

**Web-Based Distance Education:
Pedagogy, Epistemology, and Instructional Design**

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Abstract

Web-based learning and teaching is a rapidly growing area in education. Traditional forms of distance education are being transformed as the Internet becomes the new medium for communication. Web-based course delivery can offer a vibrant learning environment created through different teaching strategies, activities, and technologies. This paper briefly outlines some of the literature relevant to this new educational milieu providing insight into constructivist epistemology, situated learning, cognitive apprenticeship, and instructional design of web-based learning.

Distance education, in which the teacher and students are separated by time and place, is currently the fastest growing form of domestic and international education (McIsaac & Gunawardena, 2001). New opportunities are emerging in the area of web-based distance education as bandwidth and transmission speeds increase. These new opportunities are increasing accessibility and quality of distance education.

Education courses delivered through the Internet are reaching nontraditional students (Gubernick & Ebeling, 1997; Shein, 1997). Nontraditional students may include a home-schooled student or a student who is seeking a web-based course of study based on the nature and experience of the on-line environment. Traditional students are also enrolling in online courses to supplement their course experiences when the course is not available within the school that they are attending (S. Amundrud, personal interview, December 2001).

Rural schools and school divisions are experiencing a declining enrolment as well as a teacher shortage. As a result, specialized classes and programs are being cut due to lack of enrolment and funding. The report *Task Force and Public Dialogue on the Role of the School* (2000) recommend providing equitable access of courses in an online delivery format. Saskatchewan Education has responded to this need and has partnered with school divisions in the creation of web-based courses. Many courses are being piloted this year involving students throughout Saskatchewan (S. Amundrud, personal interview, December 2001). These web based pilot courses are replacing the traditional distance education courses of the 'industrial era' (Garrison, June 2000).

Web-based course delivery offers a complex learning and teaching environment. A vibrant learning community can be created using different teaching strategies, activities, and technologies. This review briefly outlines some of the literature relevant to this new educational milieu providing insight into the theoretical foundations and instructional design of web-based learning.

Emerging Pedagogy

Traditional forms of distance education involve passive media such as correspondence texts, audio and video broadcasts, and often involve the learner communicating with only the instructor. Internet technologies can improve the traditional forms of distance education through increased communication (Shrum, 1998; McIssac & Gunawardena, 2001). The distinctions between newer forms of distance education utilizing Internet technologies and traditional face-to-face education are being blurred in the facilitation of “individualized” and “collaborative” learning (McIsaac & Gunawardena, 2001). McIsaac and Gunawardena (2001) state, “the explosion of information technologies has brought learners together by erasing the boundaries of time and place for both site-based and distance learners” (p. 403).

The development of the Internet, and new cost-effective technologies has promoted an astounding growth of distance education courses. Provinces across Canada, including Saskatchewan, are implementing an infrastructure to increase bandwidth. High speed Internet access coupled with more sophisticated compression technologies will improve web-based distance education courses. Kevin Dowler, the new media specialist in the Southeast Distance Education Pilot Project (Banks, 2001), cites SaskTel stating

“the new CommunityNet access will reduce the bandwidth problem for students” (p 8). Saskatchewan Education’s Learning Technology initiatives of web-based distance education courses have enrolled many students throughout Saskatchewan (S. Amundrud, personal interview, December 2001). Traditional distance education courses of the ‘industrial era’ are slowly being eroded as the Internet and new technological developments “challenge educators to reconceptualize the idea of schooling and lifelong learning” (McIsacc & Gunawardena, 2001, p 404).

The web-based learning environment requires a constructivist learning setting for a healthy learning environment to exist. Traditionally distance education courses of the ‘industrial era’ were based on an objectivist learning setting. In this setting teachers delivered content through satellite technologies to the passive student. Few opportunities for student-initiated questions, independent thought, or interaction between students occur in this environment. Still today this method of delivery is used and unfortunately has been transferred to some web-based courses. However, there is a shift away from this environment to a learner-centered collaborative environment utilizing constructivist-learning theory. Constructivism is not a theory about teaching; it is an epistemological position.

Constructivist learning theory is based on the assumption that learners construct knowledge as they attempt to make sense of their experiences. What we know depends on the kinds of experiences that we have had and how we organize these into existing knowledge structures. Driscoll (1994) states that new conflicting experiences will cause “perturbations in these structures” (p. 376), where new knowledge structures arise making sense of the new information. Several different constructivist-learning theories

exist. Common to each theory is that (a) learning is an active rather than passive process, and (b) we construct knowledge based on what we know (Kanuka & Anderson, 1998).

