

---

# Technology and Education Online Discussion Forums: It's in the Response

---

*Sherry L. Markel, Ph.D.*  
*Assistant Department Chair*  
*Elementary Education (ECI)*  
*Associate Professor*  
*Northern Arizona University*  
[Sherry.Markel@NAU.EDU](mailto:Sherry.Markel@NAU.EDU)

## **Introduction**

A virtual conference center has been used for online discussion forums at Northern Arizona University since the early 90's. This asynchronous method for discussion participation has been steadily integrated into online web courses as well as discussion augmentations for face-to-face courses. NAU uses an online discussion tool called Screen Porch. Screen Porch supports a graphic user interface and allows participants to include graphics and multimedia links. The discussion forum has grown beyond the initial text only "box". It is a beguiling temptation of the technology to consider what participants can do with it without examining the pedagogical implications.

Nalley (1996) makes the point that an instructional method should be carefully chosen to address an instructional problem or goal and should be designed into a course. This is quite different from discovering a technological ability and inserting it into a course curriculum as an additional add-on or another bell and whistle. The integration of technology in instruction is not an excuse to abrogate our responsibility to design stimulating courses that provide learning opportunities based on sound pedagogical principles. However, web courses that include online discussion forums maximize student learning in a number of ways, promote student involvement and feedback feedback, and may inadvertently provide an outlet for students to voice frustrations otherwise saved for program administrators.

This article is a qualatative analysis concerning the use of discussion forums in web-based course delivery. The author has taught graduate level teacher education courses with this technology for three years, is now involved in the administration of several programs re-conceptualized for the web, and shares herein lessons learned.

## **Discussion Forum/Course Integration**

The online discussion forum allows students to work together on projects in small groups, participate in on-going discussions focused on course content, and to "present" group project products to the rest of the class. All of this is done independent of student location and time of actual participation in the discussion forum. This is coordinated with a separate web site for the readings and assignments of an online course. Making weekly participation in the discussion a requirement "institutionalizes" the discussion forum within the course.

Weekly discussion topics are coordinated with the web course assigned readings for each week. Students are asked to respond to one or two open ended questions designed to elicit discussion

about the topics. Requiring students to respond to at least three other student postings initiates a round of discussion among the participants. Each student's posting is listed in the forum under the weekly topic.

Student group projects are on-going across 14 weeks of a 15-week semester. Students assign themselves to a topic by posting their name and email addresses and stating what sub topic they are interested in doing research on. Group size is usually limited to 6 students for ease of communication. Students may exclusively use the work area set aside for their topic in the discussion forum or they may correspond using email or chat rooms.

All postings within the large group are public and archived so that whole transcripts can be re-viewed as needed and readily accessible to all participants. This written record constitutes a body of knowledge collectively written by participants in the course. Group project work can be public or sheltered by password assignment.

### **Maximizing Learning**

As Hopperton (1998) noted, participation in online discussion forums provides opportunities for responsibility and active learning through the expectation of regular participation in online discussions. This is not a scenario for a few prepared students to respond to a lecturer while the rest of the class sits back. Participation in the virtual conference demands that students become actively engaged with the course content and through the interaction with their peers, negotiate the meanings of the content. They construct knowledge through the shared experiences that each participant brings to the collaborative discussions. The online web courses about teaching offer deeper perspectives and opportunities to learn because the participants are teachers from school districts around the state and other states. This is not a narrowing of perspectives, but a broadening of the knowledge base as experiences are shared and compared relative to teaching issues.

