Creating Authentic On-Line Communities of Professional Practice
(Paper presented at Australian Association for Research in Education Conference, Fremantle, 2-6 December, 2001)

Mandia Mentis, Ken Ryba & Jean Annan
Massey University
Albany Campus
Auckland, New Zealand
Email: k.a.ryba@massey.ac.nz

Abstract

The convergence of theory and research on socially shared cognition represents a promising new direction for understanding how to enhance the intellectual growth of individuals. In this presentation, we outline how principles of situated cognition and Vygotskian thought contribute to our understanding of how to create vibrant and authentic on-line communities of practice. These principles apply equally to traditional educational settings and on-line communities. The view advanced here is that web-based learning is a potentially good vehicle for the creation of a community of learners if it is designed according to the principles for community building outlined in the present study and other related research. The Master of Educational psychology (MEdPsych) on-line community at Massey University is presented and analysed in terms of the community of practice theoretical framework. The concept of a "collective zone of proximal development" (czpd) is introduced to explain how cognitive growth progressively occurs for community members who are operating within a socially interactive and reflective learning environment. Finally, principles and recommendations are offered on how to design communities so that all individuals can achieve their optimal functioning level through guided social participation.

Authentic Learning Situated within Communities of Practice

The widespread application of on-line learning has prompted some serious rethinking about how to use the medium effectively to create better conditions for learning and professional development. The emergence of web learning environments such as *Blackboard* TM and *WebCT* TM have made it relatively straightforward to set up discussion forums and on-line conferences. However, it goes without saying that the simple creation of such environments does not ensure that the facilities are well used by participants. Despite many creative efforts at designing chatrooms, discussion forums, bulletin boards and other similar applications, why is it that these so frequently fail to offer rich and sustained dialogue amongst participants (Hung & Chen, 2001)? What is the best way to create viable on-line communities that are vibrant and highly interactive places where authentic learning can take place?

With the above questions in mind, this paper undertakes to present results from a study of post-graduate educational psychology students who were immersed in an on-line community of practice as part of their professional training. The aim is to use the formation of this community to illustrate what needs to be done in order to capitalise on the opportunities afforded by on-line learning to create authentic learning contexts. One of the most important needs in professional training is to ensure that the gap is bridged between university-based learning and real-world application. This is essential because the separation of learning from authentic use creates an incongruity in which students are learning content within the institutional culture of the university that they are unable to apply within real-life contexts (Barab & Landa, 1997; Brown, Collins, & Duguid, 1989). One important way to bridge this gap is through the creation of communities of practice that provide scaffolded opportunities for students to operate within socially interactive and reflective learning environments. The medium of on-line learning provides an excellent opportunity to develop interactive learning environments in which students can develop their identity as a member of the professional community while at the same time advancing their knowledge and skills.

'Community' has been defined by Dede (1996, cited in Brown, 2001) as "support from people who share common joys and trials". Within this conception, a community of learners refers to a group of people with a "shared purpose,

good communication, and a climate of justice, care and occasions for celebrations" (Boyer, 1995, cited in Brown, 2001). Learning communities, whether these are face-to-face or on-line, are drawn together through the principles of 'commonality' and 'interdependence'. Commonality involves a process of working together in common areas and interests and, in the process, forming a bond or identity with one another and with the group as a whole. Interdependence implies depending on one another in a positive way for information, knowledge organisation, and shared problem solving. A desirable feature of on-line learning communities is that there exists varying demands and expertise at different levels of competency where participants can scaffold one another through the sharing of information and abilities. The process of scaffolding enables the transfer of knowledge within the community and creates better conditions for learning (Wenger, 1998).

The concept of situated authentic learning has originated from two separate but related fields of study. First, there are anthropological roots that have arisen from research concerned with contexts of daily living and working (Lave & Wenger, 1991, Rogoff & Lave, 1984; Lagache, 1995). Second are theories that have arisen within educational contexts concerned with social practices and interactive teaching strategies to create better conditions for learning within classrooms (Curzon, Selby & Ryba, 2000; Brown & Campione, 1990; Johnson, Johnson, Balett, & Johnson, 1988.) Much of this work has been inspired by a concern for creating realistic and interactive learning environments that promote socially shared cognitions within specific contexts and communities of practice. Along with providing task authenticity, such interactive models have ecological authenticity in that the tasks in which the learners are engaging are embedded in ongoing activities within an ecological niche in which real-world practitioners function (Lave, 1993). This was evident in the formation of our educational psychology training community where students developed an identity as members of a community and, in the process, became knowledgeably skillful about the application of a situational analysis approach to casework and functional behaviour assessments.

Lave (1988) argued that learning takes place as a function of the activity, context and culture in which it occurs. Learning is thus "situated" within a definite social and cultural context, and domain of learning. This contrasts with most classroom-based learning activities in which knowledge is abstract and presented out of context. According to Lave, social interaction is a critical component of situated learning. Learners become involved in a "community of practice" which embodies certain beliefs and behaviors to be acquired. At the outset, learners begin their journey at the periphery of this community and progress toward the centre as they become more active and engaged within the culture. They move from being a newcomer or novice toward assuming the role of expert or old-timer. Moreover, situated learning is usually not directly taught but is unintentional, occurring through active participation in working together with other people. These ideas are what Lave and Wenger (1991) referred to as the process of "legitimate peripheral participation". Such participation is socially interactive in nature, involving an apprenticeship and guided participation between `newcomers' and `old-timers' within the educational community.

