

Computer-mediated interdisciplinary teams: theory and reality

KERRYELLEN VROMAN¹ & JOANN KOVACICH²

¹University of New England, Biddeford, Maine & ²Interdisciplinary Training for Health Care for Rural Areas Project, Margaret Chase Smith Center for Public Policy, University of Maine, Orono, Maine, USA

Summary *The benefit of experience, tempered with the wisdom of hindsight and 5 years of text-based, asynchronous, computer-mediated, interdisciplinary team communications, provides the energy, insights and data shared in this article. Through the theoretical lens of group dynamics and the epistemology of interdisciplinary teaming, we analyze the interactions of a virtual interdisciplinary team to provide an understanding and appreciation of collaborative interdisciplinary communication in the context of interactive technologies. Whilst interactive technologies may require new patterns of language similar to that of learning a foreign language, what is communicated in the interdisciplinary team process does not change. Most important is the recognition that virtual teams, similar to their face-to-face counterparts, undergo the same challenges of interdisciplinary teaming and group developmental processes of formation: forming, storming, norming, performing, and transforming. After examining these dynamics of communication and collaboration in the context of the virtual team, the article concludes with guidelines facilitating interdisciplinary team computer-mediated communication.*

Key words: *Interdisciplinary; computer-mediated communication; group dynamics; team building; problem-based learning; rural; faculty teams.*

Introduction

Computer-mediated communication (CMC) is assuming a central role in health care delivery, enabling health care teams to document and disseminate information quickly and efficiently. Laboratory and radiological results can be immediately available and patient information can be made accessible at multiple sites. However, like many human interactions, CMC is 'fraught with cognitive, cultural, social and technical challenges' (Patel *et al.*, 1999, p. 159).

Through the theoretical lens of group dynamics and the epistemology of interdisciplinary teaming, in this article we analyze the interactions of a virtual interdisciplinary team. The intention is to provide an understanding and appreciation of the role and impact of interactive technologies on collaborative interdisciplinary communication and assist the reader in facilitating interdisciplinary team CMC. Beginning with a brief description of the

Correspondence to: J. Kovacich, Interdisciplinary Training for Health Care for Rural Areas Project, Margaret Chase Smith Center for Public Policy, University of Maine, 438 Grand Ave, Rochester, NY 14609, USA. Tel: 585 288 4602. Fax: 585 288 4602. E-mail: Joann_Kovacich@umit.maine.edu

faculty team, the pedagogical approach selected, and the communication technology used, followed by an overview of the unique attributes of CMC, we focus on the team building process as it unfolds 'on screen'. By understanding the similarities and differences of on-line and face-to-face team building, unnecessary interventions can be prevented and energies can be focused on team facilitation and maintenance.

ITHCRA's story: rapée pie, ployes and creton¹

Mixing traditional ingredients with new methods

Crossing disciplinary boundaries, the Federally funded Interdisciplinary Training for Health Care for Rural Areas (ITHCRA) project, administratively located at the University of Maine, recruited in- and out-of-state faculty from the humanities, social sciences, and health care disciplines for the explicit purpose of developing interdisciplinary health care curricula. Initially, the team included a medical anthropologist, clinical psychologist, occupational therapist, social worker, community nurse practitioner, music therapist, fiction writer, chiropractor, nutritionist, and child psychologist. As the project and team developed and additional tasks were identified, the team membership changed. A speech pathologist, psychiatric nurse, cultural anthropologist, ethicist, early education specialist, and health educator joined the interdisciplinary team. Importantly, the team members were not unlike rural practitioners, in that few of the interdisciplinary faculty team had a professional relationship prior to the computer-mediated team.

Communicating via asynchronous CMC, the interdisciplinary faculty team had the primary task of developing rural, interdisciplinary, problem-based, learning case studies for a computer-mediated distance education program. The parameters for communication were that all communication would occur on-line and therefore be accessible to all team members. External individual e-mail communications were strongly discouraged, as were verbal communications (i.e. telephone or face-to-face exchanges). When individual communications did occur, it was suggested that a summary be posted on-line to inform the team members of the content. The intention was that all communications and group dynamics would be documented and accessible to everyone, including the project observers.

The team's secondary function was that of a forum or communication laboratory for the project to examine the dynamics of on-line interdisciplinary teaming. This aspect of the project was an important precursor to ensuring the success of the primary goal of the ITHCRA project: to develop an effective computer-mediated interdisciplinary education model for rural health care professionals.

