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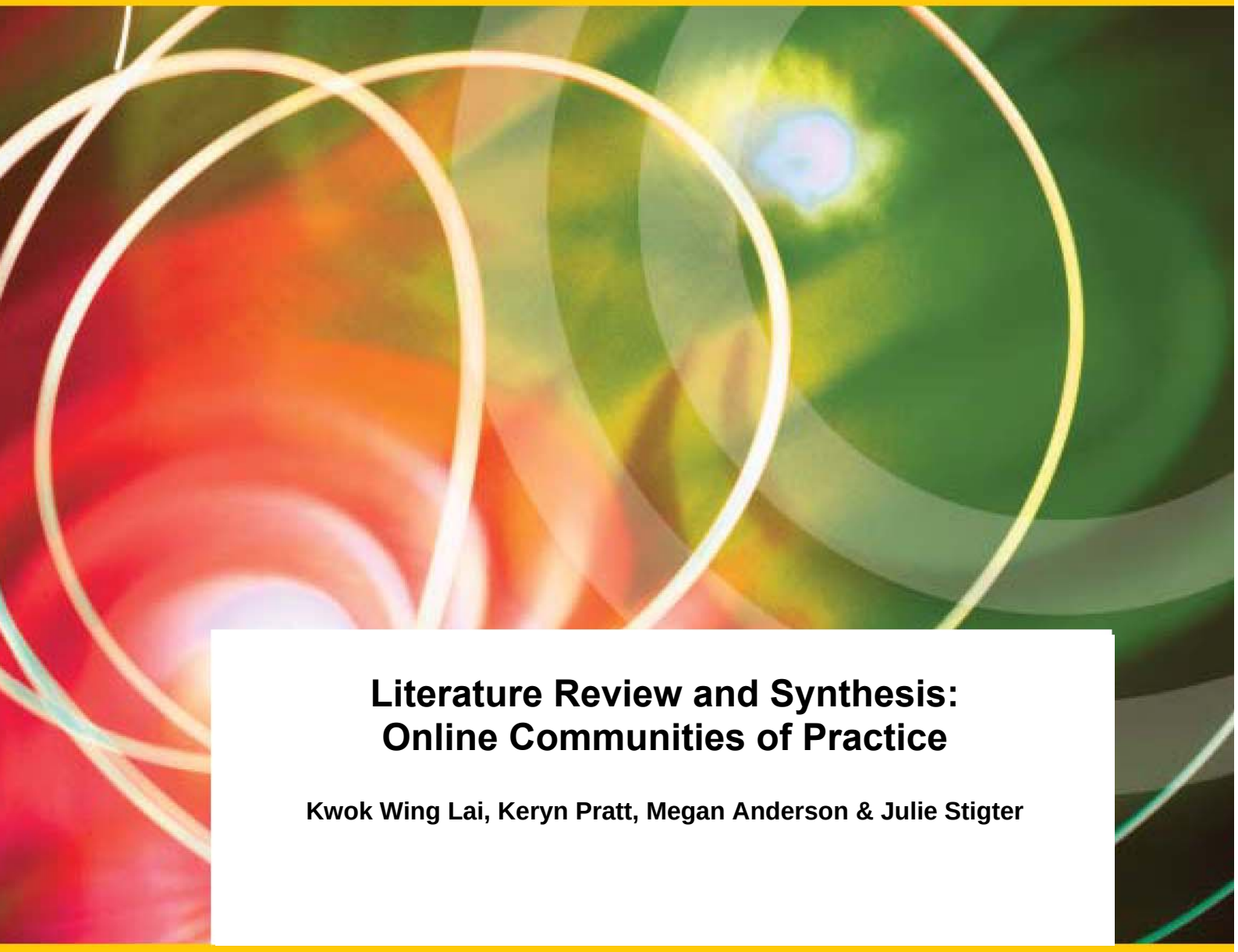

Literature Review and Synthesis: Online Communities of Practice

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Literature Review and Synthesis:

Online Communities of Practice

A report submitted to the Ministry of Education

2006

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Acknowledgements

We would like to thank the Ministry of Education for the opportunity to carry out this research. This report not only provides information that will be useful to the Ministry in its development of an online community of practice for New Zealand teachers, but also for all those interested in online communities of practice.

We would like to express our appreciation to Dr Mark Brown who acted as an independent reviewer for this report. We also thank Hannah Gray for her help in writing this report, and Jocelyn Cranefield and David Stuart, of the Ministry of Education, for their support and feedback.

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Executive summary

This literature review and synthesis aims at developing a knowledge base to inform the Ministry of Education on how to develop, implement, and maintain online communities of practice (CoPs), and how communication technologies can be used to support them.

METHODOLOGY

Research on online CoPs is a relatively new field of research, so a broad, rather than a narrow, approach was adopted in the selection of sources. As such, both published and online publications, from New Zealand and overseas, primarily published after 2001, were reviewed as well as seminal articles published prior to 2001. Both secondary and primary sources, including conceptual, empirical, and application articles were reviewed. Due to the very short time frame available, the research team reviewed academic and professional journal articles, conference papers, and commissioned reports. In addition, books and book chapters that were considered to be seminal were reviewed. A wide variety of databases and conference proceedings were searched, as well as the Internet. The abstracts of citations were scanned and articles were selected using criteria for inclusion and exclusion as guided by the research questions. Full texts of the articles selected were read and those considered to be relevant were categorised into conceptual and empirical studies. A template was developed and adopted to annotate a number of key articles. A reliability check of a sample of annotated articles was conducted to compare the accuracy of the abstracts to the content of the articles.

In the process of undertaking this review, between February and May 2005, a number of review articles relating to online CoPs or virtual communities have been identified. We have also identified a large number of articles discussing the concept of CoPs, and their relationship to situated cognition, activity theory, professional development, and knowledge management. However, we found that the majority of the literature did not target online CoPs (Couros, 2003), and there were few empirical studies of CoPs in designed or intentional learning environments (Squire & Johnson, 2000). Also, we have found very few empirical studies on online CoPs directly relating to teaching and learning (Koh & Kim, 2003). Many of the studies adopt an organisational perspective with specific references to business and commercial sectors. While many studies were available in the literature about design issues of bilingual websites, we found no articles related to bilingual communities of practice.

SUMMARY OF FINDINGS

1. Characteristics of communities of practice

1.1 *What is a community of practice?*

Defining a community of practice.

- *Communities of practice are about negotiating a joint enterprise.*
- *Communities of practice function through mutual engagement.*
- *Members of communities of practice develop a shared repertoire of communal resources.*
- *The process of learning and the process of membership in a community of practice are inseparable.*

Characteristics of a community of practice include:

- *'Practice' as the unifying feature of the community;*
- *Relationships that are grounded in information exchange and knowledge creation;*
- *Membership ranging from novices to old timers; and*
- *Shared learning, which may also occur effectively at the boundaries/peripheries of the community.*

1.2 *Distinguishing communities of practice from other groupings*

Communities of practice can be distinguished from other groupings in a number of ways. Communities of practice:

- *Are about a shared practice;*
- *Have diverse and heterogeneous membership;*
- *Are not (necessarily) task-oriented; and*
- *Are learning communities.*

2. Characteristics of online communities of practice

2.1 *What is an online community of practice?*

The evolution of Internet and Web technologies has:

- *Impacted on the way individuals communicate;*
- *Greatly enhanced the development of communities online; and*
- *Provided the opportunity for online communities of practice to facilitate the creation, refinement, sharing and use of knowledge effectively between individuals.*

An online community of practice requires more than simply transferring a community of practice to an online environment.

- *Technology infrastructures have to be created to support the functioning of online communities of practice to overcome barriers that do not occur in co-located communities of practice. These barriers include:*
  - *Time: to meet and communicate;*
  - *Size: membership may be large and involve many locations;*
  - *Affiliation: members spread across organisations; and*
  - *Culture: members experience different organisational cultures.*

2.2 *Distinguishing online communities of practice from co-located communities of practice*

While online communities of practice share some similar characteristics with communities of practice in general, they also differ in several aspects:

- *Design. Online communities of practice are usually designed top-down, while co-located communities of practice usually emerge from existing groups.*
- *Membership. Online communities of practice are usually open, while co-located communities of practice are usually closed.*
- *Leadership. Leaders of online communities of practice are recruited, while leaders in co-located communities of practice may emerge from the community.*
- *Form of communication. In online communities of practice communication is primarily computer-mediated, while in co-located communities of practice communication is primarily face-to-face.*
- *Time to develop the community. It takes longer to develop an online community of practice than a co-located community of practice. Technological support. This is essential for online communities of practice but not for co-located communities of practice.*

2.3 *Distinguishing online communities of practice from other online groupings*

A number of online groups and communities exist, in addition to online communities of practice:

- *Communities based on commerce, such as online auction sites (*e-commerce communities*);*

- *Communities based on common interests, such as online alumni association sites (*e-communities of interest*); and*
- *Communities based on learning, such as online courses (*e-learning communities*).*

Online communities of practice differ from other online communities in terms of the level of collaboration and engagement.

- *Portals (targeted gateways);*
- *Networks or information communities;*
- *Interest groups; and*
- *Blogs*.

2.4 *Can communities of practice be totally supported and operated online?*

An ongoing debate is whether or not communities of practice can be virtual. Two key issues raised in this debate concern:

- *Whether relationship and trust can be built online; and*
- *Whether tacit knowledge and practice can be shared online.*

3. Online communities of practice and the professional development of teachers

3.1 *Communities of practice and effective professional development*

Communities of practice are central to effective teacher professional development.

- *This requires a shift in emphasis from formal training to learning in practice.*
- *Communities of practice go beyond traditional 'one-shot' and 'face-to-face' models of event-based, expert-novice forms of professional development.*
- *Communities of practice allow teachers to act as co-producers of knowledge, which requires greater personal responsibility for professional growth.*
- *Currently, communities of practice are only infrequently used for teacher professional development.*

3.2 *Cases of effective online communities of practice*

Cases of effective online communities of practice include:

- *The Learning Inquiry Forum;*
- *Tapped In;*
- *Education with New Technology (ENT); and*
- *Talking Heads & Virtual Heads.*

Characteristics of these effective cases of online communities of practice include:

- *They have a clear purpose;*
- *Membership is diverse;*
- *Leadership is strong;*
- *Technology is used appropriately;*
- *There is an emphasis on participation and community building; and*
- They are long-term.

4. Life cycles of online communities of practice

4.1 *Phase 1: Formation*

A variety of activities occur in the formation phase of an online community of practice:

- *Identify potential community;*
- *Determine purpose and scope of the community;*
- *Community building;*
- *Create a preliminary design for the community;*
- *Incubate and deliver immediate value; and*
- *Launch of the community.*

4.2 Phase 2: Sustaining/Maturing

In the second phase, the focus is on sustaining and maturing the community of practice through a variety of means:

- *Leadership;*
- *Mentor new members;*
- *Seek relationships and benchmarks outside the organisation;*
- *Establish the community;*
- *Checkpoint;*
- *Knowledge repository; and*
- *Evaluate purpose and direction.*

4.3 *Phase 3: Transformation*

The third phase is one of transformation or disengaging; communities of practice may experience:

- *Expansion;*
- *Fading away; and/or*
- *Death*

5. Designing effective online communities of practice

5.1 *Design Principle 1: Online communities of practice should be cultivated to grow naturally*

Online communities of practice are grown rather than made.

- *Communities of practice are a combination of design and natural development; the design must allow for this development to occur.*
- *A key to designing a vibrant and successful community of practice is to ensure that the design invites interaction.*
- *Design should aim to bring out the community's own internal direction, character and energy.*
- *Communities of practice must be designed in a way so as to allow and encourage development.*
- *A bottom-up design encourages a sense of ownership for members.*
- *Online communities of practice can be built in terms of the technology, but members themselves must grow a community.*

Several design strategies have been identified to cultivate the growth of online communities of practice:

- *Conduct a needs assessment to form a clear purpose;*
- *Foster a sense of ownership;*
- *Allow plenty of time for the community of practice to grow; and*
- *Encourage diversity.*

5.2 *Design Principle 2: Online communities of practice should be designed to support sociability and participation*

Sociability and usability are key to designing online communities.

- *Sociability is primarily concerned with how members of a community interact with each other.*
- *Usability is primarily concerned with how members interact with the technology of a community.*

A number of strategies have been identified to support sociability and participation:

- *Allow members time to participate;*
- *Add value to the community of practice;*
- *Build a sense of community;*
- *Allow different levels of participation;*
- *Build social relationships and trust;*
- *Develop clear policies; and*
- *Ensure ease of use of technologies.*

5.3 *Design Principle 3: Online communities of practice should be created to attract a diverse membership*

It is important to ensure that a critical mass of people belong to the online community of practice. Issues to consider in this include:

- *Ongoing recruitment of members;*
- *Encouraging lurkers to participate; and*
- *Structuring to accommodate geographical and contextual diversity.*

5.4 *Design Principle 4: Online communities of practice should be managed by providing for different roles*

There needs to be different roles within communities of practice, particularly in online communities of practice.

- *There are a number of benefits to having defined roles in online communities of practice:*
  - *Reassurance;*
  - *Continuity; and*
  - *Structure.*
- *In general, roles can be divided into four types:*
  - *Leadership roles;*
  - *Core members;*
  - *Support persons; and*
  - *Community members.*

5.5 *Design Principle 5: Online communities of practice should include technology designed with functionality to support sociability and knowledge sharing*

As the choice of technology impacts on the community of practice, designers need to consider the:

- *Needs of the community;*
- *Level of access to technology; and*
- *Level of funding available.*

Technology can support communities of practice in a number of ways:

- *Connecting members of the community of practice;*
- *Supporting team work;*
- *Building knowledge repositories;*
- *Building a sense of community;*
- *Encouraging participation;*
- *Fostering identity and presence;*
- *Mentoring; and*
- *Online instruction.*

Technology can be designed to be either ‘pull’ or ‘push’ in nature.

5.6 *Design Principle 6: Online communities of practice require a blended approach to development where online activities are supported by offline activities*

Many researchers suggest that the online activities should be supported by offline activities.

- *Reasons for this include:*
  - Higher levels of satisfaction;
  - Helps in building trustworthy relationships; and
  - Provides a sense of community.

6. Bilingual considerations

The issue of using multiple languages is complex.

- *Very little information is available regarding bilingual online communities of practice.*
- *Conducting online discussions in multiple languages is complicated.*
- *Designing a bilingual website requires more than translating the words.*
- *Providing bilingual websites makes an important statement regarding the value of that culture to society.*
- *More research is required into the provision of bilingual online communities of practice.*

Introduction

PURPOSE OF THIS REVIEW

This literature review and synthesis aims at developing a knowledge base to inform the Ministry of Education on how to develop, implement, and maintain online communities of practice (CoPs), and how communication technologies can be used to support them. From the *Request for Proposals* (RFP), the Ministry of Education intended that this review would:

- Ensure that the Ministry is well informed by the growing body of international research literature into CoPs;
- Provide the basis for a set of clear, succinct Ministry guidelines for effective practice in the set-up and ongoing support of CoPs in the New Zealand school education context;
- Inform the way in which Ministry initiatives with an online community component are selected, designed, supported, and monitored;
- Provide an understanding of how CoPs might be used to help support the Ministry's "vital outcome" of effective teaching (Ministry of Education, 2003);
- Provide an understanding of effective practice in catering for diverse community needs, language comprehension and operating bilingually;
- Assist with planning and budgeting by identifying the relevant support needs and issues at different stages of a community's lifecycle (this may involve online and/or offline dimensions);
- Summarise the key practical issues surrounding the use of different types of communication tools in a CoP context; and
- Focus primarily on the role of the Internet in enabling CoPs, but also take account of the role of other ICT-based technologies in enabling CoPs.

RESEARCH QUESTIONS

Based on the scope of the review as requested from the RFP, and after negotiation with the Ministry of Education, the research team has come up with the following research questions to guide this review:

- What are online CoPs? What characterises CoPs as a professional development tool in education? What are the underpinning learning theories?
- Why can communities of practice facilitate professional learning?
- What are the online and offline factors affecting the development, implementation, maintenance, and outcome of a CoP? What are the factors distinguishing successful and less successful CoPs? Are there any exemplary practices?
- What characterises different forms of CoPs, and for different lingual and cultural communities?

- What are the pedagogical, organisational, and technical issues related to the operation of online CoPs? What kind of support is needed?
- What is the nature of communication and mentoring in CoPs?
- What information and communication technologies tools and platforms can be used to support CoPs?

By asking these questions, we are not only investigating *how* communities of practice have been used in education, but also *why* they have an impact on teaching and learning. This review will contribute to a better understanding for the Ministry of Education on how online CoPs function to enable informed decisions to be made in this area.

STRUCTURE OF THIS REPORT

This review begins by outlining the procedures taken to search for and select the literature that was considered to appropriately meet the purposes of the review. In the findings section, we look first at definitions of communities of practice, before extending these definitions to include characteristics specific to online communities of practice. The relationship between online communities of practice and the professional development of teachers is introduced and expanded to consider characteristics of effective online communities of practice. The report then considers life cycles and design issues of these communities before drawing some conclusions arising out of the literature review; acknowledging the limitations of the review, and identifying areas that need more research. Finally, we include a collection of annotated primary sources that are indicative of the breadth of research being conducted into communities of practice.

DEFINITIONS OF KEY TERMS

Communities of Practice (CoPs): is used in this report as a generic term to distinguish a particular collection of individuals from different groups that work together (such as projects or communities). CoPs may be co-located, online or a mixture of both. The evolutionary nature of a CoP may mean that in its lifetime a CoP may begin as co-located and grow to become online as members of the community become dispersed but still maintain a desire to communicate and construct knowledge within their shared practice.

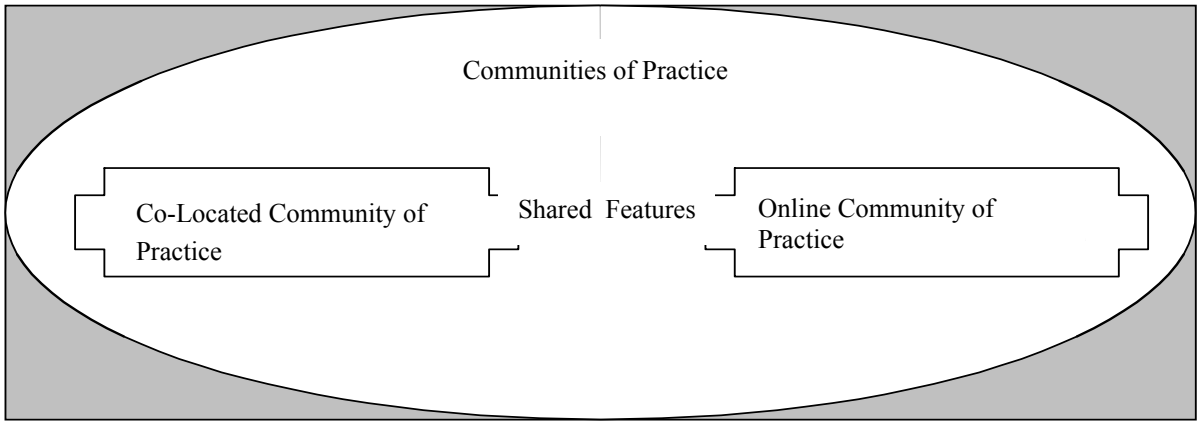

Figure 1. Communities of practice

Co-located communities of practice (co-located CoPs): is used in this report to refer to CoPs that are largely offline and geographically connected.

Online communities of practice (online CoPs): is used in this report to refer to CoPs that have a significant online component where members are most often geographically unconnected.

Professional Development: is sometimes used in the literature to refer to a formal programme relating to some aspect of teacher performance, however in this report the term professional development refers to an *ongoing process* of development that includes, but is not limited to, isolated opportunities (whether informal or formal) to participate in traditional professional focused courses or events.

Methodology

LITERATURE SOURCES

Following Borg and Gall (1983), Light and Pillemer (1984) and Tuckman (1988), the research questions as listed in the previous section were used to guide this literature review and synthesis. In identifying literature sources, we recognise that research on online CoPs is a relatively new field of research, so that a broad, rather than a narrow approach was adopted in the selection of sources. As such, both published and online publications, from New Zealand and overseas, primarily published after 2001, were reviewed as well as seminal articles published prior to 2001. Both secondary and primary sources, including conceptual (for example, Lave & Wenger, 1991; Wenger, 1998), software application (for example, Wenger, 2001), and empirical (quantitative and qualitative, for example, Hodkinson & Hodkinson, 2003; Yoo, Suh & Lee, 2002) articles were reviewed.

SELECTION CRITERIA

While a number of strategies could be employed to select publications to be included in a literature review (Light, 1980), due to the very short time frame that was available, the research team only reviewed academic and professional journal articles, conference papers, and commissioned reports. In addition, books and book chapters that were considered to be seminal were reviewed.