The Concepts of "Apprenticeship" and "Guided Participation"

Anthropological studies of apprenticeship offer alternative ways of understanding the social processes of learning. Lave (1988) drew upon experiences in other cultures - craft apprenticeship in West Africa and apprenticeship among Yucatec Mayan midwives - to illustrate there are highly valued forms of knowledgeable skill in these cultures for which learning is structured in apprentice-like forms. The perspective of "guided participation" in communities of practice is highly relevant also to many other forms of socially organized activity that have become accepted within western society as sites of learning. For example, sports and leisure communities guide their newcomers through a scaffolded sequence of learning steps so that they progress from the periphery to the centre of the activity. Likewise, service and community organizations convey a set of values and beliefs which guide their practices and influence induction of the novice into the expert membership of the organization (e.g. Alcoholics Anonymous, community service clubs).

In contrast to the above, many institutional educational arrangements are problematic in that they restrict the formation of communities of practice through requiring that skills be taught in isolation and out of context. The effect of this is that students have no sense of being within a community and that there is no process for making progress in learning through socially shared cognitions. According to Lave (1988), the main concern centres around the competitive nature of many learning environments in which learning is treated as an individualistic activity rather

than a shared enterprise. From this perspective, learning within contemporary life has taken place within relatively alienated conditions. The effect of this is to diminish the identity of oneself to that of an isolated individual rather than as a member of a community of practice who is aspiring to gain mastery of knowledgeable skills.

Although there are obvious differences between apprenticeships involving mature learners and guided participation involving younger learners, there are some common principles of interactive learning that apply to all students. Justification for the value of an interactive apprenticeship model has been provided by Rogoff (1990), who makes the following points:

1. Apprentices are active in gathering information and practising skills as they participate in skilled activities. Students are active in observing and participating in the activities of those around them and they are motivated to participate more centrally.

2. The learning of apprentices is structured by practices developed by their predecessors to meet societally valued goals. This aspect of apprenticeship provides a parallel with the importance of recognizing that students' cognitive development involves learning to use the intellectual tools of their society (literacy, mnemonic devices, conventions for representing space) to implement culturally valued activities and goals.

3. Apprentices are assisted in their learning by communication and involvement with more skilled people (i.e., experts), and more advanced apprentices**,** who help determine how to divide the activity into sub-goals that the novice can begin to attain, as well as to provide pointers on how to handle the tools and skills required.

4. Apprentices seldom learn alone. In addition to being involved with more skilled practitioners, apprentices often learn in a community of fellow novices (such as fellow graduate students, classmates, and siblings). Interaction with and observation of other novices provides challenge, support, collaborative solving of problems, and models of learning in progress.

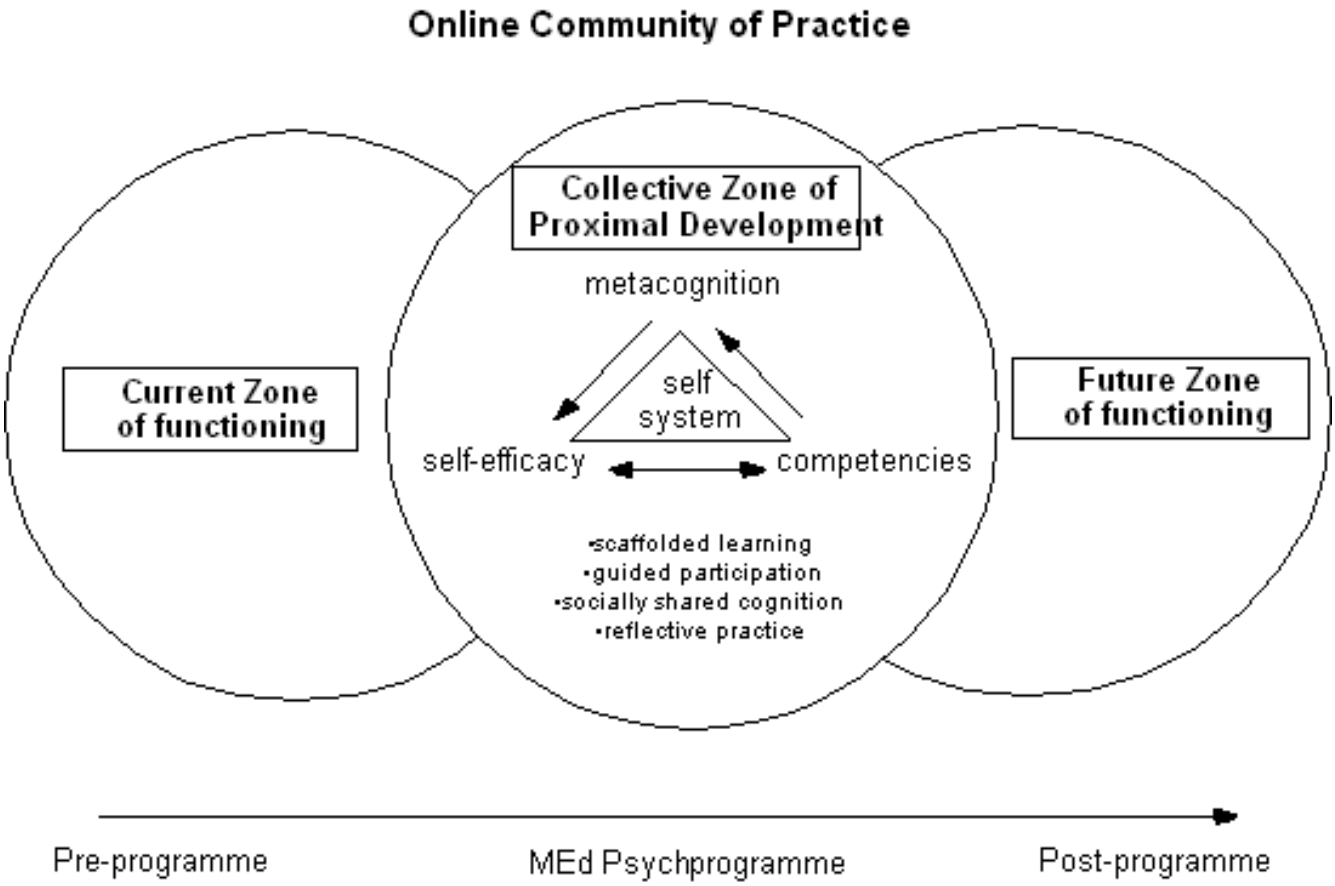
Vygotsky (1978, 1987) argued that students' interactions with others in the "zone of proximal development" provide children with the opportunity to carry out cognitive processes jointly that are more advanced than they could manage independently, and that this joint problem-solving process can serve as the basis for the learner's subsequent independent efforts. Our concept of the "Collective" Zone of Proximal Development (czpd) outlined below, extends and combines Rogoff's ideas about guided participation with Vygotsky's notion of the zone of proximal development.

