminated unduly against some participants. On the other hand, those who are able to deal with technical, language, and scheduling obstacles are in many cases able to engage in significant collaboration that spills over the workshop's boundaries and into "the rest of the world."

Enacting identity in an open-ended network

At first glance in this situation there seems to be almost no surfacing of identity, either at the personal or community level. Because the student network community uses simple email and listserv technologies, the communication appears very "thin". Messages carry no contextual features other than a time stamp, date of posting and the name of the sender. Due to the decentralized nature of the community's development and the lack of any central facilitation or directory services, there is no centralized community space where the community's identity can be negotiated or be presented to itself or the world.

Further analysis suggests that, even with such simple technologies, small contextual cues such as message time stamps that convey important context saying, for example, "He is working the same odd hours as I am!" Just enough context seems to be provided – or enacted – explicitly through individual messages. Lots of context is re-constructed implicitly by the use of the common jargon and allusion to common study situations. The basic characteristics of member's context indeed seem to be very alike: rigid study regulations, limited choices and a constant struggle with one's personal time management. The struggle to keep motivated and to sacrifice much time over a long period creates a kind of shared context. This shared context then is invoked around personal requests or answers.

At the same time the community offers rich examples and opportunities to display personal identity – especially growing expertise in distance learning. Several people run personal homepages that act as data repositories for the community. They share personal experience in form of stories, reports and advice that show identity and demonstrate personal competence. Personal profiles, preferred links and other documents serve a similar function for the less technically adept.

Perhaps even more important for this community's sense of identity and learning is the community's ongoing life together. Regular meeting times for informal, face-to-face conversation, study groups to prepare for exams, and the occasional ad hoc meeting, all provide for the development of individual and group identity. Sub-communities form easily and like-minded people are easily found. In addition many kinds of "backchannel" communication connect people and provide opportunities to express and shape identity at a more personal level.

For the community as a whole, this results in a very diverse, multifaceted community identity. The basis for the community's vitality is a toleration or even celebration of diversity, based on the voluntary nature of participation. Each

member thus brings identity and context into the community, as appropriate. However, the basis for vitality constitutes the community's fragility as well.

Sharing and elaborating practice in online learning situations

Given that we regard peripheral participation in the practice as a condition for learning, separation between "the practice" and "the learning" becomes problematic. The extent to which the actual practice can be brought into the learning situation then depends on how context is handled. Whether learning situations are developed within the practice or the practice is somehow brought into a learning situation raises many questions about context and its meaning.

Aligning with academic practice in an online class

The online class was designed using a community of practice perspective. The domain for this community is the academic study of knowledge management and the practice entails reading, understanding and commenting on scientific publications, leading toward the development of new lines of argument and shared contributions. The practice of scientific inquiry as represented in the online class is similar to the practice in the larger scientific community: it happens asynchronously with an emphasis on the careful reading and production of texts. Having the opportunity for critical discussions with 4 or 5 guest experts and the instructor – all academic scholars or experienced practitioners located in several different countries – brings the essence of scientific practice into the classroom.

This part of the practice is supported well by BSCW. In fact the strength of BSCW is asynchronous written communication and working with texts: annotations, visual evaluation and version control. In contrast to a discussion in a face-to-face seminar, all contributions are permanent and can be easily retrieved and referred to later. Asynchronicity allows all participants to "let other people's points sink in" and is completely congruent with academic discourse as a debate made up of consecutive texts that reference each other.

The class design tries to bring scientific practice into the online classroom by inviting students to expose their personal practice in various ways: by keeping a personal learning journal (that is publicly visible) and by having several distinct collaboration spaces, practices of reflection, debate and learning are enacted online. Again, the permanent form of these reflections can serve as an important learning resource and a community practice can evolve and become visible.

Class evaluations, however, show that these design elements didn't live up to expectation for a number of possible reasons. Reflection on and discussion about one's own practice might require synchronous or less formal communication. The permanence of the written contribution might hinder tentative or preliminary thinking. BSCW doesn't support synchronous communication forms such as instant messages or chat and it does not show who is working online concurrently. The fact that a large part of the grade was based on the text produced by a student may additionally limit the kind of personal reflections students were willing to post. Similarly, the workspaces for the thematic focus groups who took up leadership roles for certain phases of the class weren't used much. Students preferred collaborating on their documents and

making arrangements via e-mail even though they had to make do without BSCW's special collaboration features. Again, institutional context came in strongly here and added to BSCW's collaboration features being far from transparent.

The short duration of the class was an additional obstacle to the evolution of collective practice. The class, again due to the institutional context, had to follow a strict time schedule. The time structure was not open for negotiation and might have restricted emergent learning opportunities as regards leadership roles and reflections on the individual and the community's practice. In the larger scientific community, the practice plays out over very long periods of time, limiting the extent to which participation during a semester-long class can include the full-fledged practice.

Negotiating the meaning of practice in an online workshop

In the case of the online workshop, contextualized practice receives strong emphasis. The cases that participants post in the Practice Lab – which range from informal stories to fully developed problems for group discussions – both focus attention on real practice and exemplify the kinds of discussions that go on in a community of practice. Participants take up leadership tasks to perform genuine community development work: their leadership shapes the workshop to a large extent. The under-design that was discussed earlier renders practice almost as open for negotiation as in any self-organizing community. In this way there are ample learning opportunities around leadership roles that actively shape and contribute to the community's practice. With feedback from other learners and workshop leaders, participants have a sense of moving to fuller participation.

