Abstract: Advances in telecommunications and computer-based instruction and student learning systems have expanded the opportunities in online instruction and student learning, yet the potential of online learning resides not in the specific technologies that are applied, but in the nature of instructional methodologies and learning activities that occur when a technology is utilized. There is a trend towards redefining professional educator and student learner roles in a more constructivist manner. This paper focuses on the nature of online teaching and student learning. The purposes of this paper are [1] to examine the professional educator’s roles in technology integration, [2] to examine the professional educator’s role to facilitate student learning with technology and [3] to identify effective online instructional practices. While some research suggests a specific set of required skills, unique to online instruction, there is strong indication that effective instructional practices in traditional contexts are also applicable to online environments. The result is a paradigm shift of the professional educator’s role from presenter to facilitator/coach; a compilation of instructional competencies for effective online environments; some extrapolated from effective teaching practices in traditional setting, and others, distinctly emerging from online instruction and student learning environments.
Introduction

It is evident that the pace of educational innovation has outpaced educational research, and there is no educational sector in which this is truer than online learning. According to the National Center for Education Statistic (NCES), as of Fall 2001, 99% of public schools in the United States have access to the Internet. Although this statistic shows a tremendous increase in Internet access compared to 35% in 1994, many issues regarding computer use remain unresolved, including [a] students limited cognitive capacity to process the large amount of resources on the Internet (Hannafin, Hill, Oliver, Glazer & Sharma, 2003), [b] a dilemma between providing exploratory, authentic class activities with computer tools and achieving desirable scores from standardized tests, and [c] a lack of connection between professional educators’ epistemological beliefs and practical teaching practice with technology. Advances in telecommunications and computer-based teaching and learning systems have expanded the range of teaching and learning opportunities online, but there is general agreement that the potentials of online learning reside not so much in the specific technologies that are applied, but in the nature of teaching and learning activities that occur when a technology is used. There is a trend towards redefining professional educator and learner roles in a more constructivist manner. This paper focuses on the nature of online teaching and student learning. The purposes of this paper are [1] to examine the professional educator’s roles in technology integration, [2] to examine the professional educator’s role to facilitate student learning with technology and [3] to identify effective online instructional practices.
Teaching and Learning in Distance Education

Traditionally, distance education has been more successful at delivering content and less successful at providing interactivity and implementing the creative use of technology. Even the Internet, with all its advertised potential for interactivity and connectedness, has often been used simply to deliver print-based materials (e.g., downloadable PDFs) or other similar forms of non-interactive courseware. Streamed video on the Internet is commonly used to deliver course lectures taped in classrooms.

There are individuals who argue that the era of media’s primary role as delivery systems is nearing its end as more sophisticated interactive technologies find their way into everyday distance education practice (Dede, 1966; Ullmer, 1994; Kozma, 1994). Presumably, such technologies go beyond online (OL) class discussions and two-way communication, allowing student learners to engage in truly constructivist learning.

Constructivism is an emerging paradigm that has been suggested as a basis for re-conceptualizing distance education (Tam, 2000). Constructivism asserts that learning involves active construction of meaning by the student learner, who draws upon a myriad of internal and external factors affecting learning. Constructivist approaches also posit that complex skills normally emerge in challenging learning environments where active engagement can occur; context may have a significant bearing on skill master, execution and transfer (Blaxton, 1989; Tulving, 1983). The importance of context has led several theorists (e.g., Brown, Collins & Duguid, 1989) to describe cognition as situated in the learner’s culture, setting, history and environment. They argue that multiple contexts, active engagement and realistic activities enhance learning and transfer. Finally, work on socially shared cognition and distributed learning (Resnick, Levine & Teasley, 1996:}
Salomon, 1993) emphasize the importance of the social context for learning, within and between individuals in computer-mediated virtual environments, and gives rise to emerging conceptualizations of groups as information processors. Thus is the vision of online teaching and learning emanating from the explosive growth in telecommunications and computer-based learning opportunities.

**Innovative Roles of Professional Educators in Student Learning**

Education reformers have advocated proactive, authentic learning experiences for students to foster problem solving in everyday situations. The National Research Council (1996) has proposed scientific inquiry, in which students generate problems and hypotheses, find evidence, draw a conclusion from their findings, communicate with peers, professional educators, and scientists, and justify their conclusions as critical for doing science. As the professional educator’s role changes from the transmitter of knowledge to the action oriented facilitator, the roles of technology and computers in student learning changes from one of student learning from technology to student learning with technology. Hence, the idea of computers as tools coincides with Salomon, Perkins, and Globerson’s (1991) description of learning with technology (cited in Jonassen and Reeves, 1996):