The "Collective" Zone of Proximal Development

Vygotsky (1978, 1987) theorized that individual cognitive development is embedded in a sociocultural environment that provides tools for thinking and formation of partnerships. According to Vygotsky, students' interactions with others in the "zone of proximal development" (ZPD) enable students to carry out cognitive processes jointly that are more advanced than would be possible independently, and that these shared problem solving processes serve as a basis for subsequent independent efforts. Extending the concept of the ZPD, the view advanced here is that a group of students can form an "intellectual collective" in which there is the potential for all members to advance their learning through guidance from more capable peers. Both participation and guidance are mutual efforts of students and their companions that can result in advances in learning for all participants.

Figure 1 displays a model for understanding the operation of the collective zone of proximal development. It illustrates a movement from the current zone of functioning for a group of individuals through a collective zone in which scaffolded learning is provided through guidance and participation in the community. Within the community, individuals gain a sense of self-efficacy through reflective practice that motivates them to achieve. This sense of self-efficacy is enhanced as individuals experience success that is recognized and rewarded by others. The knowledge and skills gained through making contributions to the community lead not only to positive perceptions of ability but to the formation of an identity as an effective and contributing member of the community. It is through guided participation that individuals progress from the periphery to the centre of the learning environment.

Figure 1: Collective Zone of Proximal Development



Theoretical Implications for the Creation of an On-line Community

A conceptual analysis of situated cognition and the communities of practice model by Hung and Chen (2001) identifies four main dimensions that contribute to the formation of a vibrant and sustaining community. Following is an explanation of how each of these dimensions is linked to the creation of the on-line community.

1. *Situatedness* - learning is embedded within rich situations and socially mediated acts where learners can construct their own meaning in the contexts of application through picking up both implicit and explicit knowledge (Brown & Duguid, 1996, cited in Hung and Chen, 2001). In the process, students actively participate in situated tasks and develop their understanding through seeing a more 'global picture'. When learning is embedded within the community, learners are able to reflect on their actions through discussion of issues and problems with fellow community members.

2. *Commonality* - participants work together in ways that make sense to themselves. They share interests and problems that require joint effort and in the process, develop a similar bonding or identity with one another. Commonality is not only socially mediated, but it includes a common set of signs, tools and ways of speaking that are understood by members of the community (Lave & Wenger, 1991).

3 *Interdependency* - participants can interact based on varying needs and levels of knowledge and skills. They can make use of one another's abilities to increase their own understanding and professional skills. Participants develop in areas where they are most interested and capable with a responsibility for sharing their understanding with the other participants within the community.

4 *Infrastructure* - there are frameworks and models that enable individuals within the community to share their knowledge and understanding. Such structure enables participants to be structurally dependent on one another through drawing on the frameworks for practice that facilitate the activity (project) processes involved that learners are engaged in.

The four main dimensions of community building, outlined above, provide a framework for generating hypotheses

that can be tested through gathering evidence from the Educational Psychology On-Line Community.

H1: Tasks that are collaborative and authentic in form will enable participants to construct knowledge through socially situated learning within the intellectual collective of the community.