Interdisciplinary collaboration requires professional maturity and a grounded professional identity (Petrie, 1976; Nandan, 1997). Therefore, a model of experienced professionals was selected to inform the project on processes (i.e. group dynamics) that would require consideration in the development of interdisciplinary teams in the context of CMC. An appreciation of the communication patterns in this relatively new medium is fundamental to the development and facilitation of computer-mediated educational programs (Bordia *et al.*, 1999). The need to understand computer-mediated team communication was heightened in the ITHCRA project by the selection of problem-based learning as the pedagogical approach for the distance education computer-mediated courses.

Problem-based learning is small group self-directed learning using case studies and problems. Awareness and intentional examination of cognitive and group processes are an integral component of problem-based learning (Vroman, 1997; Young, 1998). Therefore, the problem-based learning format in the computer-mediated course experientially developed knowledge and skills in interdisciplinary team collaboration. In addition, the course facilitated rural health care professionals' development of skills in CMC and telehealth, potentially reducing

professional isolation and providing the resources of interdisciplinary teams to rural practitioners and rural patients (Kovacich, 1996; Kovacich *et al.*, 1997).

The technology

Initially, faculty computer conferencing (similar to e-mail but supporting many-to-many exchange) was augmented using *First Class*, a non-Web-based intra-institutional communication package requiring installation on individual personal computers. Faculty computer conferencing was later enhanced through the development of *First Class* Web interface allowing seamless access to both the Web-based course content and discussion forums. This electronic flexibility allowed faculty to access the communication software anytime, anywhere, without having to install special software on individual computers. To facilitate the process, faculty were given individual technical support as needed. An observation of the project was that the human interface with technology in itself required significant input, adjunctive to the explicit project activities.

The adjunctive technological dimension arises from assuming, sometimes erroneously, that professionals are computer literate. Consequently, it is easy to underestimate the psychological and cognitive demands of CMC. The success of electronic communication is proportional to the users' competency and attitudes to the medium. For example, commenting on the experience of participating in the faculty ITHCRA project, one team member reflected:

This has been a very big learning process for me in terms of evaluating my own capabilities and finding out for instance in my own office I dictate everything. Did not type It was daunting to answer back on the Internet. But, it kicked me into getting a program and learning to type a bit and then exploring other avenues.... I've really enjoyed it.²

In rural communities, individuals rather than institutions are often responsible for the electronic technology (computer and Web connection) and therefore the infrastructure of technical support and exposure to developing trends and software are not always readily available. Hence, for any computer-mediated team-based project there quickly develops an adjunctive role of supporting all participants to reach a similar level of technological competency so that the technology does not become a moderating factor in the communication process. Recognition of these technological factors coupled with appropriate action that addresses computer competency can facilitate the learning curve and avoid some of the communication 'bumps' of teaming on-line.

In association with the pragmatics of technology, it is important to appreciate and work with the social constructs and structural parameters of CMC (Bordia *et al.*, 1999). These processes are best understood when we look at group development and interdisciplinary team epistemology.

CMC: new ways of talking

Communication is both situational and culturally embedded. Meaning is constructed from these contextual parameters (Postmes *et al.*, 2000). Shared values and a commitment to the interdisciplinary process are insufficient if the team cannot effectively communicate (Darling & Ogg, 1984). An analogy for a CMC interdisciplinary team experience is finding one's self at a conference in a foreign country in which the language and customs are unfamiliar. The task is to represent your profession. As the only representative of your profession, you feel pressure to represent your discipline well but the social norms and communication strategies that typically guide you do not apply. The ITHCRA faculty's foreign country was cyberspace.

An unfamiliarity of CMC can be seen in the absence of shared physical surroundings. In the face-to-face team, members see and hear each other; exchange a look or a gesture. Text-based communication is devoid of social context cues such as intonation, facial expression, gestures, and contextual cues that we have become skilled at reading and often misreading (Sproull & Kiesler, 1991). Likewise, the content of the words in verbal exchanges account for only a portion of the meaning conveyed. In CMC, word content is the salient feature and carries with it psychological implications of permanence attributed to the written word that most people frame more carefully than spoken words. One ITHCRA team member verbally expressed the weight of the written word:

Because I tend to be a perfectionist in nature ... when I write those messages I re-read them. If there is any misspellings or anything or if it doesn't sound right, I go back and I redo it even though it's casual comments or whatever and I just can't force myself to say, oh the hell with it, I'll leave it and I'll let it go. They know what I mean ... I'd want to be looked on as ...I have good English. I have good grammar. I want them to see that I'm putting out.