The role of the teacher is to scaffold or organize information into “conceptual clusters of problems, questions and discrepant situations in order to engage the student’s interest” (Hanley, 1994). The constructivist environment is student centered, and encourages students to ask questions and make their own analogies and drawing their own conclusions. Teachers assist students through this individualized active process of developing insight and building of tacit knowledge.

Related to web-based learning are two widely accepted epistemological positions: cognitive or critical constructivism and social constructivism. Cognitive constructivism assumes that knowledge is constructed through internal contradictions resulting from environmental interactions (Driscoll, 1994). Piaget describes the cognitive development of humans, and explicates it as the construction of knowledge through experience. These experiences create schemas, or mental models (Kearsley, 2001). These schemas are altered, enlarged, and made more sophisticated through two processes: assimilation and accommodation. Assimilation refers to the way humans transform new information so that it makes sense within their existing knowledge structure. Accommodation refers to the change in cognitive structure in the attempt to understand new information (Kearsley, 2001; Rogoff, 1991).

Rogoff (1991) also talks about the ‘Piagetian Shift’ in the cognitive development of children, and how social influences enhance changes in perspective. Through social interaction participants share perspectives, which may cause cognitive conflict. This conflict may be resolved when an individual accepts the view of another. Individuals

consider the merits of the alternatives and may become dissatisfied with their current understanding and change their perspective. Through attempting to resolve cognitive conflict peers promote the advancement of cognitive development (Rogoff, 1991).

Piaget helps us to understand that learning should be whole, authentic, and real. Less emphasis is on isolated skills that try to teach individual concepts. Students will learn isolated skills in a Piagetian classroom, but they are more likely to learn them engaged in authentic, meaningful activities. Authentic activities are inherently interesting and meaningful to the student. Web-based technology offers a vast array of such opportunities to help expand the conceptual and experiential background of the individual.

Another prevalent position is social constructivism. Social constructivism is aligned with online learning (Kanuka & Anderson, 1998). Social constructivism assumes that knowledge is grounded in the relationship between the knower and the known. Knowledge is generated through social interaction. Vygotsky (1990) emphasized the critical importance of culture and the importance of the social context for cognitive development. Social experiences allow patterns to emerge and through conversational language these patterns are negotiated into meaning.

Driscoll (1994) summarizes the goals of constructivist instruction as problem solving, critical thinking, reasoning, and the active and reflective use of knowledge. Constructivist learning theories are becoming widely accepted in all fields of education, including web-based distance education. Computers can provide an interactive environment that create “an effective means for implementing constructivist strategies that would be difficult to accomplish in other media”(Driscoll, 1994, p 395).

How students learn and their ability to construct knowledge has implications for how teachers instruct. The exploration of these implications for teaching is necessary for the success of the constructivist-learning environment. Katy Campbell (1999) highlights three main principles of constructivism from a design point of view, which are:

1. Instruction be concerned with the experiences, convictions and constructs that learners already possess.
2. Instruction be structured so that it can be easily understood and modified by the learner.
3. Instruction be designed to facilitate exploration, extrapolation, and elaboration.

Lave and Wenger's (1991) notion of "Legitimate Peripheral Participation" provides a framework for induction into a community of practice. A key aspect of situated learning is the notion of the apprentice observing the 'community of practice'. Lave and Wenger propose that the initial participation in a culture of practice can be observation from the periphery or legitimate peripheral participation. The participant moves from the role of observer, as learning and observation in the culture increase, to a fully functioning member. The progressive movement towards full participation enables the learner to piece together the culture of the group and establish their identity.

“Knowing is inherent in the growth and transformation of identities and it is located in relations among practitioners, their practice, the artifacts of that practice, and the social organization...of communities of practice.”(Lave and Wenger, 1991, p 122).

Similar to the idea of legitimate peripheral participation is Vygotsky's (1990) “Zone of Proximal Development”. This theoretical construct states that learning occurs best when an expert guides a novice from the novice's current level of knowledge to the expert's level of knowledge. Bridging the zone of proximal development construct with

legitimate peripheral participation construct may be accomplished if one thinks of a zone in which the expert or mentor takes the learner from the peripheral status of knowing to a deeper status. This may be accomplished with or without intention as Lave and Wenger (1991) state:

Legitimate peripheral participation is not itself an educational form, much less a pedagogical strategy or a teaching technique. It is an analytic viewpoint on learning, a way of understanding learning. We hope to make it clear that learning through legitimate peripheral participation takes place no matter which educational form provides a context for learning, or whether there is any intentional educational form at all. Indeed, this viewpoint makes a fundamental distinction between learning and intentional instruction (1991, p. 40).

