

# Analysing the effectiveness of on-line learning communities

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**Abstract:** *This paper presents a framework for analysing the perceptions, processes and products of on-line learning. The framework, known as the Triple P Alliance, was designed by the authors to provide a systematic and rigorous analysis of the outcomes of online courses and programmes. The Triple P framework is used to identify the essential questions and data gathering methods that are required to analyse the perceptions, processes and products of learning at each stage in the development of an online learning community. It is proposed that multi-methods of data collection enable the triangulation and verification of findings. Data from an on-line educational psychology course is presented to illustrate the application of the Triple P framework for evaluation of an on-line community of professional practice.*

**Keywords:** *online teaching, online learning, evaluation*

## Introduction

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*™ and *WebCT*™ 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 outline a new model for evaluation of on-line learning and to provide examples of how this can be applied to study

the perceptions, processes and products of on-line learning. Despite all of the technical developments that have taken place, there is a lack of understanding about the educational transformations that need to take place in order to teach and learn effectively on-line. It is not simply a matter of adapting traditional forms of pedagogy to on-line forms of learning, but rather there is a need to create new models that take account of changes in learning made possible by networked technologies such as the Internet and the World Wide Web. This calls for a new generation of teachers and trainers that can work interactively with on-line learners to establish an on-line world that is a "creative, happy, productive and relevant place for successful learning" (Salmon, 2000).

Increasing attention is being given to the formation of online learning communities as a basis for creating better learning conditions. 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).

### **Situated Learning and Cognitive Apprenticeships**

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.

Increasing attention is being given to the design of online frameworks for electronic cognitive apprenticeship (Wang & Bonk, 2001). Online learning by its very nature is an ideal context for the formation of cognitive apprenticeships. This is evident by the way in which modelling, coaching and scaffolding of students can be provided on a continuous basis. Moreover, there are vast opportunities online for exploration of ideas and development of

metacognitive thinking processes based on reflection and self evaluation. The notion of guided experience within a cognitive apprenticeship corresponds to the concept of the zone of proximal development (ZPD) introduced by Vygotsky (1978, 1987).

Vygotsky 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, Mentis, Ryba & Annan (2001) have proposed a model for the "collective ZPD". This illustrates how a group of students can form an "intellectual collective" in which there is 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.

### **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*<sup>TM</sup> 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 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 and were encouraged to make use of *WebCT* for peer support and professional supervision.

## **Triple P Evaluation Method**

### **An Evidence-based Approach**

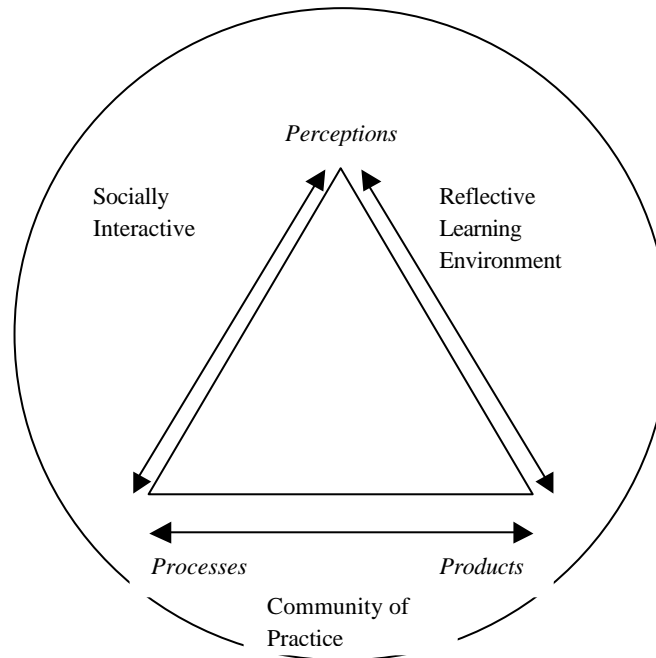
Responding to the need for more rigorous and systematic methods for evaluation of online learning, we wish to propose the Triple P Framework as a research tool. Triple P stands for an evaluation of 'perceptions', 'processes' and 'products'. It is based on the view that the results from online studies need to be triangulated in order to make definitive statements about the effects or outcomes of online learning. Previous research has frequently been descriptive in nature with enthusiastic researchers and programme developers attempting to place a positive light on their results. The aim of Triple P is to follow an 'evidence-based approach' so that specific research questions and propositions about on-line learning can be systematically tested. This includes an analysis of:

**Perceptions:** students own views about their feelings and experiences with online learning

**Processes:** analysis of online interaction patterns and content of cognitive and metacognitive processing

**Products:** observable outcomes of learning in the form of publications, reports, folios, lists of resources,

The Triple P alliance is depicted in Figure 1 as three components of an evaluation within a community of professional practice. This illustrates how the alliance can be applied to triangulate the data in order to evaluate the outcomes of an online community of practice.



