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A Systematic Review of Technology to Support Adult Learning in Communities of Practice

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Abstract

This thesis presents a systematic review regarding the way technology supports adult learning in communities of practice. It presents the systematic review procedure that was developed, based on NHS CRD (2001) protocol, from publication sources relevant to the topic. It includes the identification of research from an initial question that is: how does technology support adult learning in communities of practice. In addition, it presents a search strategy, a study quality assessment, a data extraction strategy and a synthesis of findings. Because most of the pertinent research is qualitative, a typology of qualitative research and a critical appraisal checklist for quality assessment were designed and are presented. The results presented have synthesized evidence from studies that meet certain quality criteria and they are discussed in terms of (a) the kinds of technologies applied in communities of practice, and (b) successful features of the technology that seem to contribute to learning.

Résumé

Une revue systématique de la littérature sur l'utilisation des technologies pour supporter l'apprentissage chez les adultes dans les communautés de pratique est présentée, adaptée d'après le prototocle du NHS CRD (2001). Cette revue systématique comprend l'identification d'une question de recherche, une stratégie de recherche, une évaluation de la qualité des études identifiées, une extraction des données et une synthèse. Étant donné que la recherche dans le domaine concerné est essentiellement qualitative, une typologie de la recherche qualitative et une grille d'évaluation de la qualité des études qualitatives ont été développpées et sont présentées. Les résultats offrent une synthèse des preuves concernant l'tuilisation des technologies pour supportter l'apprentissage auprès d'adultes dans des communautés de pratique, à partir d'études répondant aux critères de qualité identifiés dans la grille. Les résultats sont interprétés selon deux dimensions: a) l'éventail des technologies utilisées au sein de communautés de pratique et, b) les conditions de réussite de l'utilisation des technologies pour supporter l'apprentissage dans ces communautés.

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I. Introduction

The development of computer-mediated communications has led to rapid changes in learning environments. In the professional development literature, particularly, the concepts of "learning communities" and "communities of practice" with asynchronous and synchronous communications are emphasized because the technology makes it possible, regardless of differences of times and places, for learners to participate more actively and effectively in interactions with peers.

Even though many online learning communities and/or communities of practice have been created and are maintained (e.g., Brown & Gray, 1995; Burk, 2000; Gongla & Rizzuto, 2001), there are almost no systematic accounts of their circumstances and outcomes and, therefore, a lack of clear and helpful guidelines to increase meaningful learning in these contexts (Wenger, 1998). Most of the relevant literature offers models, programs, and projects in relation to online communities in learning environments. However, there are very few organized accounts of the significant, valuable, and reliable evidence regarding the effectiveness of on-line technology for fostering and supporting learning in communities of practice (Owen, Pollard, Kilpatrick, & Rumley, 1998; Simich-Dudgeon, 1999).

In this context, a systematic review, such as those currently being conducted in the medical and health care field and being considered seriously in education¹, seems to be an appropriate research method to produce general statements about the relationships between technology and learning through the synthesis of individual research results. However, because the systematic review is a new approach in educational research, the method itself should be examined, and its effectiveness and efficiency should be shaped through initial pilot tests prior to conducting full-scale reviews.

The research presented here is a systematic review whose purposes are (a) to present an application of the systematic review protocol in educational research on the question of web-based technology to support learning in communities of practice and, (b) based on the results of the systematic review, to examine the effectiveness of technology in communities of practice. This thesis presents a preliminary review of the studies in

¹ The Campbell Collaboration (http://www.campbellcollaboration.org/)

order to test the systematic review process and its feasibility. The review question is: how does technology support adult learning in communities of practice. The following two objectives are identified

- Objective 1: What kinds of technologies were applied to in communities of practice?
- Objective 2: What features of the technology seem to contribute successfully to learning?

In the following section, the literature on web-based learning and communities of practice is reviewed in order to position the study that was conducted.

Web-based learning

Web-based learning (WBL) is an innovative learning approach conducted through the application on Internet protocols (most importantly the World Wide Web), on wide-area networks, intranets, or extranets. The development of technology in the WWW, such as hardware, computer networking, multimedia software, and video conferencing, has offered huge potential for changes in learning.

WBL can include many components such as: content delivery (e.g., course wares), communication tools (e.g., networks), and information resources (e.g., databases). First, concerning content delivery, a lot of courses are delivered through the WWW, the Internet, or intranets. Learners can access a range of courses to learn "anywhere and anytime." Next, WBL is an innovative technology that makes it possible to communicate through distance. Learners can interact with peers and experts in their field as well as an instructor. Through e-mail, chat rooms, bulletin boards, and video conferencing, learners are able to discuss issues, share their own knowledge and experiences, and exchange peer feedback. For adult learners in the workplace, this communication opportunity can be important in terms of the learners' motivations, identities, and socializations. Third, the Web is a huge resource of potentially useful information. It is possible for learners to access and acquire intended information and knowledge by using search engines and following related links. All of the above characteristics of the Web are utilized for the construction of knowledge and knowledge management (Harasim, 1993).

Networks as a communication tool have been used to create and develop communities of practice and learning communities (Levin & Thurston, 1996). Networks promote learners' interaction and communication, and their participation to the community that is developed through authentic activity and social interaction. Owen (1998) characterizes the learning environments of online communities as a virtual environment, written communication, and disembodied learning process. Indeed, Silva and Breuleux (1995) discussed some models of educational networking and their opportunities in U.S. and Canada.

Communities of practice

According to Wenger (1998a), "communities of practice" is defined in three dimensions: "joint enterprise", "mutual engagement", and "shared repertoire." That is, a community of practice is informally bounded by the members themselves who have common purpose and interest. They actively participate in sharing, negotiating, and creating knowledge in practices in relation to themselves and the community.

In order to explore an online community, the criteria for communities of practice are needed. These provide a framework to analyze online communities.

Organization

In a community of practice, the characteristics of organization are an important background. These are classified as the organization itself and membership. A

community of practice is informally bounded, and the goals, procedures, and rules are negotiated and reified among the members (Wenger, 1998a). The life cycle of a community of practice is generally longer in comparison with a team in conventional communities. A community of practice does not disappear even when a project team has completed its task (Wenger, 1998b). Membership in a community can vary in number, required qualifications and procedures to join the community, and characteristics of individual members, such as expertise, personal goals and needs, and relationships among one another.

Participation

The degree of members' participation is indicated in terms of centrality and peripherality. The central roles are needed to build common goals and collect diverse knowledge within the community. The peripheral roles of individuals are also emphasized in a community of practice (Bielaczyc & Collins, 1999; Lave & Wenger, 1991). Riel and Levin (1990) discuss the fact that a community needs roles of leadership, such as a coordinator and facilitator who have responsibilities to monitor and facilitate interactions among participants. Communication in a community is established through various modes, for example, face-to-face meetings, telephone, fax, e-mail, and others. Technology makes it possible to build distributed communities of practices (Hildreth, Kimble, & Wright, 1998). When a community chooses a mode of communication, all members should access it easily and efficiently. According to Riel and Levin (1990), the opportunities of access and the frequency of communication should be considered as influential factors. In a community of practice, participants share their experiences, interests, and knowledge, that is, they negotiate meanings, learn from one another, and build new knowledge. This process itself can be also characterized as different kinds of knowledge.

Products

Wenger (1998a) indicates that there should be a "shared repertoire," such as "routines, sensibilities, artifacts, vocabulary, and styles" in communities of practice. As a result of member participation, some products are yielded, sustained and developed in the community. The products may represent different kinds of knowledge, and the products can also allow the creation of new knowledge.