The following databases were searched to locate publications:

- Arts and Humanities Citation Index
- Education Index
- Educational Administration Abstracts
- EdResearch Online
- Expanded Academic Index
- Index New Zealand
- JSTOR & IsiKnowledge
- Megafile Premier
- Philospher's Index
- Project Muse
- Proquest 5000
- Psychological Abstracts/PsycINFO
- ScienceDirect
- Sociological Collection
- Social Sciences Citation Index
- Te Puna

Conference proceedings/programmes published by the following professional organisations were also searched:

- American Educational Research Association Annual Conference (AERA)
- Association for the Advancement of Computers in Education (AACE)
- Australian Association for Research in Education (AARE)
- British Education Research Association (BERA)
- International Society of Technology in Education (ISTE)
- International Federation of Information Processing (IFIP) TC3 - Education
- New Zealand Association for Research in Education (NZARE)

Prior to conducting these database searches a list of keywords was developed and subsequently modified in the process of searching, with reference to some of the directories of keywords available in the databases (for example, the Thesaurus of ERIC Descriptors, Thesaurus of Psychological Index Terms). Once again a broad rather than narrow focus was used (see Appendix A for a list of the keywords used). Several Internet search engines (*Ask Jeeves*, *Google, Lycos* and *Yahoo*) were used to conduct Internet searches using the list of keywords, and the first ten pages were scanned for relevant work. The University of Otago's library system was primarily used to locate journal articles. A reference librarian at the University of Otago was consulted and assisted in the search process. The bibliographic database software *EndNote* was used to organise the references.

Over 2000 citations were obtained in the search. The abstracts of the citations were scanned and articles were selected using criteria for inclusion and exclusion as guided by the research questions. Full texts of the citations selected were read and relevant articles were categorised into conceptual and empirical studies. Over 100 articles and five books were carefully studied and some of the most relevant articles were annotated. A template consisting of the following section headings was developed to annotate the articles:

- Full reference of the article
- Type of article (for example, review, empirical, conceptual)
- Country of origin
- Area of study
- Keywords
- Abstract/Summary of study
- Key themes
- Evaluative comments

A reliability check of a sample of annotated articles was conducted to compare the accuracy of the abstracts to the content of the articles. Dr Mark Brown from Massey University, who acted as an independent reviewer and critical reader for the project, undertook this. In addition, the reviewers took notes of articles when reading the full texts, and they compared these with the annotated abstracts while writing up this review to provide a further reliability check.

In the process of undertaking this review, between February and May 2005, a number of review articles relating to online CoPs or virtual communities have been identified (for example, Couros, 2003; Ellis, Oldridge & Vasconcelos, 2004; Johnson, 2001; Stuckey, 2004). We have also identified a large number of articles discussing the concept of CoPs, and their relationship to situated cognition, activity theory, professional development, and knowledge management. However, we found that the majority of the literature did not target online CoPs (Couros, 2003), and there were few empirical studies of CoPs in designed, or intentional learning environments (Squire & Johnson, 2000).

LIMITATIONS OF THIS REVIEW

We concur with Stuckey (2004) that "the empirically based literature related to the online version of the community of practice and to those with a highly geographically distributed membership specifically, is spare and largely untested" (p. 2). We therefore had to broaden our search to include citations on virtual and online communities not just virtual and online CoPs. Also, we have found very few empirical studies on online CoPs directly related to teaching and learning (Koh & Kim, 2003). Many of the studies adopt an organisational perspective with specific references to business and commercial sectors. While many studies were available in the literature about design issues of bilingual websites, we found only one article related to bilingual online communities of practice.

Due to the large amount of research available on communities of practice, it was only possible to review and synthesise a small proportion of the studies within the time frame and funding available to the research team.

Findings

> *A community of practice is not just a Web site, a database, or a collection of best practices. It is a group of people who interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment. Having others who share your overall view of the domain and yet bring their individual perspectives on any given problem creates a social learning system that goes beyond the sum of its parts* (Wenger, McDermott & Snyder, 2002, p. 34).

Overview: The following is a summary of the remaining structure of the report.

Characteristics of communities of practice

What is a community of practice?

Distinguishing communities of practice from other groupings.

Characteristics of online communities of practice

What is an online community of practice?

Distinguishing online communities of practice from co-located communities of practice.

Distinguishing online communities of practice from other online groupings.

Can communities of practice be effective if partially or completely online?

Online communities of practice and the professional development of teachers

Communities of practice and effective professional development.

Effective online communities of practice.

Implementation: Life cycles of online communities of practice

Phase 1: Formation.

Phase 2: Sustaining/Maturing.

Phase 3: Transformation.

Designing effective online communities of practice

Design Principle 1: Online communities of practice should be cultivated to grow naturally.

Design Principle 2: Online communities of practice should be designed to support sociability and participation.

Design Principle 3: Online communities of practice should be created to attract a diverse membership.

Design Principle 4: Online communities of practice should be managed by providing for different roles.

Design Principle 5: Online communities of practice should include technology designed with functionality to support sociability and knowledge sharing.

Design Principle 6: Online communities of practice require a blended approach towards development where online activities are supported by offline activities.

Bilingual considerations

1. Characteristics of communities of practice

1.1 What is a community of practice?

Defining a community of practice.

- *Communities of practice are about negotiating a joint enterprise.*
- *Communities of practice function through mutual engagement.*
- *Members of communities of practice develop a shared repertoire of communal resources.*
- *The process of learning and the process of membership in a community of practice are inseparable.*

Characteristics of a community of practice include:

- *'Practice' as the unifying feature of the community;*
- *Relationships that are grounded in information exchange and knowledge creation;*
- *Membership ranging from novices to old-timers; and*
- *Shared learning, which may also occur effectively at the boundaries/peripheries of the community.*

The idea of a community of practice (CoP) originated in the 1980s at the Institute for Research on Learning, which was funded by the Xerox Corporation (Daniel, Sarkar & O'Brien, 2004). Lave and Wenger (1991) coined the term 'community of practice', and currently Etienne Wenger could be considered the most prominent theorist in the field of CoPs. Communities of practice have been subsequently popularised by Brown and Duguid (1996), based on Orr's study at Xerox (Hara & Kling, 2002). Subsequently there has been a growing research strand in the literature emphasising the importance of CoPs as a hub for information exchange, knowledge creation and organisational innovation (Daniel et al., 2004).

While the use of the term CoPs has not been consistent (Hara & Kling, 2002), Wenger (1998) defines a CoP as a special type of community where practice is a source of the coherence of a community. According to Wenger et al. (2002):

> *a community of practice is not just a Web site, a database, or a collection of best practices. It is a group of people who interact, learn together, build relationships, and in the process develop a sense of belonging and mutual commitment. Having others who share your overall view of the domain and yet bring their individual perspectives on any given problem creates a social learning system that goes beyond the sum of its parts (p. 34).*

Thus, a CoP can be understood as a group of people who are informally bound together by shared expertise and interest and passion for a joint enterprise (Wenger & Snyder, 2000). Wenger (1998) defines a CoP along three dimensions:

- What it is about? Members of a CoP interact in the community to negotiate a joint enterprise, which defines significance, shapes practices, and develops into community standards of practice. This process creates more than "just a stated goal, but creates among participants relations of mutual accountability that become an integral part of the practice" (Wenger, 1998, p. 78). It concerns the construction of knowledge in a purposive manner to improve practice.

- *How does it function?* In a CoP members interact and engage mutually with one another; sharing ideas and stories as they work, have lunch, or socialise outside of work. By this mutual engagement, knowledge is shared and enacted. Members also share insights, adopt others' practices, critique practices, and share frustrations (Iverson & McPhee, 2002). Mutual engagement describes relationships that are grounded in mutual interest, not just information exchange, networking, or interaction. Communities of practice support engagement in part by facilitating members to share their histories, of what they have done and what they have been (Brosnan & Burgess, 2003).

- What capability has it produced? Members of a CoP develop a shared repertoire of communal resources (for example, routines, sensibilities, artefacts, vocabulary, styles) over time.

Wenger's (1998) concept of a CoP is based on a social view of learning, developed within the tradition of the theory of situated learning (McLaughlin, 2003). This concept views learning not as a process of transmission and assimilation of information but as a process of identity change within a network of social relationships (Brosnan & Burgess, 2003). Learning within a CoP is conceptualised as a social process of acculturation into an established community and according to this view there is no distinction between learning and social participation (Wenger, 1998).

Situated professional learning in authentic environments such as the workplace has been proposed by Collins, Brown and Newman (1989) in their cognitive apprenticeship theory; by Brown, Collins and Duguid (1989) in situated learning theory; and by Lave (1991) in her situated cognition theory. According to this view, learning increasingly takes place in a social context, informally in the workplace and within a CoP.

The CoP approach is based on certain assumptions of how learning takes place, and also on a perspective of professional practice. Trentin (2002) has succinctly summarised these assumptions:

- Learning is fundamentally a social phenomenon.
- Knowledge is integrated in the life of communities that share values, beliefs, languages, and ways of doing things.
- The process of learning and the process of membership in a CoP are inseparable.
- Knowledge is inseparable from practice.
- Empowerment – the ability to contribute to a community – creates the potential for learning.

According to Wenger et al. (2002), CoPs vary in size (ranging from a few people to thousands of members), life span (long-lived or short-lived), location (co-located or distributed), membership (homogeneous or heterogeneous), boundaries (within businesses, across business units, across organisational boundaries), and formality (spontaneous or intentional, unrecognised or institutionalised).

In CoPs there are diverse memberships, ranging from old-timers (masters, mentors) to novices. Through legitimate peripheral participation novices learn from mentors, and then eventually participate fully in the CoP (Lave & Wenger, 1991). Initially the novices are not fully aware of the norms, values, and resources of the CoP but eventually they learn from the core members who are experts of the field. Learning also occurs at the boundaries as learners may not fully participate directly in a specific activity, but participate on the periphery (Altalib, 2002).

Following Wenger, other researchers have come up with similar definitions for CoPs. For example, Hildreth and Kimble (2000, cited in Kimble & Hildreth, 2004) define a CoP as "a group of professionals informally bound to

one another through exposure to a common class of problems, common pursuit of solutions, and thereby themselves embodying a store of knowledge" (p. 3) and what holds them together is a "common sense of purpose and a real need to know what each other knows" (p. 3). In a similar vein, Hara (2000) defines CoPs as informal networks that support professional practitioners to develop a shared meaning and engage in knowledge building among the members" (p. 11).
Barab and Duffy (2000) suggest that CoPs have three main characteristics:

- *A common culture and historical heritage*. CoPs have a significant history and members share a common historical heritage, with shared practices, goals and meanings.
- *An interdependent system*. Members of a CoP work and interconnect to the community, sharing purpose and identity.
- A reproduction cycle. CoPs take in new members (peripheral members) who then become practitioners and guide the community into the future.

It should be noted that knowledge building characterises all these definitions.

1.2 Distinguishing communities of practice from other groupings

Communities of practice can be distinguished from other groupings in a number of ways. Communities of practice:

- *Are about a shared practice;*
- *Have diverse and heterogeneous membership;*
- *Are not (necessarily) task-oriented; and*
- *Are learning communities.*

In the literature the term CoPs is often used interchangeably with terms such as communities of interest, communities of tasks (Schlager & Fusco, 2004), projects, teams, practice fields (Barab & Duffy, 2000; Johnson, 2001), communities of learners, communities of enquiry, knowledge building communities (Buysse, Sparkman & Wesley, 2003; Scardamalia & Bereiter, 1994); knowledge-based communities (Riel & Polin, 2004), and communities of purpose (Schlager & Fusco, 2004). We consider it important to distinguish CoPs from other "community" concepts, as different forms of communities require different social and technological supports for them to function, therefore requiring different designs. For example, communities of interest with a purpose of information exchange clearly have a different design from communities of practice that have an objective of creating knowledge and improving practice.

1.2.1 Communities of practice are about a shared practice

One critical difference that Wenger (1998) has pointed out between CoPs and other communities is that CoPs are concerned with a shared practice:

> *communities of practice are everywhere…members of a community are informally bound by what they do together…A community of practice is thus different from a community of interest or a geographical community, neither of which implies a shared practice (p. 2).*

As a CoP focuses on a domain of shared interest, its membership implies a certain level of competence and knowledge of that domain, which distinguishes the CoP from other communities. Thus, members of a CoP

interact and learn together by engaging in joint activities and form a community around the domain (Gray, 2004).

1.2.2 Diverse and heterogeneous membership

Communities of practice are also distinguished from other groupings in terms of the diversity and heterogeneity of their membership (Schlager & Fusco, 2004). While members of a CoP should have a certain level of expertise in the knowledge domain, there will be a range of levels and types of expertise to support the knowledge creation and sharing process. Also, members in a CoP will take up different roles, such as moderators, knowledge brokers, mentors, and learners (Fontaine, 2001; to be discussed in more detail in a later section).

1.2.3 Communities of practice are not (necessarily) task-oriented

Communities of practice should not be confused with teams or projects, which are task-oriented groups. As explained by McDermott (1999), teams are:

> *tightly integrated units driven by deliverables, defined by managed tasks, and bound together by members' collective commitment to results. Communities of practice are loosely knit groups driven by the value they provide to members, defined by the opportunities to learn and share they discover and bounded by the sense of collective identity the members form.*

As for projects, they are more clearly purpose-orientated than CoPs and (similarly to teams) therefore have a defined point at which they are completed. Projects also differ from CoPs in their *ad hoc* nature. They have no collective history and no collective future (Garrety, Robertson & Badham, 2004). Both teams and projects differ from CoPs in terms of personnel, goals, and how they are located in time. As will be discussed in a later section, CoPs have life cycles, which can continue for many years.

1.2.4 Communities of practice are learning communities

Communities of practice are learning communities whereas some other online groups, for example, interest groups, are not. A learning community, as defined by Fulton and Riel (2005), is "a group of people who share a common interest in a topic or area, a particular form of discourse about their phenomena, tools and sense-making approaches for building collaborative knowledge, and valued activities" (p. 1). In a learning community, members are constantly learning new skills and working to discover and propagate knowledge (Hoadley & Pea, 2002; Scardamalia & Bereiter, 1994).

Riel and Polin (2004) suggest that there are three types of learning communities, which are intentionally designed to support learning:

- *Task-based*. Task-based learning communities are similar to teams or project groups, where people are organised around a task and who "work intently together for a specified period of time to produce a product" (p. 20).

- *Practice-based.* In a practice-based learning community "there is a focus on continually improving one's practices so as to support the effective functioning of the activity system." (p. 28). This is similar to Wenger's (1998) definition of a CoP. Members of the community are predominantly concerned with refining procedures and developing tools for their practice, not generating knowledge for the future generation of practice.

- *Knowledge-based*. Knowledge-based communities focus on the "deliberate and formal production of external knowledge about the practice" (p. 21).

According to Riel and Polin (2004), these three community types can co-exist in a learning organisation (for example, a school) and can be supported by online technologies.

2. Characteristics of online communities of practice

2.1 What is an online community of practice?

The evolution of Internet and Web technologies has:

- *Impacted on the way individuals communicate;*
- *Greatly enhanced the development of communities online; and*
- *Provided the opportunity for online communities of practice to facilitate the creation, refinement, sharing and use of knowledge effectively between individuals.*

An online community of practice requires more than simply transferring a community of practice to an online environment.

- *Technology infrastructures have to be created to support the functioning of online communities of practice to overcome barriers that do not occur in co-located communities of practice. These barriers include:*
  - *Time: to meet and communicate;*
  - *Size: membership may be large and involve many locations;*
  - *Affiliation: members may be spread across organisations; and*
  - *Culture: members may experience different organisational cultures.*

There is no doubt that Internet and Web technologies have changed the ways that individuals communicate and communities develop. Wellman and Haythornthwaite (2003, cited in Fox, 2004) remind us that "we are moving away from a world of Internet wizards to a world of ordinary people routinely using the Internet as an embedded part of their lives" (p. 6). Indeed, there has been a rapid growth of online communities in the last few years. For example, according to the US Pew Internet and American Life Project, in 2001 84% of Internet users indicated that they contacted an online community and 79% identified at least one group with which they maintained regular online contact (Rainie & Packel, 2001, cited in Preece, Maloney-Krichmar & Abras, 2003). In the same year, it was reported that there were 104 million ICQ (an instant messaging tool) users online (Preece, 2001).

The advent of information and communication technologies has greatly enhanced the development of communities online. People now participate in online communities to share their expertise, experiences and knowledge. Some of these online communities can be considered as online CoPs (Wenger et al., 2002), which facilitate individuals to create, refine, share and use knowledge effectively (McDermott, 1999, cited in Mitchell & Young, 2002). However, to design an online CoP successfully, we must first understand what a co-located CoP is, and in doing so determine in what ways technologies can be used to support the functioning of a CoP online. Designing an online CoP also involves an understanding of the social, pedagogical, and organisational issues in the profession, as well as the objectives of ongoing professional discourse (Schlager, Fusco, & Schank, 2002). We have examined the nature and characteristics of CoPs in the previous section and in a later section we will review in more detail the ways technologies can support online CoPs.

It is recognised that online CoPs by nature involve more design than face-to-face CoPs as technology infrastructures have to be built to support the functioning of the CoP (Barab, MaKinster & Scheckler, 2004). Online CoPs have to meet the additional challenges of time, size, affiliation, and culture (Wenger et al., 2002), which are not barriers to co-located CoPs. For example, for onsite, organisational CoPs, members can use work time to meet and communicate, and affiliation is not an issue as members of a CoP all work in the same organisation, and experience the same organisational culture. Technologies have to be employed in online CoPs to overcome these barriers.

2.2 Distinguishing online communities of practice from co-located communities of practice

While online communities of practice share some similar characteristics with co-located communities of practice in general, they also differ in several aspects:

- *Design. Online communities of practice are usually designed top-down, while co-located communities of practice usually emerge from existing groups.*
- *Membership. Online communities of practice are usually open; co-located communities of practice are usually closed.*
- *Leadership. Leaders of online communities of practice are recruited, while leaders in co-located communities of practice may emerge from the community.*
- *Form of communication. In online communities of practice communication is primarily computer-mediated, while in co-located communities of practice communication is primarily face-to-face.*
- *Time to develop the community. It takes longer to develop an online community of practice than a co-located community of practice.*
- *Technological support. This is essential for online communities of practice but not for co-located communities of practice.*

Online CoPs and co-located CoPs share similar characteristics as they are both learning communities with members who are mutually engaged in shared practice aiming to develop a repertoire of communal resources (Wenger et al., 2002), however, online CoPs of practice are operationally distinguishable as they are primarily supported by information and communication technologies. Online CoPs differ from co-located CoPs in several further aspects, as summarised in the following table:

Table 1: Comparison of online CoPs with co-located CoPs

	Online CoPs	**Co-located CoPs**
Design	Top-down in design (Wallace & St-Onge, 2003) as technological infrastructures are needed to enable communications in CoPs (Barab et al., 2004). Wenger et al. (2002) recommends a 'fractal structure'. It is 'built out of local sub-communities or "cells"' (p. 125), with members of the CoP first belonging to a local community before belonging to the global one. Links between local groups have to be created. Each local community has a coordinator.	Mostly emerges from existing groupings (Wenger et al., 2002). Can be top-down or bottom-up in design (Wallace & St-Onge, 2003).
Membership	Open membership. Members do not necessairly know each other before becoming CoP members. A critical mass is needed for the CoP to function properly. A structure is needed to support both local and global groupings.	Closed membership. Members know each other, at least for the core group members. Mostly organisationally-based. Mainly local sub-groups.
Leadership	Leaders have to be recruited.	Leaders can emerge from the community.
Form of communication	Primarily text-based, computer-mediated communication, ideally supplemented by face-to-face meetings.	Primarily face-to-face, supplemented by computer-mediated communication.
Time to develop the community	Takes longer time to develop.	Can be developed in a shorter time frame.
Technological support	Essential for the survival of the online CoP.	Not essential.

2.3 Distinguishing online communities of practice from other online groupings

A number of online groups and communities exist, in addition to online communities of practice:

- *Communities based on commerce, such as online auction sites (*e-commerce communities*);*
- *Communities based on common interests, such as online alumni association sites (*e-communities of interest*); and*
- *Communities based on learning, such as online courses (*e-learning communities*).*

Online communities of practice differ from other online communities in terms of the level of collaboration and engagement and can be distinguished from:

- *Portals (targeted gateways);*
- *Networks or information communities*;
- *Interest groups; and*
- *Blogs*.

It should be noted that an online CoP is not just the "exchange of words and ideas through the mediation of computer bulletin boards and networks" (Preece, 2001). Simply putting people together in a virtual or Web environment does not make a community, and certainly not an online CoP (Stuckey, 2004). In fact, the majority of the online communities reported in the literature are not communities of practice.