Hence, a perceived ease of verbal interpersonal skills is supplanted by the 'rules' of written expression, keyboard and general computing skills, and a few emoticons (symbols capable of expressing emotions). An obvious and frequently documented benefit of asynchronous computer-mediated conferencing is that group collaboration is unrestricted by location or constraints of time and costs (Harasim, 1987, 1990). However, the temporal independence of communications changes the patterns of discourse. Typically, verbal conversational patterns use mutuality through turn taking, whereas CMC allows for multiple threads (many concurrent themes) of conversation to occur from multiple contributors (Moore, 1993). Members can express ideas simultaneously and without interruption (Cappel & Windsor, 2000). Some participants enjoy the multi-leveled dialogue, whereas others find it disjointed, overwhelming, and frustrating (Ruberg *et al.*, 1992). The frequency of access to the site and volume of posted communications mean that members can manage multi-thread dialogues over extended time frames. The process requires members to be cognizant of and incorporate past, posted information and decisions into current dialogue. The outcome compounds the classic Achilles' heel of interdisciplinary team communication. The speaker, or in this case writer, assumes that the readers are on the 'same page' with respect to understanding, minimizing the impact of their diverse professional backgrounds, language differences, and perspectives. In CMC, time is an additional factor to be reckoned with. A posting read immediately versus a posting read with other interim responses that comment and interpret earlier postings may influence and change understanding. Communication is not typically a single threaded linear conversation but rather like the face-to-face meeting where people are all speaking at once with several themes of conversation occurring concurrently. In the computer-mediated forum, this multi-thread pattern of dialogue is acceptable and even advantageous, yet because of our verbal social norms of rules of exchange it can 'feel' uncomfortable. It is in this environment with its new ways of talking that the computer-mediated interdisciplinary team develops. The beauty is that the text of CMC gives a window into the team. A window in which all the interactions and what is communicated are visible to the observer.

Computer-mediated interdisciplinary team: unpackaging the process

Group process—forming

In practice, the benefits of richness and scope characteristic of interdisciplinary health care

teams are always juggled with the challenges of the members' differing theoretical paradigms, use of terminology, organizational and societal hierarchies, diverse commitments, conflicting joint and unique professional domains of practice, and lack of shared knowledge of the respective disciplines (Leichtenstein *et al.*, 1997; Nadan, 1997; Drinka & Clark, 2000). In 1994, the ITHCRA interdisciplinary faculty team brought their pre-existing social and professional constructs of interdisciplinary practice to the project. In the presence of the unfamiliar, members attempted to apply these past social constructs, their disciplinary paradigms, and expectations and sensitivities of experiences of face-to-face interdisciplinary communication to the computer-mediated interdisciplinary team. What emerged was an interesting interplay of face-to-face interdisciplinary team dynamics and CMC characteristics.

Similar to the team being physically together, over time virtual teams demonstrate typical group development and dynamics (Walther, 1995, 1997; Warschauer, 1997; Bordia *et al.*, 1999). The ITHCRA faculty team was no exception in the process of team building and developing norms. The group tasks took a back seat while team development behaviors were engaged in. Tentativeness of posting, non-specific opinions, and content were expressed as members sought to achieve a sense of each other and their own place in the group. In this process, a sense of affiliation to the project and understanding of common goals were explored. These behaviors are characteristic in group theory (Humphreys, 1996) of developing a level of trust, a prerequisite of team collaboration and effectiveness (i.e. productivity). Group productivity is contingent on and maintained by repeated interactions, shared social norms, commitment, and shared experiences (Jarvenpaa & Leidner, 1998).

Early in their development, the ITHCRA team met face-to-face to discuss the project and to facilitate team development. Postings following meetings illustrated the clarification of the project, the collective goal setting, and strengthened commitment to the project. But in addition, the postings also showed enhanced social relationships, as demonstrated in this sample:

Thanks so much for all the hard work at the workshop this weekend. The presentations were clear and there was ample time to ask questions and begin to assimilate information. (Did you see the light bulb above my head?) I'm still processing and will continue to do so. This will be shared with the ITHCRA team ...

The food was delicious and more than enough. ... Have a good day. Take care of yourself.

Note how this posted message was concluded with a personal salutation. The posting highlights the personal connection forged between members at face-to-face meetings.