These criteria defining communities of practice are summarized in Table 1.

| Table | 1 | Criteria | for | communities | of | nractice |
|-------|----|----------|-----|-------------|-----|----------|
| Taulo | 1. | Unicita | 101 | communics | UI. | practice |

| Organization | - Is it formal (or informal)? |
|---------------|--|
| | - Are there negotiated and reified Goals, Procedures, and |
| | Rules? |
| | - What is the life cycle? (Ex. ongoing process.) |
| | - Number of members? |
| | - Who can be a member, and How? |
| | - What is the range of members' expertise? |
| | - What are their individual goals and needs? |
| Participation | - How long do members participate in the organization? |
| | - What is their degree of participation? (Central/Peripheral) |
| | - Which roles do they play? (e.g., Coordinator, facilitator) |
| | - Are there multiple modes of participation? (e.g., different |
| | communication media) |
| | - Can members access the tools for participation easily and |
| | efficiently? (Response opportunities) |
| | - How frequently do members participate? (Expected |
| | response time) |
| | - Are there shared tasks with specified outcome? |
| | - Do members share their experiences, interests, and |
| | knowledge? |
| | - How do they interact? (negotiating meaning / learning / |
| | knowledge building) |
| | - What kind of knowledge is characterized in the activities? |
| Product | - Is there a shared repertoire? (routines, sensibilities, artifacts, |
| | vocabulary, styles, etc.) |
| | - What are the products of the community members activities? |
| | - What knowledge is represented in the products? |

| - What knowledge is made possible by the products? |
|--|
| - Is the knowledge created and sustained? |

II. Methods

This section introduces the main concepts underlying systematic reviews in terms of their definition, benefits, purposes, and the steps involved in conducting such a review. Then, the specific procedure developed in this review is presented.

The systematic review is "a review of the evidence on a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review" (NHS Centre for Reviews and Dissemination [NHS CRD], 2001). The systematic review is a rigorous methodology that has emerged in the fields of medical and health care². The Campbell Collaboration was initiated recently to study the effects of social and educational policies and practices as a sibling organization to the Cochrane Collaboration that prepares and maintains systematic reviews of the effects of interventions in health care (Boruch, Petrosino, & Chalmers, 1999).

² The Cochrane Collaboration (http://www.cochrane.org/)

According to the Critical Reviews Advisory Group [CRAG] (1996), the systematic review has two main practical priorities in comparison with traditional literature review. First, the systematic review can overcome limitations of the traditional review. A traditional review may be initiated by selecting a group of literature sources to support some conclusion according to a reviewer's subjective assessment. On the contrary, a systematic review attempts "to be systematic in both identification and evaluation of materials, objective in its interpretation and reproducible in its conclusions" (CRAG, 1996). Second, the systematic review can add power brought by synthesizing the results of a number of smaller studies. When smaller studies lack the statistical power to demonstrate a statistically significant effect, the pooling of results from a number of smaller studies can make it possible to attain more credible and reliable conclusions.

The Campbell Collaboration Steering Committee [CCSC] (2001) suggests that a systematic review can be conducted when a researcher has some of the goals and expectations below:

- (a) produce general statements about relationships and treatment effects through the synthesis of individual study results,
- (b) find reasons for conflicting evidence,

- (c) answer questions, using variations in studies, that could not have been answered in the individual component studies,
- (d) explain variations in practice,
- (e) review the evidence on the subjective experience of an intervention, and/or
- (f) build connections between related areas of research. (p.3)
- NHS CRD (2001) summarizes the general steps of systematic review as

following Table 2.:

| Stage I. | 1. Identification of the need for a review |
|-----------------------------|--|
| Planning the review | 2. Preparation of a proposal for a review |
| | 3. Development of a review protocol |
| Stage II. | 1. Identification of research |
| Conducting a review | 2. Selection of research |
| | 3. Study quality assessment |
| | 4. Data extraction and monitoring progress |
| | 5. Data synthesis |
| Stage III. | 1. The report and recommendations |
| Reporting and Dissemination | 2. Getting evidence into practice |

Table 2. Steps of the systematic review

A flow chart illustrating the stages of this systematic review's methods is

presented in Figure 1. The major components of the procedure illustrated in Figure 1 are explained in more details in the next paragraphs.



Figure 1. Systematic review method used in the present study.

Identification of research

As a first step, the search for studies is conducted "to generate as comprehensive a list as possible of primary study.... which may be suitable for answering the questions posed in the review" (NHS CRD, 2001). In order to minimize non-retrieval of relevant documents and retrieval of irrelevant documents and to maximize retrieval of relevant documents, unbiased search strategy is required. To develop a search strategy, the research question should be broken down into facets in terms of population, interventions, outcomes, and study design.

- The Question: How does technology support adult learning in communities of practice?
- Objective 1: What kinds of technologies were applied in communities of practice?

- Objective 2: What features of the technology seem to contribute successfully to learning?

- Population: Adult (including post-secondary, university, professional development and workplace training)
- Interventions: Communities of practice and technology
- Outcomes & Study design: Unrestricted

As for the outcomes and study design, I attempted to begin the search more exclusively in order to overview the flow of current educational research in relation with this subject.

In search strategy, the search has been initially conducted in the ERIC database with a search strategy as shown in Table 3.

- Electronic database: ERIC (1985 Nov. 2001) / Total: 253 titles
- Date of the search: December 5, 2001
- Search History

| 1 | Exp technology/ or "technology".mp. | 48382 |
|----|---|--------|
| 2 | exp world wide web/ or "www".mp. | 4033 |
| 3 | exp computer mediated communication/ or "computer | 4862 |
| | mediated communication".mp. | |
| 4 | 1 or 2 or 3 | 53087 |
| 5 | exp adult learning/ or "adult learning".mp. | 3022 |
| 6 | exp professional development/ or | 16066 |
| | "professional development".mp. | |
| 7 | exp higher education/ or "higher education".mp. | 143487 |
| 8 | exp training/ or "training".mp. | 59988 |
| 9 | "WORKPLACE".mp. | 6684 |
| 10 | 5 or 6 or 7 or 8 or 9 | 199789 |
| 11 | "COMMUNITY OF PRACTICE".mp. | 87 |
| 12 | "COMMUNITIES OF PRACTICE".mp. | 63 |
| 13 | "LEARNING COMMUNITY".mp. | 837 |
| 14 | "LEARNING COMMUNITIES".mp. | 878 |
| 15 | "COMMUNITIES OF LEARNERS".mp. | 80 |
| 16 | "COMMUNITIES OF LEARNER".mp. | 0 |
| 17 | "COMMUNITY OF LEARNERS".mp. | 252 |
| 18 | "COMMUNITY OF LEARNER".mp. | 4 |
| 1 | | 1 |

Table 3. Search strategy

| 19 | 11 or 12 or 13 or 14 or 15 or 17 or 18 | 1865 |
|----|--|------|
| 20 | 4 and 10 and 19 | 253 |

For the search strategy in ERIC database, keywords were applied and combined in terms of population (e.g., adult learning, professional development, higher education, or training) and intervention (e.g., communities of practice and technology). Using the search strategy in Table 3, 253 citations were obtained. These citations then were screened according to criteria for inclusion and exclusion that are explained below.

Selection of studies

The aim of study selection is "to identify those articles that help to answer the questions being addressed by the review" (NHS CRD, 2001). In this step, the obtained citations are selected through several filters for inclusion and exclusion in order to have more retrieval of relevant documents.

For an initial selection, abstracts of citations obtained from the previous ERIC search (see Table 3) were scanned and selected using the initial criteria for inclusion and exclusion presented in Table 4:

Table 4. Initial criteria for inclusion and exclusion

• Population: "Adult (Higher education, Professional development, Training)."

Interventions: "Communities of practice" and/or "Learning communities"
If a "Community" means geographical term, such as "Community college" or "Local community", then it is excluded.

- If a paper indicates only about concept of "Learning community," "Communities of practice," or "Community of learners" without considering "technology," then it is excluded
- Study designs: "Reference materials," "Guide," "Video", "Viewpoint", and "Information analyses" in publication type are excluded.

In terms of the study designs, because the purpose of this review was to assess evidence in research, types of publication that only present general knowledge or theories, for example, reference materials, guide, video, viewpoint, and information analyses, were excluded in this selection. In addition, if it was not clear, from reading the abstract, whether a paper might be included or excluded, it was included to read a full text in order to prevent premature exclusion of relevant papers. According to the above criteria (see Table 4), 119 citations were excluded from this initial selection.

