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Abstract

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EDUCATING EDUCATORS FOR VIRTUAL SCHOOLING: COMMUNICATING ROLES AND RESPONSIBILITIES

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Abstract. New forms of electronic media have enabled the creation of virtual classrooms in K-12 schools across the U.S. The virtual schooling (VS) movement, in which courses are offered mostly or completely via distance technologies, is expanding rapidly, yet many educators who work in these environments receive little or no foundation for effectively communicating with students at a distance. This paper codifies our current thinking on communication demands for K-12 VS teachers, designers, and facilitators, and provides a conceptual framework to ground further research and development in this critical aspect of virtual schooling. Communication theories which have direct application to the design and implementation of VS can inform practice and enhance the experience of students and teachers who participate in this increasingly common educational option. In this paper we provide an overview of

how communication theories can be applied as a lens to inform VS practice.

Introduction

New forms of electronic media have been used to create virtual learning experiences in K-12 schools across the U.S. The virtual schooling (VS) movement, in which K-12 courses and activities are offered mostly or completely through distance technologies, is expanding rapidly (Clark, 2001; Roblyer, 2003;Setzer & Lewis, 2005; Zucker & Kozma, 2003). A recently released report on virtual schooling from the National Center for Education Statistics (Setzer & Lewis, 2005) indicated that about one-third of public school districts in the U.S. had students enrolled in distance education courses during the 2002-2003 school year. Wood (2005) reported that about 300,000 students participated in online education during this time period. It seems likely that participation in VS will grow exponentially during the next decade.

The purpose of this article is to delineate some of the communication theories that can inform the instructional roles that appear essential in creating a successful VS system. We provide a unique lens for examining VS practice, and open a dialogue about how relevant communication theories can inform development and pedagogy in VS contexts. Hopefully, this initial vision will help guide the design and implementation of instructional activities, and prepare educators to effectively participate in such a system. Dialogue and research around these theoretical models will be necessary–particularly given the lack of a central framework to guide research in distance education (Gunawardena & McIsaac, 2004).

Further, there are a host of critical issues surrounding educational uses of social software in VS environments. Addressing these at an appropriate level of detail and sophistication goes well beyond the scope of this article. Readers are encouraged to seek this literature out (e.g., Goodfellow, 2004; Gibson, 2003; Ermann & Shauf, 2003) —and are cautioned that the models, methods, and tools presented here should never be used without a thorough examination of essential socio-cultural writings. Discussion of these issues before engaging in VS is essential to understanding the barriers, constraints, and pressures that each individual involved in VS experiences .

Changes to the roles of college teachers due to VS have already been noted in this journal (Berge, 1999) and elsewhere (e.g. Lynch, 2002; Palloff & Platt, 1999)—and we foresee a similar shift in the roles and responsibilities of educators at the K-12 level. With an increasing demand for virtual courses at the high school level, and K-12 activities that promote connecting students who are geographically separated to share ideas and work on projects, there will be an increasing need for teachers, designers, and facilitators who understand the communication demands of VS and can incorporate these new instructional media into their teaching. Research on K-12 virtual schooling suggests that a VS teacher should be complemented with a local facilitator and, better still, guidance from each student's homeroom teachers (Aronson & Timms, 2003; National Education Association, n.d.; Davis, Niederhauser, Compton & Lindstrom, 2005). Yet many who fill these roles are people whom Alan November (2001) refers to as*digital immigrants*—those who were not born into a digital world (as were many of our students), but have had to adapt to the dramatic technological changes that have occurred during the past 30 years. A significant challenge for this group has been adjusting to new forms of popular communication such as email, newsgroups, discussion boards, instant messaging, text messaging, and an array of other emerging communication technologies. The vast majority of VS students are native to the digital world, and for whom communicating through these media is an everyday occurrence.