This particular use of the discussion forum, to negotiate and construct knowledge, is an example of using the technology as a cognitive tool and not simply as another kind of blackboard or one-way communication method. Cognitive tools and environments stimulate cognitive learning strategies and critical thinking (Jonassen, 1998). Students engaged with course content in discussions and group work with other students engage in generative processing of information. Jonassen draws upon the work of Rumelhart and Norman (1978) to describe generative processing as, "deeper information processing results from activating appropriate mental models, using them to interpret new information, assimilating new information back into those models, reorganizing the models in light of the newly interpreted information, and then using those newly aggrandized models to explain, interpret, or infer new knowledge" (Jonassen, 1998, p.3). Vygotsky's models of learning involving the social interaction of peers, the scaffolding by more able peers and the use of language as a mediation tool of cognitive development all have opportunities of enactment in the use of the discussion forum within a web course environment. Students draw upon their own experiences and interpretations and share these with the group discussion. They draw on their own teacher stories to relate to the course content. They read other student responses and interpretations and compare these with their own thoughts. This involves the processes of reflection and the construction and re-construction of domains of knowledge. The resulting kinds of learning from these processes are not a regurgitation of a lecture or reading. It is a negotiated interpretation of knowledge with student ownership. The learning is deeper and more long lasting and students refine their thinking and their voice.

The following student discussions from a graduate course on Professional Problems of Teachers

reflect the shared construction of knowledge and understandings around the topic of Teaching as a Profession in Arizona. Students in the course were from around the state of Arizona as well as 3 other states:

*" (kjj) I lean most toward the interpretive theory for many of the same reasons as have already been shared. I believe that students learn most by relating to what experiences they have already had in life and that past experiences and personal values have a great deal to do with what students will learn at school.*

*As far as changes, I would like to see more teachers being allowed to be involved in a lot of the decision making that takes place in the name of education. It seems that many decisions are made without the input of the people who are actually in the trenches and that just doesn't make sense to me.*

*I agree with others that students must be able to function in their current society. It is not fair to them if we are not educating them in how to survive in the society they will live in. As for the web exploration, I had just recently been to both sites both in my exploration of charter schools in Arizona and in my pursuit to find out how to go about renewing my license. Both are very helpful sites. I learned that it is time for me to start thinking about getting documentation of my graduate courses ready so that I can send in my renewal forms!"*

*(BRT) "I am going to have to go with the Conflict Thoery. Although each theory has its good points, the Conflict Theory takes the best of them all and incorporates it into a nice package. It allows for recognition of the state controls put on us as a society while leaving room for individuals to overcome the dominant class rules. Changes, mainly I would like to see our responsabilites as teachers more clearly defined. Are we turning into social workers or professional meeting attenders? If so, that isn't what I thought I was signing up for. A clearer definition of our roles would lead to many positives. First, we could be recognized for what we truly do. Second, societal respect would follow as they recognize there is so much more to our jobs than "Wow, I couldn't deal with them all day. Transformative pedagogy raises many more questions. I do believe we are doing students a disservice by not teaching them the rules and ways of society.*

*This is not to say they have to agree, but we owe it to them to inform them of the way it works. We should encourage them to be free thinkers who challenge the system. However, this does not mean, "That is stupid," rather it means, " Why is it that way and what can be done to fix it if I do not agree."*

*The ADE website proved interesting enough. I am currently looking for the one in Nevada where I teach. I am just about tired of waiting on hold or going through voice mail to get a simple question answered. I wish I would have known about the ADE site when I was teaching in Arizona."*

*(CC)(to)BRT - (14:10) " I do like your comments about defining our roles as teachers (especially the "professional meeting attenders" - I worked under a principal who seemed to believe that was what teachers should be doing!) Also, your comment about being asked how we deal with the kids all day hits a nerve with me as well. I hate it when people ask me that, or worse, "Aren't you scared of those big awful high school kids?" I live in a small-ish town, and since my*

*mother-in-law taught here for 20+ years, everyone knows her, and when they find out my last name they want to know if I'm related to her. When I tell them that I am, and that I teach as well, they often ask either of those questions. Kids are portrayed in such a bad light by the media, or people think the hoodlum-types they see out in public are what all kids are like, when in reality 90% of the kids are too busy doing their homework, participating in their communities, etc., to be out wandering around in the public eye. But, I'm off on a tangent here - we really do need to define WHAT teachers ARE, WHAT teachers DO, and WHAT the PURPOSE of education is in order to clarify so much of what goes on within the school."*