In contrast to the online class, where the domain and practice seem quite suited to the online environment, the fact that most of the practice in the workshop happens via computer-mediated written communication may be a limitation. Although the communities that most participants are involved with have an online component, few are as international or as dependent on ICTs as the simulated community in the workshop. Even the use of telephone conferences, which were introduced to reduce the emphasis on text-based communication, has challenges associated with cost, time zone coordination, and the pace of spoken English for non-native speakers.

The institutional informality around the workshop allows innovation from one workshop to another, permitting it to grow from three weeks to seven weeks in length, for example. Improvisation during the "admissions process" so that email exchanges about communities of practice begin before the workshop formally begins is another outcome of this particular informal institutional context.

The ample scope for negotiation and for shaping the workshop community constitutes an important learning opportunity, encompassing behaviours ranging from active taking leadership to experiencing non-participation. The flexibility and degree of authority that participants have with Web Crossing permits participants to open discussions, set up conferences or change access controls. For

many people this results in some overload and a “lost in cyberspace” syndrome. Trying to find one’s ways in other peoples’ structures in an online space seems to be much more difficult than following a turbulent discussion in a face-to-face situation. And again technology is more opaque than it should be: to navigate through the hierarchical conference structure to find a certain element takes time. To learn how to find important statements and exchanges while coping with the volume of activity requires conscious attention to the technology and the evolving social practices.

Developing the practice in a student network

All that is needed to participate peripherally in the student network is to subscribe to the community’s listserv. It enables passive participation without affecting active contributors. In fact, it is in line with an established culture of a high percentage of “lurkers” in mailing lists and newsgroups in general. Moving to fuller participation, i.e. asking questions, or sharing one’s own strategies and experience as a distance learner is equally easy and can occur in different gradients of involvement and at a self-selected pace.

Technology used in this case comes close to being invisible. E-mails blend in effortlessly within daily working routines. Giving some advice or sharing resources with other students can happen in a few lines of text, using the established jargon of the distance education program. In this community, the sender of a message can assume a very similar situation at the receiving end of an email message, knowing that a familiar course curriculum and study regulations are being discussed. The practice of being a student is assumed, even though peripheral members may be piecing its elements together.

All communication serves the purpose of mutual support within the community. As messages are therefore assessed only on their helpfulness, there is no need to “polish” them. A quick and fragmentary style of communication that’s precisely to the point has evolved, invoking a shared style. It seems to fully meet prevailing expectations and makes contributions efficient. It does not take much time and energy to make an active contribution and still the contribution is visible directly to an audience of several hundred fellow students (such economies of scale enable the existence of “gift cultures”; cf. Kollock 1999).

Moving to even fuller participation (actively enhancing the community’s resources) is encouraged by the fact that students can contribute to the community and provide a test bed for their learning at the same time (at least in the case of the 50% or more who study business informatics). And the product (e.g., a website or repository) has a more permanent character and receives community wide attention.

In this way the community’s practice evolves in a completely decentralized fashion, with lots of parallel developments and redundancies. The community’s practice and its overall purpose are constantly negotiated anew. As a consequence, learning opportunities are widely available. At the same time, due to a lack of structuring or facilitation, explicit community memory and evolution of the practice also depends a great deal on good will and serendipity. Community development and learning thus is collective but remains fragile.

The limits of this community's practice become visible when students try to co-ordinate action (e.g., attempting to negotiate with the distance study provider as a student union). Co-ordination then seems too slow and inefficient to deal effectively with organizations outside of the community.

5 Conclusions

In this paper we began unpacking the complex relationships between technologies, learning and context. We were particularly interested in the way potential loss of context in learning situations that use ICT might affect the learning that takes place. Implicit was a concern to understand how learners, community leaders or designers cope with the loss of context. For this purpose we analysed three different learning situations. To be able to assess the effects on learning we used identity and practice as central dimensions.

Of course, these dimensions for our analysis don't reduce complexity as such. The relationships between context, the connectivity provided by ICT, and learning remain highly complex. By looking at these three situations, at the problems and the solutions that emerge in each case we can sharpen our perception regarding some of the inherent problems and trade-offs. By rendering each case more transparent through this analysis, the design and experience of each case can serve as a generative basis for other designs in different contexts.

We can summarize our results as follows:

1. "*Inviting context* into the online learning space" was a productive strategy in all three cases, although its meaning varied significantly. The various kinds of actions that are considered legitimate in each community are a reminder that it's not just a matter of bringing *representations of context* into cyberspace. Skilfully bringing context into an online situation is itself a context-dependent practice.
2. *No one technical solution* completely meets the needs found in a learning situation, so propagating technical solutions across multiple and diverse situations becomes even more problematic. Community technologies are not fully transparent, particularly when in every case they are enveloped in group practices, expectations, and interpretations.
3. *Narrative* appears everywhere as important, from the canonical stories of knowledge management to the stories of personal experience and advice as a distance learner. Design for learning in an online community therefore should always allocate space and attention to the generation of stories of various kinds.
4. *Negotiability* seems to act as a vehicle for surfacing identity and practice issues. If the design for learning entails no room for negotiation and participants don't feel they can meaningfully shape the learning situation, the presence of identity and practice are limited.
5. The role of *time* in the learning that occurs in a community is normally taken as a given and is non-negotiable in most learning situations. If regarded as an aspect of life in a community, learning naturally takes time and specific events – without which identity and practice do not emerge or evolve. It takes

time to negotiate roles and leadership, or for a community's practice to mature. ICTs themselves complicate the process and take time to become transparent – even saving time takes time and effort.

The communities of practice perspective for our analysis turned out to be a useful way to look at the learning situations under investigation. It helped to prevent us from unduly reducing complexity and falling back into the common trap of ignoring the lived-in world when looking at learning. At the same time it provides an analytical framework that allowed us to harness the effort that has been invested in each of the learning situations for further improvement and refinement.

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