Just as today's VS student differs in fundamental ways from students who participated in correspondence courses 20 years ago, virtual teachers are also unique in many ways. Wood (2005) quotes Blomeyer's observation that "[there is a] persistent opinion that people who have never taught in this medium can jump in and teach a class.… A good classroom teacher is not necessarily a good online teacher" (p. 36). Although required competencies for effective virtual teachers are often supported only by anecdotal evidence, there is widespread agreement on many apparently requisite skills. Roblyer and McKenzie (2000) found that many of the factors that contribute to the success of an online instructor are similar to those identified for any successful instructor: good communication and classroom organization skills. Effectively communicating through currently available ubiquitous communication tools is critical to the success of the VS teacher.

In addition to these pedagogical issues, it appears that the online instructor's role requires a paradigm shift in perceptions of instructional

time and place, virtual management techniques, and ways of engaging students through virtual communications (Easton, 2003). VS teachers must explore the ways that time and place issues in the VS environment enable and constrain their own pedagogical practices (e.g., the ability to work from any Internet-connected computer, the ability—and perceived responsibility—to communicate with students at all hours of the day and night, opportunities to connect students in local classrooms with students around the world.). Further, VS teachers need awareness of opportunities and limitations that VS communication tools presents to their students. Classroom management issues and effective communication strategies present unique challenges when teachers never meet their students in person and may be separated from each other by thousands of miles. Designing and implementing VS systems that are firmly grounded in communication theory is essential for the future success of the VS movement.

A VS System

VS schooling systems are very different from former “teacher in front of the classroom” educational models. Typical communication patterns in traditional classrooms involved teachers presenting information to the class, teachers asking questions of students to test their knowledge, students asking questions of the teacher for clarification, and, occasionally, students engaging in small group discussions. Widespread use of VS signals a change in the structure of K-12 schooling whereby students interact with others (teachers, peers, experts, etc.) through a wide range of communication technologies. The student population is physically distributed and likely to be more heterogeneous. Resources to support learning have already developed into multimodal texts (Kress, 2004), a wide range of equipment, and most recently digital technologies. However, much of the local infrastructure remains intact, and the VS teacher continues to be responsible for designing the context, initiating activities, establishing and facilitating communication, and assessment. The heart of the education system continues to be the teacher-student relationship. VS participants constitute a bona fide group with its boundaries and context as key elements of its function and existence (Putnam & Stohl, 1990).

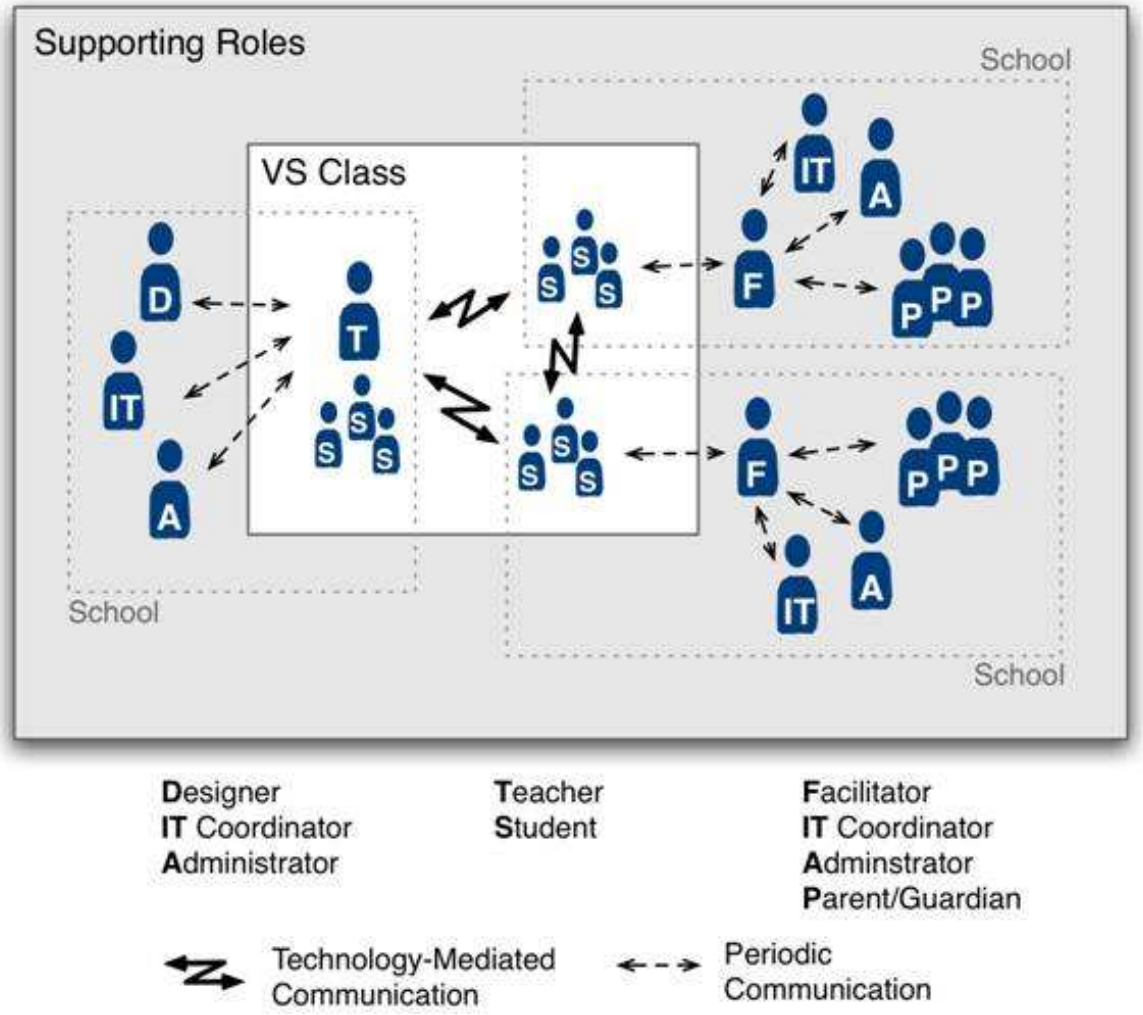
Multiple complementary roles are essential in a VS system. With respect to academic matters, these roles include instructional designers who create instructional activities and materials, facilitators who enable and support students locally, and teachers who take on responsibilities