Zacharek (1999) warned that the 'community' label should not be applied too casually to online groups as:

> *"community" is quite possibly the most over-used word in the Net industry. True community - the ability to connect with people who have similar interests - may well be the key to the digital world, but the term has been diluted and debased to describe even the most tenuous connections, the most minimal interactivity. The presence of a bulletin board with a few posts, or a chat room with some teens swapping age/sex information, or a home page with an e-mail address, does not mean that people are forming anything worthy of the name community.*

Peck (1987, cited in Boyd, 2002) used the term 'pseudocommunity' to describe online groups that lacked the engagement and acceptance of individual differences to work as one.

Online CoPs can be distinguished from the other online groupings such as:

- *e-Commerce Communities.* Many so-called online communities are communities of commerce, whose designers usually use the term community very loosely. To them, any communications software which can be added to a website is regarded as an online community (Preece, 2001). Indeed, online communities are often being described in the literature in terms of their supporting software, for example, chat, bulletin board, Listserv, Usenet news or Web-based communities. An example of an e-commerce community is *eBay*, an Internet auction community, which had 16 million registered members in 2001 (Koh & Kim, 2003), and currently reports that it has over 100 millions members (<http://pages.ebay.com/aboutebay/community.html>).

- *e-Communities of Interest*. Even when virtual or online communities can be considered as communities, they are not necessarily online CoPs (Johnson, 2001). For example, Rheingold (1992, cited in Yoo et

al., 2002), founder of *WELL*, one of the early online communities, has defined a virtual community as a "social aggregation that emerges from the net when enough people carry on public discussion long enough, with sufficient human feeling, to form webs of personal relationship in cyberspace". This definition has no mention about joint enterprise, mutual engagement of its members, or a shared repertoire, which characterise a CoP as defined by Wenger (1998). An example of a community of interest is the online alumni association support site in Korea (<http://www.iloveschool.co.kr>), which attracted 7 million members in 12 months (2000-2001) (Koh & Kim, 2003).

- *e-Learning.* The construct of an online learning community has also been widely used in online education (Tu & Corry, 2002; Lai, 1999). E-learning refers to learning taking place in a more formal structure normally using course management systems such as Blackboard or WebCt, whereas online CoPs are focused on practice, and creation and sharing of knowledge in a more informal way. Many distance education programmes refer their courses as learning communities (Lai, 1999).

2.3.1 Online communities and collaboration

Finally, online CoPs can also be distinguished from other networks or interest groups by their levels of collaboration and engagement. In her review of online communities, Stuckey (2001) pointed out that terms such as portals, hub, network, and interest groups are all used interchangeably with community in the literature. She argues convincingly that CoPs can be distinguished from all these other groups in terms of the levels of collaboration.

For portals (web pages that are gateways to online resources considered appropriate and useful for the targeted audience), which are at one end of the collaboration continuum, there is little collaboration and engagement designed for their members (some portals do not even require membership registration). According to Stuckey (2001), the main purpose of a portal is to provide or transmit information to its members (for example, *WebCT,* <http://www.webct.com/>).

Networks, sometimes called information communities (Fisher, Unruh & Durrance, 2003), have a higher level of engagement as they are formed primarily around the need to access and use information. Networks are groups with members loosely tied to each other (for example, *Australian JobSearch,* <http://www.jobsearch.gov.au/>, see Stuckey, 2001) and the group's purpose is more about social relationships (Duncan, Gordon & Hu, 2001). As suggested by Wenger (1998), a CoP differs from a network in the sense that "it is 'about' something; it is not just a set of relationships. It has an identity as a community, and thus shapes the identities of its members" (p. 4).

Stuckey (2001) suggests that an interest group offers a stronger tie than a network, with members communicating on a specific topic of interest (for example, *iVillage,* <http://www.ivillage.com/> provides an online space for discussing issues considered of relevance to women). Interest groups are not classified as CoPs because:

> *communities of practice are not just celebrations of common interests. They focus on practical aspects of a practice, everyday problems, new tools, developments in the field, things that work and don't (McDermott, 2001, p. 2).*

More recently, Wenger, White, Smith and Rowe (2005) have pointed out the emergence of the so-called 'social software' in supporting publication and group formation. One example of this type of software is weblogs or

blogs, which is a personal Web space for recording thoughts, ideas, and experience, similar to a diary (Clyde, 2002; Embrey, 2002; Oravec, 2002; Pickles, 2003, cited in Kondratova & Goldfarb, 2004; Wagner, 2003). Other readers can add comments, which makes the blog conversational and Web publishing easy. To manage information overload, RSS (really simple syndication) emerged to allow readers to subscribe to a group of blogs (Wenger, White, Smith, & Rowe, 2005).

Examining some current uses of blogs provides an example of how these different forms of online communities and collaborations are used in education. Oravec (2002) reports on ways that blogs can be used in classrooms to make better sense of Internet resources, while Embrey (2002) notes that schools are using blogs for a variety of purposes such as an alternative to school newsletters and internal communication tools. In some schools, blogs are used as a communication tool among students, among teachers, and between students and teachers (Poling, 2005). Blogs can also be used as a professional development tool for teachers, with Poling noting:

> *in a workplace setting where professionals are isolated from each other for the majority of the day, effective use of a blog is one method of bringing educators together* (p. 14).

In her school, blogs were used as a means of facilitating communication between teachers. Groups of staff with a similar interest or need used a communal blog, facilitated by one staff member, not only as a means of reporting on their own experiences, but also as a repository for materials. Blogs can also perform the function of a private or public reflective journal (Henderson, 2004) and have been used to encourage reflective practice in preservice teachers, with encouraging results (Stiler & Philleo, 2003).

Stuckey (2001) argues that at the other end of the collaboration continuum, an online CoP (for example, *Tapped In*, <http://www.tappedin.org/>) should have collaboration as its focus and it should offer "experts and novices varying roles to communicate, contribute to and initiate ideas and joint projects" (p. 3). Her idea is supported by Booth (2004), who points out "instead of having an information specialist as a primary gatekeeper, however, CoPs are characterised by the willing participation and ongoing interaction of their members" (p. 34). Members of the CoP teach, and learn from, other members and use each other as sounding boards. Thus, an online CoP can include a resource portal, interest groups and networks but members of the CoP have to be involved in actively building the community (Stuckey, 2001).

2.4 Can communities of practice be totally supported and operated online?

An ongoing debate is whether or not communities of practice can be virtual. Two key issues raised in this debate concern:

- *Whether relationship and trust can be built online; and*
- *Whether tacit knowledge and practice can be shared online.*

The question of whether CoPs can be partially or completely online is debatable (Ellis et al., 2004). In our review several authors (Davenport, 2001; Eraut, 2002; Lueg, 2000; Nichani & Hung, 2002) have questioned whether online technologies can support CoPs as to date the majority of the successful CoPs reported in the literature are face-to-face communities. These authors question whether tacit knowledge can be transferred in online settings (Davenport, 2001), whether virtual environments can support the development of relationship and trust (Eraut, 2002; Nichani & Hung, 2002); and whether practice-based communities can be situated in a virtual

space (Lueg, 2000). The most difficult area in operating an online CoP, as pointed out by Hildreth, Kimble and Wright (2000), is the facilitation of participation, which is central to the development of a community.

2.4.1 Can relationship and trust be built online?

In a paper titled *Can a community of practice exist online?* Nichani and Hung (2002) point out the importance of trust in community building:

> *trust is the glue that binds the members of a community to act in sharing and adapting manner. Without trust, members would hoard their knowledge and experience and would not go through the trouble of sharing with or learning from others* (p. 51).

Nichani and Hung (2002) believe that much of the trust between members of a CoP depends on the existing levels of trust in the organisation itself, which takes time to develop. Since virtual connections are brief and intermittent and serendipity is limited online, the opportunities for members to develop relationships and build trust are also limited. Nichani and Hung contend that online communities are merely quasi-communities not CoPs, as CoPs are:

> *tight-knit groups of people who know each other well. They have been working together for some time, and they are bound together by their shared practice and identity. Such communities are usually face-to-face communities that have a greater degree of reciprocity – sharing, contributing, supporting, helping and so forth – occurring effortlessly* (p. 25).

Brown and Duguid (1995) argued, some years ago, that it is difficult to form a virtual CoP, as online or electronic communication can only strengthen existing face-to-face CoPs. Hara and Kling (2002) support this position. In their study of CoPs in two public defender's offices, they did not find a strong relationship between CoP development and IT use but found that the online community was typically supplemented by face-to-face interactions among local attorneys. They doubt whether more advanced Web technologies than the listserv used by the attorneys will effectively support the sharing of tacit knowledge. Based on their empirical study, they challenge current ideas about online CoPs.

Further challenges facing online CoPs are the replication of elements of face-to-face meetings and group dynamics through computer-mediated communication and the development of norms for interacting as a group. The norms, values, and culture of face-to-face and online meetings differ in important ways. For example, "in face-to-face meetings, visual and auditory cues and social taboos prevent people from talking over one another, ignoring a question, or holding unrelated conversations. Such conventions must be relearned in online discourse" (Schlager et al., 2002, p. 142). Also, online activities have to be designed so that members will keep coming back, and so that they can derive value from these community activities. The challenge is that:

> *virtual networks must also be able to support subtle cultural mechanisms that shape interaction, identity, and access, such as rituals and traditions that distinguish newcomers from old-timers in communities that rely on face-to-face encounters* (Riel & Polin, 2004, p. 32).

It is important to negotiate norms (goals, ethics, liabilities, and communication styles) in an online community, as:

> *in the online environment, those collaboratively negotiated norms are probably even more*

> *critical as they form the foundation on which the community is built. Agreement about how a group will interact and what the goals are can help move that group forward* (Palloff & Pratt, 1999, p. 23).

Some authors contend that relationships and trust can be developed and sustained in online communities (for example, Haythornthwaite, Kazmer, Robins & Shoemaker, 2000). Shumar and Renninger (2002) argue that relationships can be developed in a virtual environment as "the archiving of online interactions makes possible forms of interaction that can be both more flexible and more durable than face-to-face interactions" (p. 2). The space-time flexibility of the Internet helps create more space for social interaction. Finally, as suggested by Palloff and Pratt (1999):

> *although face-to-face contact at some point in the community-building process can be useful and facilitate community development, the contact is not likely to change the group dynamic created online. It is possible, however, to build community without it* (p. 23).

2.4.2 Can tacit knowledge and practice be shared online?

Having investigated different aspects of transferring the concept of CoPs to the virtual world, Lueg (2000) questions whether doing and learning can take place in the virtual environment. He argues that because practice cannot be observed online, and since seeing/observing is essential in some practices, CoPs have to be local, not distributed. Lueg (2000) considers it important to distinguish between where the learning takes place and where the action or practice takes place. He doubts whether action can take place in the virtual world, thus raising doubts regarding whether it is possible to have virtual CoPs. Schwen and Hara (2003) raised similar concerns. Nichani and Hung (2002) also argue that as learning in a CoP is tacit (learning 'to be') rather than explicit (learning 'to know'), it has to be situated, and it is doubtful whether tacit and situated learning can take place online. However, Herrington and Oliver (2000) argue that ICT can provide the essential authentic context required by situated learning. They have designed a multimedia learning environment to support authentic learning situations and their study found that situated learning and knowledge sharing could be successfully supported in this environment.

So can CoPs be totally supported and operated online? The work of Barab et al. (2004), Riel and Polin (2004), Schlager and Fusco (2004), and Cuthbert, Clark and Linn (2002), acknowledges that while online CoPs are difficult to establish and successfully operate, if carefully designed, online communities can be formed and they will grow. Wenger, although most of his CoP examples are based on co-located communities, now believes that online CoPs can be successfully implemented (personal communication, July 29, 2005).

3. Online communities of practice and the professional development of teachers[1]

3.1 Communities of practice and effective professional development

Communities of practice are central to effective teacher professional development.

- *This requires a shift in emphasis from formal training to learning in practice.*
- *Communities of practice go beyond traditional 'one-shot' and 'face-to-face' models of event-based, expert-novice forms of professional development.*
- *Communities of practice allow teachers to act as co-producers of knowledge, which requires greater personal responsibility for professional growth.*
- *Currently, communities of practice are only infrequently used for teacher professional development.*

In a major review of professional development of teachers, Hawley and Valli (1999) called for a reform of traditional programmes, as there has been unprecedented consensus among researchers, professional development specialists, and policy makers about how professional development should be delivered. Based on research in learning and professional practice, they recommend eight principles of effective professional development. In the New Zealand context, similar characteristics of effective professional development have been reported. In a best evidence synthesis document, Mitchell and Cubey (2003) document eight characteristics of effective professional development in the early childhood settings. Both groups of researchers emphasise the importance of professional development:

- Addressing the needs of individual teachers, and taking account of their existing knowledge;
- Being situated in their place of practice;
- Addressing theoretical and pedagogical issues; and
- Being part of a wider process of change.

Hawley and Valli (1999) also identify the importance of professional development being student centred, ongoing, information rich and involving collaborative problem solving. In their recommended principles, Mitchell and Cubey (2003) emphasised the importance of teachers reflecting on their practice as part of a professional development process.

This present review maintains that CoPs (both co-located and online) can be used as an effective model for professional development, based on the characteristics as suggested by Hawley and Valli (1999) and Mitchell and Cubey (2003). As pointed out by Moore and Barab (2002), the concept of CoPs offers a new way of approaching professional development for teachers where there is a shift of focus from formal training (for example, professional development workshops) to learning in practice. According to this model, "professional development is not something you receive, but something in which you participate as part of your everyday activities" (Moore & Barab, 2002, p. 44) as learning is a participatory process that involves "doing, becoming, and belonging, not simply acquiring" (Ng & Hung, 2003, p. 62). For teachers, involvement in a CoP affords them a form of professional development that is rather different from the traditional event-based, expert-novice form of professional learning (Webb, Robertson & Fluck, 2004), which has not been shown to substantially improve student learning (Hawley & Valli, 1999).

[1] Refer to definition of professional development earlier in this report.

According to Lester (1994, 1995, cited in Murphy & Laferriere, 2003), traditional professional development is premised on a technical-rational model of professional practice. In this perspective, professional practice involves "applying a body of expert knowledge to known situations in order to produce rational solutions to problems" (p. 1). However, the problems of real-world practice (Schon, 1987) are messy and defy technical solutions so that teachers are unable to simply apply rules from a "store of professional knowledge" but can only deal with them by "a kind of improvisation, inventing and testing" (p. 3). Therefore, professional development experiences for teachers should not focus solely on the acquisition of expert knowledge, usually obtained through seminars and workshops, but on teachers' artistry and competence which can then be shared with other teachers (Murphy & Laferriere, 2003). It is unfortunate that in a national survey of professional development in Australia, McRae et al. (2001, cited in Henderson, 2004) found that the vast majority of professional development still used a 'one-shot' and 'face-to-face' model, despite the consensus in research that this 'one-shot' delivery model is ineffective in impacting on teaching practice. This is because traditional professional development activities under this model tend to provide teachers with information about their practice, rather than how to put that knowledge into practice (Schlager & Fusco, 2004).

While recently CoPs have been seen as a catalyst to improving teachers' professional practice (Schlager et al., 2002), it should be noted that to date there are very few examples in the literature of education or training organisations using co-located or online CoPs as a form of professional development (Mitchell & Young, 2002). Most of the CoP examples in the literature come from large corporations in the business sector. However, even with the limited empirical findings reported in the literature, there is evidence from both co-located and online CoPs that they can be used as a model to support effective professional development (with particular relevance to Hawley and Valli's (1999) principles 2-6, and Mitchell and Cubey's (2003) characteristics 2-4, and 8; see Appendix B for full details of these principles). The following table summarises the characteristics of effective CoPs for professional development of teachers.

Table 2: Characteristics of effective CoPs for teachers' professional development

Effectiveness of CoPs	Examples
Learning in CoPs is situated and authentic – in CoPs professional learning takes place in an authentic situation. Real life examples of classroom practice are used to investigate and evaluate teaching practices.	The Learning Inquiry Forum (*http://ilf.crlt.indiana.edu/*) is designed to support in-service and pre-service mathematics and science teachers in the "sharing, improving, and creating inquiry-based, pedagogical practices" (Barab et al., 2004). A key feature in this online community is that teachers can observe, discuss, and reflect on pedagogical theory and practice by virtually visiting each other's classrooms through the use of Web-based video technology (Moore & Barab, 2002) (*online CoP*).
CoPs can facilitate teacher reflection – CoPs encourage members to involve in individual and collective reflection.	Perry, Walton and Calder's (1999) CoP for teachers to design and implement early literacy activities for young children reported a meeting structure which operationalises critical reflection (*co-located CoP*). Murphy and Laferriere (2003) conducted a study investigating how 64 teachers from around the world formed an online community to make sense of their practice in using the Internet to teach French as a second language. They found evidence that teachers "took advantage of their participation in the community to reflect on and share with others what working with the Internet meant for their practice" (p. 11). Findings in this study show that this online community provided teachers a means to "reflect on their experiences and share their interpretations of problems and situations in order to better understand them and make sense of them in relation to their practice" (p. 10) (*online CoP*).
CoPs help change instructional practice and strategies.	Riel and Becker's (2000) study found that involvement in collaborative work through a teacher's community had a direct impact on teaching. They found that those teachers who engaged more extensively with teachers in their schools and in the wider educational community were more likely to use constructivist and collaborative instructional strategies in their classes than those teachers who had little involvement in their communities or practice *(co-located CoP).* Gallucci's (2003) study found that teachers in strong CoPs in primary schools changed their instructional practice in response to district reform policies *(co-located CoP).*

CoPs can support change of beliefs and attitudes towards teaching – in a CoP teachers engage in collaborative tasks that give them opportunities to examine their values and beliefs about teaching.	McLaughlin and Talbert (2001) found that different professional communities (innovative or traditional) accounted for the differences teachers conceived of their practice *(co-located CoP).* In a three-year study investigating the effects of a Web-based CoP on 35 intern teachers, Hough, Smithey and Evertson (2004) found that the Web-based learning environment appears to "help teachers meet their needs for professional interaction and problem-solving, and…allow teachers to explore and further define their own assumptions and beliefs about successful teaching" (p. 383) *(online CoP).*
CoPs facilitate knowledge creation and sharing best practice.	Palincsar, Magnusson, Marano, Ford and Brown's (1998, cited in Buysse et al., 2003) *Guided Inquiry supporting Multiple Literacies* project for K-5 teachers to improve science teaching practice found that "the participatory process through which members moved from learning how to reflect on practices…to becoming a community in which every person contributed knowledge and was transformed through this participation" (p. 270) *(co-located CoP).* Mitchell and Young's study (2002) of 16 CoPs found evidence of transfer of best practice and dissemination of information in these CoPs *(co-located CoP).* Ramondt and Chapman (2004) documented that CoPs could effectively support the sharing of best practice for principals in the *Talking Heads* online community *(online CoP).*
CoPs change the role of teachers to co-learners.	Webb et al. (2004) found that in the CoPs of four Tasmanian primary schools focusing on the provision of professional learning to support the use of ICT in teaching and learning, the participants were learners but they also took roles as co-learners, tutors, or mentors. They were not only learners who "confirmed and validated the experiences of their fellow learners" but were also co-producers of knowledge, which required them to take greater responsibility of their own professional growth. They were involved in a much wider and more dynamic set of relationships than the traditional 'novice-expert' model. The roles that teachers had in the CoPs greatly assisted in embedding the new or improved practices into the life and work of the school *(online CoP).*
CoPs facilitate identity building.	In Gray's (2004) study of 43 coordinators of the Alberta Community Adult Learning Council, she found that an online CoP can provide a space for newcomers to become enculturated and learn elements of the practice, where "online participation not only served as a tool for informal learning situated in the context of coordinators' everyday work experience, but also that participation became important in defining identity of the practice itself" (p. 25) *(online CoP).*

CoPs reduce teacher isolation.	Ramondt and Chapman (2004)'s study showed that principals felt less isolated, and their membership in an online CoP enabled them to participate in national discussions on current headship and policy issues *(online CoP).*
Teachers are satisfied with this form of professional development.	Webb et al.'s study (2004) found that after using the CoP approach for professional development, the participants involved in the CoPs reported higher levels of satisfaction in what they have achieved and schools reported a higher level of commitment in using this model for future professional development (online CoP).

3.2 Cases of effective online communities of practice

Cases of effective online communities of practice include:

- *The Learning Inquiry Forum;*
- *Tapped In;*
- *Education with New Technology (ENT); and*
- *Talking Heads & Virtual Heads.*

Characteristics of these effective cases of online communities of practice include:

- *They have a clear purpose;*
- *Membership is diverse;*
- *Leadership is strong;*
- *Technology is used appropriately;*
- *There is an emphasis on participation and community building; and*
- *They are long-term projects.*

There is little evidence that investments in technology or online projects have resulted in sustainable or scalable professional development of teachers (Schlager et al., 2002), and some critics caution the use of online communities as a quick fix for the problems associated with traditional professional development (Henderson, 2004). While it may, therefore, be a challenge to use online technologies to facilitate professional development in CoPs, there are some empirical studies in the literature documenting successful, sustainable and large scale online CoPs. As the focus of this review is on online CoPs, in this section we briefly describe four successful online CoPs.