**Figure 1**  
**Triple P Evaluation Within the Community of Practice**

### **Five Stage Model For Analysis of Learning and Teaching**

Online learning takes place within a definite social and community context. Moreover, online learning is progressive and goes through a series of stages corresponding to the development of a community of practice. Salmon (2000) outlines a Five-Stage Model that explains the progressive development of the online learning community which is outlined in Table 1.

Stage one at the base of the staircase indicates that individual access and the ability of participants to use the web environment are essential pre-requisites for online learning. Stage two is characterised by the establishment of online identities and finding others with whom to interact. At stage three, participants share course information and begin the process of helping and supporting one another. At stage four, course-related group discussions take place and the interaction becomes more collaborative in nature. Students work out procedures for collaboration and devise some common understandings on methods and strategies for completing the online work together. Finally, at stage five, participants demonstrate how the online learning has enabled them to achieve personal goals. They also show an increased capacity to reflect on the learning process and to facilitate the introduction of new members into the community (Salmon, 2000, p.25).

### **Triple P Model For Evaluating the Five Stages of Online Learning**

Table 1 shows how the Triple P framework fits with the five stage model of online learning.

This shows the essential questions and data gathering methods that are needed to analyse the perceptions, processes and productions of learning. The overall aim is to utilise multi-methods of data so that the results can be triangulated and verified rather than depending upon descriptive or anecdotal information. By evaluating the progressive formation of the community of practice, it is possible to: (1) document the views and experiences of students; (2) analyse the content of interaction patterns of electronic contributions; and, (3) verify the products that result from the online learning process.

**Table 1**  
**Evaluation of Five Stages of On-Line Learning**

Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Perceptions	Processes	Products
				<b>Development</b>	Do participants become responsible for their own learning and guide newcomers into the online community of practice?	<ul style="list-style-type: none"> <li>• Student Survey</li> <li>• Narrative analysis of posting</li> <li>• reflective enquiry</li> <li>• group feedback and evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• production of collaborative reports and online folios</li> <li>• increasing self sufficiency of online community</li> </ul>
			<b>Knowledge Construction</b>		Do students actively participate through formulating their own ideas or constructing their understandings of concepts, theories and practice?	<ul style="list-style-type: none"> <li>• Content Analysis to study cognitive and metacognitive skills and knowledge and depth of processing</li> </ul>	<ul style="list-style-type: none"> <li>• Quantitative Analysis of content confirms increasing depth of processing over time</li> <li>• Diagrams and models are sent as attachments</li> </ul>
		<b>Information Exchange</b>			Do students help and support one another through information exchange and advice on personal and academic tasks?	<ul style="list-style-type: none"> <li>• Analysis of electronic contributions for indicators of information exchange</li> </ul>	<ul style="list-style-type: none"> <li>• Lists of resources,</li> <li>• Messages about where to locate materials</li> <li>• Offerings of personal support</li> </ul>
	<b>Online Socialisation</b>				Do students get to know one another on a personal basis and begin to work together on common tasks?	<ul style="list-style-type: none"> <li>• Online activity graph of interaction patterns</li> <li>• Analysis of social effects</li> </ul>	<ul style="list-style-type: none"> <li>• Formation of working partnerships</li> <li>• moderation of discussion topics and encouragement to participate</li> </ul>
<b>Access and Motivation</b>					Do students report feeling welcome and encouraged?	<ul style="list-style-type: none"> <li>• Student Survey</li> <li>• Analysis of introductory messages</li> </ul>	<ul style="list-style-type: none"> <li>• Welcome messages</li> <li>• Notes of encouragement</li> </ul>

Source: Five-step model developed by Gilly Salmon (2000)

## Evaluating the Perceptions of On-Line Participants

The identity formation of participants as members of the online learning community is a critical variable that determines the effects of online learning. These perceptions can be studied at each stage by consulting with students and watching what they say and how they interact with other participants

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.