The second selection was conducted by reading the full texts of 111 citations among the 134 citations those were included through the initial selection. The remaining 23 citations have not been reviewed, because of logistical difficulty in obtaining the full texts. At this stage, more detailed criteria presented in Table 5 were applied and the papers meeting these criteria were selected.

Table 5. Second criteria for exclusion

- Initial criteria (see Table 3) are also applied.
- In addition, more detailed criteria are used as below,
- Population: As for participants, if it is focus on students' leaning in school environments not adult learners. For example, when a case studied about the partnership between university and school, and discussed about in terms of K-12 students, not in terms of teachers or university, it is excluded.
- Interventions: In technology-based learning, such as online learning, distance learning, and web-based learning, if the focus is instruction and learning strategies or other points without a concept of "learning community" or "communities of practice", it is excluded.
- If the participants use technology, but the research does not consider about the technology, it's excluded.

Through this second selection process, 51 citations were excluded. Finally,

60 papers remained for the next step which consisted in assessing the quality of the studies.

Study quality assessment

Next, the quality of the studies in the corpus thus obtained is assessed. NHS

CRD (2001) discusses the following main reasons for assessing the quality of studies:

(a) to determine a minimum quality threshold for the selection of

primary studies

(b) to explore quality differences as an explanation for

heterogeneity in study results

(c) to weight the study results in proportion to quality in meta-

analysis

- (d) to guide the interpretation of findings and to aid in determining the strength of inferences
- (e) to guide recommendation for future research (NHS CRD, 2001).

For the quality assessment step, at first, instruments such as forms for

tabulating individual quality components, quality checklists, or quality scales need to be used or developed. There exist a number of published "critical appraisal checklists" to assess studies in different disciplines and for different studies, mainly in the medical field.

For example, the Department of General Practice at the University of Glasgow³ introduced several different types of checklists for different types of research designs.

In Educational research, however, the systematic review is at a beginning stage, appropriate checklists were not found for this review. Hence, a critical appraisal checklist was developed to assess the studies. For the development of this critical appraisal checklist, the type of evidence is characterized according to different research methods in educational research, within both the quantitative and qualitative research paradigms. Because of the overwhelming proportion of studies in this field that use a qualitative approach, it was felt necessary to develop and present an initial critical appraisal checklist to help evaluate qualitative studies rather than to ignore them or lump them all into one category.

Studies within the qualitative research approach were subdivided into types to handle the different report styles and required quality components. The types of qualitative research were: ethnographic research, action research, evaluation research,

³ Refer to Web site: http://www.gla.ac.uk/departments/generalpractice/ca_check.htm

case study, and design experiments. Each research method is explained briefly below, with a specific focus on the appraisal of quality in the context of systematic reviews:

Ethnographic Research

Taft (1988) defines ethnographic research "consists essentially of a description of events that occur within the life of a group, with special regard to the social structures and the behavior of the individuals with respect to their group membership, and an interpretation of the meaning of these for the culture of the group." The purpose of ethnographic research is, usually, to describe qualitatively how a culture functions and participant observation is frequently used as a method (Crowl, 1993).

Action Research

Action research is "a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations in which the practices are carried out" (Kemmis, 1988). The purpose of action research is to solve or to improve practical problems through the application of the scientific method (Gay, 1996). Kemmis (1998) indicates the procedure of research as "planning - acting - observing – reflecting."

Evaluation Research

Educational evaluation is "the process of making judgments about the merit, value, or worth of educational programs" (Gall, Borg, & Gall, 1996). Evaluation research is purposed to facilitate decision-making regarding the relative worth of alternative actions (Gay, 1996).

Case Study

A case study is defined as "the in-depth study of instances of a phenomenon in natural context and from the perspective of the participants involved in the phenomenon" (Gall, Borg, & Gall, 1996). Yin (1994) categorizes case studies as exploratory, descriptive, or explanatory. Also, Stenhouse (1998) indicates the styles of case study as ethnographic case study, evaluative case study, educational case study, and case study in action research: this illustrates the lack of general consensus on some of the terms and meanings for qualitative research, which sometimes are used interchangeably and are not systematically distinguished.

Design Experiments

According to Collins (1999), design experiments (a) are set in real-life learning situations, (b) have dependent variables that matter, (c) seek to identify all the variables and seek to identify the nature and extent of effect of the variables, (d) start with plans that are not completely defined and are revised depending on their success in practice, (e) are conducted in complex social situations such as classrooms, (f) pursue the goal of seeing what conditions lead to different effects, and (g) involve different participants in developing the design .

Based on the above definition, some critical characteristics of qualitative research methods were summarized (see Appendix A). In addition, the criteria for qualitative research methods were developed in order to decide more explicitly and systematically the type of research method used in each reviewed study (see Appendix B).

Applying the criteria for qualitative research methods (see Appendix B), 60 citations were categorized according to the research method used. Among these citations, there were non-research papers, 'descriptive reports', articles describing or discussing certain cases, programs, courses, or practices without conducting research, and 'opinion

of experts' simply presenting or introducing some theory or comments. Thirty-eight citations were classified under descriptive reports and/or opinions of experts, and those were excluded in the review. Among the remaining 22 citations, one was an experimental research with quantitative measures, and 21 citations were qualitative research. In addition, because two citations presented the same project and discussed almost the same points, these were considered as one research study. Hence 21 research papers are included for quality assessment.

Next, a critical appraisal checklist was developed for this review in consideration of characteristics of educational research. The purpose of this checklist was to assess the quality of qualitative research studies in terms of credibility and reliability. Hence, the questions were focused on whether a research paper describes each expected component of a study within the category clearly, appropriately, and reliably. The framework underlying the critical appraisal checklist is largely composed of two parts, one regarding general features of research methods (e.g., Introduction, Methods, and Discussion / Implication), and the other for each specific research methods (e.g., Ethnographic research, Action research, Evaluation research, Case study, and Design experiments). For the general part, the items are those required in any qualitative research paper and consisted of three sections: Introduction, Methods, and Discussion & Implications. Also, there is one more section for 'Specific research method' depending on each type of research method. Each item is assessed as "Yes," "No", or unclear (marked by "?"). The items marked as unclear need to be discussed with other researcher(s) and disagreements resolved through consensus. Each item is scored as "1" and the maximum score is 20. The critical appraisal checklist is presented in Appendix C.

The remaining 20 research papers, other than the experimental study, were assessed through the critical appraisal checklist and the scores' distribution is shown in Table 6 and Figure 2.

| Score | 0-8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | Total |
|-------|-----|---|----|----|----|----|----|----|----|----|----|----|----|-------|
| No. | 0 | 1 | 3 | 2 | 2 | 0 | 1 | 0 | 3 | 0 | 2 | 4 | 2 | 20 |

Table 6. Distribution of quality scores



Figure 2. Distribution of quality scores and number of studies

According to the results of quality assessment with the checklist, 11 qualitative studies scored 16 or above. The reason 16 is a cut-off point was that studies with a score less than 16 were lacking in the items of "data collection" and/or "data analysis" that were critical to examine the credibility and reliability in a research paper. In addition to the 11 studies, the experimental study that was assessed with the "Analysis Criteria for Quantitative Studies" (Ducharme, et al. 1995) was selected for inclusion in the review.

Thus, qualified evidence was extracted and synthesized to answer the research questions.
Data extraction and Data synthesis

Data extraction is "the process by which reviewers obtain the information they need from what is reported by primary investigations" (NHS CRD, 2001). NHS CRD (2001) suggests that data extraction should be performed independently by at least two reviewers for the improvement of reliability. In this pilot review, initially, the author extracted data into a FileMaker Pro5 database, and then, collated and summarized the results of primary studies included. The summary table for the inclusion of studies is presented in Appendix D.