H2: A commonality of problems that require joint effort will enable individuals to develop their personal and professional identities through bonding as members of the community.

H3: The varying expertise brought by members of the community will enable a positive interdependence to be created so that, collectively, they can deal with problems and issues that would be too difficult for any one person to handle.

H4: The infrastructures contained within the community of practice will enable participants to be structurally dependent on each other in order to facilitate the work processes involved.

Description of the Educational Psychology On-Line Community

The on-line community was created for 32 postgraduate students studying at a distance throughout the North and South Islands of New Zealand. Delivery of the programme is 'mixed mode' involving a combination of readings and study guides, attendance at on campus seminars (3 times during the year), and participation in the on-line community. The programme operates as a "whanau" of interest or professional community committed to the practice of educational psychology within the social and cultural context of Aotearoa New Zealand. Considerable emphasis is placed on the creation of a socially interactive and reflective learning environment in which students can share their knowledge with one another. Students were currently working in education settings as regular class teachers, resource teachers of learning and behaviour, special education advisors, private practitioners, and behaviour support workers. All students had completed the equivalent of a post graduate diploma in education, psychology and other related areas. They ranged in age from 25 through 50 years of age.

*WebCT*TM was selected as the on-line learning environment, as this was the system that had been universally adopted for web-based course delivery by Massey University. The facilities made available to the class on *WebCT* included:

1. class and small group discussion forums
2. synchronous chats
3. links to other on-line resources
4. access to the library
5. class photos and powerpoint presentations
6. articles and example casework and projects
7. private email
8. course calendar and news updates

Students attended a Block Seminar at the beginning of the academic year (early March) at which time they were introduced to *WebCT*. Two initial tasks were set to activate the community:

1. *On-Line Bio* - a brief outline by each student of areas of interest and expertise
2. *Collaborative Project* - a collaborative group task (5-6 students) requiring them to engage in a shared problem-solving task involving the analysis of an ethical dilemma.

The above assignments were worth 10 percent of the final grade for the two professional core papers: 186.747 Contemporary Approaches to Assessment in Educational Psychology; and, 186.748 Professional Development.

All students had access to the Internet and were asked to login at least twice a week to meet the course requirements. The on-line requirements resulted in extensive use of the site with more than 1000 hits being logged during the first six weeks. Students were encouraged to use *WebCT* in ways that they thought would support their learning on the programme. They were assigned to private forums (discussion groups) on *WebCT* to work on the collaborative project. Beyond this assignment, they were asked to work out their own strategies for undertaking the collaborative task and preparing a group statement.

The course lecturers used the site to provide information on assignments and course updates. Most of the exchanges occurred within the general forums so that all students could benefit from information that was shared concerning the course requirements. Students were required to undertake casework with students who had learning and behaviour difficulties. The site was used extensively for sharing of information on casework and for student exchanges of resources and assessment materials. As the students had met face-to-face with one another at the outset, they were encouraged to make use of *WebCT* for peer support and professional supervision.

The Massey University Educational Psychology Training Programme is based on an alliance between three conceptual frameworks. These fit well within the communities of practice perspective as they are all concerned with the advancement of knowledge and competencies through socially situated cognitions. The three conceptual frameworks are briefly outlined below:

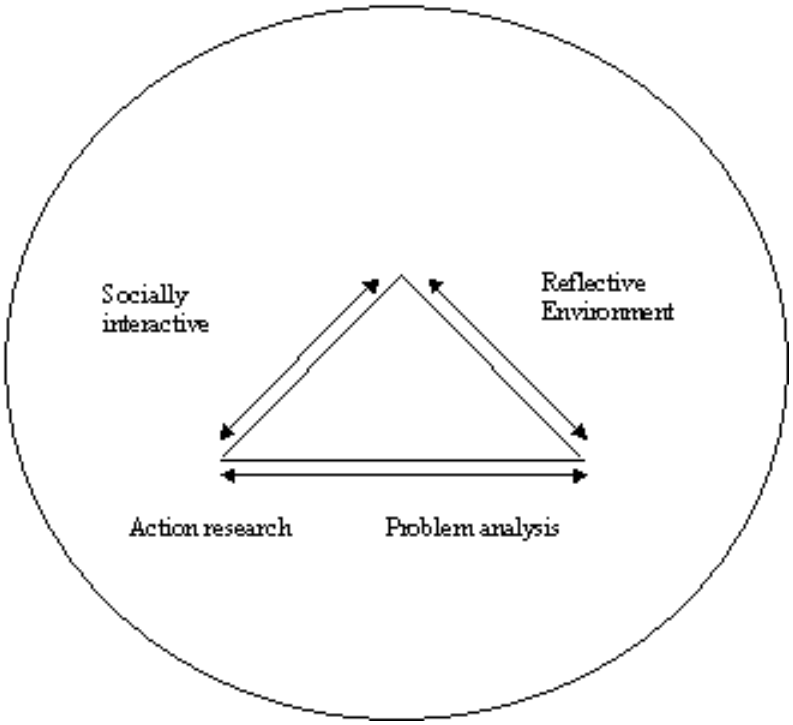
1. *Problem Analysis* - requiring the use of a "conceptual map" that can be used for working out the nature and dimensions of problems, the inter-relationships between the various parts, hypothesis generation, and priority dimensions for intervention. Problem analysis is used as a framework for casework and projects.

