



Pergamon

Internet and Higher Education 4 (2001) 45–60

**THE INTERNET
AND HIGHER
EDUCATION**

A survey of current research on online communities of practice

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Received 1 June 2001; received in revised form 24 July 2001; accepted 30 July 2001

Abstract

The author surveys current literature on communities of practice and their potential development using networked technology and remote collaboration, specifically with respect to World Wide Web (WWW) communication tools. The vast majority of the current literature in this new research area consists of case studies. Communities of practice have the following components that distinguish them from traditional organizations and learning situations: (1) different levels of expertise that are simultaneously present in the community of practice; (2) fluid peripheral to center movement that symbolizes the progression from being a novice to an expert; and (3) completely authentic tasks and communication. Supporting concepts include aspects of constructivism (i.e., ill-structured problems, facilitation, collaborative learning, and negotiated goals), community knowledge greater than individual knowledge, as well as an environment of safety and trust. Virtual communities are defined as designed communities using current networked technology, whereas communities of practice emerge within the designed community via the ways their participants use the designed community. Current networked technology has both advantages and disadvantages in emergent development of communities of practice. Because most collaboration is text-based, norms are reduced, enabling introverted participants to share their ideas on an equal footing with extroverts. However, the greatest problem with virtual communities is withdrawing, or attrition. This problem can be reduced somewhat through good facilitation techniques and adequate scaffolding, especially in the cases of online communication techniques and technical support. Finally, the author recommends further research questions and proposes a case study, whose purpose is to observe the effects of an emerging

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community of practice within the designed environment of a virtual community. © 2001 Elsevier Science Inc. All rights reserved.

Keywords: Communities of practice; Virtual communities; Situated learning; Collaboration; Authentic problem-solving

1. Introduction

In the past few years, group work and collaboration using online environments has become an important research topic because of the interconnectivity enabled by the Internet, and more specifically, the World Wide Web (WWW). An important area within group collaboration is the current research on communities of practice. Liedka (1999) describes communities of practice as “individuals united in action” (p. 5). Communities of practice employ active participation and decision-making by individuals, as opposed to separated decision-making that is present in traditional organizations (Collier & Esteban, 1999). This approach gleans creative and effective solutions from the communities’ participants that are essential for organizations if they are to survive in environments of continuous change. Communities of practice are the sum of both stakeholder interest and the development of individuals within the community. Authoritarian management is replaced by self-management and ownership of work (Collier & Esteban, 1999). The learning that evolves from these communities is collaborative, in which the collaborative knowledge of the community is greater than any individual knowledge. Communities of practice also emphasize process development over market development or product development (Liedka, 1999).

The purpose of this paper is to examine the literature pertaining to communities of practice. In addition, the goal of this work is to identify trends in research, and in turn, offer pertinent research questions for future study. The author provides an overview of the current research on communities of practice. To organize the overview, the author focuses on this fundamental issue: Does current technology support the participative collaboration required by communities? The following questions are applied to examine this issue in depth:

1. What is the definition of community of practice? What are the main concepts that comprise a community of practice?
2. Can communities of practice in their true definition be established, maintained, and supported using current Web-based applications, which are mainly text-based environments (Palloff & Pratt, 1999)?
3. What are the limitations of these Web-based applications? What aspects of a hypertext environment help or hinder establishment of communities of practice? How can these applications be enhanced to facilitate the creation of communities of practice?
4. Does face-to-face contact enhance the concept of community of practice? What are the differences between communities of practice whose members have met face-to-

face compared to those that have not? If face-to-face contact is not viable, can an effective community of practice be established using available Internet and telecommunications technology?

The author examines these issues by a review of literature. First, a historical overview and theories of communities of practice are presented. Supporting concepts of communities of practice are provided. The author also attempts to use the literature to draw out a definition of “community of practice.” He brings context to communities of practice and the suitability of current technology, limitations of current technology, and differences between virtual and face-to-face communication. Finally, the author provides impetus for further research on the topic.