including teaching, facilitating, monitoring, evaluating student learning, and coordinating the overall VS experience. Of course, there is considerable overlap in these roles and, in some situations, individuals may take on multiple roles. Figure 1 provides a schematic diagram of one common approach to VS, in which a teacher provides a course to groups of students spread across three K-12 schools (one local and two remote). Course content and resources were produced by a designer (D), who may continue to work with the teacher. An instructional technology support person (IT) ensures the teacher has adequate access to technological resources and that hardware, software, and network systems function properly. The administrator (A) at the host school supports the teacher many ways, including allocation of necessary resources, logistical coordination within and across VS sites, and leadership in initiating and maintaining the system.

Facilitators (F) assume key roles at remote sites. The facilitator role may be filled by a classroom teacher, guidance counselor, aide hired specifically for the purpose, some other individual in the school, or some combination of these individuals. Students (S) rely on on-site facilitators to provide information about VS possibilities, instructional support when taking VS courses, coordination of VS facilities, and access to VS resources. Facilitators interact with parents (P) and coordinate the efforts of their school's IT specialists and administrators to ensure provision of adequate support and services.

Within the instructional VS context, communication is essential for success. Of particular interest is the technology-mediated communication that occurs between and among teachers and students in the VS "classroom." The remainder of this article will address the use of communication theories to inform instructional practice in VS communities.

Figure 1. Roles in a typical VS course.



Communication Theories and VS Practices

The application of communication theories to ground VS instructional practices addresses a central difference between traditional and VS schooling—the nature of communication between teachers and their K-12 students. Though many scholars might agree with a *cues filtered out* perspective of mediated social interaction (Kiesler, Siegel, & McGuire, 1984), we propose that effective interaction occurs through various technology-mediated formats. As Walther (1996) suggested, though the exchange may be impeded on different levels, the potential for rich meaningful interaction is present when at least two people can communicate. The way in which communication is encoded is a fundamental concept in VS, as communication between the teacher and the student is not simply the transfer of curricular information (Bransford, Brown & Cocking, 1999). In a VS setting, participants must use multiple

channels and often have to work harder to achieve the level of social interaction that is taken for granted in the traditional K-12 school setting. Mediation of the communication through technology decreases cues, both verbal and especially nonverbal. It reduces proxemic cues, obscures facial expression and gestures, and eliminates haptics (cues based on touch). Paralanguage—the pitch, volume, and variation of the voice—may play a greater part than ever in controlling interaction and developing relational messages, or it may be absent entirely. Face-to-face communication is often the benchmark used for comparison (Gunawardena, 1995), but as will be discussed later, quality of communication depends on a range of factors.