III. Results

General results

The search identified 253 citations in ERIC database, of which 111 met initial criteria for inclusion. Upon inspection of the full texts, 60 papers were included by second criteria. Among these, 38 non-research papers, categorized as descriptive reports or opinions of experts were excluded. The 22 remaining research papers were assessed in terms of the quality of the research through the application of a critical appraisal checklist designed specifically for this study. Research papers that scored 16 and over (out of a possible maximum score of 20) were included in the final review. The selected 13 papers relate to 12 studies, given that two papers referred to the same study. These included studies ranging, in terms of publication years, from 1996 to 2000 and, in terms of publication types from "REPORTS - Research/Technical" for 10 studies, "COLLECTED WORKS" for one study, and "REPORTS - Evaluative/Feasibility" for one study. In terms of research methods, there was one ethnographic research, two action research studies, seven case studies, one design experiment, and one experimental research. General information concerning the research studies is summarized in Table 7.

| First author | Year | Publication type | Research | Score |
|--------------|-----------|----------------------------|--------------|-------|
| | published | | method | |
| Brett | 1997 | REPORTS-Research/Technical | Design | 19 |
| | | | experiments | |
| Burns | 1996 | REPORTS- | Action | 18 |
| | | Evaluative/Feasibility | | |
| Edens | 2000 | REPORTS-Research/Technical | Case study | 16 |
| Fusco | 2000 | In Collected Work | Action | 19 |
| Harmon | 2000 | REPORTS-Research/Technical | Ethnographic | 19 |
| Hirtle | 2000 | REPORTS-Research/Technical | Case study | 18 |
| Milton | 1999 | REPORTS-Research/Technical | Case study | 16 |
| Ohlund | 1999 | REPORTS-Research/Technical | Experimental | - |
| Owen | 1998 | REPORTS-Research/Technical | Case study | 20 |
| Powers | 1997 | REPORTS-Research/Technical | Case study | 20 |
| Russell | 1999 | REPORTS-Research/Technical | Case study | 16 |
| Simich- | 1999 | REPORTS-Research/Technical | Case study | 19 |
| Dudgeon | | | | |

Table 7. Summary for general information of research studies

Objective 1: What kinds of technologies were applied in communities of practice?

message board, chat room, web pages, electronic bulletin board, forum, online network, mailing lists, web conferencing, listserv, electronic database. Occasionally, some of these terms are used interchangeably, for example, forum and threaded message board. These

The technologies that were applied in the 12 studies were e-mail, threaded

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technologies can be largely categorized as asynchronous and synchronous communication tools. Representative examples of synchronous technology are chat room and video conferencing. However, none of the studies considered video conferencing. In five studies (Fusco, 2000; Harmon, 2000; Milton, 1999; Ohlund, 1999; Powers, 1997), chat applications were used, and also, these were combined with one or several asynchronous technologies, such as electronic bulletin board, mailing lists, listserve, and e-mail.

Two studies discussed the effects of chat room for synchronous interactions (Harmon, 2000; Powers, 2000). In both cases chat sessions were applied in web-based course, and seemed to have a positive effect for students to have a sense of community regardless of distances. Students felt more obligated to participate in the synchronous interaction than in the asynchronous one. Also, Powers (2000) indicated that the domain of the instructor remained in the synchronous classroom similar to a traditional classroom, whereas in the use of asynchronous communication everyone in the community, including the instructor, played an equal role.

Asynchronous technologies made it possible for participants to have time to think about their answer (Owen, 1998. e-mail discussion) and to reflect on online work that had occurred (Milton, 1999. web conferencing). Milton (1999) discussed that time for refection is one of the benefits of virtual learning environments. Regardless of tools for asynchronous communication, all these were used for the purpose that participants could post and read messages for discussing, sharing, negotiating, and/or creating according to goals of the community.

All studies report positive effects of technology in each practice. Technology seemed to support learning in the following manners:

- To have multiple conversations (Owen, 1999).
- To expand learning experiences (Rusell, 1999), such as self-directed learning (Rusell, 1999) and ongoing learning (Brett, 1997) through online networks.
- To develop an "out-of-class" classroom community (Edens, 2000). The listserv and electronic database help to create and maintain communities (Burns, 1996; Brett (1997).
- To develop collaborative work (Ohlund, 1999) that made possible peer tutoring and coaching in a virtual learning community (Milton, 1999). Evidence was found, through pre-post test measures, that "the use of internet based communication positively impacts on the attitude toward collaboration" (Ohlund, 1999).

Objective 2: What features of the technology seem to contribute successfully to learning?

Eight of 12 studies were conducted in formal learning environments. That is, learning communities were built within university-based courses. The four other studies were learning community in non-formal learning environments: listserv discussion group (Burns, 1997), online teacher professional development community (Fusco, 2000), email discussion groups (Owen, 1998), and online networks based on community centers (Russell, 1999)

As for the target learners, 6 studies involved pre-service and/or in-service teachers, 4 studies concerned graduate students, and two general adult learners who were in workplace professional development (Owen, 1998) and in community centers (Russell, 1999). The characteristics of learning environments in the reviewed studies are presented in Table 8.

| First author | Participants | Learning | Characteristics | Type of |
|--------------|--------------|------------|---------------------------|----------------|
| | | contexts | | technology |
| Brett | Teachers | Formal | Offline & Online | Asynchronous |
| Burns | Teachers | Non-formal | ITI listserve subscribers | Asynchronous |
| Edens | Teachers | Formal | Offline & Online | Asynchronous |
| Fusco | Teachers | Non-formal | TAPPED IN | Asynchronous & |
| | | | | Synchronous |
| Harmon | Graduate | Formal | Web-based course | Asynchronous & |
| | | | | Synchronous |
| Hirtle | Teachers | Formal | Web-based course | Asynchronous |
| Milton | Graduate | Formal | Offline & Online | Asynchronous & |
| | | | | Synchronous |
| Ohlund | Teachers | Formal | Web-based course | Asynchronous & |
| | | | | Synchronous |
| Owen | Adult | Non-formal | E-mail discussion | Asynchronous |
| | | | groups | |
| Powers | Graduate | Formal | Web-based course | Asynchronous & |
| | | | | Synchronous |
| Russell | Adult | Non-formal | In community centers | Online network |
| Simich- | Graduate | Formal | Web-based course | Asynchronous |
| Dudgeon | | | | |

 Table 8. Summary for characteristics of learning environments

Three studies (Edens, 2000; Milton, 1999; Owen, 1998) explore possible factors contributing to the development of an online learning community. Each study highlights a specific contrast between different learning contexts, such as 'formal vs. non-formal', 'graduate vs. adult', and 'e-mail discussion vs. integrated technology.'

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Owen (1998) identifies the following features of the group that exhibited positive outcomes: "high moderator involvement; a climate of respect; support and consideration for the other members was maintained; personal attacks were minimal, and those that did occur were either 'snipped' by the moderator or publicly addressed; clarification processes seemed to be successful; and the discussion or thread seemed to progress and develop." (p.12)

According to Milton (1999), the contributing factors fall into one of the following three categories: Preconditions, Environmental influences, and Results. First, preconditions are defined as "personal traits, F2F [face-to-face] experience with group, power roles outside of group, confidence in ability to contribute (self-esteem), and motivation to participate." Next, environmental influences are "work, school, home, and family." Finally, in terms of results, the factors are indicated as "AHA's!, use in practice, practice of learning, plans for future learning, recognition of learning, and selfobservable changes in behavior." (p.8)

Also, Edens (2000) discussed five main features of technology-mediated discourse community: "(a) respect among members with open exchange of ideas, (b) individual responsibility with communal sharing, (c) shifting roles among members, (d)

constructive discussion and making meaning, and (e) a participation framework" (pp. 5-11)

In conclusion, it is possible from the studies reviewed to synthesize the following features to take into account in order to develop an effective online learning community:

- The purposes of the group should be determined, for example, to make announcements, to share information, and/or to problem pose and solve. (Owen, 1998),
- 2. An atmosphere of respect is required. Participants should respect others' opinions and ideas (Edens, 2000; Owen, 1999). In chat sessions, one needs to be polite and respond to every chat message (Harmon, 2000). Simich-Dudgeon (1999) suggests that personal greetings among participants seemed an indicator of the growth of the learning community.
- The role of a moderator or facilitator is one of the critical factors (Edens, 2000; Milton, 1999; Owen, 1998). There is evidence that "the very active nature of the listserv group shows weekly contacts stimulation by the moderator" (Burns, 1997).