3.2.1 Examples

The Learning Inquiry Forum (http://ilf.crlt.indiana.edu/)

This online learning community is designed to support in-service and pre-service mathematics and science teachers in the "sharing, improving, and creating inquiry-based, pedagogical practices" (Barab et al., 2004). A key feature in this online CoP is that teachers can observe, discuss, and reflect on pedagogical theory and practice by virtually visiting each other's classrooms through the use of Web-based video technology (Moore & Barab, 2002). The *Learning Inquiry Forum* is hosted by the Center for Research on Learning and Technology at Indiana University and funded by the National Science Foundation.

Tapped In (http://tappedin.org/tappedin/)
While some researchers consider this online community is restricted to a distinct purpose (Barab et al., 2004), it does exhibit many characteristics of an online CoP. Its designers (Schlager et al., 2002) describe it as an:

> *online education CoP where educators can attend activities hosted by a variety of education organizations, conduct their own online activities, or expand their circle of colleagues by participating in communitywide activities* (p. 132).

Members of *Tapped In* communicate in a Web-based, platform-independent, multi-user virtual environment. Since it went online in 1997, 26 educational organisations have used *Tapped In* to provide their professional development for teachers. They receive support from *Tapped In* staff in designing and facilitating online activities, and gain access to a pool of participants (5,800 as of 1999). Members, organisations, and activities make up the fabric of this online CoP (Schlager et al., 2002; Schlager & Fusco, 2004). *Tapped In* is created by SRI International's Center for Technology in Learning, and funded mainly by the National Science Foundation, in the US.

Education with New Technology (ENT) (http://learnweb.Harvard.edu/ent/home/)
This networked community, sponsored by Harvard University, is designed to help educators develop powerful learning experiences for students through the effective integration of new technologies. Currently having close to 20,000 registered members, from 161 countries, this community provides extensive online contexts for reflection on practice by a community of practicing teachers (Riel & Polin, 2004).

Talking Heads & Virtual Heads (UK)
Talking Heads was launched in 2000 as an informal and voluntary online community for head teachers in the UK to connect with each other to share best practice and develop new approaches to tackle issues in their schools. In 2004, there were 12,000 head teachers in this online community (Ramondt & Chapman, 2004). Formed in the same year, *Virtual Heads* is an online community for deputy head teachers, with 15,000 registered users in 2004. These online communities aim at empowering practitioners to construct knowledge through engaging in community activities, and reducing members' sense of isolation.

3.2.2 Characteristics of effective online CoPs

The four online CoPs described in the previous section, together with other smaller online CoP projects reviewed in this report, share some characteristics that can inform the design of online CoPs in New Zealand. These characteristics are listed as follows:

- *They all have a very clear purpose*. These online CoPs all maintain a clear and focused purpose. For example, the authoring communities as described by Cuthbert et al. (2002) support the actual practice and daily tasks of the participating science teachers, and the *Inquiry Learning Forum* (Moore & Barab, 2002) focuses on inquiry learning, in science and mathematics.

- *Membership is diverse*. Except for the *Talking Heads* project, which is open only to UK principals, members of the other online CoPs described in the previous section are now open to teaching professionals worldwide.

- *Leadership is strong*. A team of experienced community designers, researchers, professional development specialists, and teachers has designed all these online CoPs. The involvement of practicing teachers is strong. For example, in the *Information Inquiry Forum*, teachers were involved

in the whole design process and their feedback on the operation of the online CoP is taken seriously (Barab et al., 2004).

- *Technology is used appropriately.* These online CoPs all use technologies that are familiar (lightweight) to teachers. For example, the Web is primarily used for communication in Hoadley and Pea's (2002) project as it is nearly ubiquitous among teachers. For *Tapped In*, they use a Web-based, platform-independent, multi-user virtual environment for their community (Schlager et al., 2002). As members have to observe classroom practice, in the *Inquiry Learning Forum*, Web-based video technology is used.

- *Emphasis in participation and community building.* The importance of supporting sociability by technology is recognised in the *Inquiry Learning Forum* (Barab et al., 2004). Local groups such as project groups and subject-based groups are encouraged in *Tapped In* and *Inquiry Learning Forum* (called bounded groups). In *Tapped In*, the strategy is to work with existing communities (since 1997, 26 educational organisations have used *Tapped In* to provide professional development for teachers) to grow the online community systemically. Production of a shared repertoire is seen as a strong factor in maintaining a sense of community in the authoring communities in Cuthbert et al.'s (2002) *Web-Based Integrated Science Environment* (WISE) learning communities where teachers produce teaching and curriculum materials collaboratively.

- *Long term projects.* The successful online CoPs are all well funded (for example, by the National Science Foundation) and are designed as long-term projects. For example, *Tapped In* was launched in 1997 and is still operating. The *Inquiry Learning Forum* was launched in 2000.

4. Life cycles of online CoPs

For online CoPs to function in an effective way, we need to understand how they are formed, grow, mature, and terminate. It is therefore important to understand the life cycle of online CoPs. Network activities will change through the life cycle of a CoP, as will the roles of leaders and moderators (Levin & Cervantes, 2002). As commented by Hoadley and Pea (2002),

> *CoPs are diverse in nature, and, like organisms in ecological niches, they originate, evolve, and may become extinct* (p. 326).

Before we proceed to summarise the life cycle theories as documented in the literature, it should be noted that the evolutionary pattern of CoP development has been theoretically examined but is still, as yet, under-researched in terms of empirical studies. As Schwen and Hara (2003) point out, even Wenger et al. (2002)'s detailed analysis of life cycles of CoPs has not been validated by longitudinal studies.

Several authors have discussed the life cycle of communities in the literature. Some of them, for example, Palloff and Pratt (1999), talked about the "forming, norming, storming, performing, adjourning" cycles of e-learning environments while Levin and Cervantes (2002) describe project-based communities as having gone through life cycles of proposal, refinement, organisational, pursuit, wrap-up, and publication stages and "network activity [as] episodic, unfolding over time through a series of different phases" (p. 270). Based on an organisational perspective, Wenger et al (2002) have identified a three-phase (formation, growing, transformation), five-stage (potential, coalescing, maturing, stewardship, and transformation) life cycle of CoPs. In contrast, Wallace and St-Onge (2003) have suggested a two-phase (initial development, community implementation and growth), eight-step model, while Preece (2000) described a four-stage (prebirth, early life, maturity, and death) model.

It is quite clear from the literature that community development can be divided into more or less three phases, although it is not always easy to maintain a clear boundary between phases. The first phase is the formation phase, which is followed by the sustaining or mature phase, and then the transformation or disengaging phase. All CoPs go through each of these phases, in order. Each of these phases will now be discussed in more detail.

4.1 Phase 1: Formation

A variety of activities occur in the formation phase of an online community of practice:

- *Identify potential community;*
- *Determine purpose and scope of the community;*
- *Community building;*
- *Create a preliminary design for the community;*
- *Incubate and deliver immediate value; and*
- *Launch of the community.*

This phase normally covers the conception of the idea of the community to the launch of the community. During this phase, it is critical to "have activities that allow members to build relationships, trust, and awareness of their common interests and needs" (Wenger et al., 2002, p. 82). The main issue at this stage is to generate enough energy for the community to coalesce.

Wallace and St-Onge (2003) maintain that this phase should begin by putting in place a project manager, a steering group, and a team of resource people from across the organisation to develop this community. At this stage this group should:

- *Identify potential community*. This process involves identifying the target group of interest (Daniel et al., 2004; Wenger et al., 2002) and the needs of the members. According to Cothrel and Williams (1999), in an online CoP it is essential to understand what kinds of knowledge, tools and relationships the members want and need.

- *Determine purpose and scope of the community*: This phase also includes the important process of defining the domain of the CoP; identifying engaging issues that would excite community members; and building a case for action (Wenger et al., 2002).

- *Community building*: This may involve identifying potential coordinators and thought leaders (Wenger et al., 2002), establishing governance and roles (Cothrel & Williams, 1999; Wallace & St-Onge, 2003), interviewing potential members and connecting community members (Wenger et al., 2002; Yamazaki, 2004). A workshop could be organised to bring together potential community members face-to-face to determine the focus and direction of the CoP (Daniel et al., 2004). Without community building, the expectation that members in online communities will share, contribute, and generate contents is ill founded.

- *Create a preliminary design for the community* (Wenger et al., 2002), including technology infrastructure (Preece, 2000), user education and support and contents of personal data for member profiles (Wallace & St-Onge, 2003). A vibrant CoP provides both routine events, to provide stability,

and exciting events for challenges. Vibrant CoPs have a rhythm of community events. A CoP has to find its right rhythm at each stage of its development (Wenger et al., 2002).

- *Incubate and deliver immediate value*. Find the ideas, insights, and practices that are worth sharing. A CoP must be designed to offer value to its members or prospective members. While value may not always be explicitly apparent to the members of the CoP, it should grow over time as the CoP matures (Wenger et al., 2002).

- *Launch of the community*. Key to the launch is a focus not on the technology, but on building a sense of community, through the leadership of the CoP and facilitation (Wallace & St-Onge, 2003; Wenger et al., 2002).

Wenger (1998) proposed 14 indicators that showed a CoP had formed.

1. Sustained mutual relationships – harmonious or conflictual
2. Shared ways of engaging in doing things together
3. The rapid flow of information and propagation of innovation
4. Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process
5. Very quick setup of a problem to be discussed
6. Substantial overlap in participants' descriptions of who belongs
7. Knowing what others know, what they can do, and how they can contribute to an enterprise
8. Mutually defining identities
9. The ability to assess the appropriateness of actions and products
10. Specific tools, representations, and other artefacts
11. Local lore, shared stories, inside jokes, knowing laughter
12. Jargon and shortcuts to communication as well as the ease of producing new ones
13. Certain styles recognised as displaying membership
14. A shared discourse reflecting certain perspective on the world (pp. 125-6).

4.2 Phase 2: Sustaining/Maturing

In the second phase, the focus is on sustaining and maturing the community of practice through a variety of means:

- *Leadership;*
- *Mentor new members;*
- *Seek relationships and benchmarks outside the organisation;*
- *Establish the community;*
- *Checkpoint;*
- *Knowledge repository; and*
- *Evaluate purpose and direction.*

A particular concern identified in the literature about community development is that while it may be easy to form a CoP, it is more difficult to sustain it. Cothrel and Williams' (1999) study of 15 business communities

shows that the effort to sustain the online community was almost always greater than the effort required to launch it. At this phase, according to Wenger et al. (2002), the CoP should focus on its roles, and boundary. The community now shifts from just sharing ideas to organising the community's knowledge. The indicator for this phase is knowledge creation.

The focus of this phase is to create value in the community – value to its members, the community, and the organisation. During this phase, the CoP matures through a continuous cycle of development, evaluation, and growth with the support of the leadership group (the facilitator/manager/leader). The members now take responsibility for the community. A core of community leaders and champions emerges and a rhythm of community participation is established.

- *Leadership.* Wenger et al. (2002) point out the importance of developing new leadership in this phase as well as actively recruiting new people to the core group. The issue of leadership is also emphasised in Cothrel and Williams' (1999) and Stuckey and Smith's (2004) studies. They maintain that to sustain online CoPs, leaders have to participate in the life of the community and keep members involved in the community.

- *Mentor new members*. Williams and Cothrel (2000) consider member development, relating to all aspects of marketing the community to prospective members, as a key way to sustain a virtual community. Wenger et al. (2002) emphasise the need to routinize entry requirements and processes and Stuckey and Smith (2004) discussed the importance of communities needing "to be both closed and open at the same time" (p. 6) as the inherent community turnover means there is a need for ongoing recruitment.

- *Seek relationships and benchmarks outside the organisation*. Wenger et al. (2002) and Stuckey and Smith (2004) raised the importance of seeking nourishment from outside the communities. The CoP also has to respond to the needs of the wider community in which it operates so that it does not become isolated and internalised.

- *Establish the community*. It is important to continue community building, focus on social and facilitation issues required to support the group as a community (Yoo et al., 2002); test out the functionality of the website (Wallace & St-Onge, 2003) and redefine the community boundary (Wenger et al., 2002). Use events such as guest participation from experts to build traffic and increase participation (Cothrel & Williams, 1999).

- *Checkpoint*: Assess community progress and value. A permanent channel for feedback is established and assessment routines are implemented (Wallace & St-Onge, 2003). Gathering feedback both from core and peripheral members is a key activity to sustain the online communities from Stuckey and Smith's (2004) survey of six online CoPs.

- *Knowledge repository*. Identify gaps in knowledge and develop a learning agenda and build and organise a knowledge repository (Wenger et al., 2002). New knowledge is now generated through collaboration. Knowledge capital is now created within the CoP through online and offline events (Wallace & St-Onge, 2003), and the CoP offers resources valuable to members (Williams & Cothrel, 2000).

- *Evaluate purpose and direction*. A formal evaluation should now be completed to test the CoP's value to the community membership, identify areas for improvement, and make recommendations for expanding the community (Wallace & St-Onge, 2003). There may be a need to hold a renewal workshop (Wenger et al., 2002).

4.3 Phase 3: Transformation or disengaging

The third phase is one of transformation or disengaging; communities of practice may:

- *Expand;*
- *Fade away; and/or*
- *Die.*

At this stage, the community may be further expanded (Wallace & St-Onge, 2003), fade away or simply close (Wenger et al., 2002). Communities may also be transformed into formal units or merge with other communities. The indicator for this phase is what Preece (2000) called death: discussion slows down, and the number of participants drops below the critical mass necessary for it to function.

When considering these phases, it should be noted that Wenger et al. (2002) have discussed life cycle issues in terms of business-based CoPs. Further research is needed to determine whether this organisational perspective is directly applicable to CoPs in the educational sector.

5. Designing effective online communities of practice

It should be noted that as the literature on online CoPs is very limited, much of the following discussion related to design principles has been extrapolated from the literature of co-located CoPs.

Design principles

- Online communities of practice should be cultivated to grow naturally
- Online communities of practice should be designed to support sociability and participation
- Online communities of practice should be created to attract a diverse membership
- Online communities of practice should be managed by providing for different roles
- Online communities of practice should include technology designed with functionality to support sociability and knowledge sharing
- Online communities of practice require a blended approach towards development where online activities are supported by offline activities

From the literature, it is clear that if online CoPs are to be sustainable and to have an impact on teaching practice, they have to be designed to successfully improve teaching practice. It is emphasised that to design a successful virtual or online CoP, one needs to consider all the technical, pedagogical, and organisational issues (Hara & Kling, 2002) and there are some key design decisions that have to be made by the community leaders and organisers.

A number of design principles have been identified in the literature (for example, Cothrel & Williams, 1999; Hung & Chen, 2001; Kim, 2000; Le Moult, 2002; McDermott, 2001; Preece, 2000, 2001; Schwen & Hara, 2003;

Stuckey, 2004; Stuckey & Smith, 2004; Wallace & St-Onge, 2003; Wenger, McDermott & Snyder, 2002, 2005; Williams & Cothrel, 2000). Other empirical studies, including Preece (2000, 2001), Schlager and Fusco (2004), and Barab et al. (2004), also provide useful insights to the design of online CoPs. A synthesis of these design principles is presented in this section of the report.

5.1 Design Principle 1: Online communities of practice should be cultivated to grow naturally

Online communities of practice are grown rather than made.

- *Communities of practice are a combination of design and natural development; the design must allow for this development to occur.*
- *A key to designing a vibrant and successful community of practice is to ensure that the design invites interaction.*
- *Design should aim to bring out the community's own internal direction, character and energy.*
- *Communities of practice must be designed in a way so as to allow and encourage development.*
- *A bottom-up design encourages a sense of ownership for members.*
- *Online communities of practice can be built in terms of the technology, but members themselves must grow a community.*

Several design strategies have been identified to cultivate the growth of online communities of practice:

- *Conduct a needs assessment to form a clear purpose;*
- *Foster a sense of ownership;*
- *Allow plenty of time for the community of practice to grow; and*
- *Encourage diversity.*

It is a challenge to decide whether a CoP should be designed or developed as a natural process (Barab et al., 2004). Many respected researchers and CoP proponents including Wenger (1998) recognise this tension and support the argument that CoPs cannot be made but grown (Barab et al., 2004; Brown & Duguid, 2000; Kim, 2000; Schlager & Fusco, 2004; Wenger et al., 2002). This proposition envisions that the sponsoring organisation and leaders only provide an opportunity for community, both online or offline, to bloom (Stuckey, 2004).

Wenger (1998) describes establishing CoPs as "the art of balancing design and emergence" (p. 9) and advocates the idea of minimalist design. For Wenger and his colleagues (2002), the key to designing a vibrant and successful CoP is to design for a sense of aliveness so as to generate "enough excitement, relevance, and value to attract and engage members" (p. 2) in the community. Communities of practice thus have to be designed so that they can "invite the interaction that make them alive…to bring out the community's own internal direction, character, and energy" so that the community is "natural, spontaneous, and self-directed". The first of Wenger's (1998) seven design principles is "*design for evolution*" where the primary role of design is to catalyse the CoP's natural evolution (see box below for all seven design principles). As CoPs are usually built on pre-existing personal networks, it is argued that the purpose of the design is not to impose a structure but to help the community develop.

Wenger's (1998) seven design principles of CoPs.

- *Design for evolution*
- *Open a dialogue between inside and outside perspectives*
- *Invite different levels of participation*
- *Develop both public and private community spaces*
- *Focus on value*
- *Combine familiarity and excitement*
- *Create a rhythm for the community*

In the literature, several design strategies have been identified to cultivate the growth of online CoPs:

- *Conduct a needs assessment to formulate a clear purpose.* In designing the *Inquiry Learning Forum*, an online CoP for pre-service and in-service science and math teachers, Barab and his colleagues (2004) viewed the design process as self-organising, "beginning as a minimalist design and then working collaboratively with members as they are using the designed space to evolve participant structures that meet their own needs" (p. 66). They began their design with a needs analysis, talking to teachers about what their needs were and teachers were invited to participate in the design team. According to Preece (2001), an online community should have a shared focus on its purpose, needs, service, and support, which provides the member with a reason to belong to the community. This is an important process to determine who the community is and what its purpose is (Preece, 2000).

- *Foster a sense of ownership.* Van der Kuyl (2001, cited in Stuckey, 2001) maintained that communities are not built, but grow through personalisation, member participation, contribution and most importantly ownership. Thus, created communities should be designed with roles to develop as much member involvement as possible and to build an early sense of ownership.

- *Allow plenty of time for the CoP to grow.* While CoPs are naturally created, they can be fostered (cultivated). It takes time for a community to develop and members have to stay together long enough for a CoP to grow (Sharp, 1997, cited in Tu & McIsaac, 2001). Due to the possibility of conflicting priorities, lack of connection and trust among members of online CoPs, time and effort should be allowed to engage all the stakeholders of the CoP to develop a common understanding of the value of the community (Wenger et al., 2002).

- *Encourage diversity.* If an online CoP is allowed to emerge, it has to allow for diversity, and ensure that multiple voices and perspectives can be advanced in the community (Barab et al., 2004). For example, in the *Inquiry Learning Forum*, virtual space is given to "bounded groups" or sub-communities of teachers to provide diversity for the online CoP.

5.2 Design Principle 2: Online communities of practice should be designed to support sociability and participation

Sociability and usability are key factors for designing online communities of practice.

- *Sociability is primarily concerned with how members of a community of practice interact with each other.*
- *Usability is primarily concerned with how members interact with the technology of a community of practice.*

A number of strategies have been identified to support sociability and participation:

- *Allow members time to participate;*
- *Add value to the community of practice;*
- *Build a sense of community;*
- *Allow different levels of participation;*
- *Build social relationships and trust;*
- *Develop clear policies; and*
- *Ensure ease of use of technologies.*

According to Preece (2000, 2001, 2004), an experienced online community designer, the key to the design of online communities focuses on two concepts: usability and sociability. Sociability is primarily concerned with how members of a community interact with each other through technology while usability focuses on how users interact with technology. The designer has to understand how technology can be designed to support social interaction and sociability, just designing for usability is not enough. To plan for sociability, as suggested by Barab and his colleagues (2004), there is a shift of focus for the designer from human-computer interactions to human-human interactions as mediated by computer interactions. Generally, if incentives are provided they should be inherently rewarding, celebrated, and supported by the culture of the community (O'Dell & Grayson, 1998, cited in Sharratt & Usoro, 2003).