However the expert scaffolds the environment to the extent in which the learner is engaged with the discourse and participants within the zone and is drawn from a peripheral status to a more engaged status. The peripheral learner interacts with the mentor, expert learners and peers within this zone. More able learners (peers) or the mentor will work with the less able learner potentially allowing for socially constructed knowledge.

Herrington and Oliver (1995) link characteristics of situated learning with instructional design of interactive multimedia. The three mutually constitutive elements of the learning process are the learner, the implementation and the interactive multimedia program (Figure 1).

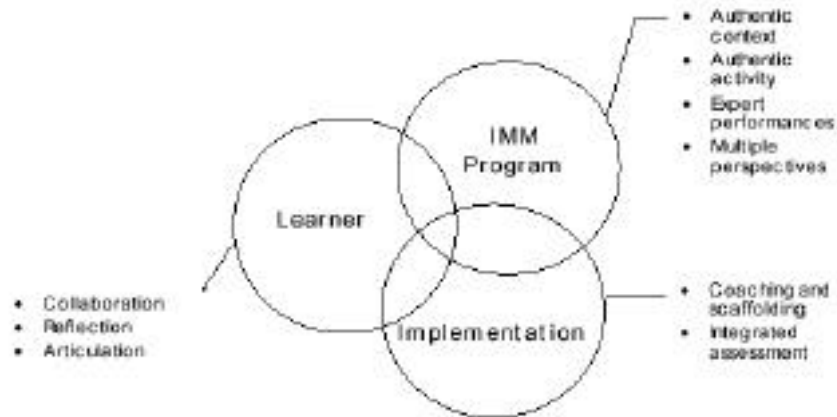


Figure 1 (Herrington & Oliver, 1995, p 4)

One form of interactive multimedia may be a web-based distance education course. Based on a situated learning environment the course would provide authentic context. Real-life applications of the subject material would provide motivation and the bridge between abstract and practical concepts. Authentic activities involve a loosely structures approach with the learner developing part of the task. Real word activities involve uncertainty and are often complex. Authentic activities strive to emulate real world activities. With the help of the expert or teacher, the process of modeling allows the student to observe the task before they attempt it. The learning environment should also entertain multiple perspectives. The learner has the opportunity to investigate various avenues moving away from a linear format of investigation. Providing multiple roles and opportunities engages the learner in decision-making and critical and creative thinking.

A situated learning environment allows the learner to collaborate, reflect, and to articulate. As the learner collaborates with other members of the environment, they are able to establish their identity. The asynchronous nature of the online environment is

conducive for reflection. As the learner interacts with others, they have the opportunity “to articulate, negotiate and defend their knowledge”(Herrington & Oliver, 1995, p 6). Making their tacit knowledge explicit is very important in the process of learning and legitimate peripheral participation. Coaching at critical times, and scaffolding of support keeps learners focused and organized. The teacher is able to model concepts and skills for the learners. The teacher offers hints and reminders, provides feedback, and scaffolds the learning. Coaching is situation specific, and scaffolding involves instructional design.

Providing for integrated assessment of learning within the tasks is an important characteristic of situated learning. Having a formative type of evaluation supports the progression of learning providing immediate, contextualized feedback and encourages self-reflection. Summative evaluation contradicts the idea of growth throughout the learning process, and focuses on a final evaluation promoting the ‘regurgitation’ of material. Students able to ‘cram’ for the final exam access short-term memory to achieve a final mark, however this information disappears from memory soon after. Summative evaluation focuses in on the end result and bypasses the entire learning process.

Barbara Rogoff (1990) describes the cognitive development of children as an apprenticeship through “guided participation in a social activity with companions who support and stretch children’s understanding of and skill in using tools of culture” (vii). The apprenticeship model is based on Vygotsky’s work, which involves peers (novices) working closely together with a teacher (expert) in joint problem solving. Cognitive Apprenticeship focuses on cognitive and metacognitive skills, rather than on physical skills and processes of the traditional forms of apprenticeship (Brown et al., 1989). Rogoff (1990) states that intersubjectivity underlies the process of guided participation.