2. *Action Research* - simultaneously assists in problem solving and enhancing competencies of those concerned. It is based on a collaborative approach to problem solving that has reciprocal benefits for all participants.

3. *Reflective Practitioner Model* - educational psychologists not only perceive and define problems and generate and apply solutions, they must also use this process to reflect upon their professional actions and as a means of enhancing their understanding of best practice.

The context for the triple alliance is a 'community of practice' that is dedicated to the creation of a knowledge network through interactive learning and consultation, both on-line and face-to-face. This is illustrated in Figure 2 below:

Figure 2. Conceptual Alliance for the MEd Pychology Community of Practice



Reflective Practitioner

Community of Practice

Ryba,K.,Pine,T.,Mentis,M & Bowler,J.(1999).

Analysis of the On-Line Community

Data on the development of an on-line community of practice within the Educational Psychology Training programme was gathered via a survey of students' perceptions as well as an analysis of the quantity and quality of student discussion postings.

Survey

The survey used in this study was divided into three main aspects. The first focused on the learning environment of *WebCT* and evaluated the students' perception of the value of the *WebCT* tools used. The second and third aspects were adaptations of Chang's (1999) Web-based learning environment instrument (WEBLEI) and focused on dimensions relating to co-participatory activities and on-line learning. Co-participation, as defined by Chang (1999) relates to the presence of a shared language which can be accessed by all participants in order to engage in the activities of the community, with a goal of facilitating learning. On-line learning for the purposes of this study included what Chang describes as emancipatory (convenient, efficient and autonomous) learning and qualia (enjoyment, confidence and success) in learning.

For each section, quantitative and qualitative data were collected and are represented in the tables below:

Perceived value of *WebCT* tools

Table 1: shows the students' perceptions of the value of the *WebCT* tools used in this programme. These tools included study tips, calendar, private email, course discussion, chat room, links, library, and class photo.

Table 1: Students' perceptions of the value of WebCT tools						
	1- not useful	**2**	**3**	**4**	**5-very useful**	**Mean Rating**
	%	**%**	**%**	**%**	**%**	
course discussion	0.00	0.00	11.11	25.93	59.26	**4.33**

chat room	7.41	3.70	29.63	25.93	29.63	**3.56**
class photo	7.41	11.11	22.22	18.52	33.33	**3.37**
library	7.41	7.41	22.22	22.22	29.63	**3.26**
study tips	3.70	18.52	25.93	22.22	14.81	**2.81**
private email	22.22	18.52	18.52	18.52	14.81	**2.63**
calendar	11.11	33.33	25.93	7.41	11.11	**2.41**
links	11.11	14.81	14.81	22.22	11.11	**2.30**

Results, when ranked, indicate that the most valuable tools were perceived to be course discussion, chat room, class photo and then library. More than half of the students rated the discussion groups and chat room as valuable or very valuable and there were no negative ratings for the discussion group. This is significant when linked to the students' qualitative comments, as it was these tools that were seen to provide the most opportunity for students to participate in two of the four main dimensions outlined above, that Hung and Chen (2001) believe contribute to the formation of a vibrant and sustaining community. These were the development of commonality (working together in common areas and interests) and interdependence (making use of each other's knowledge, skills, perspectives and opinions), and the importance of these dimensions is evident in the students qualitative comments listed below:

· *It's great to realise that you are not on your own*

· *I loved (the chat rooms) - very collaborative and useful to talk about our case studies*

· *(Discussion tool is) excellent for clarifying matters*

· *Being referred to web-sites and references is very useful*

· *(Discussion is) great to run quick ideas past people*

· *(WebCT) enabled a more personal connection with class members*

Results also indicate that some students did not find the calendar, private email and study links useful. However, their qualitative comments revealed that they were using private emails (home and work addresses) rather than the *WebCT* emails. Students preferred using their own time management system (diaries & year planners), and most had access to an alternative library source (a service provided within their workplace). This suggests an alternative use, rather than a lack of use, of these communication and information tools.

Co-participatory activities

Table 2: **shows the students' perceptions of the value of their on-line learning in promoting co-participatory activities. Co-participation involved acquiring a shared language for students to communicate within the community in order to promote learning.**

Table 2: Students' ratings of co-participatory activities						
	1 not valuable	**2**	**3**	**4**	**5-very valuable**	**Mean rating**
	%	**%**	**%**	**%**	**%**	
gaining an awareness of professional issues	0.00	0.00	22.22	29.63	48.15	**4.26**
staying in touch between class meetings	0.00	11.11	3.70	22.22	59.26	**4.19**

Checking understanding of issues	0.00	0.00	25.93	29.63	44.44	**4.19**
Communicating with course coordinators	0.00	7.41	11.11	22.22	55.56	**4.15**
Creating a sense of community	0.00	7.41	7.41	33.33	48.15	**4.11**
Participating actively in forums	0.00	0.00	18.52	40.74	37.04	**4.04**
Communicating with course colleagues	0.00	7.41	3.70	18.52	59.26	**3.96**