Preece's (2000) framework of 'designing usability, supporting sociability' is useful for designing online CoPs, as it is crucial that issues of participation and interaction are addressed from the outset. As pointed out by Kimble et al. (2001), the major problem in online CoPs is the facilitation of participation. We have to understand why people wish to participate in the online community, and what factors will affect knowledge sharing, at an individual and community level. Participation is also important in defining identity of the practice itself (Gray, 2004). Without active participation, the CoP is doomed from the start.

In the literature a number of strategies have been identified to support sociability and participation (Brosnan & Burgess, 2003; Cothrel & Williams, 1999; Hossain & Wigand, 2004; Ridings & Gefen, 2004; Sharratt & Usoro, 2003).

- *Allow members time to participate.* A number of authors in the literature point out the importance for members to have time to participate in online CoPs (Duncan et al., 2001; Preece, 2000). For example, in McDermott's (2001) *10 critical success factors in building communities of practice*, making sure people have time to participate is one of the critical success factors. The lack of time is also the most common reason given by principals for not participating in the *Principals' Electronic Network* (PEN) in New Zealand (Simpson, Anderson, Court & Robertson, 2005). In organisational-based CoPs, members are sometimes given time by the organisation to participate in the CoP (Wenger et al., 2002).

Time is also needed for members to learn and familiarise themselves with the technologies used to support the CoP. Ease of use of the technologies and the complexity of the system supporting online communication will affect the time needed to learn to interact online. Schlager and his colleagues (2002) caution us that while technologies have been enthusiastically employed to support communication, there is a lack of understanding of how to employ online technology to achieve professional development goals and cultivate CoPs. They cautioned that teachers using online technologies in CoPs must understand, and be proficient with these technologies, before they are expected to engage in productive activities online. They emphasise the importance of prior training before members are asked to participate actively in online activities.

- *Add value to the CoP.* To encourage participation, potential members have to be convinced that it is worth participating in the CoP. Having a clear and focused purpose for the online CoP will help members to decide whether it is useful to engage in the community. The member will be more willing to participate in the community if there is a critical mass in the community, the information available is of high quality, and the members of the community are knowledgeable (Sharratt & Usoro, 2003). The WISE learning communities (Cuthbert et al., 2002) motivate interaction by supporting their members' actual practices and daily tasks, for example, by developing curricula through authoring communities. People are more willing to participate in a CoP if their participation is recognised or if it may lead to career advancement (Sharratt & Usoro, 2003).

- *Build a sense of community.* A sense of community has been defined as "a feeling that members have of belonging…that members matter to one another…and a shared faith that members' needs will be met through their commitment to be together" (McMillan & Chavis, 1986, cited in Sharratt & Usoro, 2003, p. 191). Cothrel and Williams (1999) recommend that community building is the key to success and developing a sense of community for its members is essential to achieve a high level of participation. They contended that if organisations are not willing to invest the time and resources to nurture activities that constitute community building, they couldn't expect members of the online community to share, contribute, and generate knowledge.

A number of suggestions have been identified in the literature to facilitate the building a sense of community:

  - *One-on-one networking*. To develop a sense of community, there is a greater need for one-on-one networking in online CoPs as compared to co-located CoPs (Wenger et al., 2002). Coordinators of the community should engage in active networking to increase the exposure of community members to each other.

  - *Organise meaningful activities*. Community building requires members to engage in meaningful activities that produce shareable artefacts (Brosnan & Burgess, 2003). As suggested by Wenger et al. (2002), public events can help develop a sense of community for members but private space should still be developed to promote informal interactions. It is noted that the public and private dimensions of a CoP are interrelated, with strong individual relationships resulting in richer public events.

- *Provide social support*. Ridings and Gefen (2004) asked members of online communities why they joined them, and then categorised their answers. They found that social support was a major reason why people joined online communities. The most common reasons given by members of online communities categorised as health or professional communities were information exchange and social support.

- *Allow different levels of participation*. People participate in a CoP for a variety of reasons and have different interests in the CoP. From their experience of developing CoPs, Wenger and his colleagues (2002) suggest that there are normally three levels of participation in a CoP:

  - A small core leadership group of active participants, about 10-15% of the whole community.

  - A small active group (15-20%) that attend meetings regularly and participate in community forums occasionally.

  - Large proportions of members are peripheral and rarely participate.

  Outside these three levels there are people who are interested in the community but are not members. The CoP activities should be designed so that all levels of participants are felt valued, so that they are willing to participate.

- *Build social relationships and trust.* For members of the CoP to engage in the community, their social relationships have to be founded on trust, allowing them to take risks and explore new ways of negotiating meaning (Brosnan & Burgess, 2003). Building trust in an online CoP is essential if participation and sharing of knowledge is to be effected. Tsai & Ghoshal (1998, cited in Sharratt & Usoro, 2003) found that where relationships were high in trust, people were more willing to engage in cooperative interaction.

  In Sharratt and Usoro's (2003) study of CoPs, they have mentioned three types of trust:

  - *Integrity-based trus*t. If the community is perceived as honest and reliable, the members are more willing to participate.

  - *Benevolence-based trust*. If the community is perceived as friendly and benevolent, the desire to participate is higher.

  - *Competence-based trust*. If a member perceives that the community has a high level of competence in relation to his/her own competence, there is a fear of losing face by contributing, reducing the desire to participate. Thus there is a need for a range of expertise as suggested by other authors (for example, Wenger et al., 2002).

  Van den Hooff, Elving, Meeuwsen and Dumoulin (2003) have empirically investigated two ICT-facilitated communities of professionals and the factors that affected the sharing of knowledge in these communities. Using a structural equation model, their findings showed that trust among members of the community, and how strongly they identified with the community, were key factors affecting knowledge sharing. In their study, they concluded that the use of ICT in communities can positively

influence trust and identification because it helps overcome the barriers of space and time, and affords frequent and intense communication between community members, which helps create task-related trust.

Creating individual identities (for example, displaying personal profiles and photos), developing a common symbol system and shared personal narratives will also help create emotional connections for members of online CoPs (Boyd, 2002).

- *Develop clear policies.* Preece (2001) maintains that online communities need policies to guide members' interaction and provide a sense of history for participation. For example, policies for membership, codes of conduct, community governance, security, level of free speech, privacy, copyright have to be planned for the online CoP (Preece, 2000).

- *Ease of use of technologies.* As pointed out by Sharratt and Usoro (2003), the greater the ease of use of the communication system the greater one's use of it. This is similar to Preece's (2001) caution about the importance of usability (concerned with the human-computer interface) and the difficulties that members may have in using and interacting with the software and computer systems. Preece (2001) suggests four components that are particularly important when designing technology to be used as a medium to support social interaction:

    - *Dialogue and social interaction support*. This is about the prompts and feedback that support interaction, and the spatial relationships in the virtual environment where members communicate with each other.

    - *Information design*. Information within the community should be presented in a way that it can be easily read and understood.

    - *Navigation.* The user interface should be designed so that members of the community can move around in the virtual space and transfer data with ease.

    - *Access*. Attention should be given to the bandwidth issue as not every member of the community has the same level of technology to access the community space. The importance of access has also been raised by Wenger, White, Smith and Rowe (2005).

      Information accessibility, which refers to the type and amount of information organised in a way that is accessible to participants (the amount available as well as the quality of the information), is also important. Teo, Chan, Wei and Zhang (2003) recommend that virtual community organisers should pay attention to "information content and amount, access policies, the type of communication channels provided and information organisation" (p. 692).

5.3 Design Principle 3: Online communities of practice should be created to attract a diverse membership

It is important to ensure that a critical mass of people belong to the online community of practice. Issues to consider in this include:

- *Ongoing recruitment of members;*
- *Encouraging 'lurkers' to participate; and*
- *Structuring to accommodate geographical and contextual diversity.*

A diverse membership is needed for the online CoP to function effectively. The CoP designers therefore have to decide who should be included in the CoP. For organisational CoPs membership is not an issue as it is well defined, but for distributed or online CoPs a number of design strategies have to be employed to maintain a critical mass for a sustained development.

5.3.1 Ongoing recruitment of members

Stuckey and Smith (2004) raised the issue of whether online communities should be open (to all teachers) or closed (open to some teachers) in their study. After having studied six online communities, they concluded that communities need distinct and coherent boundaries while at the same time leadership should actively promote transparency and change (allowing for new membership). The inherent community turnover means that there is a need for ongoing recruitment, although community leaders usually recruit members privately. The need to recruit new members has also been confirmed by Wenger et al. (2002) and Wallace and St-Onge (2003) as a critical mass of activity is required to attract others to participate in the CoP (Preece, 2000). Existing members can recruit new members and in doing so can then be responsible for orientating them to the community. The issue of how far community membership should be extended relates directly to the vitality of the community.

5.3.2 Encourage lurkers to participate

In online communities, some argue that there must be control on its membership so that expertise is not "diluted by those of marginal use to the community as a whole" (Snowden, 2000, cited in Davenport & Hall, 2002, p. 192). One group that may be initially unwelcome in online communities is 'lurkers' as initially they do not participate in knowledge sharing. Lurkers are people who participate in online communities in private, by reading messages without posting in the public domain, and usually are the largest group in the community (Nonnecke & Preece, 1999). These 'lurkers' can later become integrated into the main group and become active participants (Brown & Duguid, 1998). Research also suggests that lurkers are in fact learning in the periphery and they also feel a part of the community (Bowes, 2002). Thus, silent participants should not be criticised too early. In fact, in an online CoP, it has been argued that members in terms of knowledge and expertise should be diverse, allowing newcomers to the practice to acquire expertise through legitimate peripheral participation (Lave & Wenger, 1991). In recruiting members to a CoP, the concept of interdependency is introduced by Hung and Chen (2001). They maintain that in an online community there should be varying demands and diverse expertise of different competency levels so that members can learn from other members and share their expertise. An implication from this is that members of varying levels of expertise should be recruited. Several community leaders in Cothrel and Williams' (1999) study also commented that both 'givers' and 'takers' contribute to the vibrancy of their community.

5.3.3 Structure to accommodate geographical and contextual diversity

In designing an online CoP, the issue of how local/global the community should be also has to be addressed (Wenger, 1998). Should the CoP be based in a school, a region, or be nationwide? The more local the CoP is, the more relevant it is to its immediate members, but the less relevant it is to its global members. It is sometimes

difficult for a teacher to share her/his local experience and insights with colleagues who work in different contexts with different constraints (Barab et al., 2004). The challenge is to find ways to share local experiences between diverse groups of CoP participants. Wenger et al. (2002) suggests creating a structure that promotes both local variations and global connections. Structures should be designed into the online CoP so that sub-communities can function (for example, topic-focused communities). These sub-communities or local communities or what Barab and his colleagues (2004) called the "bounded groups" should have a coordinator who maintains the local community and helps link people to the global community. In the New Zealand Principals' Electronic Network, for example, it is found that many users expressed a preference for having small group discussions, rather than linking into the wider community (Simpson et al., 2005).

5.4 Design Principle 4: Online communities of practice should be managed by providing for different roles

There needs to be different roles within communities of practice, particularly in online communities of practice.

- *There are a number of benefits to having defined roles in online communities of practice:*
  - *Reassurance;*
  - *Continuity; and*
  - *Structure.*

- *In general, roles can be divided into four types:*
  - *Leadership roles;*
  - *Core members;*
  - *Support persons; and*
  - *Community members.*

Studies identified in this review consistently suggest that roles have to be designed into the CoP in order to manage it (Preece, 2001), particularly for online CoPs, which are usually formed by a top-down approach. According to Fontaine (2001), roles provide communities with three significant benefits:

- *Reassurance* – that the community is being taken seriously.
- *Continuity* – roles connect the CoP's present to its past.
- *Structure* – to help members to share knowledge and expertise.

Leadership roles have been clearly identified in the literature. For example, Wenger et al. (2002) maintain that community coordinators and thought leaders are key to community success, and Stuckey (2004) asserts that the community organiser, moderator, facilitator, or leader is vital to the success of the community. The important role of the facilitator was reported in Pereles, Lockyer and Fidler's (2002) study of doctors in a CoP. In discussing the development of online communities for school leaders in UK (the Talking Heads and Virtual Heads projects), Ramondt and Chapman (2004) also attribute their success to a significant extent to the online facilitation team.

The term moderator is commonly found in the CoPs literature. For example, a study conducted by Gray (2004) to investigate (among others) the role played by the moderator in an online community found that moderator's role in this online CoP was perceived as "absolutely critical" in starting up, supporting, and sustaining the

informal learning environment. The moderator was also the person who helped them to learn and the members considered that this role was needed in an ongoing basis.

Different authors suggested different frameworks for roles in CoPs, for example, Le Moult (2002) maintains that there should be four basic roles in a CoP: sponsor, moderator, supporter, and member. The most detailed discussion about roles in CoPs perhaps can be found in Fontaine (2001), who, after in-depth interviews with almost 100 community members, leaders, and knowledge management professionals in 18 firms, concludes that if roles are not established in the early part of the development of the CoPs they may often flounder and fail. Fontaine has listed 11 roles in a CoP, grouped under four categories; they include leadership roles (leaders and sponsors), knowledge domain roles (subject matter experts, core team members, community members), intermediary roles (facilitators, content coordinators, journalists), and support roles (mentors, admin/event coordinators, technologists).

Overall, roles in CoPs can be categorised into four main groups, as shown in the following table.

Table 3: Categories and examples of roles in CoPs

Leaders	Core Members	Support Persons	Community Members
• Community organiser (Stuckey, 2001) • Project manager (Wallace & St-Onge, 2003) • Sponsors (Fontaine, 2001 • Moderators/facilitator (Cothrel & Williams, 1999; Fontaine, 2001; Ramondt & Chapman, 2004) • Co-ordinator (Wenger et al., 2002)	• Subject matter experts (Cothrel & Williams, 1999; Fontaine, 2001). • Knowledge manager (Cothrel & Williams, 1999) • Content co-ordinator (Fontaine, 2001)	• Mentors (Fontaine, 2001) • Tutors (Webb et al., 2004) • Event co-ordinator (Fontaine, 2001) • Technologist (Fontaine, 2001) • Help desk (Cothrel & Williams, 1999)	• Co-learners (Webb et al., 2004)

Leaders of an online CoP provide overall guidance and management of the CoP, and should secure funding for the community (Fontaine, 2001). They also model and reinforce community rules and norms of practice and nurture the growth of others to become leaders (Schlager & Fusco, 2004). As suggested by Gray (2004), they should have technical competence, an understanding of community building and developing social connections, a learning orientation, and sufficient knowledge of the practice itself.

Core members are subject matter experts who have expertise in the practice. They are active participants of the CoP and are responsible for the daily operation of sub-communities (Barab et al., 2004). They are also knowledge brokers/stewards/researchers who help capture, codify, retrieve, and transfer knowledge of the CoP, and facilitate its exchange (Fontaine, 2001).

Support persons are mentors who help new members to understand the CoPs' culture and practices, the administration/event coordinators who plan online or face-to-face events, and the technologists who have to understand the needs of the community so as to select, adopt, and adapt technology for the community and maintain its communication infrastructure (Wenger, White, Smith, & Rowe, 2005). These people help develop norms and policies for the CoP (Fontaine, 2001).

Community members are the active or non-active (lurkers) members of the CoP. They participate in the events and activities of the CoP (Fontaine, 2001). Eventually some of these members may become core members or leaders of the CoP.

Two strategies for developing leaders in online CoPs have been identified in the literature:

- *Nurturing leaders within the CoP*. Leadership is considered the most important role in online CoPs (Fontaine, 2001). Koh and Kim (2003) and Gray (2004) recommended that virtual communities should nurture enthusiastic community leaders. One successful characteristic of successful online managers, moderators, and knowledge managers in Cothrel and Williams' study (1999) was that they were all members of the group they now facilitate. As such, they have an in-depth understanding of the needs of the groups.

- *Involving leaders as early as possible*. Fontaine (2001) notes that roles in CoPs may change as the CoP matures and they also evolve differently in a "bottom-up" or "top-down" manner. In a CoP that is deliberately created (top-down), roles are often established at the outset. Wenger and his colleagues (2002) concur with Fontaine (2001) that community coordinators should be involved in the formation of the CoP as early as possible, and well respected community members invited by the community sponsor to serve as official coordinator, to recruit potential community members (Wenger et al., 2002). Similarly, in Wallace and St-Onge's (2003) community development model, they suggest that in the first phase of developing a community, a project manager, a steering group, and a team of resource people from across the organisation should be put in place and roles should be defined. When CoPs emerge bottom-up, the CoP has normally evolved from a core group of subject-matter experts and a leader and a core team will emerged as the CoP begins to mature to take responsibility for daily operations (Fontaine, 2001). Wenger (1998) maintains, "whether these [CoPs] arise spontaneously or come together through seeding and nurturing, their development ultimately depends on internal leadership" (p. 7).

5.5 Design Principle 5: Online communities of practice should include technology designed with functionality to support sociability and knowledge sharing

As the choice of technology impacts on the community of practice, designers need to consider the:

- *Needs of the community;*
- *Level of access to technology; and*
- *Level of funding available.*

Technology can support communities of practice in a number of ways:

- *Connecting members of the community of practice;*
- *Supporting team work;*
- *Building knowledge repositories;*
- *Building a sense of community;*
- *Encouraging participation;*
- *Fostering identity and presence;*
- *Mentoring; and*
- *Online instruction.*

Technology can be designed to be either 'pull' or 'push' in nature.

5.5.1 Designing technology

In configuring technology, the designers have to adapt the design process to the specific conditions of the CoP (Wenger, White, Smith, & Rowe, 2005):

- *Needs of the community*. It is important that the technology designers have a good understanding of the goals, purpose, and the needs of the online CoP, as well as the social and pedagogical issues of the teaching profession, before deciding how to configure technology (at the platform, tool, and feature levels) to support the functioning of the CoP. The technology configuration will provide functionality to support learning, knowledge sharing and creation, as well as sociability and participation in the online CoP (Preece, 2000). Teachers participating in an online CoP need "a set of learning and collaboration capabilities that they can own and tailor to meet their own needs and the needs of the community" (Schlager & Fusco, 2004, p. 139), and thus the technology infrastructure must be able to support the forming of sub-groups for specific activities.

- *Level of access of technology*. The bandwidth, compatibility of computer platforms (Mac or PC), and operating systems to which the potential members of the CoP have access have to be considered. "The technology needs to work for everyone if the sense of community is to be sustained" (Wenger, White, Smith, & Rowe, 2005, p. 9).

- *Funding available*. What kinds of technology tools the CoP can access depends on its budget (Wenger, White, Smith, & Rowe, 2005). We note that some of the technological platforms and tools used to support the development of online CoPs are very expensive to purchase or license and they may only be affordable to large organisations (for example, see Wenger, 2001).

Good design of technology is essential for the functioning of online CoPs. As maintained by Wenger, White, Smith and Rowe (2005), "good technology in itself will not make a community, but bad technology can sure make community life difficult enough to ruin it" (p. 9). While it is not the intention of this review to provide details and compare design features of the tools or platforms of technology that can be used to support online communities, suffice it to say that technology should be designed:

- For ease of use and learning (Preece, 2000; Wenger, White, Smith, & Rowe, 2005);
- For evolution. The community itself will evolve so technology should be simple (Wenger et al., 2002; Wenger, White, Smith, & Rowe, 2005);
- For availability of access so that community activities are more easily integrated with members' work and social environments (Schlager & Fusco, 2004; Wenger, White, Smith, & Rowe, 2005); and
- From the user's perspective (Preece, 2000; Wenger, White, Smith, & Rowe, 2005).

5.5.2 Functionality – technology to support CoPs

In a recent book chapter Wenger, White, Smith and Rowe (2005) discuss the contributions that technologies can make to CoPs. They argue that technology can help community cultivation by providing the resources to foster a sense of togetherness for the members, so that they feel that they belong to and are part of the online or distributed community (for example, not just an email list), despite the separation of time and space. At the same time, for individuals to participate successfully in multiple communities, they also need to preserve a sense of identity; and technology can support individual participation, thus fostering a sense of individual identity. Technology should be designed with the following functionality to mediate community experience:

- *Connecting members of the CoP.* Technology in the online CoP can connect members in a number of ways:

  Asynchronous discussion forums – private and public discussion forums should be supported so that members of the CoP can form sub-communities or topic related groups (Booth, 2004; Henderson, 2004).

  Synchronous Web-based chat forums - should be set up to support social networking (Henderson, 2004). Graphical chat environments and audio and video conferencing could provide a stronger sense of co-presence and engagement (Preece, 2000; Wenger, 2001). Text-only chats can accommodate more participants than chats that use avatars (graphical/pictorial illustrations of who is 'chatting'), which will be too crowded even with 10 users, but if the online community is large, synchronous chats are not always recommended (Preece, 2000). In particular, this is because the discussion becomes harder to follow as the number of members participating increases and slower typists are often left behind.