Enfranchisement is also an important pedagogical aspect of the use of the discussion forums. Many of our students are reticent under the timed constraints of an on-campus class. Those that have been conditioned early and successfully to the verbal demands in a classroom tend to dominate what discussion time is left over from lecture time. The discussion forum environment evens the playing field of opportunity and accessibility. Those students who have a reflective style that does not lend itself to quick, off the hip questions or comments now have time to contribute their well thought out responses. Connections that few have time to make in the stream of classroom discourse now stand out in a discussion forum flow of asynchronous discussion. Those students who migrate to the back of classrooms suddenly find that in the virtual environment their voice is not only solicited, but it is required and they are discovering that they can interact with the content of the course and their peers.

Group work within this environment imparts a shared sense of purpose and develops a group identity with a sense of interdependence and belonging. The initiation of these tasks can be perceived as exceptionally difficult for students who are not familiar with the concept in a web-based environment. The tasks must be structured with clear instructions and expectations. The public display of group work products in the discussion forum through the use of graphics, Power Point displays, or links to web sites maximizes the learning potential for the whole class and provides a model for students to use in future work.

Students are never anonymous as their name is posted with their comments. They develop an identity online as well as a voice as they tell their stories and mutually construct understandings around the course content.

Figures 1 through 3 illustrate the Screen Porch discussion forum.

Figure 1. Students are presented with a list of topics

You may [Create a new item by clicking here](#),

read [all the items](#) or [all the new material](#), or click on item titles listed below to read individual items.

List   or

#	<a href="#">Item Name</a> (click on column header to sort item list)	<a href="#">Author</a>	<a href="#">New</a>	<a href="#">Last</a>
1	<a href="#">Introduce Yourself - Jan. 15- 21</a>	<a href="#">Sherry L. Markel</a>		<a href="#">155</a>
2	<a href="#">Week 2 TIMSS Jan. 22-28</a>	<a href="#">Sherry L. Markel</a>	<a href="#">5</a>	<a href="#">132</a>
3	<a href="#">Week 3 - Reform Challenges - Jan 29 -Feb. 4</a>	<a href="#">Sherry L. Markel</a>	<a href="#">99</a>	<a href="#">121</a>

<a href="#">4 Week 4 - Standards &amp; Assessments - Feb. 5 - 11</a>	<a href="#">Sherry L. Markel</a>	<a href="#">113</a>	<a href="#">113</a>
<a href="#">5 Week 5 - Models, Traditions, Tests... Feb. 12-18</a>	<a href="#">Sherry L. Markel</a>		<a href="#">105</a>
<a href="#">6 Week 6 - Constructivism &amp; Knowledge Development Feb. 19-25</a>	<a href="#">Sherry L. Markel</a>	<a href="#">94</a>	<a href="#">121</a>
<a href="#">7 Week 7 - Changing Society Feb. 26 - March 4</a>	<a href="#">Sherry L. Markel</a>	<a href="#">100</a>	<a href="#">112</a>

Figure 2. Students click on topic message to read and reply.

**E C I 649 Spring 2001 Problems In Elementary School Curriculum Item 3**

**Week 3 - Reform Challenges - Jan 29 -Feb. 4**

**Item 3 21-DEC-2000 13:54 [Sherry L. Markel \(slm\)](#)** Edit

What are the issues involved in reforming the school system in this country?  
Do you think tests drive the curriculum?

Figure 3. Students' replies are viewable by all course participants and can receive replies.