2. Historical overview and theory of communities of practice

Communities of practice trace their roots to constructivism (Knowles, Holton, & Swanson, 1998; Oliver & Herrington, 2000; Palloff & Pratt, 1999; Persichitte, 2000; Squire & Johnson, 2000), whose main principle shifts control from instructors to learners. Constructivism involves the following concepts:

1. Ill-structured problems (e.g., open-ended questions). In traditional learning environments, problems are simplified and abstracted to allow learners to focus on certain concepts, as well as apply generalized concepts to a variety of different situations in future realistic applications. On the other hand, ill-structured problems are authentic and complex problems that learners encounter in the real world. Constructivist learning environments seek to replicate a realistic problem situation, so learners can develop skills in complex and messy problem-solving.
2. Learning in social and physical context of real-world problems, including group activities, collaboration, and teamwork. Realistic problem-solving is often carried out in teams, in which the different members bring different skills, experience, and backgrounds to help solve complex and ill-structured problems. Constructivist learning attempts to recreate this social interdependence.
3. Shared goals, which are negotiated between both instructors, learners, and between learners. This negotiated process helps to establish learner ownership over process and problems; thus, increasing both interest and learning.
4. Cognitive tools, which aid in helping learners organize knowledge, such as, methods of categorization, organization, and planning (Knowles et al., 1998). These cognitive tools can be aided by processes, procedures, and technology (Wenger, 1998).
5. An instructor’s role as facilitator or coach. Ill-structured problems involve skills that are beyond the mastery of any one individual, including the instructor. Therefore, the instructor’s role changes to one that guides learners in attaining their goals by helping them develop cognitive and metacognitive learning strategies.

Knowles et al. (1998) cite the relevance of constructivism to adult experience. Adults learn well in situations in which they can readily apply their previous knowledge and experience. Coppola (1999) discusses how constructivist principles apply to learning processes of technical writers, that is, with respect to constructing meaning with problem-based learning, structuring meaning via social activities, negotiating meaning through schemata and expectations, as well as building knowledge through interactions. Coppola emphasizes that technical writers need to understand discourse communities and the ways they function, as well as receive task-oriented pedagogy. Communities of practice are centered on task orientation and discourse communities.

Wenger (1998) provides a theoretical basis for communities of practice. Wenger describes communities of practice as an evolutionary process for learning in groups in which communities of practice are ubiquitous and have always existed. They form out of necessity to accomplish tasks and provide learning avenues, and they exist within, between, and outside defined organizations. Liedka (1999) points out that communities of practice are not formed, for they evolve and disband out of necessity of the members. Therefore, communities of practice develop over time (Squire & Johnson, 2000). Learning in such a community of practice is known as “situated learning” (Wenger, 1998).

Wick (2000) defines collaborative teams and communities of practice as entities that help solve authentic problems. Wick defines communities of practice in a more concrete way than Wenger (1998), that is, as groups of professionals with similar task responsibilities. Collaborative teams should quickly form and dissolve to promote cross-pollination of ideas among different groups. This practice enables interdisciplinary knowledge and practice. Communities of practice exist to promote learning via communication among their members.

A main reason for the increase in interest in communities of practice is dissatisfaction with traditional learning methods and arenas. Soden and Halliday (2000) performed a case study with 25 subjects investigating vocational training in Britain. Soden and Halliday concluded that little evidence has shown transfer between the classroom and workplace; however, they cited other studies that indicate the correlation of skills in learning-by-doing.

Robey, Khoo, and Powers (2000) describe traditional educational techniques as “codified and transferred” learning, that is, removed from the place where the learning is to be applied. In addition, the learning is abstracted and designed to apply in more than one unique situation. In contrast to this, situated learning in communities of practice involves learning that is not codified and transferred because it takes place at the time and place in which the actual tasks are performed.