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.

Survey results of the value of WebCT tools 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 actively participate through *interdependency* and *communality* within the community (Hung and Chen, 2001).

- *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*

Survey results of the students' perceptions of the value of their on-line learning in promoting co-participatory activities were positive with more than half of the students rating their on-line learning as being valuable or very valuable in acquiring a shared language with which to communicate within the community. This is significant as co-participatory activities form the key to effective on-line communities of practice. Commonality and interdependency, as well as situatedness is reflected in the students' qualitative comments below:

- *It's 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*

- *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 classmates viewpoint and ways of thinking.*
- *Getting encouraging emails kept triggering me into action.*
- *Learning from others with different types of work experience is valuable*

Results of students perceptions of their on-line learning in terms of what Chang (1999) referred to as emancipatory (convenient, efficient and autonomous) learning and qualia (enjoyment, confidence and success) in learning were mixed. While 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*
- *Some aspects were very time consuming*
- *Delays and multiple entries lead to confusion in the chatroom*
- *Conversations in the chatrooms were difficult and disjointed*

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 environments, 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.

### **Evaluating the Processes of Participation**

An analysis of the content of posting and of the interaction patterns revealed a progression in the electronic contributions from stage one of Salmon model (access & motivation) through to stage 5 (development). A sample of the postings (every 5<sup>th</sup> message posted) were selected over three phases and the analysis linked to Poole's (2000) work of coding students' participation in a discussion-orientated on-line course as one or more of the following:

- Technical – messages relating to the website and managing on-line learning (Stage one of Salmon's model - access & motivation)
- Social – messages that were non-academic in nature (Stage two of Salmon's model - socialisation)
- Coursework – information related to the course content and academic work (Stages three to five of Salmon's model - information exchange, knowledge construction and development)

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 0 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 coursework - information exchange, knowledge construction and development increased over time, once students felt competent with regard to the technology aspects and had a social infrastructure for communicating on-line.

## Evaluating the Products of Participation

### 1. Access and Motivation:

The fact that students had an opportunity at the beginning of the academic year to meet one another face-to-face was an advantage for showing how to use webCT and for motivating students to participate. The group photos proved to be a valuable tool for welcoming and encouraging students online. The following comments illustrate the motivational benefits of the online work:

- *I found that this has been the most intimate (if I can say that word) extramural classes I have ever been involved with.*
- *(WebCT) enabled a more personal connection with class members*

### 2. Online Socialisation:

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 your 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.*

### 3. Information Exchange:

An analysis of the coursework 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.

### 4. Knowledge Construction

Analysis of posting indicated that the online community provided a context in which students could construct their own knowledge and understanding. Evidence that showed the benefits to the learning of individual participants included:

- Diagrams to map the dimensions in casework
- Design of methods for carrying out functional behaviour assessments
- Advice to colleagues on where to access resources and materials
- Support for participants needing reassurance and

### 5. Development:

WebCT enabled students to set up their own approaches to professional development. Two examples of this were the establishment of on-line responsive feedback buddies (two students 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.*

## Conclusion

The Triple P model provides a comprehensive and systematic way of evaluating the effects of online learning. The advantages of the Triple P model include:

- Multi-methods of data collection
- Active involvement of participants in the evaluation process
- Ability to triangulate the data in order to confirm the outcomes
- Contextual analysis of the community of practice
- Integration of evaluation within community building
- Development of a pedagogical framework that embraces the dynamic nature of online learning

The Triple P model indicates that evaluation should be built-in to the community of practice as an ongoing process. Evaluation needs to be designed in such a way that it is participatory and contributes positively to the creation of a viable and sustainable community of practice. The Salmon (2000) five-step model of teaching and learning on line is valuable for setting up an evaluation that follows the progression of community building with attention to the e-moderating and technical support required at each stage. Hung & Chen's (2001) four dimensions of community building provides a solid framework for assessing factors that contribute to the formation of an effective community of practice.

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 learning, electronic cognitive apprenticeships, and the zone of proximal development all contribute to an understanding of how to develop new pedagogies for online learning. Further research is needed, however, to decrease the gap between technological advancements versus pedagogical and psychological theory. Finally, it is hoped that future studies will undertake to base their methods on theory and research concerning the learning process and information processing rather than relying on descriptive and atheoretical accounts of electronic collaboration.

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