**3:1) 28-JAN-2001 13:20 [sandee bonura \(sb38\)](#)** Edit

Some of the common reform issues include greater accountability with regard to individual schools and individual teachers. Also, equal funding for schools, pay increases for teachers, and assessment after assessment for both students and teachers. Class size reduction, and the elimination of social promotions with more accountability for student athletes were also present in the various states proposed reform efforts. Choice programs that allow open enrollment and the establishment of more charter schools were another common theme. Curriculum, of course, and the concept of Performance-Based Education with clear standards which hold both students and schools responsible for a more quality education was shared by many states.

I heard a lot about site-based management which gave teachers the power they long have been

denied and I saw my district "tinker" with that only to have that reform effort shelved quickly. Districts are full of BIG egos who will not readily turn over ANY control.



## Response as Key

"Much of the Web's power comes from interactivity, which engages learners and provides mechanisms for quick feedback"(Hazari & Schnorr, 1999, p.1). The opportunities for communication within the discussion forum cover a myriad of directionalities. One face-to-face model of pedagogy involves a quiet classroom of receivers with a lecturer dispensing information. Those web courses designed without the use of discussion forums replicate this limited bandwidth model in a correspondence course format. Another model of pedagogy includes students as responders and usually involves a handful of verbal participants who respond to instructor cues with pre-formed bits of content knowledge previously dispensed. The discussion forum makes active participation by all students the price of citizenship within this learning community. The asynchronous environment assures that there is time enough for all to respond. Hartman, et al. (1996) found that computer-mediated-communication did not just redistribute shares of a constant pie (communication time), it actually increased the size of the pie. Communication is among all participants, including the instructor and it is accessible at all times. The role of the instructor is as a facilitator/participant within the discussion forum.

Most of the communication is not directed specifically to the instructor. Students quickly discover that their peers are also holders of knowledge and they initiate discussions and respond to one another's postings. The instructor is a facilitator in this environment and is not viewed as having all of the knowledge and the answers. Within this highly public, mostly text-based environment, social currency and value is accorded by response. Students often note after the third week of a semester that they are attending to the discussions more than just the required twice a week, as they are eager to see if anyone responded to their postings. It is possible to feel invisible in an online discussion forum if no one responds to an individual's postings. Part of a course design should include a requirement that students respond to at least 3 or more students each week and at least 1 of those should be a student not previously responded to. This helps distribute the responses. Responses are a hook to student motivation to participate above and beyond grades. A socialization exists in these virtual conversations and for public school teachers who often feel isolated in their classrooms, it is a powerful draw to the opportunity to share knowledge and experiences. Here is one of many, many examples of this:

*(ROP) to (KWT): As everyone has said before me I truly understand. There are many days I get home & have said exactly what you have, What am I doing???*  
*Then it takes one child that 'gets it' or lets me know I have helped in some way & I realize why I am doing this. Isn't this format great? We can share our victories, joys, sorrows, and frustrations & someone else understands completely. In fact, this evening on my way out, I stopped by to say bye to a colleague. She expressed frustration about some deadlines & questioned if it was just our school. **I was able to share w/ her that we were not alone, other educators are feeling it too, from New Mexico to San Diego and th/out AZ. Then, we know change has to be in the wind.** By the way, K, one of the 'neatest' kids I have now, came from your area. He has had a horrific life, so something is going right over there by 'teachers' standards. He talks fondly of his education in New Mexico.*

McDonald and Gibson (1998) studied the patterns of interpersonal interactions relating to group

development in an asynchronous computer conferencing course. This is of particular interest to online instructors and administrators as one of the goals in using an online discussion forum is to establish a virtual community of learners, a sense of identity as a group. McDonald and Gibson draw from Schultz's work and support a model of group development based on interpersonal needs. All groups follow the same course of development and resolution with predominant areas of interpersonal need concerned with issues of inclusion, control, and affection. Inclusion is of primary concern and can be observed in the discussion forum environment as the need by individuals to be attended to and to be recognized as distinct person. Control is a need that can be a desire for authority and power or a need to be controlled and without responsibility. The need for affection is also present in a virtual discussion forum. This need is characterized by trust, self-disclosure and willingness to reveal experiences, thoughts and interpretations. An example of this, from the fifth week of a fifteen week class is:

*(KWT) to ROP and others, Thanks for sharing that. I didn't think I'd be sharing this with the class, but I think I may be approaching burn-out in my school district right now. i find myself thinking , why am I doing this? Of course, a hours drive each way to get to school doesn't help any. I feel like I get no respect( who doesn't) and many of the jobs that i do outside of the classroom (totalling reading minutes for the lower grades, screening chair, leveled reading, and just about anything else thrown my way are expected and certainly not appreciated) I try to keep the parents of my children informed about their progress, but sometimes don't know why I bother, they don't really care and don't miss it if I don't send the report home. Guess I'm done feeling sorry for myself. I know I've made a difference in some kids lives and that is why I do it.*

The case is made that all three areas of need are always present but different areas are dominant at different times. McDonald and Gibson (1998) concluded that people who met, discussed and collaborated as a group using computer conferencing had similar interpersonal issues at comparable stages as face-to-face groups. These researchers found that interpersonal issues constituted an average of between 45% - 75% of communication within small group work and that affection needs were important throughout the duration for the course. They recommended that, "Instructors can encourage and model this behavior from the beginning of a course, thereby creating a safe learning environment of acceptance and trust. Activities that enhance sharing and cooperation can further develop openness and solidarity within groups." (McDonald & Gibson, 1998, p.21)

## **Controversy**

Activities that encourage group development should be woven into the design of the course. Web environments can make use of interactive components and educators should design and look for activities that are problem oriented, interactive, and engage students in an application of knowledge, principles, and values (Hazari & Schnorr, 1999). This is not without controversy. If knowledge is negotiated, then there must in fact be varied perceptions and various lenses to examine truth. Computer conferencing stimulates and supports multiple viewpoints. Students will engage in debates with increasing levels of heat as the issues come closer to challenging deeply held beliefs. This is another group dynamic of the virtual conference center discussion forum and the instructor must have guidelines for discourse clearly stated the first week of the course. Debate of ideas and respect for people is crucial to creating and continuing a group environment of inclusion and affection, and ultimately self control. Through this process, students recognize and reconcile conflicting opinion, often integrating a variety of perspectives presented in a discussion. The public emergence of disagreement, controversy, is an indicator of the growth of trust within a group. The following example comes from the third week of a five week summer school class.

*(DGL) "to HAC. Don't you think teachers already teach to the test (Stanford 9, CBT, AIMS)? How many countries already have a National Curriculum? The US has fallen behind. .... Those tests are suppose (sic) to represent the knowledge level of our students. Someone felt that first graders (Navajo) should understand the meaning of the word 'blunder'. That amazes me. I don't use the word and neither does anyone I talk to on a regular basis. How many times do you use it? The tests are not always relevant and their idea of multicultural is to use names like Juan and Chan....."*

*(HAC) "to DGL. I think there is a difference between national curriculum and national testing. We already have "national testing." When you say you teach the word "blunder" to your students, I don't see that as teaching to the test. If you were(sic) take a look at a national test and teach solely based on that (which I have witnessed with more local tests) I would disagree with that teaching style. I think it curbs many opportunities to explore ideas and concepts that are not on the test.*

*A "national curriculum" would drive what everyone taught in their classroom. You mentioned that you taught Navajo students. If the national curriculum didn't include multicultural education in their curriculum, then you wouldn't or shouldn't teach your own students about their culture, which I see as a disadvantage...."*

Disagreement is a behavior that an instructor can model early in the course within the discussion forum. The first instance of this can be the instructor modeling a disagreement with a researcher's findings. Setting the stage for disagreement within the discussion forum is also a motivation and invitation for students to become more engaged in the discussions. There are always hot spots in every subject and field and singling one or two out for a week's topic of discussion, openly soliciting varying perceptions gives students practice in expressing disagreement and building a case for their position. This is another example of an advantage of the online discussion forum. There isn't enough time for much of this honing of academic discourse in our limited face-to-face classes. It is an opportunity for students to read carefully, critically, write reflectively, and logically order their supporting evidence. These are conversations of purpose and are instrumental to our academic communities.