Results of this section of the survey are overall positive and show that more than half of the students rated all items as valuable or very valuable. This is significant as these items form the key elements that contribute to effective on-line communities of practice. Commonality and interdependency, as well as situatedness is reflected in the students' qualitative comments below:

· (*WebCT is) a quick and wonderful way of staying in touch, getting to know each other and discussing issues, finding common interests and learning about other people's passions*

· *This is a superb way of learning from each other*

· *A great window to shared information*

· *We should have more set group (chat room) tasks, as so much more than sharing of ideas flows from this - bonds are forged and friendships made.*

· *I am able to ask for advice from classmates. Able to see and understand class-mate's viewpoint and ways of thinking.*

· *Getting encouraging emails kept triggering me into action.*

· *This is a great support system.*

· *Learning from others with different types of work experience is valuable*

Learning to learn online

On-line learning for the purposes of this study included elements of what Chang (1999) referred to as emancipatory (convenient, efficient and autonomous) learning and qualia (enjoyment, confidence and success) in learning.

Table 3: shows the students' perceptions of their (88% of students' first time) experiences of on-line learning using *WebCT*.

Table 3: Students' perceptions of on-line learning						
	1 strongly dis-agree	**2**	**3**	**4**	**5 strongly agree**	**Mean rating**
	%	**%**	**%**	**%**	**%**	
Access information at convenient times	0.00	7.41	0.00	11.11	70.37	**4.11**
flexibility enables exploration beyond course work	3.70	0.00	22.22	18.52	44.44	**3.67**

more autonomy in accessing information	3.70	3.70	7.41	22.22	48.15	**3.63**
satisfaction with this learning environment	0.00	7.41	25.93	25.93	29.63	**3.44**
the technology enhances learning	0.00	7.41	22.22	33.33	25.93	**3.44**
confident using technology	0.00	7.41	22.22	33.33	22.22	**3.26**
Web is a good supplement to classes	0.00	7.41	29.63	18.52	29.63	**3.26**
asynchronous interactions allows time to reflect	11.11	14.81	18.52	14.81	29.63	**3.04**
enjoyment in this learning environment	3.70	11.11	25.93	25.93	14.81	**2.81**

While the results outlined in Table 3 are positive overall, some negativity was expressed in terms of autonomy, flexibility and enjoyment. These mixed responses are elaborated upon in the following qualitative comments by the students:

· *(WebCT) provides flexibility and access to info when I needed it in my own time frame*

· *Being geographically distant from the hub of activity, this is a great way to keep communicating.*

· *Lack of nonverbals leads to misunderstandings in chat and delays result in miscommunications*

· *WebCT was a huge learning curve*

· *Some aspects were very time consuming*

· *Delays and multiple entries lead to confusion in the chatroom, but with practice this did improve.*

· *Conversations in the chatrooms were difficult and disjointed*

· *We need more technical training - short cut tips, more demonstrations and written guidelines.*

An analysis of the students' responses indicated that their frustrations were linked to difficulties with the technology as well as non-verbal communication. As Hara & Kling (2000) warn, the communicative and technical capabilities required by students should never be understated, and they suggest the introduction of on-line orientation courses for students taking distance courses to help students understand the communicational complexities of asynchronous text-based communication. Linked to this is Poole's (2001) finding that, because visual and verbal cues are absent from on-line learning envrionments, it is common for groups to develop other ways of expressing their emotions and feelings which could include emoticons (computer keystrokes that resemble things like smiley faces). For Hung and Chen (2001), a facilitating infrastructure is one of the four key dimensions in establishing and sustaining on-line communities, and it would be these difficulties with technology and non-verbal communication that would need to be explicitly included in orientation courses to web-based learning environments.

Analysis of discussion postings

As the discussion tool was seen to be crucial in contributing to the development of an on-line community, the discussion postings were analysed in order to gain a deeper understanding of the type of postings.

The number of postings (1286 over a period of 9 months) far exceeded expectations and indicates the extent to which

the on-line medium gave each student an opportunity to contribute to their on-line community. All voices were heard - not just the most vocal students as is often the case in traditional face to face classes. A content analysis was done on a sample of the postings to assess the type of message. 250 messages (every 5th message posted) were selected over three phases and analysed in terms of the content of the posting. This analysis was based on Poole's (2000) analysis of students' participation in a discussion-orientated on-line course where messages were coded into focus areas. For the present study, posting were coded as one or more of the following:

· Technical - messages relating to the website and managing on-line learning

· Coursework - information related to the course content and academic work

· Social - messages that were non-academic in nature

The three phases included initial phase (first 400 postings), middle phase (400-800 postings) and end phase (800-1286 postings). Results of the postings according to type and phase can be seen in Table 4.