Intersubjectivity is the sharing of focus and purpose between the novice, expert, and peers. Within this situated context the novice is able to participate in skills beyond those that they are capable of handling independently. The internalization of the shared cognitive process by the novice extends existing knowledge and skills. The process for this internalization takes place through the following method:

1. Modeling -- involves an expert's carrying out a task so that student can observe and build a conceptual model of the processes that are required to accomplish the task.
2. Coaching - consists of observing students while they carry out a task and offering hints, feedback, modeling, reminders, etc.
2. Articulation - includes any method of getting students to articulate their knowledge, reasoning, or problem-solving processes.
3. Reflection - enables students to compare their own problem-solving processes with those of an expert or another student.
4. Exploration - involves pushing students into a mode of problem solving on their own. Forcing them to do exploration is critical, if they are to learn how to frame questions or problems that are interesting and that they can solve (Collins, Brown, Newman, 1989, 481-482).

An example of cognitive apprenticeship may be a teacher modeling the process of editing a literary work of a student in synchronous environment such as a whiteboard. The students can participate in real-time as the teacher edits the literature with different colored highlights and text to illustrate certain concepts. The teacher may then summarize the process of editing and post the summary to the bulletin board. The teacher may then ask the students to edit the same literary work and post the revised version to the bulletin board for peer review. The teacher is available to provide coaching through email (asynchronous) as well as set times on the synchronous chat system. Through these forms of communication the teacher can coach students in the

editing process. Students are able to reflect upon the posted work, as well as the teacher's example. As the teacher views the progress of the students, the teacher can tailor questions and work for the individual student allowing them to expand areas that require further attention. Exploration of individualized assignments allows the individual to be challenged and improve on areas that require attention, allowing articulation of knowledge.

The online environment encourages individual cognitive growth through independent learning as well as through social interaction or intersubjectivity. The environment is monitored by the teacher who is there as a mentor and as a guide for the learner. It is in the locus of the intersubjectivity in which Vygotsky and Piaget differ in perspective (Rogoff, 1990); "In Vygotsky's perspective, joint problem solving occurs between partners, whereas in Piaget's view, individuals work with independence and equality on each other's ideas." (p. 140). Piaget's theories describe the independent learning of the individual, and Vygotsky's theories describe the learning that takes place from social interaction. The combination of these theories provides a theoretical framework for the virtual learning community. Constructivism is grounded in the work of Piaget and Vygotsky. Leve and Wenger as well as Barbara Rogoff extend our understanding of the learning environments of Piaget and Vygotsky. The understanding of these theories helps develop the 'big picture' of the cognitive processes of learners, which can be extended and applied to virtual learning. This theoretical framework for learning in a web-based environment is essential in the first step of the design of the online community of learners.

Strategies for Designing On-line Instruction

Web programming allows for endless design structures that can transform the static traditional distance education course. It is important that the course designer redesigns the existing course rather than simply transferring an old course to the new medium (Schrum, 1998). Utilizing tools for course design, the design structure can be visually appealing, engaging, interactive, and dynamic. The designer will have to determine how to promote active as well as independent learning characteristics within the structure of the course (Schrum, 1998). Certain subject matter and assignments will lend themselves to be completed individually or within a group.

A useful model and didactical tool for the instructor is the FIKS-model (Flexible IT-based course system, Figure 2) (Andresen, 1999, as cited in Witfelt, 2000; Mathias & Kenneth, 2001). This model helps the instructor cope with the following three questions:

1. Learning Principles: which learning principles are to be used?
2. Organizational Model: how is the process of teaching organized?
3. Software genres: which Software genres are the students going to work with?

(Witfelt, 2000, p237; Mathes & Kenneth, 2001, p. 32)

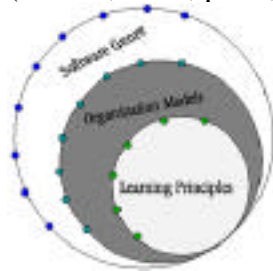


Figure 2 (Witfelt, 2000, p237; Mathes & Kenneth, 2001, p. 32)

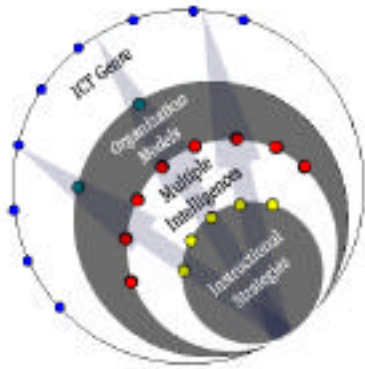


Figure 3 – VLSM (Boulton, 2002)