Our theoretical perspectives start with the medium, before moving to the more central aspect of social interaction. The impact of various forms of media is best formulated in *media richness theory*. Media richness has been defined as the "ability of a communication channel to handle information or convey meaning contained in a message" (O'Hair, Friedrich, & Shaver 1998, p. 60). Media richness theory suggests that the more cues afforded to a user by a medium, the richer the medium. Specifically, richness, and its inverse, leanness, are determined by four dimensions: (1) availability of instant feedback, (2) the use of multiple cues, (3) the use of natural language, and (4) personal focus (Daft & Lengel, 1984). Natural language includes verbal and nonverbal cues as well as the communication context (Rice, 1993).

Rich media such as face-to-face communication or videoconferencing are most effectively used for complex or ambiguous tasks. Lean media, such as a statistical report or memo, are effective for simple unambiguous tasks. Such designations comply with Bruner's (1966) third aspect of instruction that material should be presented in the most effective sequences. Further, Rice (1993) found that as individuals interacted, they chose specific media to accomplish specific tasks. Time and efficiency acted as primary factors for determining which medium individuals used at any given time.

In one example of VS, two teachers, one in the Midwest and another on the West coast, used email and chat to have their fifth-grade students engage in virtual literature circles. Teachers found that some tasks were better addressed through synchronous media (e.g. using chat to quickly decide on which books to read), while other tasks (e.g. actually discussing the books) were more effectively accomplished through asynchronous email, because students could spend time off-line

preparing carefully thought out and constructed responses that more clearly represented their feelings, thoughts, and ideas (Lindstrom, 2003). As seen in this example, multiple media formats were used to accomplish a number of interrelated communication tasks efficiently. As more children are exposed to various levels of mediated social interaction, more critical assessments of the social software they are using and its affect on their interactions is warranted.

Media richness issues are apparent in the implementation of many aspects of VS instruction. For example, in a Physiology and Anatomy course designed for Iowa Learning Online (see Davis, Niederhauser, Compton & Lindstrom, 2005), the teacher used videoconferencing technology to hold office hours for student presentations. This allowed the teacher to provide instant feedback to students on whatever questions and concerns students might have—a highly ambiguous task. Further, access to the multiple visual and audio cues available through videoconferencing allowed both teachers and students to communicate ideas and feelings more effectively. Students typically handed in (relatively unambiguous) written assignments by simply uploading files, but used videoconferencing to present (more ambiguous) group and individuals projects to teachers and peers. Students and teachers also used asynchronous communication tools available in WebCT (e.g. email and discussion boards) to address content and assessment tasks. This allowed the use of natural language, including the acronyms and shorthand prevalent in text-based interactions such as text messaging and other forms of digital textual communication, as well as the use of *emoticons* to express feelings graphically. Through these activities teachers and students built personal relationships by using effective tools to meet the communication needs of participants.

The social interaction accomplished across a medium is done so through communication which necessitates an understanding of basic dimensions of communication in mediated form. A theory that works toward that understanding is the theory of social presence (Short, Williams & Christie, 1976). Central to this theory is the idea that different media allow individuals to have greater or lesser social presence during mediated interactions. They defined social presence as, “The degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships.” (Short et al., 1976, p. 65). Though this definition suggests a user-based perceptual construction of the other end of the mutual relationship, Short and colleagues were

interested in measuring various media to determine their capacity to allow social presence to occur.

Distance education scholars have both utilized their (Short et al, 1976) semantic differential scales in a longitudinal study to measure “intimacy” of the medium (<Gunawardena & Zittle, 1997) as well as developed unique measures dimensionalizing social presence as social context, online communication, and interactivity (Tu & McIsaac, 2002). According to the various assessments of social presence, the users’ academic experiences were heightened through increased perceptions of social presence.