First, we distinguish between two kinds of cognitive effects: Effects with technology obtained during intellectual partnership with it, and the effects of it in terms of the transferable cognition residue that this partnership leaves behind in the form of better mastery of skill and strategies. (p.2)
Building upon the notion of computers as tools, Hannafin, Land and Oliver (1999) proposed a framework, *Open-ended learning environments* (OELE), to identify the characteristics and components that computer tools need to facilitate higher order thinking. They need to be grounded in empirically proven practices, regardless of the epistemological approach they take (e.g., constructivist, instructivist, etc.). Specifically, they should address four basic principles: enabling contexts, resources, tools and scaffolds. *Enabling contexts* frame learning in situational boundaries within which problems are posed or surface, be they well defined or open-ended. *Resources* means learners have access to different libraries of knowledge rather than receiving it all from one source. These may take a variety of forms, including such sources as the Internet, professional educators, parents, peers, books, etc. *Tools* are the means provided to allow learner inquiry into the problems at hand. They should allow learners to confirm, challenge, explore and test the contextual theories and ideas presented. *Scaffolds* are support structures that “shift the locus of responsibility for task completion to the learner: (Sharma, 2001). Removing the scaffolds should not hinder or diminish learner knowledge in any way, rather knowledge remains intact because the learning is placed only on the learner and rests in no way on the scaffold. OELEs proposes that all four elements be present and properly in order to foster high order thinking skills. Based on the OELE framework, characteristics to effectively increase student learning computer activities should:

A. Be situated in students’ real lives and problems

B. Provide balanced scaffolds

C. Enhance students’ reflective thinking
D. Promote communications from learners’ multiple perspectives

E. Foster an interdisciplinary approach to subject matter

F. Include process-oriented assessments

**Effective Online Teaching**

If there is to be a change in the orientation to student learning at a distance it must be supported by a change in the orientation to teaching at a distance. Do the same skills that define excellence in classroom teaching apply in online courses? Research by Chickering and Gamson (1987) offers an interesting framework with which to address this question. Based on 50 years of educational research, they produced a list of seven principles of good teaching practices in face-to-face courses. Graham, Cagiltay, Craner, Lim and Duff (2000) used these same seven principles to assess whether these skills transfer to online teaching environments. Their general findings, supported by the research of Schoenfeld-Tacher and Persichitte (2000) and Spector (2001), indicate that online teachers typically require different sets of technical and pedagogical competencies to engage in superior teaching practices in online courses. Ultimately, such research may lead to improved preparation for online professional educators, targeting specific areas of practice and helping novice online professional educators become aware that they “need more planning time, more instructional support and additional training for all of the potential delivery formats for distance teaching: (Cyrs & Conway, 1997, p. 18).

Of greater importance in this paper are the effects of online teaching on online student learning. How are student participation represented by posted messages, and the criteria that both quantifies and qualifies good participation established? What criteria
constitute good participation and what is the relationship between these criteria and motivation, understanding, and learning? Sadly, one major factor affecting online teaching is that professional educators still do not understand how to construct an online environment so that it is the quality and level of comprehension that is represented and factored into course grades, not volume of messages. Professional educators who teach online continue to be overwhelmed by the volume of messages they must attend to, which naturally leads to students being overwhelmed as well, simply due to the fact that online communication continues to be structured and evaluated in terms of number of messages, rather than evolving into a collective, collaborative knowledge building endeavor.

The reality is that the majority of faculty has little or no experience with online learning, what it entails, and how it is successfully undertaken (Gold, 2001). Gold contends that to become an effective online professional educator, one must engage in online learning. The experience of participating in an online community from a learner’s perspective develops new thinking about pedagogy. Without this type of experience, teachers simply apply traditional practices (Gold, 2001) to new teaching and learning contexts when, to be effective online professional educators, they should be developing new methodologies of teaching that re-distribute power, roles, and responsibility within the learning community. The change from thinking about knowledge being fixed to a particular place and time to being accessible anytime, anywhere invokes a tremendously powerful paradigm of teaching and student learning. Yet, without proper pedagogical training and online experience, professional educators regretfully continue to draw upon their knowledge of what works best in a traditional teaching environment, and implement
those strategies in their online courses. The result is often professional educators and students engaging in a barrage of messages, where, neither, the technology, the teaching nor the student learning, is being optimized for beneficial use.

Effective Teaching Practices

Research in distance teaching suggests a specific set of required skills, unique to online teaching; there is strong indication that effective teaching practices in conventional contexts are applicable to online learning environments. The result is a compilation of competencies for effective online teaching, some drawing from effective teaching practices in traditional settings, and others, distinctly belonging to online teaching and student learning environments.