The debate regarding face-to-face interactions continues to be active in the computer-mediated community and the related literature. Initially, it was thought that communication of social information important to team development was minimal if not absent in CMC and that face-to-face dialogue prior to computer-mediated collaboration increased performance (Jarvenpaa & Leidner, 1998; Jonassen & Kwan, 2001). The collaborative process requires social interactions that facilitate the reconciliation of differences across individuals and their institutions and hence face-to-face was seen as pivotal to computer-mediated collaboration (Patel *et al.*, 1999). ITHCRA's actions might have supported this position initially. However, social communication emerged and was present throughout the project, even when the project expanded to the inclusion of out-of-state faculty who never met face-to-face. Given an electronic forum, evidence indicates that social information exchange is similar in content to face-to-face communication. The difference is that, at first, the computer-mediated social information process occurs more slowly. At closer examination,

the difference of CMC is one of rate rather than content (Walther, 1992, 1995). Computer-mediated teams need to be cognizant of the more gradual developmental process, be accepting of this preliminary process, and proactively encourage social relational information exchange to facilitate team building because the strongest group norms are frequently implicit rather than explicit. The implicit norms reflected in the patterns of communication can be facilitated to establish a blend of social and work-related communication, similar to the characteristic informal exchanges that occur in face-to-face conversations before the formal meeting begins fostering the developmental team process.

The social relational dimension of face-to-face teams is typically associated with higher levels of satisfaction (Ocker & Yaverbaum, 1999; Cappel & Windsor, 2000). However, this higher satisfaction of the face-to-face team experience is being challenged. Hollingshead *et al.* (1993) found that the difference of satisfaction could be attributed to time and that, after 3 weeks, the difference in satisfaction was not significant. One could expect that as CMC has a more central role in personal and working lives (i.e. Internet relationships and personal communication), the social relational process of computer-mediated teams will be facilitated. Furthermore, as the expediency of computer-mediated teaming becomes an increasingly attractive choice to the more time-consuming face-to-face conferencing, teams will further address their needs through this form of communication.

The face-to-face team structure includes explicit meeting times, agendas, and minutes. CMC also has structure. Instead of meeting times and an agenda, the team members agree about the flow of communications. For example, how often communications are to be read and responded to, documenting visits to the electronic site (i.e. no lurking), and where in the team site information is to be documented (Abrami & Bures, 1996). For example, multi-thread interactions are successfully streamlined by technological infrastructure such as topic folders that separate the threads. The infrastructure is created using the members' Web craft skills or technical support to develop within a participating institutional server domain a site that is structured to manage the communication needs of the team. A group e-mail address is not satisfactory. Unless members save or archive all e-mail communication, they cannot review past messages. The text becomes the documented team records available to team members and any future member. The technological infrastructure is the electronic version of the committee structure. Folders can become subcommittee meetings with the advantage that all team members can see the subcommittee's process and decision making.

Leadership is integral to this team developmental process (Patel *et al.*, 1999). It is critical to team interactions. The leadership has a role in facilitating process, presenting organizational structure and goals, focusing the team, and managing the logistics.

Leadership

It would be easy to attribute leadership struggles in computer-mediated teams to the mode of communication, but the reality is that we need to analyze leadership dynamics in the context of interdisciplinary teaming. The mode of communication is merely a smoke screen and when the haze lifts, we are left with the proverbial issues of interdisciplinary teams. Theory purports that interdisciplinary team leadership comes from within the group and is not contingent on traditional hierarchies and organizational protocol (Lichtenstein *et al.*, 1997). The leadership is consensual and egalitarian. Such sophistication of leadership eludes most interdisciplinary teams. The ITHCRA faculty team predictably modeled non-interdisciplinary leadership team dynamics. Experience and professional constructs of predominantly multidisciplinary and/or hierarchical health care and university team structure prevailed. The explicit team autonomy and its equality of membership (experienced professionals) could not moderate tradition or group dynamics. Early group formation demands

leadership to provide structure, expertise, and define expectations. Consistent with typical early group development, the ITHCRA team members 'wanted' the organizational grant infrastructure to provide the leadership (i.e. the ITHCRA Director to take the leadership role).

Directed to ITHCRA Director: J, Thanks for the update! I was feeling a little lost with Y leaving and not hearing anything from our leader! I'm ready to work on any changes if needed. Whip the faculty into shape if you need us! X.