In addition, alternative definitions of social presence include “the degree to which a person is perceived as a ‘real person’ in mediated communication” (Gunawardena, 1995, p. 151) and “…ability of participants …[in a community of inquiry]…to project their personal characteristics into the community, thereby presenting themselves to the other participants as ‘real people’” (Garrison, Anderson, and Archer, 2000, p. 4). Here they are discussing the communication context created through familiarity, skills, motivation, organizational commitment, activities and length of time as opposed to the medium carrying the message. It is the “project[ion] of personal characteristics” that seems vague as they distinguish what are “real people”. The receiver’s ability to process and acknowledge understanding of those characteristics differs from the medium effectiveness for supporting social presence. Of primary importance to Garrison, et al. was the capability for individuals to share information.

Contemporary views and past definitions of social presence were summarized by Biocca, Harms, & Burgoon (2003):

Mediated social presence is the degree to which a user of a communication technology feels that another human being or intelligence is accessible and co-present via medium. The sense of social presence can vary within and across media technologies from the simple sense that a user is aware that “some body” is present via a mediated space, or that they are mutually aware of their mediated co-presence, to a sense that the mediated representation of the other enables some level of access to the other’s attentional, cognitive, or affective states (p. 334).

This definition makes clear that social presence is not a property of the medium, but of the individual or individuals. It is necessary to distinguish this as it is the individuals' connection to others (i.e., their perceivable interaction or relationship) that can culminate in potentially mutual interdependence and knowledge sharing. The medium's affordances, though important in the mediation of it, are not the social phenomenon itself. The relational connection between individuals does not necessitate variation simply because the interaction occurs via text messaging, rather than telephone or face-to-face. However, the perceptual quality varies depending on the requirements or predispositions of participating individuals. Therefore, investing time and effort to refine the form and function of information exchange within any particular context is valuable.

Mediated communication presents a complex matrix of confounding dimensions (Harms, 2005). Social presence was originally formulated as a uni-dimensional concept, but recent investigation into its use and scholarship has outlined six specific dimensions: co-presence, attentional allocation, perceived message understanding, perceived affective understanding, perceived affective interdependence, and perceived behavioral interdependence, see Table 1 (Harms, 2004). When detailing these dimensions, the terms observer, user, other, and interactant may be interchanged as is typical with the terms sender and receiver. The distinction depends on the side of the exchange.

Table 1. The six dimensions of social presence.

Dimension	Dimension Definition
Co-presence	This construct serves to distinguish a user's sense of being alone compared to being aware of an existing interactant's agency. The capacity of interaction is determined by perceived reciprocal awareness.
Attentional Allocation	This construct addresses the amount of attention the user allocates to and receives from an interactant.
Perceived Message Understanding	The ability of the user to understand the message being received from the interactant as well as her/his perception of the interactant's level of message understanding.
Perceived Affective Understanding	The user's ability to understand the interactant's emotional and attitudinal states as well as her/his perceptions of the interactant's ability to understand the user's emotional and attitudinal states.
Perceived Affective Interdependence	The extent to which a user's emotional and attitudinal states affect and are affected by the emotional and attitudinal states of the interactant.
Perceived Behavioral Interdependence	The extent to which a user's behavior affects and is affected by the interactant's behavior.

Co-presence is the degree to which the observer believes she/he is not alone and secluded, her/his level of peripheral or focal awareness of the other, and her/his sense of the degree to which the other is peripherally or focally aware of them. Co-presence is often mistakenly used interchangeably with social presence in the literature. Co-presence is necessary but not sufficient for defining social presence. It is different from the other dimensions in that it is hierarchical. Co-presence must occur for the other dimensions to be obtained. In mediated interactions, co-presence can vary in its indication. In video conferencing formats, the image of the other assures the existence of the other. Audio-only formats are enriched when interactants provide positive back-channeling such as “yeah,” “um,” and “uh-huh.” Text responses in instant messaging interaction do the same. Avatars, a digital representation of an individual, can also provide a sense of co-presence by its observable existence, orientation, and proxemic behavior.