Converting Traditional Instructional Strategies into Online Practices

Building on the work of, Chickering & Gamson (1987) and Graham, Cagiltay, Craner, Lim and Duff (2000), there are effective instructional strategies typically implemented in traditional teaching environments that can be useful in online student learning environments. Yet, often the discussion about traditional face-to-face instructional strategies versus online strategies becomes murky, often reduced to the question of whether or not traditional instructional practices have a place in online communities of student learners. Basically, the issue is one of educating oneself in the pedagogy of online instruction and the skills of effective online learning in order to convert effective traditional instructional strategies into purposeful online practices to increase student learning. Table I below, presents a summary of the findings of research by Graham et.
al. (2000), which essentially confirms that there are steadfastly effective instructional strategies in traditional learning environments that apply equally well in online instruction.

<table>
<thead>
<tr>
<th>Principles of Effective Teaching</th>
<th>Lessons Learned for Online Teaching</th>
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<tr>
<td>1. Encourage student-faculty contact</td>
<td>Professional educators should provide clear guidelines for interaction with students. Explain how often you will be online and how quickly you will be able to reply to emails. Notify students when you will be temporarily “away” from the course.</td>
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<tr>
<td>2. Encourage collaboration among students</td>
<td>Well-designed assignments and activities facilitate meaningful collaboration among students.</td>
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<tr>
<td>3. Encourage active learning</td>
<td>Students should present course projects. Provide a forum in which students can present their own work and hold it accountable to critique and constructive criticism.</td>
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<td>4. Provide prompt feedback</td>
<td>Professional educators need to provide two types of feedback: Information feedback (regarding student learning) and acknowledgement feedback (regarding student participation).</td>
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<tr>
<td>5. Emphasize time on task</td>
<td>Online courses need deadlines. Activities require timelines that accommodate learners’ schedules, course accessibility and offline work.</td>
</tr>
<tr>
<td>6. Communicate high expectations</td>
<td>Challenging tasks, sample cases, and praise for quality work communicate high expectations.</td>
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<tr>
<td>7. Respect diverse talents and ways of learning</td>
<td>Allowing students to choose project topics incorporates diverse views into online courses.</td>
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**Table 1:** Seven principle of effective teaching in online course

What the field of educational technology has postulated for over 30 years is that in order to encapsulate the potential of technology for increasing student learning, professional educators must have direct knowledge of, and experience with, the technology being used. To further expand this rationale is that in order for professional educators to influence technology to create innovative and engaging opportunities of
learning for their students in an online environment, professional educators themselves must have the technology experience. Knowledge of and experience with the technology used to facilitate and engage student learning informs and converts pedagogy such that some would argue that the “old” pedagogical approaches have no, or extremely limited bearing on online learning contexts. Voiding the ‘either or’ debate, recent research (Graham, Cagiltay, Craner, Lim and Duff, 2000), indicates that traditional instructional strategies, with specific modifications to accommodate innovative instructional media, do serve an important role in online teaching. Graham et. al., (2000) strongly assert that there are some skills required of effective online professional educators, that must be newly learned, because there is no comparable face-to-face pedagogy from which to draw. This is corroborated by the research of Gold (2001), Schoenfeld-Tacher and Persichitte (2000) and Spector (2001), wherein the roles and capabilities of effective online professional educators are clearly associated with the acquisition of very specific skills and knowledge.

**Developing New Instructional Methodologies for Online Teaching**

Professional educators must shift their instructional perspectives to be effective in an online environment. They do not have to abandon their teaching philosophies but rather, find innovative ways to demonstrate and utilize them in an online environment. Teaching online is very different from traditional classroom practice. Rather than being a presenter in a traditional classroom, an online professional educator is more like a facilitator or coach to his/her students. In a traditional classroom, the professional educator disseminates information so that students are enthused about the content. To the extent
that the student is engaged in active learning, there is less need for the professional educator to provide extrinsic motivation to enable students to move through the course. However, there is much more to an effective online course than the assembly of course modules or the amalgamation of course activities. The most effective online courses are those that have vital communities of learning, built and sustained through applications of sound pedagogy and instructional methodology, and significantly characterized by high levels of interaction, feedback, moderating, and facilitating/coaching.

**Moderating and Facilitating/Coaching**

Moderating is maintaining a constant flow of content-focused interaction between students. Strategies include encouraging students to participate in discussions and individual and group learning activities; keeping discussions focused on specific content; drawing out multiple perspectives; and summarizing and synthesizing the salient points of discussions. Moderating also entails ensuring that certain students do not dominate discussions. Facilitation/coaching involves disseminating information and direction to assist students with completion of assignments, suggesting ideas or strategies for them to pursue in their course work, and getting students to reflect on their responses and their work product. It involves scaffolding the building of both individual and collective knowledge, and elevating student cognition and reflection, so that each student’s learning is maximized.