  Listserv email delivery - is well suited to broadcasting messages (Preece, 2000) and publishing community newsletters, to provide news and announce online and offline events (Wenger, 2001).

- *Supporting teamwork.* Technology should be designed to provide an online community space for members to conduct their team work, support for sharing of ideas and brainstorming (Booth, 2004), and to help members to produce, share and organise communal repositories. Online collaborative tools such as electronic whiteboards and document sharing capabilities should be supported for task scheduling and project management (Schlager & Fusco, 2004; Wenger, 2001).

- *Building knowledge repositories*. The technology infrastructure should maintain a knowledge base of best practice for the community and support practice-building projects for groups in the community (Wenger, 2001), for members to retrieve and analyse the records of online discourse and digital artefacts created collaboratively by members of the online CoP (Schlager & Fusco, 2004). These artefacts could include technical worksheets, educational theory, exemplary materials, video of practice, or lesson plans (Henderson, 2004).

- *Building a sense of community*. Technology can provide a variety of interactions for the community members to develop a sense of community such as providing a community calendar (Henderson, 2004), online lecturers and workshops, and Web tours. Technology also helps increase the efficiency of involvement by making participation easy for the members, providing subscriptions to new information, and providing desktops to integrate knowledge and work in the CoP. Technology can also support multiple levels and types of participation, by providing differential access rights, lurking facilities, and creating subspaces for different groups of members (Wenger, 2001).

- *Encouraging user participation*. The technology infrastructure can highlight the value of joining a CoP. For example, an online CoP can provide links to other sites and set up a library of resources for its members. It can also provide a personal knowledge portal, which merges work with knowledge management, and provide the users with a point of entry into their work, their projects, CoPs, and other information resources (Henderson, 2004; Wenger, 2001). Access to help desk facilities can also help members to overcome some of the technical barriers for participating (Schlager et al., 2002).

- *Fostering identity and presence.* The Web provides many possibilities for members to develop their personal identities. Technology can support member directories and profiles, electronic newsletters, one-to-one instant messaging, personal history, ranking of reputation and provide personal space in the community space. A virtual meeting place provided by technology can help develop a communal identity in online CoPs (Preece, 2000; Wenger, 2001).

- *Mentoring*. Technology can support peripheral participation by providing FAQ lists, databases of answers, and access to experts, for its members (Wenger, 2001).

- *Online instruction*: The technology infrastructure can provide space for educational activities and can support CoPs if they have a responsibility to train newcomers how to operate within the community (Wenger, 2001).

5.5.3 Pull or push technology?

In the design of an online CoP, it is suggested that some functionalities should be provided to push content to members (for example, by the community manager) but the aim of the CoP should be for members to generate as much content between them as possible (Pickles, 2003, cited in Kondratova & Goldfarb, 2004). These push functionality (pushing content to members) features include knowledge repositories, news, workshop/e-learning modules, classifieds and job offerings. There are also pull features (pulling content from members) that should be supported, which include discussion forums/conferencing, member directories, member reviews, polls and surveys, online and offline events, and topic experts services, chat rooms, and live meetings, and audio/video conferencing. Different online technology systems have different focuses in terms of using push or pull technology. For example, two systems described by Wenger (2001), Intraspect and Communispace (http://www.comunispace.com), have different focuses. While Intraspect used email as its primary interaction medium, Communispace encourages its users to use the community space on the Web to communicate. Users

may prefer to use different technologies at different stages of the community's development. For example, in Cothrel and Williams' (1999) study, it was found that members used the discussion space to establish initial contact but then exchanged views by email.

5.6 Design Principle 6: Online communities of practice require a blended approach to development where online activities are supported by offline activities

Many researchers suggest that the online activities should be supported by offline activities.

- *Reasons for this include:*[a]
  - Higher levels of satisfaction;
  - Helps in building trustworthy relationships; and
  - Provides a sense of community.

The importance of organising offline events (William & Cothrel, 2000), and face-to-face meetings (Wenger, 1998) to sustain online CoPs has been proposed by a number of authors in the literature (for example, Hildreth et al., 2000; Johnson, 2001; van den Hooff et al., 2003). For example, Bos, Olson, Gergle and Irwin (2002) reported that purely text-based electronic communication not supported by significant face-to-face contacts tended to dwindle and disappeared in online communities. After gaining experience in designing a CoP for Sun Life Financial, in the fall of 1999, Wallace and St-Onge (2003) also suggest that the virtual space needs to be complimented by opportunities for members to meet face-to-face, and on the telephone. Sharp (1997, p. 6, cited in Stuckey, 2001) argues that online communities are "…a weaker sense of community, a discourse community" (p. 5) and suggested that face-to-face activities and opportunities for short-term mentoring are ways of increasing the success of online CoPs. As suggested by Stuckey (2001), even a highly developed technological environment alone cannot support all that true community requires.

5.6.1 Reasons for having offline interactions

- *Higher level of satisfaction*. In Hossain and Wigand's (2004) study, the need for face-to-face communication support was also highlighted, with participants having a higher level of satisfaction in collaboration as a result of face-to-face communication support.

- *Help in building trustworthy relationships*. Earlier studies tended to support the view that due to the loss of social cues in the communication process, ICT mediated communication is not socially rich enough to establish real trust (for example, van den Hooff et al., 2003). For trust to emerge in a community, face-to-face interactions are essential (Handy, 1995; Hossain & Wigand, 2004). Even if trust is developed in a virtual environment, as argued by Jarvenpaa and Leidner (1999, cited in van den Hooff et al., 2003), it is a "task-related, 'swift' kind of trust instead of a truly interpersonal or socially based trust" (p. 124). Bos et al. (2002) has conducted a study comparing trust generated by four modes of communication. They found that face-to-face communication generated the most trust among participants, closely followed by video and audio conferencing, while purely text-based communication (chat) generated significantly less trust. Hossain and Wigand (2004) also found that building trustworthy relationships among participants was dependent on the level of face-to-face communication support.

  The importance of having face-to-face meetings is also emphasised by Hildreth et al. (2000). They maintain that CoPs can function in online environments but it is necessary to have face-to-face contact. Initial face-to-face communication is an essential prerequisite to establishing higher levels of trust

among agents working from geographically dispersed locations. ICT can be used to support further relationships once teams have experienced some level of initial face-to-face communication.

- *Provide a sense of community*. Koh and Kim (2003) investigated factors affecting members' sense of virtual community by distributing 220 questionnaires (172 usable questionnaires returned) to 44 virtual communities in Korea. A major finding from this study was the critical role that offline activities played in an individual member's sense of (virtual) community. This finding is consistent with earlier studies that "offline meetings play a critical role in enhancing the inherently low social presence of computer mediated environments" (Lombard & Ditton, 1997) and that strong ties among members cannot be sustained without physical cues (Stoll, 1995, cited in Koh & Kim, 2003).

5.6.2 How can online CoPs be supported by offline activities?

It is recommended by Koh and Kim (2003) that when offline activities are not feasible, using multimedia support, in the form of videoconferencing, or PC camera chatting, may provide the community with the effects of offline, face-to-face meetings. Wenger et al. (2002) also mentioned the need for audio-conferencing and face-to-face meetings in online CoPs. There appears to be a need for 'face-time' for a community to have coherence. Collision and Parcell (2001, cited in Nichani & Hung, 2002) maintain that "a rule of thumb is to meet face-to-face at least once a year to establish and maintain relationships" (p. 54). Thus, a balancing act is needed in building online CoPs.

6. Bilingual considerations

The issue of using multiple languages is complex.

- *Very little information is available regarding bilingual online communities of practice.*
- *Conducting online discussions in multiple languages is complicated.*
- *Designing a bilingual website requires more than translating the words.*
- *Providing bilingual websites makes an important statement regarding the value of both cultures to that society.*
- *More research is required into the provision of bilingual online communities of practice.*

Searching for information on bilingual online communities of practice proved very difficult. Most of the information found related to the use and design of bilingual websites, rather than bilingual communities, let alone bilingual communities of practice.

Only one paper was found that reported on the use of multiple languages in a community, that of Trayner (2003). In her paper she reports on the experiences of members of an "International Cafe" in an international workshop about CoPs. Each member used their first language, and their comments were quickly translated into three further languages. It was expected that this would "result in the encompassing and extending of different worldviews and different local knowledge" (p. 408). The research, however, highlighted the difficulties involved in conducting online discussions in multiple languages. Trayner reports that her research leads her:

> *to consider that while negotiating meaning in unilingual groups is already a complex issue, further complicated by the challenges of communicating online, the complexity of meaning-making is significantly amplified in a dispersed community with members conversing in different national languages* (p. 408).

This is in line with the literature on bilingual websites, which noted that designing effective bilingual websites was about more than the language. As Bayan (2001) noted, "Your language-specific pages must use country/culture-specific displays, such as colors, symbols and graphics, appropriately". In addition, it is important to realise that the choosing whether or not to make your website bilingual can be related to, or may affect, society as a whole. As Cunlifee (2001) noted:

> *the way in which language is used on a bilingual site will not only affect the direct usability of that site but may also have an indirect effect on actual use if it is perceived as reflecting the extent to which an organisation values a particular language community.*

Given the wider implications of using multiple languages identified in the literature on bilingual websites, it is apparent that the issue of using multiple languages in online communities of practice is one that requires further research.

Conclusion

In the process of undertaking this review and synthesis, the reviewers identified a wealth of conceptual studies on communities of practice and knowledge management, but very few empirical studies on the actual practice of communities of practice, particularly with relationship to professional development of teachers, have been found. Even fewer articles have been identified in the field of online communities of practice. However, with the limited literature available, it is confirmed that online CoPs, with their capabilities to serve as a bridge between space and time, have a real potential to be an effective model for professional development of teachers. However, while anecdotal evidence has been found in the literature to document the effectiveness of online CoPs, no systematic studies have been found to measure effectiveness. One can argue that we are still at the very early days of the development of online CoPs and more credible evidence will be found if this review is to be undertaken again in five years' time. A few design principles have also been identified in the literature to support the functioning of online CoPs but again they have not been adequately tested.

SUMMARY OF FINDINGS

Communities of practice are about negotiating a joint enterprise and function through mutual engagement. Members of communities of practice develop a shared repertoire of communal resources. Within a community of practice, the process of learning and the process of membership are inseparable. Communities of practice are distinct from other groups in that they are about a shared practice, they have a diverse and heterogeneous membership, they are not necessarily task-oriented, but they are always learning communities.

While online CoPs share some similar characteristics with CoPs in general, they also differ in several aspects, including design, membership, leadership, the form of communication, the time it takes to develop the community and the technological support required. It is important to note that creating online CoPs requires more than simply transferring a CoP to an online environment, and that not all online groups or communities are communities of practice. Online CoPs differ from other online communities in terms of the level of collaboration and engagement.

One debate in the literature is whether or not CoPs can be totally supported and operated online. Two key issues raised in this debate concern whether relationship and trust can be built online and whether tacit knowledge and practice can be shared online. Although no definitive answer has yet been reached, a number of researchers believe that these issues can be overcome if care is taken in the development of online CoPs.
Communities of practice are central to effective teacher professional development. This requires a shift in emphasis from formal training to learning in practice, and to learning which is ongoing. Communities of practice allow teachers to act as co-producers of knowledge, which requires greater personal responsibility for professional growth and development.

A number of effective online CoPs exist currently. Some of the characteristics of effective online CoPs include the clarity of their purpose, the diversity of membership, the strength of the leadership and their emphasis on participation and community building. In addition, it is important that the technology is used appropriately, and that they are long-term projects.

A number of principles have been identified for designing effective online communities of practice:

- Online CoPs should be cultivated to grow naturally.
- Online CoPs should be designed to support sociability and participation.
- Online CoPs should be created to attract a diverse membership.
- Online CoPs should be managed by providing for different roles.

- Online CoPs should include technology designed with functionality to support sociability and knowledge sharing.
- Online CoPs require a blended approach towards development where online activities are supported by offline activities.

All online CoPs go through a number of different phases. The first phase is a formation phase, the second a sustaining and maturing phase and the third a phase of transformation or disengaging. At this third phase the online CoP expands, fades away, or ceases to exist.

The issue of using multiple languages in online communities of practice is complex. Very little information is available regarding this, although the literature does show that conducting online discussions in multiple languages is complicated. From lessons learned from the use of bilingual websites, it is apparent that the issues are more involved than simply translating the words, and providing bilingual websites makes an important statement regarding the value of that culture to society.

LIMITATIONS OF THE REVIEW

As commented in the introduction, little empirical research was found with regard to online CoPs, and even fewer studies were related to the use of online CoPs related to teaching and learning. There were also areas of interest, such as issues related to bilingual online communities of practice, where very little research was found. Limitations associated with the paucity of literature directly related to the area of interest meant we had to broaden our search. As such, we considered research available on communities of practice in general, as well as to online communities of practice in areas unrelated to education, such as business. Given the large amount of literature available in this area, we have been able to review and synthesise only a small proportion of the studies within the time frame and funding available to the research team.

RECOMMENDATIONS FOR FURTHER RESEARCH

Our review has found that there is a clear need for further research, particularly empirical research, into the use of online CoPs in professional development, and its effects on teaching and learning. As well, systematic research should be conducted to investigate how a systemic education CoP could be developed in order to:

> *build the capacity of, and provide incentives for, teachers to participate in a variety of teacher education, staff development, and self-motivated professional activities from their workplace via the Internet* (Schlager et al., 2002, p. 154).

In addition, there is need for research into the issues associated with the provision of bilingual online CoPs.

Annotation of selected research studies

The following collection of research studies has been selected to represent a cross-section of the literature informing this report. The template used provides bibliographical detail as well as original abstracts where available. Where abstracts were not originally provided we have included a brief summary before listing a selection of key themes and evaluative comments.

Ardichvili, Page, & Wentling (2002)
Barab, MaKinster, & Scheckler (2004)
Buysse, Sparkman, & Wesley (2003)
Cothrel & Williams (1999)
Davenport (2001)
Davenport & Hall (2002)
Ellis, Oldridge, & Vasconcelos (2004)
Eraut (2002)
Fontaine (2001)
Gray (2004)
Hildreth, Kimble & Wright (2000)
Hossain & Wigand (2004)
Hung & Chen (2001)
Johnson (2001)
Kling & Courtright (2003)
Koh & Kim (2003)
Lueg (2000)
Moore & Barab (2002)
Nichani & Hung (2002)
Palinscar, Marano, Ford, & Brown (1998)
Preece (2004)
Schlager & Fusco (2004)
Schwen & Hara (2003)
Sharratt & Usoro (2003)
Sherer, Shea, & Kristensen (2003)
Stuckey & Smith (2004)
Wallace & Saint-Onge (2003)
Wasko, & Faraj (2000)
Wenger (1998)
Wenger & Snyder (2000)

Ardichvili, A., Page, V., & Wentling, T. (2002, April). *Motivation and barriers to participation in virtual knowledge-sharing communities of practice*. Paper presented at the OKLC 2002 Conference, Athens, Greece.

Type: Empirical **Country of origin:** United States of America

Area of study: Practical issues

Keywords: communities of practice, virtual communities, online, knowledge networks, social capital, mentoring

Abstract:

This paper reports the results of a qualitative study of motivation and barriers to employee participation in virtual knowledge-sharing communities of practice at Caterpillar Inc., a Fortune 100, multinational corporation. The study indicates that, when employees view knowledge as a public good belonging to the whole organization, knowledge flows freely. However, even when individuals give the highest priority to the interests of the organization and of their community, they tend to shy away from contributing knowledge for a variety of reasons. Specifically, employees hesitate to contribute out of fear of criticism, or of misleading the community members (not being sure that their contributions are important, or completely accurate, or relevant to a specific discussion). To remove the identified barriers, there is a need for developing various types of trust, ranging from the knowledge-based to the institution-based trust. Future research directions and implications for KM practitioners are formulated.

Key themes:

- CoPs are knowledge sharing communities
- CoPs can facilitate knowledge management and professional development
- Online CoPs should be cultivated to grow naturally
- Online CoPs should be designed for knowledge creation, but mechanisms have to be put in place to protect privacy and intellectual property
- The environment from which CoPs develop can impact upon their efficacy

Evaluative comments:

This study identifies significant issues regarding motivation and barriers to participation. In addition, this study has acknowledged the importance of environmental factors as an indicator for the success or failure of a CoP. If the CoP emerges from a work environment that values and encourages collaboration, knowledge sharing and innovation, it will have a higher chance of success. The authors noted that an important issue to consider regarding online CoP is to ensure that its members are familiar with and used to communicating in a virtual environment. Once again the emergent nature of CoPs was highlighted. Two of the barriers were a hesitancy to post a message for fear of submitting potentially inaccurate data and the lengthy process of obtaining approval from the CoP managers, who checked each potential message for accuracy.

Barab, S. A., MaKinster, J. G., & Sheckler, R. (2003). Designing system dualities: Characterizing a web-supported professional development community. *The Information Society*, *19*(3), 237-256

Type: Empirical **Country of origin:** United States of America

Area of study: Practical and design issues

Keywords: communities of practice, knowledge network, online, inservice teacher education, teacher improvement, social network, virtual communities

Abstract:
In this article we focus on the challenges we have encountered in attempting to support the development of an online community of practice for grade 5-12 mathematics and science teachers. Specifically, this project involves the design and evaluation of an electronic knowledge network, the Inquiry Learning Forum (ILF), a web-based professional development system designed to support a community of practice (CoP) of in-service and preservice mathematical and science teachers who are creating, reflecting upon, sharing, and improving inquiry-based pedagogical practices. This research examines the interplay among a variety of variables that characterize the dynamics of building a social network through which participating teachers will seek to share and improve their pedagogical practices. Our research suggests that designing for virtual communities involves balancing and leveraging complex dualities from the "inside" rather than applying some set of design principles from the "outside". This research provides an illuminative case study from which others can more readily identify patterns occurring in their own interventions and navigate the challenges they face more intelligently.

Key themes:

- CoPs as learning/ knowledge communities should be distinguished from other forms of communities/ groups
- Having offline and face-to-face encounters is important to sustain online CoPs
- CoPs have life cycles
- Technology should be designed with functionality to support sociability and knowledge sharing
- Hardware and software tools impact on the community
- Online CoPs need to allow for different levels of participation, and movement between these levels

Evaluative comments:
The importance of face-to-face contact was highlighted in this article. The authors also concluded that the community itself should play a large part in its design. This article offers valuable insights into the design issues arising from online communities, and highlights the issues associated with deliberately planning and designing an online community that is essentially emergent in its nature.

Buysse, V., Sparkman, K. L., & Wesley, P. W. (2003). Communities of practice: Connecting what we know with what we do. *Exceptional Children*, *69*(3), 263-277.

Type: Review/Conceptual **Country of origin:** United States of America
Area of study: Practical issues
Keywords: communities of practice, professional development, situated learning, teacher education, inservice teacher education

Abstract:
This article examines the community of practice model as a framework for integrating educational research and practice. This perspective extends current notions about collaborative inquiry and the role of teacher participation in research aimed at improving educational practices. In addition to defining communities of practice and describing reflective practice and situated learning as the theoretical underpinnings of this approach, the article analyzes applications of this model from the literature and offers suggestions for transforming traditional methods of conducting research on educational practice. The article concludes with a challenge to the field to consider ways to promote dialogue and inquiry to advance our knowledge on this issue.

Key themes:

- CoPs are learning communities
- CoPs are distinguished from other groups in terms of membership, domain, and collaboration
- CoPs can facilitate knowledge management and professional development of teachers

- CoPs should be cultivated to grow naturally
- CoPs have life cycles

Evaluative comments:

This article offers insight into the potential of using CoPs not only for professional development, but also as a valuable tool for educational research. Although this article is restricted to traditional CoPs, much of what is discussed can also be related to online CoPs.

Cothrel, J., & Williams, R. L. (1999). On-line communities: Helping them to form and grow. *Journal of Knowledge Management*, *3*(1), 54-60

Type: Empirical **Country of origin:** United States of America

Area of study: Practical issues

Keywords: online, virtual communities, group dynamics

Abstract:

The rise of e-mail and other computer-based communication technologies has enabled members of global organizations to collaborate and exchange information to an unprecedented degree. The term "on-line community" (OLC), coined in the early days of computer networking, is now being applied to groups of employees with common professional goals and interests who seek to add value by extending themselves virtually. However, the performance of these corporate OLCs has not always kept pace with their lofty aspiration. To find out why, Arthur Andersen's Next Generation research Group, in cooperation with Anheuser-Busch, The Mutual Group, and Shell US, studied 15 very different OLCs. Among the questions we sought to answer were: how successful are OLCs in achieving their state purpose? What distinguishes a truly successful OLC? What are some pitfalls that everyone is encountering? This article presents findings and lessons learned from our in-depth interviews with the organizers of these virtual groups.