Squire and Johnson (2000) make an important distinction between communities of practice and “practice fields.” Although both between communities of practice and practice fields involve learning with authentic content and by solving authentic problems, practice fields separate the authentic content from the real situation. Practice fields include activities such as simulations and role-playing. Contrary to practice fields, learning in communities of practice is separated from neither the activity nor the meaningful social arrangements in which the activity takes place. In this sense, learning is participatory. Bielaczyc and Collins (1999) add that a culture of learning is promoted, which requires a community goal of learning, stressing ways of learning how to learn, and developing ways of sharing this knowledge.

3. Supporting concepts of communities of practice

A key concept of communities of practice is community knowledge, in which the sum of this community knowledge is greater than sum of individual participant knowledge (Gherardi & Nicolini, 2000). Bielaczyc and Collins (1999) acknowledge this symbiosis by noting that the collective knowledge of the group advances, while simultaneously advancing the individual's knowledge. In a case study of mechanical engineering students working at a company as interns, Winsor (2001) emphasized that the interns manipulated and interacted with knowledge before completely understanding the processes involved and increased their knowledge via experience. As a further example of community knowledge being more extensive than individual knowledge, Winsor noted that the company's knowledge base was in a constant state of flux. Thus, even experienced employees worked with incomplete knowledge, emphasizing further the concept of distributed cognition and continuous learning. Employee knowledge is one of the main products of companies today.

Wick (2000) observes that knowledge itself has limited value because it becomes obsolete very quickly; therefore, an organization needs to value its employees as an intangible asset. Knowledge needs to be recognized as an asset, and knowledge management needs to be recognized as a skill. However, it is not knowledge itself that is so valuable, rather it is the ability of an organization's members to generate knowledge and innovate using that knowledge.

Individual knowledge and collective knowledge should support each other (i.e., common knowledge vs. diversity). Rather than performance goals, learning communities produce artifacts and histories that aid in the transfer of knowledge and the increase of understanding (Wenger, 1998). Knowledge is expanded through discussion (Bielaczyc & Collins, 1999); hence, a main function of a community of practice is to help establish discussion.

Facilitation, which is a concept borrowed from constructivism, also applies to communities of practice (Bielaczyc & Collins, 1999; Fischer, 1998; Palloff & Pratt, 1999). Palloff and Pratt (1999) recommend that an instructor or a group leader should act as a "gentle guide," or facilitator, who fine-tunes and nudges discussion and learning in the right direction. This includes the instructor's duty of opening the community environment for discussion of the following: (1) goals, criteria for meeting goals, (2) evaluation of whether the goals have been met, plus (3) peer evaluation and self-evaluation. Rogers (2000) describes the instructor's role as a moderator, coach, or, at most, a mentor. Powers and Guan (2000) emphasize that identifying self-motivating factors and enabling self-direction of participants is essential, far exceeding any motivation brought about by lecture-based or training brought about by content transfer between the instructor and the participants. Squire and Johnson (2000) add that the facilitator role of an instructor is more valuable than a content provider or information source.

Facilitation allows two aspects of collaboration to develop: peer interaction and expert-to-apprentice interaction. As it applies to communities of practice, peer interaction enables negotiation and co-construction of the community of practice (Bielaczyc & Collins, 1999). That is, the experience and collaboration of the community are worked out and transformed

into “artifacts” (e.g., symbols, procedures, rules, technology, products, etc.) (Wenger, 1998). Wenger (1998) also notes that members of a community of practice construct a common history through negotiated meaning.

Expert-to-apprentice relationships are a key concept in communities of practice (Soden & Halliday, 2000). This relationship is known as “legitimate peripheral participation,” which conceptualizes novices at the periphery and experts at the center of a community of practice (Gherardi & Nicolini, 2000; Wenger, 1998). In traditional educational situations, all learners are required to learn the same thing at the same time. However, in communities of practice, peripheral roles (e.g., nonmajors, apprentices, or novices) play an important part in the community of practice by developing and using skills that require collaboration and mixing different types of expertise. Bielaczyc and Collins (1999) point out these are not skills that are learned in traditional education. Bloomer and Hodkinson (2000) note that social and cognitive apprenticeship occurs in all settings, not just educational. In a case study with student dyads, Oliver, Omari, and Herrington (1998) observed that, in expert–novice pairings, experts took control of the learning sequences; thus, establishing a mentor–apprentice relationship. Expertise can also come from outside the community, who, in the case of networked communities, Bielaczyc and Collins term as “telementors.”