- 4. The participation framework may effect the development of online learning communities. Guidelines, regulations, and norms of etiquette are required for the community environment, ways of participation, and roles of participants (Edens, 2000; Owen, 1999). In chatting, particularly, formal rules and informal guides can help effective and constructive interactions (Harmon, 2000). Harmon (2000) also indicates "early control of the environment contributes to the growth of the learning community."
- 5. The strategies for facilitating learners' participation should be considered. There is some evidence that "the more often a member logs in, the greater the perceived reduction of professional isolation and the higher positive impact on practices" (Fusco, 2000). Also, learners who have strong technical skills (Harmon, 2000) and have Internet connection at home (Brett, 1997; Harmon, 2000) participate more actively. "Posting expository assignment in board" is an example of such strategies (Hirtle, 2000). Indeed, Brett (1997) suggested that "intensive or extended small group experiences" will be effective in consideration with the different participation patterns. In the teacher professional development, typically, the online interaction

should be "central or required part of professional development" (Fusco, 2000) in order to encourage the participation.

On the other hand, Edens (2000) and Milton (1999) indicated two difficulties regarding the use of technology in a community: (a) the problems of the software and network itself, and (b) the lack of non-verbal communication cues, such as eye contact and body expression, in electronic written communication. Owen (1998) suggests that the use of "emoticons", that is "graphic icons, graphic accents and/or smilies," could enable the written communication to be more visual and possibly more expressive.

IV. Discussion

According to the results of this systematic review, there are several findings having implications for follow-up reviews and further research.

First, as research questions and objectives become clearer and more specific, in part as a result of this initial review, the identification of studies can be designed more systematically. Through this initial review, some possible questions can be identified, for example, the relationships between specific types of technology and specific learning environments. Second, the search strategies could be developed further. This systematic review was limited the year of publication from 1996 and the publication type to "REPORTS-Research/Technical" and "REPORTS-Evaluative/Feasibility," excluding "Descriptive report." Indeed, for a follow-up review, the sources could be expanded, for example by deploying more systematical search strategies in the ERIC database, searching the WWW, and hand searching in proceeding papers or journals not included in ERIC search.

Third, the critical appraisal checklist needs to be continuously developed and validated to increase its validity and reliability for the assessment of study quality. In this systematic review, for example, the criteria for the detailed assessment of research methods did not seem to discriminate properly the studies, since 10 of the 12 studies received the same score of "1."

Fourth, there was a lack of evidence that presented the benefits, difficulties, or critical factors of technology in communities of practice. Most of the literature related to this question were descriptive reports and opinions of experts, rather than research papers that can show evidence in practical settings. Also, most studies were focused on teacher education, formal learning contexts, and university-based courses. Thus, more research needs to be conducted in non-formal learning contexts emphasizing adult learning and various adult learners.

The weakest point of this initial systematic review is that only one researcher, the author, has conducted the assessment. To improve the reliability and validity, two or more researchers should participate in the review.

V. Conclusions

Computer-mediated communication (CMC) makes it possible to interact asynchronously and synchronously at a distance. It can facilitate sharing, negotiating, developing, sustaining, and building knowledge in communities of practice. During this process, learning can be achieved.

Based on the review of 12 studies, screened for quality, when the technology fosters active and constructive interactions among participants, the group of participants develops its identity as a learning community or a community of practice.

All studies applied asynchronous communication tools such as, e-mail, bulletin board, listserv, and conferencing, and only a few studies used chat rooms as a means of synchronous interaction. Depending on how the technology is used in

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communities of practice, learning can be facilitated or impaired. The major factors contributing to facilitate learning in communities of practice are: (a) well-defined purposes for the group, (b) an atmosphere of respect among participants, (c) a moderator or facilitator playing an active role, (d) a structured participation framework, and (e) strategies to trigger and maintain participation.

This systematic review shows the positive potential of the systematic review as an effective research method in educational research, at least in the area of educational technology in practice settings. That is, existing variations in practices and general relationships can be examined by synthesizing related qualified data in smaller studies. It suggests that conducting further systematic reviews in this area will be fruitful.

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| | Ethnographic | Action | Evaluation | Case Study | Design Experiment |
|------------|---------------|-----------------|---------------|--------------------|--------------------|
| | Research | Research | Research | | |
| Objects of | Social | Educational | Two or | Contemporary | Social/natural |
| Research | structures & | practices (in a | more | real-life | context in |
| | individual | specific | alternative | phenomenon in | classrooms |
| | behaviors | situation) | programs | natural context | (programs/designs) |
| Purpose | To describe | To solve or | To facilitate | To illuminate | To engineer and |
| | how a culture | improve | decision | and explain a | test innovative |
| | functions | practical | making | decision or set of | learning |
| | | problems | | decisions | environment |
| Kind of | Vague notion | "How", | costs, | "How", "Why" | "How to" |
| Research | | "Why" | benefits, | Empirical | What conditions |
| questions | | Self reflective | problems | enquiry | lead to different |
| | | enquiry | | Hypothesis | effects |
| | | | | (=proposition) | |
| Role of | | Practitioner | Evaluator | | Co-participant |
| researcher | | | | | |
| Key of | Participant | Self reflection | Depends on | Interview / | The broader |
| source & | observation | | the question | observation | context of design |
| data | | | of | (Multiple data | partnerships & |
| | | | evaluation | sources) | some specific |
| | | | | | outcome measure |
| Discussion | Interpretive | Evaluative | Evaluative | Interpretive | Evaluative |
| | Descriptive | Interpretive | | Descriptive | |
| | | Self reflection | | | |

Appendix A: Summary of Qualitative Research Methods

| | Ethnographic | Action | Evaluation | Case study | Design |
|--------------------------------|--------------|--------|------------|--------------|--------------|
| | | | | | experiments |
| Driving Question | | V | V | √ | V |
| Product developed by authors | | | | | V |
| Participant observation | √ | | | V | |
| Researchers are involved | √ | V | | | V |
| Self-reflection | | √ | | | |
| Evaluative | | V | V | | V |
| Interpretive | \checkmark | V | | \checkmark | |
| Natural context | N | V | | √ | \checkmark |
| Social context or organization | V | V | | √ | |
| Ongoing data collection | ↓ √ | | | √ | √ |

Appendix B: Criteria for qualitative research methods

Appendix C: Critical Appraisal Checklist

| Items | Questions | Y | N | ? |
|----------------|--|---|---|----------|
| [Introduction] | | | | |
| 1. Rationale & | Are rationale and purpose of the research clearly described? | | | <u> </u> |
| Purpose | | | 8 | |
| 2. Research | Is the research problem clearly stated? | | | |
| Question | (* In Ethnographic research, this is optional.) | | | |

► Is it related with your intended study? \diamond <u>Yes</u> () \rightarrow *Continue* \diamond <u>No</u> () \rightarrow *Exclude*

[Methods]

| 3. Research design / | (1) Are the research design and/or methodological approach | |
|----------------------|---|--|
| Methodology (2) | clearly stated? (If not, what can be inferred?) | |
| | (2) Are the research design and/or methodological approach | |
| | appropriate for investigating the research question? | |
| 4. Sampling / Sites | (1) Are sampling / sites selection procedures clearly described? | |
| selection (3) | (2) Are sampling procedures appropriate to the problem? | |
| | (3) Are characteristics of samples (informants, settings, and | |
| | events) described? | |
| 5. Data Collection | (1) Is a rationale provided for each technique, data source, and/or | |
| (4) | instrument? | |
| | (2) Is procedure of data collection clearly described? | |
| | (3) Are data collection strategy and sources appropriate? | |
| | (4) Are data collection strategy and sources trustworthy? | |
| | (e.g., Is more than one data collection strategy used?) | |
| 6. Data Analysis (2) | (1) Is it clearly described how the analysis was done? | |
| | (2) Is analysis strategy used to strengthen the validity and | |
| | reliability of the data? | |
| | (e.g., inter-observer agreements, triangulation, etc.) | |