The virtual learning environment is student centered. The teacher must be aware of the components of the virtual learning scaffolding model (VLSM, Figure 3), an adapted model aligned with the philosophy of Saskatchewan Education. The virtual teacher's task is to scaffold learning to support the learner in the use of the design elements of the virtual learning environment. The scaffolding process engages and supports learning of the individual through the integration of a variety of instructional strategies that utilize the two different organizational models and the diverse ICT Genres. This instructional design involves learning activities based on the Instructional Strategies of the teacher that may be social or non-social in nature.

The first layer of the VLSM involves the use of instructional strategies, which are as follows:

1. Direct Instruction
2. Indirect Instruction
3. Experiential Learning
4. Independent Study
5. Interactive Instruction (Instructional Approaches, 1999)

Andresen (as cited in Witfelt, 2000; Mathias & Kenneth, 2001) examines the first layer of the instructors design framework as learning principles of the student. Based on the

learning objectives the teacher will determine which instructional strategies are appropriate for use. Through the use of various instructional strategies the teacher is able to meet the many different learning styles of students.

Teachers will need to examine their pedagogical beliefs and take into consideration the theory of multiple intelligences (Witflet, 2000; Bishop, Hayes, & Seehusen, 2001). The theory of multiple intelligences is controversial and has not been proven, however educators cannot dispute that students learn in a variety of ways. The theory of multiple intelligences suggests several other ways in which the subject material may be presented to facilitate effective learning. Meeting the individual learning needs of the student can be accomplished through the use of eight potential pathways 'individualizing' instruction. The eight multiple intelligences (Gardner, cited in Armstrong, 2000) are as follows:

1. Linguistic
2. Logical-Mathematical
3. Spatial
4. Bodily Kinesthetic
5. Musical
6. Interpersonal
7. Intrapersonal
8. Naturalistic

The organization model of online instruction may be accomplished two ways, synchronously or asynchronously. Web-based technologies promote synchronous and asynchronous communication providing access to and from geographically isolated communities. A combination of synchronous and asynchronous communications is desirable for online learning. Most tasks that require thought and reflection would utilize asynchronous communication. The use of synchronous communication through

courseware such as WebCT can allow for a virtual chat through text, and possibilities for audio and video. Chris Dede (1996) comments that “groupware” tools support effective interactions and enable the formation of virtual communities. Dede (1996) states that “such ‘telepresence’ enables mentoring across distance and provides a social context that reinforces and motivates learning” (p 12). The virtual learning community involves learners who are separated physically and rely completely on communication technology, partially overcoming geographical inhibitions.

The ICT (Information Communication Technology) genre involves the use of all tools in the forms of software, online programs, and resources to create new and improved conditions for learning.

1. WebCT Chat
2. WebCT BB
3. Email
4. Word Processor
5. Web Resources (Static - information)
6. Web Resources (Dynamic - interactive)
7. News (Listserve)
8. Whiteboard

The ICT genre is implemented will correspond with the selected organizational model and instructional strategy. The layers of VLSM work in unison and require that online instruction utilize the many different combinations of the four layers in order to meet the many different intelligences and learning styles the students possess (Witfelt, 2000). In a study titled *e-learning: Studying Canada's Virtual Secondary Schools*, Barker and Wendel (2001) found two general types of students who were attracted to online course delivery. The first being “aggressive, self-directed learners with clear expectations and goals” which are students who choose virtual schooling as a first resort,

and the second being “underachievers in conventional schools for whom virtual schooling is a last resort”(p 122). The latter study also reports that success factors are weighted towards students for whom virtual schooling is a first choice. Students who are independent learners and take responsibility for their learning will be able to learn in the majority of online environments whether or not the VLSM is utilized. The VLSM is designed to expand the online learning environment involving a heterogeneous mix of learners. Students who are generally underachievers in conventional schools are not motivated to learn because of a disinterest in learning. Typically these students have seen little success because their learning needs were not met in the conventional classroom, or by various other factors such as low parental involvement, or lack of self-esteem. If instruction is not varied within the conventional classroom then certain students whose learning needs are not being met become disinterested and stop learning. Often these students do not succeed and look for alternative routes to achieve attention, which often lead to behavior problems, and classroom management issues. The VLSM for online courses helps create a learning environment in which the conventional disinterested learner becomes interested in learning and engaged with the course materials (Boulton, 2002). Barker and Wendel (2001) report that students that find success in virtual schooling having characteristics such as self-motivation, supportive parents, a working knowledge of computers and the Internet, orientated towards completing work, as well as skills and knowledge that are aligned with grade level placement. The parents, teachers, and administrators reflect these characteristics in their description of the successful student within the latter report. The challenge for educators and instructional designers are to develop web-based distance education courses that are inclusive not exclusive.