Attentional allocation addresses the amount of attention the user allocates to and receives from an interactant. This dimension changes dramatically between a dyadic interaction and that of a small group. From the teacher’s perspective she/he may be attending to each and every student. But any student may feel they are being focused upon, overlooked, or disregarded depending not only on their perspective, but also on a variety of other factors including their propensity toward high or low self esteem, intrapersonal noise, or any number of other distracters. Once again, the media format can greatly affect this interpretation. Another important consideration is the synchrony of the medium, or lack of it. Attentional allocation may be complimented, compromised, or inconsequential depending on whether a synchronous or asynchronous medium is employed.

The third dimension, perceived message understanding, is the ability of the user to understand the message being received from the interactant as well as their perception of the interactant’s level of message understanding. Aside from the various types of noise that can hamper message transmission on the receiver’s side, there are constraints such as media literacy, experience, capacity for listening, and others that must be accounted for in computer mediated communication (Paulsen, 1995). Here, properly encoding messages is critical. Strength can be added to reassure success by incorporating queries, supplementing messages with examples, and other supportive techniques. Lack of familiarity with cultural and social subgroups interacting together,

dialects and accents, as well as slang and group-specific terminology can impede understanding. One particular example of this is the increasing use of acronyms and shorthand prevalent in text-based interactions. Many parents and teachers find what passes as conversation between kids to be indecipherable (e.g., “omg”… “kewl”… “lmao”).

Understanding is not restricted to the messages being exchanged in text or verbal forms. Perceived affective understanding is the user’s ability to understand an interactant’s emotional and attitudinal states as well as their perception of the interactant’s ability to understand the user’s emotional and attitudinal states. As has been said many times, “it’s not what you said, but how you said it.” This distinction is equally important on both sides of the virtual desk. A teacher needs to catch the frustration and uncertainty in a struggling student’s voice. A student is advantaged by detecting the subtle bias toward one issue versus another when a teacher delineates certain topics. This is empathy. It is the emotional connection between two human beings to the point that they can interpret each others’ state. Here, more than anywhere, it is important to have an understanding of various socio-economic issues and how things such as gender, race, and economic status can impact the individuals, their relationships, and even aspects of the VS experience. When one’s attitude or emotional state changes the other’s attitude or emotional response, we might refer to that as emotional contagion or perceived affective interdependence.

Perceived affective interdependence is the extent to which the user’s emotional and attitudinal state affects and is affected by the emotional and attitudinal states of the interactant. In a classroom, emotion can inspire behavior and it can solidify purpose. Any number of examples can represent how teachers affect students, how students affect each other, and how they all change the world. To assume that teaching will be the same in the traditional setting as it is in VS is shortsighted. As mentioned above, each of the aspects taken for granted in face to face situations must be considered in preparing for the mediated interactions.

The final and perhaps most important dimension is perceived behavioral interdependence, defined as the extent to which a user’s behavior affects and is affected by the interactant’s behavior. At its simplest point behavioral interdependence has its greatest influence when students learn from each other and group work is predicated on behavioral interdependence. Well-recognized strategies have been developed to

create online communities (e.g. Lynch, 2002). A sense of community provides multiple benefits to the student including support, a sense of cohesion, and interdependence. Mutual interdependence is essential toward establishing a learning community (Palloff & Platt, 1999). What one person says influences what the next person says—so goes the irreversible process that is communication.

One last distinction should be made regarding the use of the word "perceived" for the last four dimensions. Each of these dimensions can vary between interactions and interactants, and it is the perception of each individual that is important to consider when designing for and engaging in VS.

Technology-Mediated Communication in Three Instructional VS Roles

Three central roles have direct impact on how the aforementioned communication theories get integrated into VS practices: Designer, Teacher, and Facilitator. Individuals who fill each of these roles have many opportunities to integrate theory with practice, but must first be aware of them and have some insight into how they can be carried out in practice. Individuals benefit from both understanding the roles and the interdependence between them. Providing educators with this information will assist in creating accurate expectations, reducing turnover, and increasing performance and satisfaction (Wanous, 1980). Some of the ways that communication theory can inform VS instructional practices are addressed below.