[Discussion / Implications]

| 7. Results / | (1) Are results / outcomes clearly presented? | |
|----------------------|--|--|
| Outcomes (2) | (2) Do the results / outcomes appropriately answer to research | |
| | question? | |
| 8. Conclusion (3) | (1) Are reasonable interpretations provided for findings? | |
| | (2) Are conclusions supported by results of the data analysis? | |
| | (3) Are possible limitations of the study discussed to avoid | |
| | overgeneralizing findings beyond the context of the study?? | |
| 9. Future action (2) | (1) Are recommendations for future action asserted? | |
| | (2) Have implications for educational practice been addressed? | |

10. Specific Research Methods (2)

| 2 – All / Most | 1 - some (not fulfilled or not adequately described) | 0 – Few / No |
|----------------|--|--------------|
|----------------|--|--------------|

| Research Method | Considerations | 2 | 1 | 0 | ? |
|-----------------|--|---|---|---|---|
| Ethnographic | (As for participant observation, were strategies for minimizing | | | | |
| Research | observer bias and observer effect described?) | | ļ | | |
| | - Are multiple conceptual and theoretical frame described | | | | |
| | broadly? | } | | | |
| | - Was the duration of observation long enough? (If not, was the | | | | |
| | reason explained?) | | | | |
| | - Was the setting clearly and credibly described? | | | | |
| | - Were background and experience of researcher indicated? | | - | | |
| | - Was it clearly described how actively the researcher participate | | | | |
| | in role relationships at the site? | | | 1 | |
| | - Was the trail of the researcher clear? | | | | |
| Action Research | - Was researcher's role clearly described? | 1 | | | |
| 5 | - Were the procedures for planning, acting, observing, and | | | | |
| | reflection clearly described? | | | | |
| | - Was there ongoing self-reflection? | | | | |
| | - Were the researcher's self-reflections differentiated from | | | | [|
| | descriptive field notes? | | | | |
| Evaluation | - Were evaluated programs comparable? | | | | |
| Research | - Were the purpose and methods of evaluation clearly and | | | | |
| | appropriately described? (e.g., costs, benefits, problems) | | | | |

| Case Study | - Was a rational provided for the case selected? |
|-------------|---|
| | - Were these clearly described? (Strong chain of evidence) |
| | the sources and methods of recording raw data |
| | process notes |
| | the development of the instruments and procedures used to collect |
| | data |
| | data reduction and analysis products |
| | data reconstruction and synthesis products |
| | - Were appropriate strategies used to gain multiple perspectives? |
| | (e.g., triangulation-credibility, dependability) |
| | - Were data coding strategies reliable? (e.g., more than one |
| | researcher) |
| | - Was researcher's role clearly described? |
| Design | - Were relationships between conditions and effects clearly |
| Experiments | described? |
| | - Was there some specific outcome measure? |
| | - Were different participants involved in developing the design? |

Adapted from

- Critical appraisal checklist for an article on Qualitative research (Department of general Practice /

University of Glasgow) (http://www.gla.ac.uk/department s/generalpractice/qualitative research.PDF)

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- Ducharme, M. K., Licklider, B. L. Matthes, W. A., & Vannatta, R. A. (1995). Conceptual and Analysis

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Ed.)

- McWilliam, R. A. Reporting Qualitative Studies. The Journal of Early Intervention. 23, 77-80.

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- Ratcliff, D. Evaluating Ethnographic Research: Attributes and Components

(http://don.raticliff.net/qual/evaluating.html)

- Stewart, A. (1998). The ethnographer's method. Thousand Oaks, CA: Sage Publications.

(http://tonic.acs.unt.edu/omlit/Stewart_1998_checklist.htm)

Appendix D: Details of the included studies

| N | TITLE | M | S | Participants | Type of | Technology |
|------------|-----------------------------------|--------|----------|--------------------------------|---------------------|-------------|
| O . | | ļ | | | Community | |
| 1 | Communities of Inquiry | D | 19 | Preservice Teachers (n=11 | a learning | Electronic |
| | among Pre-service Teachers | Е | | females) (F2F and | community | database |
| | Investigating Mathematics | | | electronic) (2 year | | |
| | (Brett, 1997) | | | certification course) | | |
| | - The networked interaction | was | very re | elevant to ongoing learning | | <u> </u> |
| | - Home access is a critical fa | ctor, | becau | se it facilitates reflection | | |
| | - A lot of the participants esp | pecia | lly in (| Gaining and Low Active grou | ps, using e-mail w | vas a more |
| | direct and preferred means | ofco | ommui | nication | | |
| | - Degree of participation: Hi | gh A | ctive, | Gaining Active (changed the | most), and Low A | ctive |
| | (changed the least) | | | | | |
| | - The electronic community | prov | vided a | context for extending and ref | lecting on the var | ious in- |
| | class and pedagogic experi | ence | s partic | cipation underwent. | | |
| | - The electronic commentary | y allo | wed th | ne Discourses to be both mad | e explicit, and bec | ome |
| | objects for reflection, ques | tioni | ng, and | d revision. | | |
| 1 | - The electronic database car | n off | er the c | conditions necessary for main | taining communit | y, at least |
| | for the majority of participation | ants. | Some | participants found it provided | a context for built | ding their |
| | knowledge about mathema | ttics | and pe | dagogy. Everyone found it pr | ovided social supp | port and |
| | ideas for lessons as well a f | forun | n to po | se questions about different p | edagogical and co | ontent |
| | issues. | | | | | |
| | - The different participation | patte | erns of | the three groups suggest the | need for more inte | nsive or |
| | extended small group expe | erien | ces | | | |

| 2 | E-Mail Survey of the | A | 19 | ITI Listserv | Electronic | Listserv | | |
|--------|---|--------|----------|-----------------------------|--------------------------|----------------|--|--|
| | Interdisciplinary Teamed | | | subscribers | Community of | Discussion | | |
| | Instruction (ITI) Listserv | | | (Educators: teachers | Learners. | group | | |
| | Discussion Group: | | | 56%) | | | | |
| | Exploratory Study of an | | | | | | | |
| | Electronic Community of | | | | | | | |
| | Learners. (Burns, 1996) | | | | | | | |
| | - The concept of "commu | inity | " shou | d be expanded to include | e cyberspace. That is | s, community | | |
| | is not so much a physic | al "pl | lace" ir | which events must occu | ur, as it is the experie | ence itself. | | |
| | - The ITI listserv group is very active. | | | | | | | |
| | - There is interest in an o | nline | class 1 | egarding ITI, but not for | graduate credit. (per | sonal audit | | |
| | and professional develo | pme | nt leve | 1) | | | | |
| | - All of the suggested topics for such an online class related to practical "how-to's" of | | | | | | | |
| | curriculum integration. | | | | | | | |
| - - | - ITI listserv is helping to | crea | te a co | mmunity of learners. | | | | |
| | - The very active nature of | of thi | s listse | rv group shows that weel | dy contacts stimulat | ion by the | | |
| | moderator is required. | | | | | | | |
| | - If the ITI listserv is able | to st | imulat | e discussions, then the gr | oup can be said that | it is an | | |
| | electronic community o | f lea | rners. | - | - | | | |
| | * A community of loorn | or f | an aday | atom the charing of their | walves and holisfa | haut | | |
| | - * <u>A community of learn</u> | ers n | or eau | ators: the sharing of them | values and beliefs a | idout | | |
| 5 | improving instruction for | or the | eir stuc | lents, engaging in reflecti | ve dialogue about te | aching and | | |
| | learning, and discussing | , imp | licatio | ns for the professional pr | actices. | | | |
| 3 | Developing a Discourse | C | 16 | Beginning preservice | Technology- | Internet | | |
| | Community of Preservice | | | and inservice teachers | mediated | discussion | | |
| | Teachers in a Technology- | | | (preservice | discourse | group | | |
| | Mediated Context. (Edens, | | | undergraduate | community | (asynchronous) | | |
| | 2000) | | | students and faculty, | | | | |
| | | | | focus on large | | | | |
| | | | | population of | | | | |
| | | | | preservice teachers) | | | | |