Reply from ITHCRA Director: Hi X. If we are successful here at ITHCRA, there will be no individual 'leader'... :)

Reply from X: J, I respect the 'group effort', but you're still our leader. Every now and then, doesn't someone have to lead the charge?

Reply from ITHCRA Director: Good point, but should it be the same person all the time? Aren't we teaching the students that interdisciplinary teaming means different types of leadership roles as well as role rotation depending on the task at hand? Don't forget, K did a wonderful job taking the lead when I, C, V and S went to Lakehead University.

Reply from X: J, I want you out front!

This dialogue effectively illustrates how team members sought hierarchical, directive leadership: a leadership structure that was contradictory to its interdisciplinary mandate. This leadership format would have been similar to that of an interdisciplinary health care team reporting to and getting direction from an external medical director who is not a member of the day-to-day service delivery. When the grant agency appointed a coordinator to be a participating member of the team, the leadership dynamics moved to a multidisciplinary process³. As with any multidisciplinary team, the ITHCRA team gave the functions of coordinating information and distributing tasks to the designated leader. The team members settled comfortably into parallel rather than collaborative activities like face-to-face multidisciplinary teams.

Later, as the ITHCRA team matured, a group member assumed a facilitator team leader role more consistent with an interdisciplinary team model. The preference for a more formalized hierarchical leadership persisted for some members and detracted from the truly collaborative, consensual process of the interdisciplinary team.

The ITHCRA experience illustrates the leadership dilemma of most interdisciplinary teams. Without an understanding and an agreement of behavioral expectations for leadership and membership that are congruent with the philosophical premise of interdisciplinary practice, teams consistently rely on more familiar, directive leadership models. With little or no experience to effectively model interdisciplinary leadership behavior in the virtual interdisciplinary group, CMC teams cannot afford to preempt the process of explicitly establishing norms, determining group goals, or establishing expectations of the leader and members. Because social conventions established in the CMC environment (group) determine the nature and characteristics of participation, the judicious and intentional group developmental process allows the virtual team to move forward and be productive (Dubrovsky *et al.*, 1991).

Storming

Interdisciplinary groups can experience conflict at any stage, as diverse perspectives and expertise collide. But as the newness of a recently established team subsides, the perceptible shift of dynamics is one of assertion, power, and disciplinary boundaries. For the interdisci-

plinary team these are seen in alliance to create homogeneity (i.e. tenure, discipline, affiliation, and status) and splitting, turf demarcation and, as mentioned, difficulty with leadership expectations. However, to work effectively the group must reach a collective understanding (Shortliffe *et al.*, 1998). By having established similarities in the forming stage, storming becomes the acknowledgement of difference and compromise. In the CMC climate of low or slower relational communication, the expression of conflict behaviors is seen in the task orientation.

In conferencing (many-to-many communications) and, therefore, team collaboration, the anonymity of CMC has an effect of diffusing individual responsibility, an electronic version of the 'observer effect'⁴. Individual member accountability is replaced by an amorphous collective responsibility. Team members, feeling less visible, exert less effort on-line (Abrami & Bures, 1996). A characteristic of this behavior is 'lurking'; team members read electronic communications but do not actively participate in the exchange. In this awkward time of group development, it becomes virtual absenteeism. Individualistic attitudes rather than collective identity exist. The consequence of conferencing anonymity is that commitment to the team, productivity, and collaborative decision making can be undermined. In the ITHCRA team, an example of this effect of anonymity was seen in the levels of initiative and individualized responsibility for tasks and decision making activities and that deadlines were liberally interpreted. It is captured in the tone and content of this posting:

Don't want you to think that I'm ignoring the discussion because of the fact that I'm not posting. Actually, I check the *First Class* messages almost every day. If something *specifically* is needed from me, I'll respond. Grading and final lectures are consuming all my time this week. The shortened time between Thanksgiving and Christmas has created a lot of havoc! I also stop by the office on College Ave occasionally and yesterday J prodded me for action pictures that I'll take care of. I'll also make sure that nutrition articles are on file there. I never posted a 'bio' on me but it seems a little redundant at this point. Let me know if you still want it.