Taking advantage of the VLSM for course delivery can foster a more inclusive environment engaging the students at all levels of motivation.

Issues of Importance

Student Characteristics

Online learners convey attitudes of greater control and responsibility toward their learning (Schrum, 1998). Students who are self-motivated and take a course of interest will have greater success than students who need external motivation and continual encouragement to stay with the course (Barker & Wendel, 2001). The latter report also finds that students who are successful “have diverse background but also strong commonalities” such as:

- These students have strong parental support.
 - Students are at grade level in their knowledge and skills.
 - Students have some knowledge of computers and the Internet.
 - Students who have not experienced success in conventional schools have found some success in the virtual school when provided with extensive and positive feedback.
 - Students are self-directed and well motivated to complete and turn in their work for marking and feedback.
 - Students may have special needs due to moderate and severe disabilities.
- (p 102)

The Role of the Teacher/Adult-Supervisor

The role of the teacher supervisor is key for the success of the disinterested student. The teacher supervisor may be a teacher in a school with a student taking an online course, or they may be a parent/guardian of a home-schooled child. I will refer to this role herein as ‘teacher supervisor’. Monitoring student progress and communicating with the online teacher is an important task of the teacher supervisor. The role of the teacher supervisor needs to be recognized as an important element of the student’s

success (Boulton, 2002). Barker and Wendle (2001) state, “Unless there is an adult present to provide supervision and help, the chances of success are small. This is especially true of students who have failed to achieve success in the classroom.”(p. 99). Time is required for the teacher supervisor to monitor the student’s progress and communicate with the online teacher. The time allowed for the teacher supervisor should coincide with scheduled time the student is to work on the online course. Providing time and proper scheduling has implications for the division office as well as the school administrator. Teacher time and proper scheduling allows for greater success in meeting with the student, providing assistance with the material, possibly providing external motivation, and communicating with the parents of the student as well as the online teacher.

Teacher Characteristics

The demands of the virtual learning environment on teachers is different than of the conventional classroom. Barker and Wendel (2001) found six key characteristics of the ideal virtual teacher:

1. an interest in innovation and in technology
2. creativity and enthusiasm
3. a desire and ability to work collaboratively
4. a commitment to put students first
5. a willingness to work with parents, and
6. some technology skills and the ability to adapt quickly to change. (p 103)

Some provinces do not limit the number of students enrolled in an online course. These provinces provide tutors and markers for the instructors of courses with large

enrollment numbers. Tutors and markers may or may not be certified teachers. Teachers in other provinces are critical of large enrollment numbers. In the Barker and Wendel (2001) study a pupil-teacher ratio had not been established. Teachers in the virtual environment are burdened by the additional time required for communication.

Comparing face-to-face communication with typing messages sent via-email, much more time is required for virtual teachers to communicate with their students. Students can feel isolated very quickly without a response to an email. Saskatchewan Education has limited the number of students in an online course to twenty (S. Amundrud, personal interview, December 2001). This low enrollment number allows for the teacher to communicate to each individual student without the need of a tutor or marker. Barker and Wendel (2001) indicate that staffing and teacher-student ratios are limited by the funding formulae and budget. Economic restrictions can restrict student teacher interaction by increasing the number of students in the online class. The report makes recommendations regarding teacher-student interaction; “high expectations for contact with students and simultaneous expectations for course development in addition to teaching students” (p 112). Saskatchewan Education recognizes the need for low teacher-student ratio and has funding in place so that economic restrictions do not interfere with the ratio (S. Amundrud, personal interview, December 2001). The Barker and Wendel (2001) study also suggests that teachers need a continual upgrade in technical skills. Professional development is required for teachers and staff due to the reliance and continual change in technology.