| | - Five main features of classroom communities: (1) respect among members with open | | | | | | | | |
|---|--|----------|----------|------------------------------|-------------------------|----------------|--|--|--|
| | exchange of ideas, (2) individual responsibility with communal sharing, (3) shifting role | | | | | | | | |
| | among members, (4) constructive discussion / making meaning, and (5) a participation | | | | | | | | |
| | <u>framework</u> . | | | | | | | | |
| | - Technology is a viabl | e tool : | for dev | eloping a classroom com | munity out-of-class. | | | | |
| | - Feeling "at ease" – no | fear o | f retrib | ution for one's remarks e | ven when incorrect- | is important | | | |
| | within a community. | | | | | | | | |
| | - Deliberate efforts sho | uld be | made t | o establish a viable partic | cipation structure that | t sustains the | | | |
| | qualities. (need to ass | gn spe | cific ro | bles to student) | | | | | |
| | - Three type of informa | tion in | the dia | alogue: (1) Link between | course content and | real-world | | | |
| | classroom observation | n, (2) N | Aiscon | ceptions, inappropriate ir | iferences, and approp | priate | | | |
| | conceptualizations, (3 |) Deve | elop a s | ense of community throu | igh ongoing interact | ions. | | | |
| | - The technology-medi | ated d | esign g | ave apprentice teachers o | pportunities to expa | nd their | | | |
| | interactions with reso | urces t | beyond | the classroom walls thro | ugh electronic conve | ersation. | | | |
| | Feedback from teachers at the field site, input frequently not available during class time and | | | | | | | | |
| | from peers, occurred. | | | | | | | | |
| | - Disadvantages of tech | nolog | ically n | nediated community - the | e nature of the mediu | ım itself | | | |
| | (communication, without non-verbal cues), technical problems, | | | | | | | | |
| | - Other unexpected diff | icultie | s relate | d to the unstructured par | ticipation frameworl | c of the | | | |
| | discussion group. (ex | plicit g | uidelin | nes, rules, regulations, and | d norms of etiquette | are required) | | | |
| 4 | Assessing the impact of a | Α | 19 | Teacher professional | Education | A platform- | | | |
| | Large-Scale Online teacher | | | development | communities of | independent, | | | |
| | professional development | | | (preservice and | practice | web-based, | | | |
| | community (in Telecomm: | | | inservice teachers) | Online | real time | | | |
| | Graduate & Inservice) | | | | community | environment. | | | |
| | (Fusco, 2000) | | | | (TAPPED IN) | | | | |

| | | - The members are more frequent and facile users of technology than one would expect in the | | | | | | | |
|---|---|---|------------|-----------|---------------------------------------|-----------------------------------|----------------|--|--|
| | | overall teaching population. | | | | | | | |
| | | - When online interactions are central or required part of professional development, time | | | | | | | |
| | | becomes less of a perceived barrier. | | | | | | | |
| | | - Online professional interactions have a positive impact on educators. | | | | | | | |
| | | Those who rate themselves as more frequent wars of TADDED IN report lower lower lower | | | | | | | |
| | | - I nose who rate themselves as more frequent users of TAPPED IN report lower levels of | | | | | | | |
| | | professional isolation an | d po | ositive (| effects on their knowledg | ge subject area and te | aching | | |
| | | techniques. | | | | | | | |
| ſ | 5 | A Qualitative Analysis of | Ε | 19 | Intensive graduate | Online learning | - Chat | | |
| | | Situated Web-Based | t | | level course in WBI | community | application | | |
| | | Instruction (Harmon, 2000) | | 1 | (a multi-site distance | | - Electronic | | |
| | | | |] | education class) in |) | bulletin board | | |
| | | | | | two universities | | ("forum") | | |
| | | | | | | | - WebCT | | |
| | | | | | | | - E-mail | | |
| | | - Weekly synchronous int | erac | tion: C | hatroom \rightarrow felt obligate | $d \rightarrow give a sense of c$ | community. | | |
| | | - The need to be polite an | d re | spond | to every chat message wa | s prevalent initially, | but | | |
| | | eventually attenuated the | ougł | n never | quite vanished. | | | | |
| | | - Asynchronous interactio | m: a | bulleti | n board, email, and tutor | ial type lessons. | | | |
| | | | ۰ . | ~ 1 | · · · · · · · · · · · · · · · · · · · | 1 1 1 | | | |
| | | - 1 ne students who self-ic | lenti | med as | technically stronger and | who have internet c | onnection at | | |
| | | home were more active in creating the learning community. | | | | | | | |
| | | - The Key goal of the course was for the students to establish a learning community. | | | | | | | |
| | | - In chatting, it requires for | rma | l rules | and informal guides.: abl | breviations, emotico | ns. | | |
| | | - The early control of the | envi | ronme | nt contributes to the grow | wth of the learning co | ommunity. | | |
| | | - Students feel the bonds | ofth | e com | munity are significantly s | tronger in the online | e class than | | |
| | | regular classes. (due to t | ne fe | eling o | of "shared suffering") – C | In the bulletin board | , it's showed | | |
| | | from the constructivist n | atur | e of the | e class and the regular co | mmunication | | | |
| £ | | | | | | | | | |

| 6 | New Horizons in Distance | С | 18 | 16 post-baccalaureate | Learning | Web pages, | | |
|---|---|--------------|---------|-----------------------------|------------------------|---------------|--|--|
| | Education: Re-Mapping the | | | students (for | community | Threaded | | |
| | Pedagogical Terrain (Hirtle, | | | certification of | discussion in | message board | | |
| | 2000) | | | secondary teachers): | web based | (Forum) | | |
| | | | | in distance education | lessons | | | |
| | | | | course | | | | |
| | - The posting expository | assig | nment | in a board encouraged a | dialogue between st | udents in the | | |
| | class and the rest of the l | learn | ing co | mmunity about the conne | ection of the theory t | o classroom | | |
| | practice, giving them tin | ne ar | nd spac | e to explore the connecti | ons. | | | |
| | - Educators must facilitate | e virt | ual con | mmunities of learners wh | o work in small coll | aborative | | |
| | groups to achieve a com | mon | goal. | | | | | |
| 7 | Virtual learning | C | 16 | Graduate HRD course | Virtual learning | Web | | |
| | communities: Creating | | | (15 students from 2 | community | conferencing | | |
| | meaning through dialogue | | | universities – 3 | | Synchronously | | |
| | and inquiry in cyberspace | | | groups) | | and | | |
| | (in Qualitative Studies in | | | -1 week: F2F sessions | | asynchronousl | | |
| } | HRD) (Milton, 1999) | | | -7weeks: small group | | y on the web | | |
| | | | - | case work on the | | | | |
| | | | | WWW | | | | |
| | - Model of a Learning Co | mmı | inity | | | | | |
| | - Collaborative learning a | nd k | nowled | dge building did occur w | ithin all of the group | os on some | | |
| | level. | | | | | | | |
| | - In addition to efforts tha | t we | re so m | such a part of the group in | nteraction, there was | also | | |
| | evidence of other types | of <u>gr</u> | oup lea | arning: the learning with | each other and from | each other | | |
| | when particular skills or | stre | ngths c | of one member were reco | gnized; and peer tute | oring and | | |
| | coaching that went on w | vithir | n group | DS. | | | | |
| | - The personal learning of | fpart | ticipan | ts was often based on off | line reflection on th | e work that | | |
| | was occurring on-line. Time for reflection is one of the benefits of virtual learning | | | | | | | |
| } | environments and particularly applicable for this type of content. | | | | | | | |