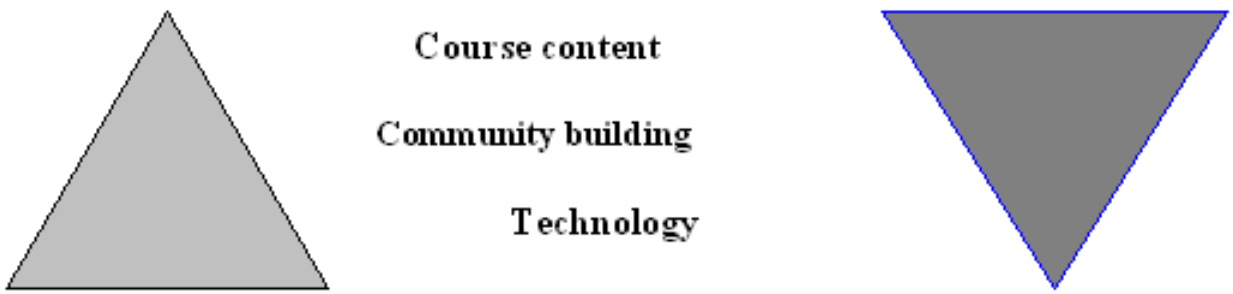
Table 4. Analysis of discussion postings by phase and type

	Type of posting		
	Technical	Course-work	Social
Initial phase	43%	26%	31%
Middle phase	14%	57%	29%
End phase	0	70%	30%

In the initial phase, the majority of postings were technical and the least number of postings were related to coursework. This changed over time where technical postings dropped to 14% in the middle phase and zero in the end phase. Social postings stayed relatively the same in all three phases, and course-work increased over time from being the least in the initial phase to the most in the end phase. These results suggest that students were initially inexperienced with the technology and were still learning about on-line learning. Postings relating to commonality and interdependence regarding course-work increased over time, once students felt competent with regard to the technology aspects of the infrastructure for communicating on-line.

This analysis of the postings can be linked to Brown's (2001) model of the Time Triangles in Figure 3. This model uses a triangle to represent time on certain tasks. For students new to on-line learning the large base of an upright triangle accounts for the time taken up becoming familiar with the technology, and the small peak at the top represents the limited time available for sharing activities. As students become more experienced with technology, the triangle inverts and the peak becomes technology-related time, while the large base of the triangle represents time available for academic content and community building activities. Within the apprenticeship model, it was evident that the varying technical expertise of some students in the community enabled a positive interdependence to be created so that they collectively helped each other develop competence in this area.

Figure 3: Time Triangles



New students Experienced students

An analysis of the course-work postings showed queries relating to course assignments and resources, notification about conferences and seminars across the country, as well as a significant number of posting that involved information sharing and help with relevant articles and resources. Advice for current case work and projects were openly shared as the following posting in response to a student's query about her case-work on selective mutism shows:

> *· I have worked with a six-year-old boy - who was a selective mute. A programme was given to me by (x) working in the communication strand at SES. The programme has been a success. So if you would like me to send you a copy of the programme - then just tell me and I will send it on.*

This highlights the importance of situated learning in strengthening the commonality and interdependence of the community. The issue of shared responsibility emerged, where students started taking responsibility in part not just for their own learning but for others' learning too. Thus an "intellectual collective" emerged within this community where the potential existed for all members to advance their learning through guidance from more capable peers within the collective zone of proximal development. This reinforces the notion that learning does not occur in isolation, but through being involved with more skilled practitioners, and a community of fellow novices and classmates.

Two additional dimensions of the on-line programme included an on-line responsive feedback buddy (where two student paired up to provide each other with comments on assignments), and a cultural forum debate. Both generated a significant amount of postings and were found to be valuable shared learning experiences as indicated by the following student comment and posting:

> *· (The buddy system) is a great idea. R and I used a buddy feedback system for the first case study and it was really valuable to get another person's opinion. R would direct my thinking to an area which I hadn't covered, as well as ensuring there were no silly mistakes. Using a buddy also made me feel like I was on the right track with my work.*
>
> *· Cultural competence is an interesting question and one that is very relevant. Our Manager for Maori, has presented several lectures related to this at X University. She is a valuable resource person, a local Kuia and has had many years of experience in education. I will discuss this question with her and bring back her perceptions on this question soon.*

The social postings ranged from motivating others, arranging trips to and from block courses to more deep and personal postings such as a death in the family, a new job or moving home. These again suggest the strong bonds that can develop within an on-line community as students share joys and sadness, and gain support from one another.

> *· Glad to hear you're back on board. I can't imagine the pain you're going through. Sounds good that you've been with your family - you've got to be surrounded by the ones you love at a time like this. Good luck with all your study you've now launched yourself back into. Take care - kia kaha.*
>
> *· Great news (new job) It certainly sounds as if you've chosen a new and exciting experience. Grabbing opportunities like changing jobs certainly moves one out of one's comfort zone and get one all revved up about life all over again. Enjoy.*
>
> *· I found that this has been the most intimate (if I can say that word) extramural classes I have ever been involved with.*

Implications for the Creation of Effective Communities of Practice

Analysis of projects, such as the one presented here, indicates that there are some important underlying principles for the creation of viable and sustainable communities of practice that can enhance cognition and assist with the development of identity and professional knowledge. Hung & Chen's (2001) dimension have been used below as the framework to explore these educational implications and link to the Educational Psychology programme:

Dimension	**Implications for creating authentic on-line communities**

Situatedness

· Learning involves collaborative and authentic tasks which enable participants to construct knowledge through socially situated learning within the intellectual collective of the community.