Safety and trust within a community of practice are important for developing a learning environment (Grisham, Bergeron, & Brink, 1999; Palloff & Pratt, 1999). Edmondson (1999) carried out a case study with 51 work teams at a manufacturing company, with which detailed statistical analyses were performed. Edmondson found the following:

- Teams’ interpretation of others’ intentions plays a major role. In other words, if they perceive notification of a mistake as being informed of the mistake, rather than being blamed for the mistake, learning and innovation are higher.
- In a trusting team environment, learning takes place through corrective action. This results in team members’ willingness to take more risks, for example, outside consulting to non-team members or soliciting outside help.
- In an environment of trust, there was continual change and experimentation.

Furthermore, these teams found continuously good solutions to problems. Conversely, the opposite was true in teams with lack of trust and safety. This lack of trust resulted in individual work with little collaboration, worker dissatisfaction, and team attrition.

Finally, communities of practice comprise everything that its members negotiate or produce (Wenger, 1998), which includes all aspects, symbols, technology, textual and symbols in a “system of material relations” (Gherardi & Nicolini, 2000). In Winsor’s (2001) case study of engineering interns, the community of practice comprised learning by using language and jargon, drawing and labeling conventions, as well as engineering terminology—which provided stabilizing elements in an environment of constant change. Although these elements were not completely stable, they served as anchor points for both interns and experienced employees. Seufert (2000) defines collaborative learning environments as a meeting place of technology and social groups, which cannot be separated.

4. A new development: the virtual community

Virtual communities use networked technology, especially the Internet, to establish collaboration across geographical barriers and time zones. In comparison to traditional communities, virtual communities in cyberspace differ in several respects (Palloff & Pratt, 1999). Traditional communities are place-based and have membership according to norms. Group dynamics often override individual expression. There is a distinct border between membership and differentiation, that is, it is clearly defined who is a member and who is not. In contrast, virtual communities exist according to identification to an idea or task, rather than place. They are organized around an activity, and they are formed as a need arises (Squire & Johnson, 2000). Squire and Johnson (2000) also note that virtual communities do not need formal boundaries for they can be fluid. Because the members cannot see each other, norms do not dominate as much as in traditional communities, thus allowing for greater individual control. In other words, the Internet, or the WWW, becomes the “place” for the community; thus networked communication has increased the parameters of what is known as a community (Palloff & Pratt, 1999).

Palloff and Pratt (1999) describe several steps in constructing a virtual community. First, one needs to define clearly the community’s purpose and create a gathering place for the group. Subsequently, the participants in the group should promote leadership from within the group, as well as define norms or a code of conduct. This allows community members to resolve conflicts by themselves. In addition, a range of member roles should be established, plus facilitation of subgroups.

Both virtual communities and communities of practice have life cycles. Palloff and Pratt (1999) outline the following five stages with respect to the life cycle of community development, whether the community is traditional or virtual: “forming, norming, storming, performing, adjourning.” “Storming” refers to conflict that is an inherent and necessary part of all workgroup evolution. Haythornthwaite, Kazmer, and Robins (2000) refer to these temporal stages of community development as initial bonding, early membership, and late membership. Palloff and Pratt delineate the phases of building a virtual community as follows: (1) the initial (testing the waters) phase, (2) the conflict phase, (3) the intimacy and work phase, plus (4) the termination phase. Seufert (2000) focuses on learning within a community and divides it into four phases: (1) content, (2) intention, (3) contracting, and (4) settlement. These phases are also based on time. Thus, in communities of practice and virtual communities, language, practices, customs, and resources develop over time (Squire & Johnson, 2000).