F

| | - The effect of technology was seen in two primary ways: (1) problems from the software or | | | | | | | |
|---|---|---------------|----------------------------|-----------------------|----------------|--|--|--|
| | network itself. (2) psychological issues it raised for participation about communicating in | | | | | | | |
| 1 | cyberspace without the benefit of eye contact and body. | | | | | | | |
| | - Technology & Medium: technical problems, access, experience, technical support, technical | | | | | | | |
| | facilitation. | | | | | | | |
| | - Mediating Behaviors/Strategies: conflict, safety, empowerment, emotions, humor, intimacy, | | | | | | | |
| | empathy/acknowledgement of feelings, trust, being explicit, listening, openness, | | | | | | | |
| | defensiveness, expressi | ng/recogniz | ring fears, excitement/fun | /enjoyment, authent | icity. | | | |
| | - Having the initial F2F r | elationship | has made it easier to for | me to do the electron | nic. | | | |
| | - Contributing Factors in | the Develo | pment of a Virtual Learn | ing Community: Pre | conditions, | | | |
| | Environmental influenc | es, Results | | | | | | |
| 8 | Impact of Asynchronous | E | K-12 | Learning | Internet based | | | |
| | and Synchronous Internet- | x | Teachers.(n=161) | communities (A | communicatio | | | |
| | Based Communication on | | In an interactive web- | large community | n | | | |
| | Collaboration and | | based course | and small | -Mailing lists | | | |
| | Performance among K-12 | | | communities) | (Asynchronous | | | |
| | Teachers. (Ohlund, 1999) | | | |) | | | |
| | | | | | -Chat session | | | |
| | | | | | (Synchronous) | | | |
| | - * Pre-Post tests: the data | a suggested | a relationship between a | ttitudes toward colla | boration and | | | |
| | use of internet-based co | mmunicati | on. It is encouraging that | use of Internet-base | d | | | |
| | communication increase | es the likeli | hood of completing the c | course activities. | | | | |
| | - Internet-based commun | ication may | contribute to the develo | pment of collaborat | ion among | | | |
| | educators at a distance. | | | | | | | |

| 9 | Electronic Learning | С | 20 | -Workplaces groups (2) | Learning | E-mail | |
|---|---|--------|----------|---------------------------------|---------------------|--------------|--|
| | Communities? Factors That | | | (within-organization | communities | discussion | |
| | Enhance and Inhibit | | | group) | | group | |
| | Learning within Email | | | -Professional | | (Asynchrono | |
| | Discussion Groups. (Owen, | | | Development groups (3) | | us) | |
| | 1998) | Ĩ | | -Small business groups (2) | | | |
| | | | | (community group) | | | |
| | - Indicators of learning: E | xper | iencing | g, Reflecting, Conceptualizing | g, Experimenting | | |
| | - Comparison of Traditio | nal a | nd Vir | tual Learning Environments: | Time and place, F | orms of | |
| | communication, Role of | faci | litator, | Features of communication | | į | |
| | - People have time to thir | ık ab | out the | eir answer | | | |
| | - People can remain unhe | ard i | n the b | ackground and contribute as | frequently or infre | quently as | |
| | they with. | | | | | | |
| | - "Multiple conversations": the amount of communication can be more varied. | | | | | | |
| | - Determining the purpose a list will be one of the first issues that will need to be resolved by | | | | | | |
| | anyone thinking about establishing an email group (Purpose: to make announcements? To | | | | | | |
| | share information? To problem pose & solve?) | | | | | | |
| | - Evidence of learning is | as pa | rt of th | e content of discussion | | | |
| | - One of the most interest | ing f | eatures | was the prevalence of challe | nge present in the | interaction | |
| | among group members | -> th | e poter | ntial for challenge and a chall | enging environme | nt to both | |
| | enhance and inhibit lear | ning | , deper | iding on how it is managed | > A supportive en | vironment | |
| | is necessary | | | | | | |
| | - Conclusions: should con | nside | er grou | p purpose, degree of individu | al participation (g | ender?), the | |
| | role of moderator and fa | cilita | ator, th | e problem of misunderstandir | ng | | |
| | - Attending to the ways in | n wh | ich lear | ming is part of the email com | munication proces | ss is | |
| | important so that processes supporting and enhancing electronic communication as a medium | | | | | | |
| | for learning can be effect | tivel | y estab | lished and supported. | | | |
| 1 | 1 | | | | | | |

| 10 | Student Perceptions and | С | 19 | Graduate students | A community of | Web page | | |
|----|---|--------|----------|----------------------------|------------------------|-----------------|--|--|
| | Performance in a Virtual | | | (both on-campus and | learners | Listserv, e- | | |
| | Classroom Environment | | | remote users) | | mail | | |
| | (Powers, 1997) | | | (Internet based | | Internet relay | | |
| | | | | course) | , | chat (IRC) | | |
| | - Peer support: What eme | rged | was a | true community of learne | ers who were commi | tted to | | |
| | providing encourageme | nt an | d supp | ort to each other through | nout the course – (rea | asons) the | | |
| | perceived safety and support of community emerges from the use of the technology. | | | | | | | |
| | - The listserv format provided the opportunity for cultural differences to emerge without the | | | | | | | |
| | hindrance of communication difficulties. | | | | | | | |
| | - The domain of asynchro | nou | s comn | nunication belonged to the | ne community of lea | rners where | | |
| | everyone played an equ | al rol | le, incl | uding the instructor. | | | | |
| | - The synchronous classro | oom | remain | ed the domain of the ins | tructor, much as doe | s a traditional | | |
| | classroom. (students who appointed "officially" may attempt to stimulate and develop | | | | | | | |
| | conversation) | | | | | | | |
| 11 | Learning Online: Extending | С | 16 | Adult learning (in | Online learning | Online | | |
| | the Meaning of Community. | | | community centers) | communities | network | | |
| | A Review of Three | | | | SENIORNET | | | |
| | Programs from the | | | | NEIGHBORHO | | | |
| | Southeastern United States. | | | | OD | | | |
| | (Russell, 1999) | | | | NETWORKS | | | |
| | | | | | POWERING UP | | | |
| | - Online learning community characteristics: Learning environment, Vision of adult learning | | | | | | | |
| | and development, Instructional model, Social construct | | | | | | | |
| | - Within online learning communities, technology has come to serve a dual purpose: a "social | | | | | | | |
| | marketing" tool and that employs technology to link instruction and information through a | | | | | | | |
| | focus on adult interest, while it expands the non-formal education setting to include diverse | | | | | | | |
| | locations, ages, ethnic, and interest groups. | | | | | | | |
| | - The network allows learners access to tools for self-directed learning. | | | | | |
|----|--|---|----|-------------------------|-----------------|---------------|
| | - The networks provide members with learning experiences that are transformative, inclusive | | | | | |
| | of life experience, rewarding, and accommodating. | | | | | |
| 12 | Interpersonal Involvement | C | 19 | Graduate students | Online learning | Conferencing |
| | Strategies in Online Textual | | | (n=4) in a fully online | community | in the Web |
| | Conversations: A Case | | | graduate course | | (COW) |
| | Study of a Learning | | | | | (asynchronous |
| | Community. (Simich- | | | | | interactive |
| | Dudgeon, 1999) | | | | | communicatio |
| | | | | | | n system) |
| | - Personal greeting is a powerful indicator of the rapport and intimacy that developed over time | | | | | |
| | and this make signals the growth of the learning community. | | | | | |
| | - An increase in the use of involvement strategies would signal a level of maturity of said | | | | | |
| | learning community. From the beginning of their online textual interactions, the students used interpersonal involvement strategies to develop a social context of rapport and intimacy that facilitated conveying their virtual academic meanings. Students worked cooperately to create learning, supportive community and to facilitate the | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | joint negotiation of academic meaning through the use of involvement strategies. | | | | | |
| | | | | | | |