Low productivity, lack of commitment, and 'flexibility with deadlines' can equally be attributed to common interdisciplinary dynamics resulting from the conflict of each member's competing institutional and departmental responsibilities (also seen in the sample text). All interdisciplinary team members (virtual or not) deal with the pull of competing loyalties and demands that can only be addressed through clarity of purpose, a collective team paradigm of practice, and goals and realistic expectations for members given their numerous obligations; typical issues for the storming phase of group development. These are the issues that need to be resolved before the group solidifies its core purpose and develops strategies for working collaboratively. The ITHCRA computer-mediated faculty team characterized by low social relational information and high task orientation reached consensus slowly with each member representing his or her own opinions rather than affirming or coalescing around a collective position.

Splitting or the formation of subgroups, not a problem in mature teams, undermines team collaboration and consensus in the immature team and is representative of underlying team conflict and poor team communication. In the ITHCRA team, three senior allied health care professionals with university affiliations and more than 10 years of clinical experience formed a subtask group. Confident in their respective professional identities, high level of professional similarities (knowledge and common language) and low level of threat (characteristics that facilitate interdisciplinary collaboration) they developed a subgroup alliance at the cost of team collaboration. This unit independently moved forward with tasks leaving other members less involved and disenfranchised. The computer-mediated text showed the predominance of dialogue from the subgroup and the involvement and contributions of others

gradually disappeared. The fiction writer, unable to find a voice in this health-focused group, left the team. The leadership struggled with the dilemma of fostering inclusion and interdisciplinary collaboration while also needing to achieve tasks and meet project deadlines.

Norming, performing and transforming—becoming a virtual team

With maturity, the ITHCRA team showed participation patterns of asynchronous CMC that used the linking of topic threads as a strategy to facilitate collective understanding and progress. Initially there had been a tendency to post independent statements without contextual references that in effect created a collection of 'virtual monologues' not unlike individual reports at a multidisciplinary meeting. The change replicated strategies used effectively in one-to-one e-mail exchanges, such as acknowledging others' posted messages, explicit referencing to date and content or even including significant passages in the present posting to provide a specific point of reference. For example:

Subject: Mr M's autonomy

I have read with interest the maturing reports on Mr M.

DP has established Mr M's independence and character traits that could well cause problems of non-compliance.

TS has also shown Mr M to be depressed and somewhat confused. I am not certain of what her clinical judgment would be on his competence, but it seems borderline to me.

Anyway, I am not sure that I should write dialogue since my role in this is not as a direct caregiver but it seems we have a good basis for a number of possibilities. One is that treatment plans—diet, chiropractic, social services—are going to be recommended. Another one is commitment to a nursing home ... At any of these points, the question has to be asked about whether Mr M's consent is informed and voluntary, and if Mr M is not competent then the process of a surrogate or proxy has to be handled. I do not know this territory, i.e. rural, but I assume there is a standard process for taking care of an incompetent person. For the moment, I am assuming that we will want to have Mr M be competent though compromised by his health. The challenge then will become not legal but psycho-ethical, that is, ... How to proceed without trampling on Mr M's distinct trait of independence? The trend of the case seems to be able to have some caregiver have to struggle with getting Mr M's voluntary compliance. At this point, I am not sure where this will fit into the case...I am enjoying the development of the case. It has a lot of possibilities.

The productivity of the 'performing and transforming' phase of group development is reflected in the freedom to brainstorm, less sensitivity to critique, and the willingness to critique or question another. In ITHCRA, this was particularly demonstrated in the later years of the project. There was less stress about task completion and less division of tasks into individual efforts, denoting greater ease with collaborative products, more experimentation and most important, a willingness to accept that not all disciplines need to be involved. The latter is particularly indicative of interdisciplinary collaboration in that there was a greater sense of reciprocal professional respect and members no longer felt a need to define professional turf as seen in this ITHCRA faculty posting:

Topic: Feeding and nutritional needs of a child with cerebral palsy.

Disciplines of faculty: Nutrition, occupational therapy, and speech pathology

D, J and I think the three of us might want to talk about the aspects of our respective nutrition, speech and feeding perspectives so we are consistent about the case in this area. I was also wondering if we were going to have some issues imbedded in the case that would challenge students to consider the implications of individuals working together from different paradigms. I thought D and R might provide differing nutritional perspectives...one traditional and one from the complementary/alternative medical perspective.

Experimentation and the interdisciplinary shift were also seen in the ITHCRA team's ability to depart from a health discipline-dominant team. In the last case study developed, the adolescent patient was given a voice in the form of personal diary entries written by a social work student team. These diary entries paralleled the health care provider's clinical reports and documented the patient's interactions with and experience of the respective health care providers.