Communities of practice comprise social arrangements in which individuals learn by participating in activities. They include the members, which consist of both experts and novices. In addition, communities of practice also include the artifacts, which are the products, technology, media, and processes that are created by its members. Constructivist techniques (e.g., collaboration, facilitation, and ill-structured problems) enable learning to take place in communities of practice. Communities of practice differ from traditional learning environments because the learning takes place in the actual situation, including the social environment. This means novices and experts, as well as novice movement to expertise, are important aspects of communities of practice.

Virtual communities are networked communities that bridge time zones and geographical locations. Networked technologies, especially the Internet, allow these virtual communities to exist.

5. Case study review of literature pertaining to communities of practice

5.1. Method

The author located mainly case study literature as the major reporting style of studies available in this field. In their literature review, Ricketts, Wolfe, Norvelle, and Carpenter (2000) noted the lack of true experimental design in studies on online courses and reliance on case studies as evidence of online learning's success. In addition, online groups are usually self-selected, rather than being true random selections in an experimental design. Because communities of practice and virtual communities are a new area of research in online learning, the author expects case studies to be the further sources of his research. He also bases this prediction on the volume of studies he has reviewed thus far.

Yin (1994) notes that case studies are observations of real life events that are not controlled. A case study's goal is to understand current and complex social phenomena. Case studies ask "how" and "why" questions. They employ a mix of quantitative and qualitative evidence, use multiple sources of evidence, as well as apply triangulation to compare and corroborate the evidence. This case study review is intended to find questions for further research on the topic of communities of practice. The author classified the reviewed case studies into three types: studies between groups, studies within groups, and longitudinal studies of individuals (i.e., observing individuals in detail for a long period of time). The appendix shows the case studies, their classifications, as well as a short description of their type. The appendix shows that 13 of the 15 studies were based on group comparison or individuals as part of a group. In addition to the theoretical literature reviewed, these studies form the basis for the subsequent case study literature synthesis.

5.2. Definition of community of practice

This section considers the question, what is a definition of community of practice? What are the main concepts that comprise a community of practice?

In Section 4 the author presented a detailed description of what constitutes a community of practice. However, what is its main essence? All of the reviewed studies agree that there is a master to apprentice, learning-by-doing, and social structure to communities of practice. One reason for this is because virtually every study reviewed cites Wenger (1998) or one of his earlier works when addressing this concept. The studies differ only in how clearly they state the definition. Wenger's own definition of communities of practice is fluid and can be very hard to grasp.

On the other hand, the definition of virtual communities is clear: a group separated by space and time (i.e., geographic location and time zone). The other key concept behind

virtual communities is the use of networked technologies in one form or another to collaborate and communicate.

A virtual community or any traditional organization is the *designed* community, whereas the community of practice is what *emerges* from the designed community (Nachmias, Mioduser, Oren, & Ram, 2000; Wenger, 1998). The members of the community of practice will almost certainly use the communities' artifacts (e.g., technology, processes, symbols, pictures, policies, etc.) in ways that are different from their designed purpose. As an example, the virtual teams in Robey et al. (2000) used communications technology in creative ways; however, their methods were inelegant with respect to data security and central access via databases. The virtual teams were located in different parts of the USA, and they sent everything back and forth as e-mail attachments. The emergent behavior in communities of practice results from interaction between the communities' members.

This elusive concept of community of practice has vague references: the "grapevine," "connections," the "real work," or the "inside scene." Therefore, the best one can do is to set up a design (e.g., a virtual community) and hope the emerging community of practice can achieve its goals of learning and growth within and around it. Also, the question arises of whether movement from the peripheral to the center can take place (Wenger, 1998). Finally, legitimate task-oriented reasons need to exist for the community of practice to emerge in the first place. Simply setting up a virtual community infrastructure without this premise will not automatically cause a community of practice to form.

5.3. *Suitability of current technology*

Now that the relation of communities of practice with virtual communities has been established, the next research question was considered. Can communities of practice in their true definition be set up, maintained, and supported using current Web-based applications, which are mainly text-based environments (Palloff & Pratt, 1999)?