Key themes:

- Online CoPs should be cultivated to grow naturally
- Online CoPs should be designed for sociability
- CoPs should be managed with different roles

Evaluative comments:

The authors conducted a literature review "that identified 35 OLCs worthy of further study" (p. 54), yet list only one reference at the conclusion of the article. This article does, however, offer practical insights into the workings of online communities.

Davenport, E. (2001). Knowledge management issues for online organisations: 'Communities of practice' as an exploratory framework. *Journal of Documentation*, *57*(1), 61-75.

Type: Conceptual/empirical **Country of origin:** United Kingdom

Area of study: Practical issues

Keywords: organisational knowledge, knowledge management, case studies

Abstract:

Communities of practice have been identified as sites where knowledge is created in organisations. The author reviews studies of situated learning and situated action and suggests that these two activities may characterise the learning process in communities of practice where they are supported by a distinctive 'social' infrastructure. She analyses recent fieldwork in three online communities (a digital library reference service, a virtual enterprise

and an online shopping group) to discover to what extent they may be described as communities of practice, and to establish how they support participants' learning.

Key themes:

- Deconstruction of knowledge management
- Communities of practice as source of organisational knowledge; a form of social interaction
- Situated learning (creating shared expectations), situated action (creating new practices) and social infrastructure (providing common ground for innovation) all contribute to the framework of organisational knowledge, by promoting understanding of the impetus behind communities or practice
- 'Key informants' play an important role in garnering support for emerging rhetoric or emerging innovative practice. It is more difficult for novices to identify these people in an online community, as relationships are subtler.

Evaluative comments:

The paper presents a review of the role communities of practice play in the creation of knowledge and explores the infrastructure that supports the growth and transfer of that knowledge including how to compensate for the lack of face-to-face interaction in an online community of practice. It appears that successful communities of practice are informal in that they determine their own 'shape'. The case studies provided are of interest but not directly informative except in that they provide examples of different purposes of web-based communities.

Davenport, E., & Hall, H. (2002). Organizational knowledge and communities of practice. ***Annual Review of Information Science and Technology*****, *36*, 171-227**

Type:	Review	**Country of origin:**	Scotland
Area of study:	Practical issues		
Keywords:	community of practice, online, social capital, knowledge network, situated learning,		

Summary:

This review considers different approaches to CoP and examines "…contributing domains; current (corporate) manifestations; motivations and infrastructures; tools for analyzing communities of practice; and analytic case studies" (p. 172). The authors observed that situated learning, distributed cognition and communication studies were three domains relating to CoP and discussed each domain in turn. It was also noted that the research studies relating to CoP were from either a performative perspective, or an interpretive or constructivist perspective. Both perspectives are discussed. The impact of different sources and types of motivation on CoP are examined, as well as the different rewards aimed at increasing motivation. Infrastructure was discussed under three headings - technologies for communication and representation, boundary objects, and social infrastructure. Online CoPs are examined and their advantages and disadvantages are discussed.

Key themes:

- CoPs are learning communities
- CoPs are distinguished from other groups in terms of membership, domain, and collaboration
- Online CoPs should be distinguished from online or virtual communities, which are not necessarily CoPs
- Not everyone is convinced that online CoPs can function effectively
- Having offline and face-to-face encounters is important to sustain online CoPs
- Online CoPs should be designed for sociability
- Online CoPs should be designed for knowledge creation, but mechanisms have to be put in place to protect privacy and intellectual property
- Technology should be designed with functionality to support sociability and knowledge sharing

Evaluative comments:
This lengthy article provides an overview of the issues surrounding CoP, both offline and online. It raises awareness of the factors contributing to the success or failure of a CoP.

Ellis, D., Oldridge, R., & Vasconcelos, A. (2004). Community and virtual community. *Annual Review of Information Science and Technology*, *38*, 146-186

Type: Review/ Conceptual **Country of origin:** United Kingdom
Area of study: Practical issues
Keywords: virtual communities, communities of practice, social capital, information networks
Summary of study:
Ellis, Oldridge & Vasconcelos (2004) examine the concept of virtual community and the debate surrounding the use of the term 'community' in the context of electronic environments. The status of virtual communities as communities is questioned. They go on to

> explore the notion of community and virtual community in relation to four different themes: (1) virtual communities and communities of practice; (2) virtual communities and virtual arenas; (3) virtual community networks; and (4) networked virtual communities. The objective is to illuminate how the concept of virtual community, in different ways, may be changing our understanding of community, rather than to provide a definitive doctrine of virtual community (p. 155).

The authors conclude that virtual communities offer new windows of opportunity for researchers to study the concept of community, where its members may be widely dispersed around the globe.
Key themes:

- CoPs should be distinguished from online or virtual communities, which are not necessarily CoPs
- Having offline face-to-face encounters is important to sustain online CoPs
- Technology should be designed with functionality to support sociability
- CoPs are learning communities
- CoPs are distinguished from other groups in terms of membership, domain, and collaboration

Evaluative comments:
This article identifies different types of virtual community including CoPs, as well as noting the specific attributes of an online CoP.

Eraut, M. (2002, April 1-5). *Conceptual analysis and research questions: Do the concepts of "learning community" and "community of practice" provide added value*? Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, LA. Retrieved April 6, 2005, from http://www.eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED466030.

Type: Conceptual **Country of origin:** United Kingdom
Area of study: Practical & theoretical issues
Keywords: communities of practice, mentors, professional development, intergroup education
Abstract:
The concepts of "learning community" and "community of practice" may hold value to researchers, but questions exist as to how well they help in organizing and clarifying the type of critical thinking involved in investigative work. This paper approaches the problem from two directions. One is to deconstruct the two

concepts themselves and explore their range of meanings. The other is to explore more grounded research questions about learning and the conditions for learning that are relevant to researching learning communities and/or communities of practice. The purpose of this investigation is to develop criteria by which one can judge whether these two ideas provide useful frameworks for organizing questions involving learning communities and communities of practice. The discussion includes asking what kind of empirical evidence is needed to recognize such communities when perceived, and what kind of learning is occurring, how it is taking place, and what the factors are that affect its magnitude and direction(s). If these concepts do not provide the route to yet other theories that provide greater purchase on the problems of facilitating learning in a wide range of contexts.

Key themes:

- Not everyone is convinced that CoP, whether online or not, can function effectively
- Having offline and face-to-face encounters is important to sustain online CoP

Evaluative comments:

This paper offers a different perspective from many of those commonly cited in discussions of CoPs. Eraut (2002) challenges Lave and Wenger's (1991) concept of a community of practice, and offers examples of situations in which the environment, nature of the work, or social structure prevents or disrupts the functioning of a community of practice. Eraut also suggests that a lack of stability or job-security, due to the ever-changing nature of work today, may be detrimental to communities of practice. It is interesting to note that some of the factors cited by the author as limiting the efficacy of communities of practice could be eliminated through the use of online communities of practice, although this possibility is not discussed in this paper.

Fontaine, M. (2001). Keeping communities of practice afloat. *Knowledge Management Review*, *4*(4), 16-21.

Type: Empirical **Country of origin:** Not stated

Area of study: Practical issues

Keywords: communities of practice, mentors

Summary of study:

Aim: The study concerned communities in 18 firms, and identified 11 formal and informal roles within these communities (p. 16). It aimed to identify the roles needed to maintain a vibrant community of practice.

Methodology: In-depth interviews were conducted with approximately 100 community members, leaders, and knowledge management professionals to determine what roles existed, and what roles may potentially exist. Case studies were developed and data compared with the roles identified in the CoP literature.

Findings (p. 17):

- CoPs don't depend on technology and funding, but on organizations supporting the creation of clear roles;
- Researchers examining 18 companies found 11 distinct roles being played in CoPs;
- The CoP roles can loosely be grouped in four categories: knowledge domain, leadership, knowledge intermediary and community support;
- Roles within communities may evolve in a "bottom-up" or "top-down" manner;
- Clearly defined roles ensure a structure that allows a community to grow with a sense of vision;
- Continuity of roles provides consistency and structure as the membership changes;
- Roles reinforce the legitimacy and value of the community throughout the organization.

Key themes:

- CoPs should be managed with different roles.

Evaluative comments:

This article clearly sets out the 11 roles found in CoPs. Fontaine provides descriptions of each, along with their primary responsibilities. This article offers valuable insights into the various roles that are needed within a CoP.

Gray, B. (2004). Informal learning in an online community of practice. *Journal of Distance Education*, *19*(1), 20-35.

Type: Empirical **Country of origin:** Canada

Area of study: Practical issues

Keywords: communities of practice, online, collegiality, professional isolation

Abstract:

What role can online communities play in meeting the informal learning needs of a professional association? This article presents the results of an interpretive study of the experiences of coordinators of Alberta Community Adult Learning Councils who participated in an online community of practice designed to support informal workplace learning. Through active participation and peripheral "lurking", newcomers were oriented into the skills and culture of the practice, and experienced practitioners gained new insights into their own professional identities and the meaning of their work. Telling their stories helped to develop not only identity as individual practitioners, but also served to reconstruct the identity of the collective community on an ongoing basis. Motivations to participate included an opportunity to learn new skills and work practices, a means of social and professional connection to colleagues, and a mechanism to reduce the isolation that was inherent in the job function and geographical location. The role of the online moderator was identified as critical in sustaining the online community over an extended period and enhancing the learning function.

Key themes:

- CoPs are distinguished from other groups in terms of membership, domain, and collaboration
- CoPs are learning communities
- CoPs should be managed with different roles
- Online CoPs should be designed for sociability

Evaluative comments:

This article provides useful information on the role of the moderator in online CoPs. This is an important role that enables the facilitation of learning and smooth operation of the CoP.

Hildreth, P., Kimble, C. & Wright, P. (2000). Communities of practice in the distributed international environment. *Journal of Knowledge Management, 4*(1), 27-38.

Type: Conceptual/empirical **Country of origin:** United Kingdom

Area of study: Practical issues

Keywords: communities of practice, case studies

Abstract:

Modern commercial organisations are facing pressures which have caused them to lose personnel. When they lose people, they also lose their knowledge. Organisations also have to cope with the internationalisation of business forcing collaboration and knowledge sharing across time and distance. Knowledge management (KM) claims to tackle these issues. This paper looks at an area where KM does not offer sufficient support, that is, the sharing of knowledge that is not easy to articulate. The focus in this paper is on communities of practice in commercial organisations. We do this by exploring knowledge sharing in Lave and Wenger's (1991) theory of communities of practice and investigating how communities of practice may translate to a distributed international environment. The paper reports on two case studies that explore the functioning of communities of practice across international boundaries.

Key themes:

- Knowledge of how work is done in practice is seen as central to the success of an organisation. Communities of practice offer an approach for negotiation of this issue.
- Learning in a community of practice is not merely learning situated in practice but is an integral part of practice
- Legitimation (power and authority relationships) and peripherality (degree of engagement) are connected with participation and are essential components implied in a community of practice
- Communities of practice are an effective and flexible means of bringing together skills and expertise to organisations that are increasingly physically distributed
- Narratives and story-telling within a community of practice contribute to new forms of knowledge and to the development of the community.

Evaluative comments:

The article offers a collection of definitions for communities of practice within corporate organisations, which can be synthesised for a more widespread and less economically driven environment Differences between a team and a community of practice are identified by exploring the types of legitimation in each of these membership groupings. The authors evaluate the transferability of the features of a community of practice into the virtual domain. A particular strength of the article is the discussion in the case studies, which provide conceptual models for constructing/growing/evolving virtual (or distributed) communities of practice.

Hossain, L. & Wigand, R. T. (2004). ICT enabled virtual collaboration through trust. *Journal of Computer-Mediated Communication, 10*(1).

Type: Conceptual **Country of origin:** Australia/United States

Area of study: Practical issues

Keywords: trust, virtual organising, virtual collaboration, social structures

Abstract:

The advent of information and communication technology (ICT) provides opportunities for employees with offices in geographically dispersed locations to communicate, share and collaborate on projects to achieve common business goals. Previous studies on computer-mediated communication and computer-supported cooperative work suggest that the higher utilization of ICT for supporting collaborative work is largely dependent on the business strategy, which promotes trust among parties. Our focus is on understanding the effect of virtual organizing for achieving higher collaboration in virtual settings. We identify the challenges for developing trust in a virtual collaborative environment. We describe how the process for virtual organizing helps promote higher levels of collaboration among parties in geographically dispersed locations. We posit that virtual organizing helps support creating, sustaining and deploying key intellectual and knowledge assets while sourcing tangible, physical assets in a complex network of relationships. Our analysis demonstrates that the real challenge for the management of virtual collaboration is trust and has to be guided by a shared business principle or shared vision. Eight propositions are offered based on this analysis. We conclude that virtual organizing as presented here suggests a set of rules and norms enabling and constraining actions that promote a desired and required higher level of trust. This, in turn, is critical (a) to the development and sustainability of virtual collaboration and (b) to ensure the optimal use of ICT.

Key themes:

- The interplay between ICT, organisation structure and geographical dispersement of members working on a common organisational goal involves virtual organising that reflects the power structures involved

- Knowledge and intellect create value for organisations but require collaboration, communicating and working together across organisational boundaries
- Trust is necessary for higher levels of knowledge sharing and therefore for building and sustaining collaboration
- An understanding of the relevant social groups is necessary in the design process
- Integration of knowledge and social relationships is important

Evaluative comments:

Implications for trust arising from knowledge sharing through virtual collaboration are examined. The authors note that time, space and culture all have implications for the level of communication, trust development and types of ICT used.

Hung, D. L., & Chen, D. T. (2001). Situated cognition, Vygotskian thought and learning from the communities of practice perspective: Implications for the design of web-based e-learning. *Educational Media International*, *38*(1), 3-12.

Type: Conceptual **Country of origin:** Singapore

Area of study: Practical issues

Keywords: communities of practice, situated cognition,

Abstract:

This paper describes the key notions of situated cognition, Vygotskian thought (zone of proximal development, the general law of cultural development and the mediational nature of signs and tools), and learning from the community of practice perspective. From these notions, we conceptualize principles on learning through which design considerations relevant to the web-based e-learning environments are drawn. These community-oriented web-based design principles can be summarized under four dimensions: situatedness, commonality, interdependency, and infrastructure. These e-learning design principles are illustrated with current web-based examples. In particular, the infrastructure dimension is of particular significance to web-based online environments. Rules and processes relevant to face-to-face communities may have to be radically transformed in the context of web-based e-learning communities.

Key themes:

- CoPs are learning communities
- Technology should be designed with functionality to support sociability and knowledge sharing

Evaluative comments:

This article offers a valuable discussion on the importance of situated cognition and Vygotskian principles, and identifies four dimensions that are needed for the design of successful online CoPs. The authors argue effectively against the direct transferability of a face-to-face CoP to an online CoP.

Johnson, C. M. (2001). A survey of current research on online communities of practice. *Internet and Higher Education*, *4*(1), 45-60.

Type: Review **Country of origin:** Germany

Area of study: Practical issues

Keywords: communities of practice, online, virtual communities, situated learning

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 the centre 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 community of practice within the designed environment of a virtual community.

Key themes:

- Virtual or online communities are not necessarily CoPs
- There is debate over the necessity of face-to-face encounters to sustain online CoPs
- CoPs should be managed with different roles
- Online CoPs have life cycles
- Technology needs to be functional and support sociability and knowledge sharing

Evaluative comments:
Johnson (2001) raises important points regarding online communities of practice and offers suggestions for future research. In contrast to much of the literature, this article suggests that the lack of face-to-face contact could be viewed as a positive factor.

Kling, R., & Courtright, C. (2003). Group behaviour and learning in electronic forums: A sociocultural approach. *The Information Society*, *19*(3), 221-235

Type: Review/Empirical **Country of origin:** United States of America
Area of study: Online learning community and practical issues
Keywords: communities of practice, virtual communities, professional development, teacher improvement, group dynamics

Abstract:
The term community is widely and often uncritically used to characterize groupings of people who meet in electronic forums (e-forums). The research reported here shows how the casual use of the term community to characterize these groups can actually undermine their transformation into forms of social organization that are justifiably characterized as communities. This article examines how transforming a group into a community is a major accomplishment that requires special processes and practices. Primary data come from a particular project, the Inquiry Learning Forum (ILF), that aimed to develop "communities of practice" (CoPs) among high school science and mathematics teachers through an elaborate dedicated web site. We examine participants' behaviours in some of the differently structured forums within the ILF web site. While the project's developers expected

CoPs to develop autonomously, there was no evidence of CoP formation in open public online forums. The article contrasts two approaches to building online communities that differ sharply: "IT-led community development" and "IT-supported community development". The experience of the ILF project shows that IT-led community development strategies are much more difficult to made workable than are the "IT-supported" strategies.

Key themes:

- CoPs are distinguished from other groups in terms of membership, domain, and collaboration
- Online CoPs need to be distinguished from online or virtual communities, which are not necessarily CoPs
- Online CoPs need to be cultivated
- There are arguments for and against open and closed participation
- Offline and face-to-face encounters are important to sustain online CoPs
- CoPs require effective moderators
- Technology should be designed with functionality to support sociability and knowledge sharing

Evaluative comments:

This article provides important information relating to trust and sociotechnical consideration. The need for effective moderation to sustain growth is highlighted, as is the importance of building up trust within the group. Valuable insight into the need for consideration of the social aspects of a community is provided.

Koh, J., & Kim, Y. G. (2003). Sense of virtual community: A conceptual framework and empirical validation. *International Journal of Electronic Commerce*, *8*(2), 75-93.

Type: Empirical **Country of origin:** Korea

Area of study: Practical issues

Keywords: virtual community, communities of practice, online

Abstract:

The sense of virtual community is a principal construct in virtual community research. Therefore understanding it in depth is important for studies of communities-of-practice, virtual collaboration, virtual organization, and other critical organizational and information systems issues. This article conceptualizes and operationalizes the sense of virtual community, and validates several of its antecedents. An analysis of 172 members of 44 virtual communities found that the sense of virtual community is affected by the enthusiasm of the community's leaders, off-line activities available to members, and enjoyability. These characteristics had a stronger impact for members of virtual communities that originated on-line than for those in communities that originated off-line. The implications of the findings and future research directions are discussed.

Key themes:

- Having offline and face-to-face encounters is important to sustain online CoPs
- Online CoPs should be designed for sociability
- Multimedia applications could be used to provide alternatives to face-to-face contact.

Evaluative comments:

While the authors note that their findings are not generalizable, they offer useful insights into the idea of the 'sense of virtual community' and the variables impacting upon it. They offer suggestions on how to circumvent the need for offline activities in a widely geographically dispersed virtual community by utilising available information and communication technologies to minimise the impact of a lack of offline contact.

Lueg, C. (2000). ***Where is the action in virtual communities of practice?*** **In Proceedings of the workshop Communication and Cooperation in Knowledge Communities at the German Conference on Computer-Supported Cooperative Work (D-CSCW) "Verteiltes Arbeiten - Arbeit der Zukunft", September 11-13. Munich, Germany.**

Type: Conceptual **Country of origin:** Switzerland

Area of study: Practical issues

Keywords: knowledge management, case studies, virtual communities, legitimate peripheral participation

Abstract:

Over the past few years, viewing social groupings as "communities of practice"' has become increasingly popular in the knowledge-management literature as communities of practice have been identified as settings for effective knowledge sharing. It is tempting to use the concept to describe and to analyze "knowledge communities" as well. In this paper, we argue that the transfer of a concept that is deeply rooted in the lived-in world to the virtual involves conceptual problems, such as the question where learning and doing, two constituents of communities of practice, are to happen in the virtual world. In particular, we discuss selected aspects of combining communities of practice and virtual worlds by example of a virtual community that is situated in the global conferencing-system Usenet news.

Key themes:

- Problematises shifting concepts from the "lived-in world" to the virtual environment
- Communities of practice are effective settings for knowledge sharing where learning is based on social participation, however, knowledge acquired in the virtual community can only manifest in the real world
- Focus on situated learning and situated action in the context of virtual communities of practice
- A distributed community where communication is partly via electronic media may still see members interacting with the real world and it is here that learning takes place
- 'Lurking' (as opposed to active participation) may be a frequent and important part of online communication; and may be regarded as peripheral participation
- In Usenet newsgroups, reading before posting is the most appropriate way to examine the virtual community but members who do not contribute their own articles remain invisible to the community and do not achieve any social status within it

Evaluative comments:

The paper explores the difficulties with moving real world concepts into the virtual community. In particular, it compares functioning newsgroup virtual communities with definitions of communities of practice and examines membership behaviour and knowledge exchange within those newsgroups. The author attempts to draw a distinction between distributed communities that communicate electronically and virtual communities of practice.

Moore, J., & Barab, S. (2002, May/Jun). The inquiry learning forum: A community of practice approach to online professional development. *TechTrends, 46*(3), 44-49.