Designer. Two essential aspects of the design of an online course are structural support and instructional strategies (Erlbaum, Mcintrye & Smith, 2002). Structural support includes issues like creating a course schedule with clear deadlines, planning for ongoing quality assurance, ensuring support from administration, and providing for technical support. Designers also address ways to create a learning environment that ensures students focus on content, establishes a learning community, develops a balanced mixture of individual and group learning activities, builds in appropriate pacing, and provides for ease of access.

A VS course designer can introduce several elements into an online course to address Social Presence Theory issues. For example, some course designers provide opportunities for teachers and students to create personal web pages that allow participants to get to know one another on a more personal level. Further, the use of previously

mentioned *avatars,* or other evidence of presence in the online environment, can promote co-presence by providing an easily identifiable presence while engaging in online activities and discussions. Designers can enhance attentional allocation by creating an engaging VS environment. Providing a variety of interactive activities for student learning can increase student participation and motivation.

VS designers can also promote perceived message understanding, affective understanding, and affective interdependence. Providing multiple communication channels in the course context (email, videoconferencing, chat, etc.) offers students many opportunities to ask questions and receive and provide clarification of discussions and assignments. Designers can also include other structural components including informational overviews to introduce course activities, clear and explicit instructions for assignments, and online help. Affective factors are addressed through the use of a variety of communication options including online discussions, videoconferencing, and face-to-face meetings with guidance on etiquette and expectations (Lynch, 2002). These options address the co-presence considerations addressed in the previous paragraph and the use of acronyms, shorthand and emoticons described above. Finally, longitudinal asynchronous communication media (e.g. discussion boards) provide outstanding opportunities to address perceived behavioral interdependence.

Teacher. Essential elements for teaching an online course are: to provide a comprehensive set of informational materials; to facilitate discussion in a way that keeps students on task, to manage student communication (Adria & Woudstra, 2001), and to promote full participation. Full participation includes encouraging peer collaboration, engaging with students without over-engaging, and assessing student work and providing feedback (Erlbaum, Mcintrye & Smith, 2002; Lynch, 2002).

Teachers also have opportunities to develop co-presence in their VS classrooms. Conscientiously using activities that encourage students to get to know each other (especially early on in the course) is important in any course—but is essential in the VS environment. Teachers can also model *back-channeling* in videoconferencing and chat sessions. Creating a supportive and interactive environment with mutual support and respect can provide a welcoming environment that can enhance attentional allocation. Active teacher involvement in monitoring and engaging in student discussions, clarifying instructions, and providing

multiple opportunities for interaction through various media can alleviate concerns about perceived message understanding.

Perceived message understanding, affective understanding, and affective interdependence are also under the purview of the VS teacher. Teachers can become a part of the learning community—sharing their personal experiences and feelings and encouraging students to do the same. Building a caring VS environment is grounded in effective communication among all participants.

Facilitator. Facilitators support VS students in their local K-12 school contexts. Responsibilities include getting to know individual students to advise in the selection of VS classes that address individual learning needs. Further, a facilitator in a VS setting may serve as a coach to prepare students for VS, including the development of organizational and other study skills necessary to be successful online learners. Finally, facilitators mediate between the VS teacher and the local K-12 school system, and provide a communication link for parents and guardians.

Facilitators can also promote co-presence—especially when they have more than one student at their locale. Building community within a local group can encourage participation and involvement and provide an ongoing peer-support system. Facilitators can help students focus their attention on course-related tasks to promote engagement and commitment to learning as they mentor and monitor student progress. They also serve as an essential resource for students when other communication channels are not effective. Facilitators can serve an important role by providing an immediate, personal, face-to-face communication option who can act as problem-solver, mentor and friend.

Conclusion and Future Directions

Communication theory provides important insights that can inform VS practice. Communication is clearly central to instructional interactions, and the VS environment provides some unique affordances and challenges that are not present in the traditional face-to-face classroom. Effective attention to, and use of, digital communication tools is essential for the success of VS. However, many educators are not familiar with the new forms of digital communication that are commonplace in VS settings. The call for manuscripts for this special

issue noted that “teaching is at its root a process of communication.” Inherent in communication technology used by students and educators are positive and negative affordances.