Moderation and facilitation/coaching take place in various locations of the course area, in various amounts, according to the type of learning activity and level of student preparedness, ability and social need. At the beginning of the course, for example, the
professional educator may discuss with students their specific expectations and goals for the course, given their background, experiential base, learning style and previous online experience. In the context of conference areas or group forums, the professional educator’s primary concern is to get all students to participate and learn from one another. Similarly, in the context of group projects or collaborative activities, the professional educator is focused on getting student to work together and learn together so that all students benefit from the group interaction.

Many researchers (Dehler & DeSimone, 2000; Gold, 2001) suggest that the ability to facilitate and moderate online courses is a skill that can only be fully developed online. The implication is that in order for a professional educator to develop the knowledge and skills required to effectively facilitate/coach and moderate an online community he/she must position him/herself to fully engage in the experience. There are no similar strategies in classroom instruction that approximate the task of being responsible for sustaining and intelligent conversation and learning in a dynamic and changing environment.

**Implementing Effective Instructional Design**

Instructional design is a systematic process, involving the analysis of a particular educational scenario and the design, development, implementation, and evaluation of instructional strategies to address that specific educational situation (Reiser, 2001). In its simplest form, instructional design is the deliberate organization of teaching and learning activities so that content is effectively delivered and eventually mastered. Designing for online learning environments is particularly challenging, because one must fully
understand the potential and limitations of the technology involved, and how each of these affects student learning.

Stubbs and Burnham (1990) define an online course as a learning environment where students and teachers employ very specific methods and techniques enabled by technology to communicate information and convey knowledge. An engaging and effective online course involves the utilization of its three entities; professional educator, student and content, by means of the strategic implementation of three instructional methodologies: the organization of students for learning; the design of activities that help students learn; and, the selection of technology and tools to facilitate the delivery of the first two strategies (Picciano, 2001).

In effective learning systems, interactivity between professional educator, student and content is high. In online learning, each of the possible interactions among the three aforementioned entities is extremely important. With respect to instructional design, each must be considered to create a successful online course: Professional educator—student interaction; student—student interaction; and, professional educator and student interaction with content (Picciano, 2001). An online professional educator must be able to customize the content, monitor student progress, and provide guidelines for further study. Mastering the skills of designing online courses takes time and multiple opportunities to implement instructional methodologies.

Management versus Instruction

The challenge that most professional educators face when teaching an online course is that much of their time is spent managing and administering the course leaving little time
and energy for actual instruction. When too much of a professional educator’s time is spent on the technicalities of teaching an online course, valuable expertise is underutilized. Therefore, it is crucial to design and organize the online course, activities and assignments, so that managing the course is not time consuming.

**Pedagogical and Technical Tasks**

Technical tasks include: ensuring and maintaining confidentiality of communication; keeping the course conference areas uncluttered and easy to navigate; removing any inappropriate communication; uploading materials and modifying course site when required. Pedagogical tasks include: motivating and moving students, collectively and individually, through the course content; stimulating high quality intelligent online discussions with specific and focused questions; assessing learning and evaluating the course.

**Acquiring Innovative Instructional Functions**

Of the many innovation roles and responsibilities one assumes when teaching an online course, the majority of a professional educator’s online instruction relates to one of the following four functions of communication. These include: *organizational* – to set the schedule and organize students, activities and interactivity for the online course; *social* – to create and maintain a user friendly, constructive and active learning environment; *intellectual* – to focus discussion on the content and critical points, engage students in higher order thinking and support individualized and collaborative learning; and, *assessment* – to assess learning of course content and attainment of instructional
objectives. While communication serving these affective and strategic purposes is not completely foreign to an online professional educator, the challenges of carrying out the communication online can be overwhelming without adequate preparation and organization. The ability to respond to students quickly and appropriately takes time to master, and is entirely dependent upon one’s ability to design and manage an online course, wherein the work of facilitating/coaching, moderating, and the performing of technical and pedagogical tasks is manageable.

Conclusion

An online course and the teaching thereof transform learning, curriculum and pedagogy (Dehler, 2003). A number of adjustments have to be made to both instructional modalities and to the curriculum in order to implement useful, relevant and effective online courses. Changes to the curriculum typically revolve around several key points, which include: deciding upon and structuring learning activities; selecting the readings and other course work upon which the learning activities would be based; allocating enough time for the learning activities to be learned; ensuring that changes created by any actions taken with respect to all of the above, are relevant to the remainder of the course content. Modifications to instructional approaches imply both the conversion of effective traditional instructional strategies into purposeful online practices and the acquisition of new knowledge and competencies in a number of technological and pedagogical areas. Effective online teaching strengthens and extends course objectives and changes the processes by which students meet these objectives and learn course content. The power of online course lies with the professional educator’s ability to create a student-centered
learning environment where each student engages in the active construction of meaning, drawing upon myriad internal and external factors affecting student learning in online environments.
References