Type: Conceptual **Country of origin:** United States of America

Area of study: Community of practice approach to online professional development

Keywords: community of practice, online professional development, practical issues

Abstract:

This paper discusses the "Inquiry Learning Forum (ILF), an Internet-based professional development environment designed to support teachers in sharing and evolving their teaching practices" (p. 44). The authors identify a need for more effective models of professional development, and then propose using communities of practice as the basis for a professional development model. They outline an example of this, the ILF, and explore some of the design and implementation issues they faced, and introduce research that is continuing to examine the effectiveness of the ILF environment for teachers' professional development.

Key themes:

- There are a lack of effective models of professional development
- Professional development should be "something in which you participate as part of your everyday activities" (p. 44)
- Design and implementation issues of the ILF, a community of practice professional development model
- Issues that arose included access, social structure, and motivation for participation.

Evaluative comments:

This paper describes the implementation of a community of practice for teachers, as ongoing professional development. It highlights issues that arose, and factors that needed to be considered when designing the environment.

Nichani, M., & Hung, D. (2002). Can a community of practice exist online? *Educational Technology, 42*(4), 49-54

Type: Review **Country of origin:** United States of America

Area of study: Practical issues

Keywords: communities of practice, group dynamics, knowledge networks, social capital, virtual communities

Abstract:

The notion of community is at the heart of many epistemological theories of learning, both in organizations and in academia. CoPs or Communities of Practice facilitate not only the processes of learning about *knowledge* within a particular practice, but through enculturation practitioners learn *to be* identified with that profession. With the rise of the Internet, and its ability to reach out and connect people, it is unsurprisingly the focus of many community initiatives. The success of some commercial online communities is compelling other organizations and academies to follow suit. The aim of this article is to act like a speed breaker for those rushing to create online learning/knowledge communities, urging them to stop and heed the numerous, and often neglected, social aspects associated with such developments. By drawing on research done by John Seely Brown, Paul Duguid, Larry Prusak, Peter Cohen, and Malcolm Gladwell, and by companies like British Petroleum, we hope to implant the notion that "virtuality" is only effective when it is used as an add-on to already existing social structures and not as a stand-alone initiative. Similarly, learning is facilitated through complementing and extending existing social networks with technologies that can enhance the learning processes.

Key themes:

- CoPs as learning/ knowledge communities should be distinguished from other forms of communities/ groups
- Need to allow for different levels of participation
- CoPs need to be cultivated
- Opportunities for face-to-face contact is vital for sustaining online CoPs
- CoPs need to be managed with different roles, for example, 'connectors', 'mavens' and 'salesmen'

Evaluative comments:

This article raises important points regarding the need for face-to-face socialisation to occur on a semi-regular basis in order to facilitate the building of trust and community, even though most of the interaction between members will take place online. Nichani & Hung (2002) suggest that in order for an online CoP to be effective, it should stem from a pre-existing CoP, with the online aspect in a supportive role. They offer sound argument for this stance.

Palincsar, A. S., Magnussen, S. J., Marano, N., Ford, D. & Brown, N. (1998). Designing a community of practice: Principles and practices of the GisML community. *Teaching and Teacher Education, 14*(1), 5-19.

Type: Conceptual **Country of origin:** United States

Area of study: Practical issues, teaching based community of practice, case study

Keywords: teacher collaboration, teacher practice, learning communities, knowledge sharing

Abstract:

Describes an elementary-level professional-development project designed to build a community of practice focused on inquiry-based science teaching (Guided Inquiry supporting Multiple Literacies). Presents the basic tenets that guided the development of learning experiences for teachers and illustrates how the principles influenced the design of specific activities during the first year of the project.

Key themes:

- The most commonly used application of communities of practice in education is in the context of practice as a model for professional development as identification within a group is important for the classroom context
- Interdependence of social and individual processes in the co-construction of knowledge
- Teachers have limited opportunities for informal exchanges, one characteristic of participation and knowledge sharing in a community of practice
- Problems that result in teacher isolation may be due to the individualistic nature of teaching and a lack of consensus regarding goals and means of education
- A challenge facing communities of practice in education is that there is no general agreement regarding what constitutes expert practice
- Identification of design principles for communities of practice
- Connections between being a learner and being a teacher within the context of a community of practice leading to collaboration of planning and teaching and implementation in classroom practice

Evaluative comments:

The paper describes the principles that have guided the development of a particular community of practice and illustrates how these principles influenced the design of the specific activities that are integral to the organisation of professional development within the community. The community of practice examined focuses on the common enterprise of improving classroom practice for teachers, particularly inquiry-based teaching, and includes discussion on factors such as the roles, procedures, underlying assumptions and shared world views that emerge through participation.

Preece, J. (2004). Etiquette, empathy and trust in communities of practice: Stepping-stones to social capital. ***Journal of Universal Computer Science, 10*****(3), 294-302**

Type: Conceptual **Country of origin:** United States of America

Area of study: Practical issues

Keywords: tacit knowledge, explicit knowledge, social norms, trust, etiquette, social capital, communities of practice, online communities, sociability

Abstract:

Creating online communities of practice involves much more than creating software. Software houses online communities of practice activities but social interactions also depend on who is involved, what their goals are, their personalities and the community's norms and policies. By paying attention to these sociability issues, community members can influence how their community develops. Norms that lead to good online etiquette, empathy and trust between community members provide stepping-stones for social capital development.

Key themes:

- Both explicit and tacit knowledge are exchanged in communities of practice
- Communities of practice typically refer to professional, work-oriented groups, which focus on a domain of knowledge and evolve over time
- Trust, empathy, responsibility and reciprocity are key features of successful communities of practice
- Facilitation of etiquette and development of social capital are necessary within a community of practice

Evaluative comments:

The article provides a focus for comparison between the development of communities of practice in an online environment, particularly with reference to community interaction and development. It notes membership development and how the exchange of different systems of knowledge facilitate and strengthen relationships between members. Further to this, the article explores how necessary attributes of an online community of practice, such as trust, can be strengthened through software development

Schlager, M. S., & Fusco, J. (2004). Teacher professional development, technology, and communities of practice: Are we putting the cart before the horse? In S. Barab, R. Kling, & J. Gray (Eds.) ***Designing for virtual communities in the service of learning*** **pp. 120-153. Cambridge, UK: Cambridge University Press.**

Type: Conceptual **Country of origin:** United Kingdom

Area of study: Practical issues, teaching based community of practice, case study

Keywords: Tapped In, practice, professional development, design principles, online education communities of practice, sociotechnical infrastructure

Summary

In this chapter "we step back from a focus on *online* communities as designed and built by researchers and professional development providers to serve a particular purpose and examine communities of practice *as they exist* in local education systems. We seek to understand the nature of local education communities of practice, their reciprocal relationship with teacher professional development and instructional improvement interventions, and the sociotechnical infrastructure through which the community supports the professional growth of its teachers" (p. 121).

Key themes:

- Training and supporting technology can have a tendency to separate professionals from their practice by focusing on information about the practice rather than putting that knowledge into practice
- Distinctions between online communities of practice and online communities have important consequences for online infrastructure design, in particular optimising design alternatives for cultivating and supporting membership

- Care must be taken to ensure that in seeking to remove barriers from teachers that result in isolation, the community member remains embedded in their immediate professional practice
- All education professionals, not just teachers, should be a part of a community.
- Not all communities of practice are effective; however, ineffective communities of practice can, over time, become effective.
- The online infrastructure needs of education communities of practice is different to that of organisations.

Evaluative comments:

This chapter draws together the research on communities of practice in education. It provides discussion of what communities of practice are, and how they could be of benefit to the education sector. The authors also propose a model and guideposts of how communities of practice could be used to benefit the education sector as a whole.

Schwen, T. M., & Hara, N. (2003). Community of practice: A metaphor for online design? *The Information Society*, *19*(3), 257-270

Type: Review **Country of origin:** United States of America

Area of study: Practical issues

Keywords: communities of practice, online, instructional design, online professional development, group dynamics, inservice education, participative decision making, social networks

Abstract:

This article examines four cases and identifies several issues associated with the concept of communities of practice. These cases describe different forms of communities of practice in various settings including consulting firms and legal firms. After introducing these cases, we address several issues that emerged from these cases and the research literature. First, we caution against the tendency to romanticize the communities of practice construct and especially online communities. The cross-case analysis points to five problems that should be considered before developing an online community of practice. These five problems include: prescriptive versus descriptive distinction; ready-made versus communities in the making; knowledge of possession versus knowing in practice; mid-level social theory versus micro learning theory; and motivated members versus unwilling subjects. In sum, we believe that a community of practice is not likely to be forced, but is emerging, and designers need to be aware of the characteristics of existing communities of practice to nurture them.

Key themes:

- Online CoPs need to be cultivated
- Motivating participation is crucial to the formation of online CoPs
- CoPs are emergent and evolving - they have life cycles;
- Technology should be designed with functionality to support sociability
- An online CoP should develop from a pre-existing CoP
- Design of online CoPs are problematic

Evaluative comments:

The four examples of CoP given in this article highlight positive and negative factors in the evolution and design of CoP. The social aspect of communities and the need for face-to-face contact, or a pattern of positive contact over a period of time is identified as an important starting place in the development of trust. Trust is an integral part of any online CoP. Schwen & Hara (2003) suggest that the members of the CoP become codesigners of the online CoP, working toward a single aim.

Sharrat, M., & Usoro, A. (2003). Understanding knowledge-sharing in online communities of practice. *Electronic Journal of Knowledge Management*, *1*(2), 187-196. Retrieved April 13, 2005, from http://www.ejkm.com/volume-1/volume1-issue-2/issue2-art18-sharratt.pdf

Type: Review **Country of origin:** Scotland
Area of study: Practical issues & knowledge sharing
Keywords: communities of practice, online

Abstract:

Information Technology is no longer regarded solely as a repository within knowledge management but also as a collaborative tool. This change of role gives rise to online communities (OLCs), which extend the loci of existing communities of practice. To leverage the potential of these communities, organisations must understand the mechanisms underpinning members' decisions to share knowledge and expertise within the community. This paper discusses existing research and develops a theoretical model of factors that affect knowledge sharing in OLCs. The aim is to increase our understanding of the antecedents to knowledge-sharing in OLCs.

Key themes:

- CoPs can facilitate knowledge management
- Technology should be designed with functionality to support sociability and knowledge sharing

Evaluative comments:

There is a useful discussion of knowledge and sharing, and the factors that impact positively and negatively upon knowledge sharing.

Sherer, P. D., Shea, T. P., & Kristensen, E. (2003). Online communities of practice: A catalyst for faculty development. *Innovative Higher Education*, *27*(3), 183-194.

Type: Empirical **Country of origin:** United States of America
Area of study: Practical issues
Keywords: communities of practice, faculty development, professional development, self-directed groups, online

Abstract:

This article addresses the concept of "communities of practice" and how it has come of age for the professional development of professors as teachers. Thanks to current technological options, faculty developers can enhance the opportunity for the entire faculty to learn through the use of online communities. Designing a faculty development portal using community of practice concepts can be an effective means to jump-start, facilitate, develop, and sustain faculty involvement in academic communities.

Key themes:

- CoPs are distinguished from other groups in terms of membership, domain, and collaboration
- Having offline and face-to-face encounters is important to sustain online CoPs
- Online CoPs should be cultivated to grow naturally
- Technology should be designed with functionality to support sociability and knowledge sharing

Evaluative comments:

The authors present a positive case for the development and implementation of online communities of practice to further faculty professional development.

Stuckey, B., & Smith, J. D. (2004, March 24-26). *Sustaining communities of practice*. Paper presented at the International Association for Development of the Information Society (IADIS) Conference, Lisbon, Portugal.

Type: Conceptual/empirical **Country of origin:** Australia/USA

Area of study: Successful leadership in communities of practice

Keywords: community of practice, online communities, leadership, community development

Abstract:

This paper reports on the activities and practices of leaders whose efforts to sustain their successful communities of practice have lessons for practitioners and researchers. These leaders kept their communities connected, and helped them collaborate and work online to develop an area of expertise over sustained periods of time. The leaders attended both to assuring continuity and stability at the same time as they supported the evolution and transformation of their communities. The themes that these successful leaders focused on were: being together inside their communities, maintaining boundaries around their communities, and drawing nourishment from their communities' environments as they responded to environmental challenges.

Key themes:

- Leadership and the role of leaders in sustaining, rather than building, CoPs.
- The design and development of CoPs is ongoing.
- Balance between stability and change is critical to the survival of CoPs.
- Three themes emerged as being critical to a CoP being sustained:
  - sustaining the stability of the CoP
  - maintaining boundaries regarding the CoP so it keeps its identity
  - drawing nourishment and responding to the environment
- Leaders need to participate in CoPs

Evaluative comments:

This paper explores the role of leaders of ten successful communities of practice. It identifies several areas in which good leadership is crucial if the community is to be sustained, and gives examples of the strategies leaders used. The communities of practice are varied, but the similarities identified in the leadership roles within each of these communities suggests that many of these lessons would be applicable to the proposed online community of practice for New Zealand educators.

Wallace, D., & Saint-Onge, H. (2003). *Leveraging communities of practice*. Retrieved April 13, 2005, from http://www.intranetstoday.com/Articles/?ArticleID=5499&IssueID =182

Type: Empirical **Country of origin:** Not stated.

Area of study: Practical issues

Keywords: communities of practice, online, virtual communities

Summary of study:

The aim of the study was to design a sustainable strategic community. In 1999 a third attempt was made. In this attempt a community of development process model divided into two phases was used. The initial phase consisted of three steps: define the community project; establish community components; and, launch the community. The second and final phase consisted of community implementation and growth. It is at this stage that the community itself takes control of its evolutionary process. The 'community's architecture' was seen as vital to the overall success or failure of the community. Tools that facilitate communication and ease of knowledge sharing are key components of a thriving community, as are opportunities for offline interaction.

Key themes:

- Technology should be designed with functionality to support sociability and knowledge sharing
- CoPs should be managed with different roles
- Having offline and face-to-face encounters is important to sustain online CoPs

Evaluative comments:

This article clearly sets out the steps that were taken to set up an online learning community. It also describes the various roles that were used at different stages to facilitate the growth of the community. It should be noted that there is no reference made to any of the existing CoP literature, aside from the passing mention of Wenger and Lave.

Wasko, M. M. & Faraj, S. (2000). "It is what one does": Why people participate and help others in electronic communities of practice. J*ournal of Strategic Information Systems, 9*(2), 155-173

Type: Conceptual/empirical **Country of Origin:** United States of America

Area of study: Practical and theoretical issues

Keywords: knowledge management practices, people participation, electronic communities

Abstract:

Advances in information and communication technologies have fundamentally heightened organizational interest in knowledge as a critical strategic resource. However, organizations are finding that members are often reluctant to exchange knowledge with others in the organization. This paper examines why. We review current knowledge management practices and find that organizations are treating knowledge as a private good, owned either by the organization or by organization members. We propose that knowledge can also be considered a public good, owned and maintained by a community. When knowledge is considered a public good, knowledge exchange is motivated by moral obligation and community interest rather than by narrow self-interest. We provide support for the public good perspective by providing results from a survey examining why people participate and share knowledge in three electronic communities of practice. The results indicate that people participate primarily out of community interest, generalized reciprocity and pro-social behavior.

Key themes:

- Knowledge is a valuable resource for growth of communities of practice; it can be socially generated, maintained and exchanged within emergent communities of practice
- Explores three perspectives of knowledge: as an object, as embedded in individuals; and as embedded in a community
- Different motivations for exchange of knowledge affect the strength of the community
- Reciprocity in online communities of practice is generalised rather than individualised
- Online communities of practice are critical for members that otherwise have only indirect, or limited access to others in their practice
- Knowledge management systems based on extrinsic rewards are potentially fatal to communities of practice as they turn moral obligations into acts of self-interest.

Evaluative comments:

Knowledge sharing is crucial to the survival of online communities of practice and this article provides an examination of differing perspectives of knowledge and the implications of these for knowledge exchange and management. It appears from the study that many of the reasons for not wanting to participate in face-to-face knowledge-sharing relationships are also apparent in online communications.

Wenger, E. (1998). Communities of practice: Learning as a social system. *The System Thinker*, *9*(5). Retrieved March 9, 2005, from http://www.co-i-l.com/coil/knowledge-garden/cop/lss.shtml

Type: Review **Country of origin:** Not stated

Area of study: Practical issues

Keywords: communities of practice, knowledge networks, information networks

Summary:

Wenger provides an overview of CoPs. He defines the concept of a CoP and proceeds to discuss CoPs in organizations. They can emerge from a business setting and span across boundaries. CoPs play an important role in the growth and exchange of information. They become repositories for knowledge and communities of innovation. CoPs need to be developed and nurtured, but not smothered. This can be achieved by using leadership or management through different roles within the CoP itself. Five methods that can be used to nurture CoP are discussed.

Key themes:

- CoPs are learning communities
- CoPs are distinguished from other groups in terms of membership, domain, and collaboration
- CoPs should be cultivated to grow naturally
- CoPs should be managed with different roles
- CoPs have life cycles
- Technology should be designed with functionality to support sociability and knowledge sharing

Evaluative comments:

Although there is no mention of online CoPs, the roles suggested by Wenger could be transferred to an online CoP. The five ways for nurturing a CoP can also be used for nurturing online CoP. Wenger is very positive in his discussion of CoP and does not raise many of the issues, such as trust, other authors and researchers highlight.

Wenger, E. C., & Snyder, W. M. (2000). Communities of practice: The organizational frontier. *Harvard Business Review, 78*(1), 139-145.

Type: Conceptual **Country of origin:** United States of America

Area of study: The role of managers in organisational communities of practice

Keywords: communities of practice, organisations, management

Abstract:

“Communities of practice are emerging in companies that thrive on knowledge. The first step for managers now is to understand what these communities are and how they work. The second step is to realize that they are the hidden fountainhead of knowledge development and therefore the key to the challenge of the knowledge economy. The third step is to appreciate the paradox that these informal structures require specific managerial efforts to develop them and to integrate them into the organisation so that their full power can be leveraged” (p. 145).

Key themes:

- Communities of practice are key to enhancing and improving knowledge sharing in organisations.
- Communities of practice are effective in improving organisational performance.
- It is not easy to build or sustain communities of practice.
- Managers play a crucial role in determining how well a community of practice is sustained in an organisation.
- Communities of practice can’t be created, but they can be cultivated.
- Communities of practice should grow out of existing networks.
- Communities of practice require financial support in order to be effective.

- Traditional measures of value are not accurate measures of the effectiveness of a community of practice.

Evaluative comments:

Although this paper looks at the use of communities of practice in an organisational setting, it emphasises the importance of knowledge sharing, which is relevant to the education sector. It identifies benefits of communities of practice, and some of the issues involved with managing them.

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Appendix A: List of the keywords used

change strategies
collegiality
communities of practice
consciousness raising
cooperation
cooperative planning
faculty development
group dynamics
improvement programs
information networks
inservice teacher education
inservice education
instructional design
intergroup education
knowledge networks
lifelong learning
mentors
online professional development
participative decision making
partnerships in education
professional development
professional development in schools
professional isolation
self help programs
self-directed groups
situated cognition
social capital
social exchange theory
social networks
staff development
teacher collaboration
teacher education
teacher improvement
virtual communities

Appendix B: Principles of effective professional development

Hawley and Valli (1999) eight recommended principles of effective professional development:

1. Goals and student performance – "professional development should be driven by analyses of the differences between goals and standards for student learning and student performance" (p. 139), and thus should be student-centred.
2. Teacher involvement – teachers should identify what they need to learn, and develop the learning opportunity and the process to be used.
3. School based - professional development should be situated and authentic.
4. Collaborative problem solving – teachers should work in communities to address common concerns.
5. Continuous and supported – professional development should be ongoing.
6. Information rich – professional development should incorporate evaluation of multiple sources of information.
7. Theoretical understanding – opportunities should be provided to teachers to develop theoretical understanding of the knowledge and skills to be learned.
8. Part of a comprehensive change process – "professional development should be integrated with a comprehensive change process that deals with impediments to and facilitators of student learning" (p. 143), thus allow teachers time and provide them with support to implement the new practices.

Mitchell and Cubey's (2003) eight characteristics of effective professional development:

1. The professional development incorporates participants' own aspirations, skills, knowledge and understanding into the learning context.
2. The professional development provides theoretical and content knowledge and information about alternative practices.
3. Participants are involved in investigating pedagogy within their own early childhood settings.
4. Participants analyse data from their own settings. Revelation of discrepant data is a mechanism to invoke revised understanding.
5. Critical reflection enabling participants to investigate and challenge assumptions and extend their thinking is a core aspect.
6. Professional development supports educational practice that is inclusive of diverse children, families and whanau.
7. The professional development helps participants to change educational practice, beliefs, understandings, and/or attitudes.
8. The professional development helps participants to gain awareness of their own thinking, actions, and influence.