Course Design and Communication

Schrum (1998) states that students find that greater reflection is required when typing, than when speaking. Asynchronous communication provides time for reflection and composition. Reading email or bulletin board postings encourages reflection. Utilizing these ICT Genres is important for the varied instruction of the online course. Electronic communication appears to foster collaboration and group interactions (Schrum 1998). Groupware such as WebCT supports this form of instruction. Through scaffolding learning the teacher can create the conditions for collaboration. Organization and implementation of collaborative activities is important to be initiated and sustained by the instructor (McIssac et al., 1999). A key element of student collaboration is the support and monitoring by the online teacher. With the majority of communication in text format the online environment operates differently than the face-to-face environment. Any form of communication has deficiencies, however understanding them and capitalizing on the strengths can shadow the weaknesses. Understanding communication in the medium of the virtual learning environment allows for a more natural development of collaboration.

Critics of online courses emphasize the isolation of learners through the lack of communication. Communication is very important in the virtual learning community; it is the “actual brick and mortar of the community”(Schwier, 2001). The online instructor must be conscious of this reality and stay in communication with the learner. It is also important that various forms of communication are fostered between learners, not just between the instructor and the learners.

Participation of the instructor in online discussions moderated by students provides more credibility to the discussion (McIssac et al., 1999). If the theoretical foundations of online learning are based on cognitive apprenticeship it is important that the mentor be available to model proper discussion etiquette and to guide the discussion in a meaningful way. Involving participants from the periphery of the discussion can be achieved through public or private questioning by the instructor. Participants share tacit knowledge when they feel comfortable in the environment. The instructor moves towards the periphery of the discussion and monitors its progress with little input as the discussions quickly become student centered. Examination of the tacit knowledge when made explicit by the students helps the instructor evaluate what information and skills have been internalized. Since face-to-face meetings before meeting online cannot always be established, it is important for the promotion of interaction and social presence. Learners need to feel socially present interacting online (McIssac et al., 1999). As learners move from the periphery of a virtual learning community and engage the community, they can claim membership to the community and feel socially present when interacting.

In the videoconference “Staying the Course: Retaining Online Students”, Joyce Bishop (2001) indicates that “frontloading” is very important in retaining students. The initial meetings of the online course should include an activity for learning style assessment, an icebreaker, and have open communication. Students need to recognize their personal learning style. The instructor must be also aware of this latter information. Students and teachers need to compromise and accommodate each other in the teaching-learning process. When students understand how they learn, they can work on expanding

ways of learning. The student who requires external motivation in an online course may look at ways of becoming internally motivated and learn independently. The teacher must be aware of this and help the student by being in constant contact with the learner as well as the teacher-supervisor.

Frontloading engages the student immediately with the course. Allowing the student to talk about themselves is very important in the initial stages. Scaffolding the initial stages of the course brings the student into the learning environment, and makes them feel a part of the group. Interaction throughout the course is important which usually “results in engagement of ideas, people and processes.”(Schwier, 2001).

Summary and Conclusions

Distance education is growing to meet the needs of traditional and non-traditional students. With broadband Internet technologies reaching urban areas as well rural areas, a diverse course offering can be provided to students throughout the province. Equitable access to courses can benefit the learning experiences of students. The quality and diversity of education will increase as the number of online courses and access develops. However, the instructors of web-based distance education courses are critical to the success of the learner. Through utilizing the virtual learning scaffolding model, teachers can incorporate multiple instructional routes to include all learners, fostering active and social learning.

Reviewing literature surrounding traditional satellite distance education as well as current web-delivered distance education indicates that a homogeneous group of students find success in these types of environments. It is up to educators and instructional

designers to challenge these findings, creating an environment that fosters inclusion. Through the facilitation of various student-learning styles, the student may become engaged with the material and take on the responsibility of learning.

The complexity of the online learning environment must be based on a conceptual framework utilizing constructivist elements. Critical and social constructivism provides a theoretical basis for cognitive development. Situated learning as a model of instruction for web-based courses can foster apprenticeship-style learning that engages the learner with authentic context.

Reconceptualization of distance education courses involves the study of virtual learning communities. Understanding student epistemology and ontology is essential for the design, support, and growth of the virtual learning community. Legitimate peripheral participation helps us understand the virtual community of learners and the progressive involvement and encouragement required for the student to be part of the community.

This paper has attempted to address the theoretical underpinnings of virtual learning, as well as strategies for designing online instruction and issues surrounding this form of education. Understanding this new educational milieu will help instructional designers, and educators in the struggle to create and deliver successful inclusive online courses.

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