Communities of practice can emerge in very adverse situations; so the real question is whether the current Web-based and text-based environments are conducive to allow communities of practice to emerge and operate as learning entities. The answer is yes; however, support in the form of extensive scaffolding is necessary. Ricketts et al. (2000) observed a course that promoted an interactive style of learning. Initial results showed that the main problem was with technology implementation. These flaws were corrected, which improved the format of further semesters. Borthick and Jones (2000) note that virtual team environments require skills not inherent in students, for they need to be learned. That costs time and money. These skills include not only operation of the technology, but skills in asynchronous and synchronous discussion, as well as online collaboration.

Fischer (1998) and Oliver et al. (1998) discuss the importance of scaffolding, especially in using the Web-based technology. In addition, Fischer advocates clearly designed performance outcomes, although it should be recalled which practices will emerge in reaction to these performance outcomes. This includes communication, group support environments, and communication conventions or protocols. Seufert (2000) adds that extensive knowledge of the tools is required. Metaphors of traditional places enable electronic communities to be

established: discussion forums, repositories, “rooms,” etc. Oliver et al. concluded that interactive materials are more suited for Web-based environments than textual content. Winsor (2001) extends the definition of communication tools as software applications that synthesize and analyze knowledge, such as Microsoft Office, computer-aided design (CAD), and other drawing and labeling tools. By converting raw data into knowledge with these tools, participant understanding increased. Knowledge artifacts generated from these tools can be placed in Web-based environments as images and animation. Therefore, the combination of content (i.e., text, images, animation, etc.), scaffolding (i.e., especially with respect to Web-based technology), plus text-based communication can be suitable environments for emerging communities of practice. Palloff and Pratt (1999) advocate defining clearly the communities’ purpose and setting up a “place” for it. However, Ricketts et al. (2000) caution that scaffolding should not overload the students with too many additional links. Oliver et al. add that interactive materials are essential in a virtual environment, as opposed to pure text-based scaffolding.

Finally, virtual communities have a key characteristic that is especially conducive for communities of practice to emerge. According to Palloff and Pratt (1999), this includes the lack of traditional group norms caused by the physical presence (e.g., voice, stature, visible reactions, visible approval or disapproval, etc.). For this reason, asynchronous communication is known as the “great equalizer” (Wepner & Mobley, 1998).

5.4. Limitations of current technology

What are the limitations of these Web-based applications? What aspects of a hypertext environment help or hinder establishment of communities of practice? How can these applications be enhanced to facilitate the creation of communities of practice?

Section 5.3 presents apparently a positive outlook on the suitability of current Web-based technology, which can potentially provide a prospering environment for emerging communities of practice. In summary, these positive aspects are the lack of physical presence that influences norm behavior in groups, technological support through scaffolding, and interactivity. Therefore, these aspects answer how hypertext or Web-based environments can help facilitate the creation of communities of practice. This section considers the limitations and possible enhancements.

One of the greatest problems in virtual communities is fading back or withdrawing, traditionally known as being absent (Haythornthwaite et al., 2000). Haythornthwaite et al. (2000) recommend the use of a variety of Internet communication technologies simultaneously (e.g., e-mail, asynchronous discussion, and synchronous discussion) to help minimize this ubiquitous problem.

LeBaron, Pulkkinen, and Scollin (2000) point out that cultural differences among individual participants can act as barriers to communication. Because virtual community infrastructure can easily be set up across cultures via the WWW, these cultural differences can hinder the desired fluidity of learning in communities of practice. In other words, different cultures can hinder the “cultural” development of the community of practice itself (i.e., the community of practice develops its own culture over time) (Wenger, 1998). Hodkinson and Bloomer (2000) observed students in a prestigious British university that promoted a unique collaborative and commun-

ity-based environment. This collaborative environment had a greater impact on student learning than teaching styles, classroom environment, and educational methods. In addition to barriers caused by cultures and subcultures, different people perform better in online or live environments (Palloff & Pratt, 1999).