Current understandings of human learning help clarify the ways that technology can enhance education. The most relevant aspects are that teachers can use communication media to give more feedback, introduce curricula based on real world problems, and build local and global communities that include students and teachers (Bransford, Brown & Cocking, 1999) while not being restricted by time and space. How those communities fit together in the vastness of cyberspace is still to be determined (Rheingold, 1993). Bransford and his colleagues refer to it as *social glue*; it is that bond between individuals striving toward a common goal. This discussion would not be complete without mentioning the Constructionism perspective. The rich theoretical literature of both cognitive and social constructionism can provide important insight into the experiences of the students. Research into VS will benefit from both micro and macro levels of evaluation. Just as VS and the use of the Internet may provide K-12 students with unique and perhaps enriched educational experiences, caution must also be taken.

VS scholars and practitioners will also need to be conscious and proactive with regard to the negative behaviors increasingly afforded by technologically-based education and predatory dangers of online interaction. The Internet provides students with innumerable opportunities as well as distractions. Class time spent playing online games, socially networking on such sites as MySpace.com, and chatting via instant messaging systems rather than attending to lessons have begun to plague teachers’ efforts to provide engaging educational experiences. Cheating and plagiarism are compounded by wireless devices and powerful search engines. Cyber-bullying and flaming behaviors can have powerful reverberations in adolescent students learning the power of words. In addition, access to pornography and drugs has grown with the Internet. The additional role of safety monitor and the inclusion of precautionary messages into instruction results in greater demands on the teacher. Predatory dangers can include frauds and scams, information and identity theft, online stalking and harassment, and the sexual exploitation of children (Henderson, 2005). As mentioned earlier, the natives or individuals growing up with the technology can easily navigate the vastness of cyberspace, but they must talk about these dangers before being allowed solo flight. The

most important thing to teach them is that personal information must be kept private and that once something is put out into cyberspace it becomes out of anyone's control with an indeterminable existence. For children at this time, the Internet poses some very serious and very real dangers. According to Finkelhor, Mitchell and Wolak (2000), 1 in 5 children received a sexual solicitation online and 1 in 33 received an aggressive sexual solicitation (someone asking to meet them somewhere; called on the phone; sent regular mail, money, or gifts). These numbers are measured in millions. VS teachers will need to consider incorporating public service programs like the I.C.A.C. (Internet Crimes Against Children) Netsmartz program. Discussions of acceptable behavior will be necessary in the absence of established norms.

The future trends of the digital divide, which Lloyd Morrisett defined as "a discrepancy in access to technology resources between socioeconomic groups'' (Roblyer, 2006, p. 191) remain pertinent. How will the progression and distribution of VS be impacted by issues such as planning, context selection, implementation, cost effectiveness, formative evaluation, and research methodology (Holmes & LaBoone, 2002)? Are there specific trends that will allow a more accurate model of racial and economic constructions of inequality (Jackson et al., 2001)?

The overview of some recent communication theories and their link to the practices of three essential VS roles provides an important milestone in our project. In Fall 2004, the Department of Education's Fund for the Improvement of Postsecondary Education (FIPSE) awarded Iowa State University and a consortium of teacher education programs, including the University of Virginia, University of Florida, and Graceland University, a grant to create a model for integrating a comprehensive VS curriculum into preservice teacher education. The ongoing goal of the project is to develop a better understanding of necessary skills and responsibilities for these roles and to integrate this knowledge into preservice teacher education to prepare effective VS teachers (Davis & Roblyer, 2005), while considering theoretical foundations that will support the VS movement more generally. Toward that goal, research and development of tools to assist in the educating of educators continues. To make the most of learning opportunities enabled by technology-mediated VS systems, students, teachers, and facilitators must be willing to assume new and untraditional roles. The intent is to provide insight and guidance for VS educators that will enhance the educational experiences of VS students.

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http://www.ctlt.iastate.edu/research/projects/tegivs/homepage.html

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