### **Instructor Role**

What are the pedagogical issues for instructors using online discussion forums? First and foremost, instructors should have the syllabus developed and the course up and online before the first day of class. This is inherently self evident and no different from a traditional face-to-face course and yet there are instructors who give themselves permission to waive this basic requirement. This situation is hardly fair to either the student or instructor as each struggles to keep up and make sense of the experience as whole while it unfolds piecemeal.

The materials; including web pages and articles to download from the Web need to be well organized, sequential, user friendly, and re-checked for errors. What may represent a few minutes of time for a Web savvy student to negotiate can take a novice user hours of frustration. Administrators can help with this particular step in instructional planning by providing personnel for technical support and editing.

online discussion forums significantly change the nature of interaction, de-emphasizing teacher input and accentuating interaction and collaboration between peers. (Jonassen et al., 1995). The instructor is also a facilitator and a participant in the discussions. This is a direct shift from the model lecturer who dispensed knowledge to semi-empty receptacles. Hiemstra (1998) notes that effective instruction in this media depends on a collaborative, group-oriented, attentive (responsive), and egalitarian instructional style. This doesn't mean that instructors do less or have



less involvement with the class and with the students. In actuality, the instructor is now accessible at all times via email from students in the course. This impacts issues of load for faculty as administrators develop teaching schedules. Instructors need to be a "presence" in the virtual conference center as they monitor the discussions and provide continuous guidance to students to focus on the course goals by utilizing a technique called "weaving". This is a skill that involves using a part of a student comment in a posting and re-directing it to the main topic without an explicit negative value judgment. Instructors in a discussion forum will set and maintain the type of language and tone used in the virtual conference center. It is harder to interpret the tone and therefore the meaning of a message without visual clues or the sound of a voice. Instructors fulfill a role like that of a list moderator as they support and give students guidance in communicating successfully within the environment.

Instructors also help learners identify the important threads of conversations by drawing attention to a posting or series of postings. Any conversation can get side tracked and it is the instructor's responsibility to bring the discussion back around. Parallel to this, an instructor needs to be aware of the role that conversations that are personal and seem incidental play in the development of inclusion, control, and affection. These "getting-to-know-you" scenarios are as important as course content in reaching the goal of a collaborative community of learners. The instructor needs to be sensitive to this need and find a balance within the discourse.

Instructors must be responsive. Feedback has long been recognized as critical to the learning process and timely feedback is potent. This is especially true in the online course. A student assignment, question or bid for response can come directly to the instructor via email or as part of a discussion forum posting. Feedback needs to be specific, personal, and within 24 hours of the posting. Students report checking back to see if there is a response. If they are left dangling for days on end, they lose a feeling of connection and begin to feel lost in Cyberspace. This is a negative loop that contributes to a lessening of participation in the discussions.

Timely and close monitoring of email and the discussion forum is essential. An instructor is making a time commitment, not lessening the demands on their time by taking on a web-based course. It is another educational myth that these courses are "canned" and take much less time than a "real" class. It is another pervasive myth that instructors do not know who their students are in these classes. The amount of student-to-instructor and response interaction increases as well as student-to-student communication.

### **Administrator Role**

Administrators are able to plan for program and online course development. They are also able to see patterns of course registrations and student response from evaluations and often, direct student feed back. Recognizing the amount of time investment to develop and then enact a class is one important way administrators can program support for faculty. Administrators are often notified when the technology or course assignment planning goes awry. Online students feel vulnerable to servers and links functioning improperly and often notify many people when servers are down or links don't work. Using the insights gained from these experiences, administrators can mentor faculty to avoid some of these issues. Providing personnel with technical training for faculty and student support eases most of the frustrations for everyone. Setting up a program on the web along with its constituent courses is a ripple effect for faculty and staff scheduling. There are considerable time and effort demands. Administrators should consider the positive effects of enhancing the web course work with online discussion forums. It seems quite likely that students gain a voice in the online classroom with less need to resort to administrative channels to vent concerns.