Oliver and Herrington (2000) note that content of asynchronous discussion can become poor and superficial without coaching and scaffolding. They also recommend required reading of others' responses as part of the negotiated collaborative duties of participants in collaborative learning environments. Powers and Guan (2000) warn that Web-based environments run the risk of becoming impersonal without frequent contact between the participants. Squire and Johnson (2000) further recommend that the instructor create a synchronous presence in an asynchronous environment.

Hammond (1998) notes that although time and place independence of asynchronous discussion is an advantage, it creates lack of urgency in responding because there is no presence of the other parties. Short and superficial messages cause annoyance, whereas messages that are too long tend to cause problems with processing times—neither of which is beneficial for promoting effective channels for communities of practice.

Hammond (1999) observed that communicative learners feel responsibility for group processes, but they are not necessarily the best learners. Hammond (1998) cited the concern some learners had about the permanence of posted messages, which reinforces the need for trust and safety among virtual teams and communities. Ricketts et al. (2000) concluded that “noisy” learners, that is, those learners who rely on interaction as opposed to reflection, do not function well in virtual environments. Palloff and Pratt (1999) cited studies showing introverts being more comfortable than extroverts in online collaborative environments. Borthick and Jones (2000) noted a “politeness syndrome” that causes students to be positive to one another, but not constructive or honest. This situation stems from interactions with people who do not know each other. Oliver et al. (1998) found that collaboration was richer among students who knew each other.

Finally, Soden and Halliday (2000) note that learners pick up the culture, belief, and practice from the entity for which they work via conversation and action. The question is whether a remote, text-based, and asynchronous environment is adequate for creating conversation, belief, and practice. Currently, the highest percentage of virtual community interaction is text-based. Web-based audio and video conferencing, which add a new dimension to remote conversation, are currently inadequate for group conversation on a regular basis. Asynchronous audio discussion forums, such as the one developed by Wimba (www.wimba.com) using streaming audio, look promising; however, their use in collaborative group work is untested.

5.5. Differences of virtual and face-to-face communication

What is the role of face-to-face contact in communities of practice? Is it essential? Does face-to-face contact enhance the concept of community of practice? What are the differences between communities of practice whose members have met face-to-face compared to those that have not? If face-to-face contact is not viable, can an effective community of practice be established using available Internet and telecommunications technology?

All of the studies that address this issue note the importance of face-to-face content, especially for initial contact between community members (Borthick & Jones, 2000; Fischer, 1998; Hammond, 1998). Fischer (1998) states that face-to-face contact is essential for rapport. Hammond (1998) makes a case for multimodal learning, that is, face-to-face mixed with asynchronous learning. According to Borthick and Jones (2000), synchronous environments provide a better learning environment than either asynchronous environments or traditional classrooms.

However, only one study found that collaboration was actually richer because the participants actually knew each other (Oliver et al., 1998). However, it did not address whether the participants had met each other online or not, rather, all the participants had collaborated face-to-face.

These examples raise the following questions. Is face-to-face contact essential for “knowing” someone? What capacity of “knowing each other” do participants working in a community of practice require?

5.6. Summary

Virtual communities are groups that use networked technologies to communicate and collaborate. Communities of practice are cultural entities that emerge from the establishment of a virtual or nonvirtual organization—as opposed to the virtual community itself, which is designed. Therefore, designing a virtual community does not guarantee that a community of practice will arise because an underlying task-based learning need must exist.

Communities of practice can exist with current Web-based technologies. However, adequate scaffolding in the form of both technical support and usage of the technology for communication and collaboration is necessary. The lack of face-to-face contact in text-based communication tools can actually be an advantage because this environment suppresses traditional group norm behavior.

However, withdrawing, cultural differences, superficial discussion content, as well as lack of urgency in responding are all limitations that hinder the development of communities of practice within virtual communities. Finally, the question of whether face-to-face contact between members is essential remains.