Within the Educational Psychology programme this involved on-line discussion of situated casework, shared problem solving in the group project involving an authentic ethical dilemma, and the use of a buddy system for assignments.

Commonality

· Learning involves a joint effort to enable individuals to develop their personal and professional identities through bonding as members of the community. Socialization into a community of practice not only promotes skill development but also assists in the formation of self identity as a capable practitioner.

In the Educational Psychology programme there was evidence both in the course-work and social postings that students were using this environment to bond with each other in developing a personal and professional identity.

Interdependency

· Learning involves using the varying expertise brought by members of the community to promote a positive interdependence so that collectively students can solve problems that would be too difficult for an individual on their own.

Students in the Educational Psychology programme developed a sense of shared responsibility for learning - where more experienced students offered support for those less competent in both the technical and coursework areas.

Infrastructure

· Successful learning communities develop strong norms for helping others. This sense of altruism and shared responsibility results in participants having a positive reciprocity with one another. Combined with this social infrastructure, is a professional structure, a language and framework that contributes to shared understandings and ways of working.

The extent to which students in the Educational Psychology programme asked for advice, offered information, shared ideas and made suggestions is indicative of their sense that their on-line community was a safe place where they could be enriched by both giving and receiving assistance. This social infrastructure was supported by a professional structure of common ways of working- which included functional behaviour assessments and a problem analysis approach to casework.

The communities of practice framework provides an encompassing theory for understanding how individuals can achieve their optimal functioning level through guided social participation. The concepts of situated cognition, the collective zone of proximal development (czpd) and the apprenticeship model have been explored within the Educational Psychology training programme to illustrate the potential of web-based learning to create a sustainable learning community. Authentic on-line communities of practice can be successfully developed to the extent that the dimensions of situatedness, commonality, and interdependency are allowed to occur within an altruistic and psychologically safe infrastructure.

References

Barab, S. A. & Landa, A. (1997). Designing interdisciplinary anchors. Educational Leadership. 54 (6), 52-55.

Barab, S., Squire, K. & Dueber, W. (2000). A co-evolutionary model for supporting the emergence of authenticity.

Educational Technology Research and Development, 48 (2), 37-62.

Brown, A.L. & Campione, J.C. (1990). Communities of learning and thinking or a context by any other name. Contributions to Human Development, 21, 108-126.

Brown, J.S. Collins, A. & Duguid, P. (1989) Situated cognition and the culture of learning. Educational Researcher, 18, 32-42.

Brown, R.E., (2001). The Process of Community-Building in Distance Learning Classes. JALN, Volume 5, Issue 2. 18-35.

Chang,V. (1999). Evaluating the effectiveness of on-line learning using a new web based learning instrument. Proceedings Western Australian Institute for Educational Research Forum. http://cleo.murdoch.edu.au/waier/forums/1999/chang.html

Curzon, J., Selby, L. & Ryba, K. (2000). Realising the power within: Partnerships and information and communication technology. In D. Fraser, R.Moltzen & K. Ryba (Eds.), Learners with special needs in Aotearoa NewZealand. Palmerston North: Dunmore.

Hung,D.W.L. & Chen,D. (2001). Situated Cognition, Vygotskian Thought and Learning from the Communities of Practice Perspective: Implications for the Design of Web-Based E-Learning. Education Media International . 38,1, 4-12.

Johnson, D., Johnson, R., Barlett, J. & Johnson, L. (1988). Our cooperative class. Edina, MN: Interaction Book Company.

Lagache, E. (1995). Diving into communities of learning: Existential perspectives on communities of practice and zones of proximal development. Unpublished PhD Dissertation, University of California at Berkeley.

Lave, (1988). Cognition in Practice: Mind, mathematics, and culture in everyday life. Cambridge UK: Cambridge University Press.

Lave, J and Wenger, E. (1991). Situated learning: Legitimate peripheral participation. Cambridge: Cambridge University Press.

Lave, J. (1993). Situating learning in communities of practice. In L.B. Resnick, J.M. Levine, & S.D. Teasley (Eds.), Perspectives cognition (pp. 17-36). Washington D.C.: American Psychological Association.

Poole,D. (2000). Student Participation in a Discussion-Oriented Online Course: A Case Study. Journal of Research on Computing in Education. Volume 22,No 2.

Rogoff, B. & Lave, J. (1984). Everyday cognition: Its development in social context. Cambridge, MA: Harvard University Press.

Rogoff, B. (1990. Apprenticeship in thinking: Cognitive development in social context. New York: Ozford University Press.

Ryba K, Pine,T., Mentis, M. & Bowler,J. (1999) Training educational psychologists for the 21st century: A Massey University perspective. New Zealand Psychological Society Bulletin.

Vygotsky L.S. (1978). Mind and society. Cambridge: Cambridge University Press.

Vygotsky L.S. (1987). Thinking and speech (N. Minick, Trans.). In R.W. Rieber & A.S. Carton (Eds.), The collected works of L.S. Vygotsky (pp. 37-285). New York: Plenum.