## Summary

The discussion forum is a public place for discussion that allows time for reflection. While there is a flow of discussion and it is linear, it is not subject to the tyranny of the ever present "now" of the face-to-face classroom that doesn't allow the participants the benefit of an "instant replay." The discussion forum allows as many replays as a participant wants of what was said. A discussion can be revisited and commented on as long as the forum is open, while in a classroom, often the moment is lost and is difficult to revisit.

Instructor response, student response are the key components to the construction of shared knowledge within the discussion forum. The deepest learning is in the writing and "talking" about the content of the course within the community of learners. It is a pedagogically sound practice, based on cognitive learning theories, to design and engage in discussion forums with our students. We provide more opportunities for students to become actively involved with the course content to construct their own deeper and lasting learning.

There are still many issues for further research concerning online discussion-based courses. Who is advantaged in this format? What role does culture play in individual participation and communication styles? How real are the questions about accountability concerning student identity and assignments? Are we exacerbating a system of economic privilege and leaving a socio-economic class behind through lack of access? What motivates a student online and conversely what unmotivates them? These are questions for the administrator as well as the instructor to give careful attention to when offering online courses.

---

## References

Berge, Z.L. & Collins, M. eds. (1996). *Computer Mediated Communication and The Online Classroom*.vol. 2: *Higher Education*.Cresskill: Hampton Press, Inc.

Hartman, K., Neuwirth, C., Kiesler, S., Sproull, L., Cochran, C., Palmquist, M., and Zubrow, D.(1996). Patterns of social interaction and learning to write: Some Effects of network technologies. In *Computer Mediated Communication and The Online Classroom*.vol. 2: *Higher Education*. Berge, Z.L. & Collins, M. Eds. Hampton Press, Inc.

Hazari, S. & Schnorr, D.(1999). Leveraging student feedback to improve teaching in web-based courses. *THE Journal (Technological Horizons in Education)*. 26(11):30-38.

Hiemstra, R. (1998). Computerized distance education: The role for facilitators. *The MPAEA Journal of Adult Education*. 22(2):11-23.

Hopperton, L. (1998). Computer Conferencing and College Education. *The College Quarterly*. Available at: <http://www.senecac.on.ca/quarterly/CQ.html/HHH.079.W98.Hopperton.html>

Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B.B. (1995) Constructivism and computer-mediated communication in distance education. *The American Journal of Distance Education*. 9(2):7-26.

Jonassen, D. (1998). Technology as cognitive tools: Learners as designers. *IT FORUM Paper 1*. Available at: <http://itech1.coe.uga.edu/itforum/paper1/paper1.html>

McDonald, J. & Gibson, G.C. (1998). Interpersonal dynamics and group development in computer conferencing. *The American Journal of Distance Education* 12(1):7-25.

Nalley, R. (1996). Designing computer mediated conferencing into instruction. In *Computer Mediated Communication and The Online Classroom*.vol. 2: *Higher Education*. Berge, Z.L. & Collins, M.Eds. Hampton Press, Inc.

Rumelhart, D. & Norman, D. (1978). Accretion, tuning, and restructuring: Three Modes of learning. In J.W. Cotton & R.L. Klatsky (Eds.), *Semantic Factors in Cognition*. Hillsdale, NJ: Lawrence Erlbaum Associates.

---

*Online Journal of Distance Learning Administration, Volume IV, Number II, Summer 2001*

*State University of West Georgia, Distance Education Center*

**[Back to Journal of Distance Learning Administration Contents](#)**