6. Conclusions and further research

The studies reviewed in this literature review were designed to have a different purpose than observing communities of practice. Communities of practice were usually part of the respective studies’ literature searches, that is, research with respect to the phenomenon they were trying to research. However, none of the studies directly compared the designed effects of virtual communities versus the emergent effects of communities of practice. Actually, any observation of emergent effects addresses this situation; however, no study reviewed approached the creation of a virtual community with a deliberate view towards a community of practice. In other words, how can a virtual community be developed that fosters this

emergence? Maximizing the development of a community of practice would be the ultimate goal; however, the reality would be setting up a virtual community (i.e., based on a complete review of the literature of virtual communities and communities of practice), observing the emergent community behavior, and implementing support in the form of collaborative techniques, facilitation, and adequate scaffolding.

Therefore, a case study could be developed as follows: (1) design a virtual community, (2) support scaffolding, (3) predict how the emergent community of practice will use the designed elements, (4) monitor how the community develops practices because of and/or in spite of the intended design, and (5) implement revisions that make learning more efficient. Discrepancies between the intended design and the emergent usage would surely exist, therefore, the observant effects should yield insight in refined design—an iterative process.

In order to consider such a case study, the following questions could be considered:

1. In what ways does scaffolding affect emergence of communities of practice within a virtual community (Oliver et al., 1998)? What configurations of scaffolding are necessary to sustain a community of practice (e.g., media, frequency, etc.)?
2. In general, learning communities, which are based around tasks and actual social situations, are considered more relevant than traditional learning situations because the learning situation (e.g., classroom) is removed from the real situation. Thus, little transfer exists between the classroom and the real life situation (Winsor, 2001). How can a virtual community be set up with this practical (i.e., emergent) situation in mind?
3. Can the positive components of virtual communities (scaffolding, facilitation, lack of group norms, time and place independence, etc.) overcome the obstacles (cultural differences, attrition, etc.) and cause communities of practice to develop?
4. Can refined facilitator and moderator techniques compensate for some of the problems of online communication?
5. What is a reasonable time limit for a community of practice to emerge after the implementation of a virtual community?
6. Face-to-face contact should probably take place, if possible. However, if face-to-face contact is not possible, can a virtual community with an emergent community of practice be sustained using current Internet and Web-based technologies?

Wenger (1998) discusses the aspect of locality in communities of practice. However, he states that it does not depend on geographic proximity—rather, the learning aspect takes precedence. The development of remote collaboration via Internet communication tools and the concept of a virtual community creates a vast area of research in which the application of remote collaboration can be explored with respect to how it both supports and hinders the emergence of communities of practice. This research includes not only the application of individual Internet communication tools in isolation, but the usage of how they work in combination with each other together with the support functions of scaffolding. Even more important is the emergent use and community understanding of Internet communication tools and virtual community environments in accomplishing authentic problem-solving and real-world tasks.

Appendix. Case study by type

Case study	Type	Description
Borthick and Jones (2000)	Study between groups	Three online courses vs. one traditional course.
Edmondson (1999)	Study between groups	Fifty-one teams, four in detail. Trust in teams.
Ricketts et al. (2000)	Study between groups	Three online courses that mixed CD-ROM and Internet delivery with a traditional course.
Robey et al. (2000)	Study between groups	Twenty-two participants via open interviewing in three virtual teams.
Oliver et al. (1998)	Study between groups	Three pairs of students. Comparison of pairs in collaboration.
Hammond (1999)	Study between groups	Three case studies. Participation levels between asynchronous communities.
Fischer (1998)	Study within a group	Fifty-one middle school teacher trainees in a Web-based training environment.
Grisham et al. (1999)	Study within a group	Survey: Web usage of individuals in an online community of practice.
Hammond (1998)	Study within a group	Communication patterns of individuals.
Hammond (1999)	Study within a group	Meta-analysis of three case studies: asynchronous communities.
Soden and Halliday (2000)	Study within a group	Twenty-five subjects investigating vocational training in Britain.
Wenger (1998)	Study within a group	An office of employees for an extended period of time.
Winsor (2001)	Study within a group	Six interns in an engineering company.
Bloomer and Hodkinson (2000)	Longitudinal	One individual's learning patterns.
Hodkinson and Bloomer (2000)	Longitudinal	Four individuals' participation in a learning community.

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