Experience shared: facilitating CMC interdisciplinary teams

The hindsight gained in reading over the text of the ITHCRA communications was that in the throes of the experience the ITHCRA interdisciplinary faculty team members readily and somewhat erroneously attributed their moments of angst and frustration to the new mode of communication. No doubt, CMC will bring challenges to any virtual team. However, the perennial challenge present is the complexity of interprofessional collaboration. The reality of the ITHCRA experience is that the ITHCRA faculty team was/is an interdisciplinary team and thus demonstrated the best (e.g. creative diverse ideas) and the worst (professional turf sensitivities, subgroup alliances, vulnerabilities of professional identity, and communication difficulties) of interdisciplinary teaming, but this time it was in the computer-mediated environment. It was only as a mature productive team that the mode of communication and burgeoning team dynamics became secondary to the goal and work of the project.

Future technological and software developments will make the logistics of CMC easier, but the group developmental process (forming, storming, norming, performing, and transforming) will remain and needs to be acknowledged in the computer-mediated environment as it is in the face-to-face team process. In these situations, clarity is imperative; its absence is acutely exposed in CMC. To mitigate the technological impact and facilitate the dynamics of virtual teams: (1) the human interface with technology should be judiciously addressed by providing technical support; (2) the electronic infrastructure to share social relational information should be in place allowing for on-line photographs, biographical information, and introductions; (3) an electronic communication strategy should be agreed upon; that is, how often communications are to be read and responded to, documenting visits to the electronic site, and in which electronic conference folders on the team site information is to be documented; (4) programmed electronic reminders of deadlines to provide non-judgmental feedback and keep the team task oriented should be provided. Virtual interdisciplinary teams might heed the words of an ITHCRA faculty team member:

I learned a great deal about being on-line. I found it exciting. Yes, I think you can do it on-line (be an interdisciplinary health care team). I just think everything you do in the meeting room you have to be *that* much clearer about, *that* much more explicit about and *you have to really do the team process piece...*

Face-to-face or virtual, an effective interdisciplinary team is dependent on the quality of the communication between the members. Having addressed the pragmatics of technology, created technological support, and defined the process and format for CMC dialogue, the

interdisciplinary team will still need to confront the fundamentals of interprofessional collaboration. In other words, regardless of team composition (i.e. students, health care professionals, faculty, etc.) or the ultimate project goal (i.e. working on a class project, creating a learning module, providing clinical services, etc.) the team process itself must be supported. For example, during the team forming stage, delineation of the group's purpose is the single most important task to accomplish. Taking into account (1) the needs and motivations of the participants, (2) the purpose of the group, and (3) the environment in which the group will function, the on-line facilitator must take a leadership role in setting clear objectives, norms, and expectations. The facilitator should craft this communication in such a way as to encourage participation and feedback from group members. Asking open-ended questions can encourage dialogue. In order to facilitate the exchange of social relational information, the on-line group leader should model introductions as well as point out any commonalities shared by the group members to help establish a collective group identity and develop a sense of belonging in all the members. Recognizing that the group process entails a storming stage where conflicts arise, differences are acknowledged, and ultimately compromise is reached, the on-line facilitator can mitigate obstructionist behavior, such as lurking, by soliciting individual opinions on a particular task or group objective as well as encourage a collective dialogue reviewing the purpose and objectives of the group. In addition, the on-line facilitator can summarize common threads within individual postings for further discussion. Once the group has passed the storming stage and is developing into a mature virtual team, the role of the on-line facilitator changes to support personnel, maintaining the on-line conferences, and ensuring that virtual team members have access to needed technological resources.

Notes

- [1] Traditional Acadian dishes. These were used contextually in the ITHCRA team's first case study: Mr Mornault (www.ume.maine.edu/ITHCRA/Ithcra/Lesson1.html).
- [2] Taken from the transcript of a faculty evaluation focus group at the end of the 5 year ITHCRA project.
- [3] Leadership in a multidisciplinary team is structured one-to-many. The information is directed to the leadership, it is coordinated and distributed back to the member. Member-to-member communication is minimized in this centralized process.
- [4] The observer effect is the term given to the inaction of an individual to act responsibly or intervene in a manner that would typically be characteristic (i.e. help) when in a crowd that is observing an offensive, traumatic or violent event.

References

- ABRAMI, P.C. & BURES, E.M. (1996). Computer-supported learning and distance education. *Journal of Distance Education*, 10(2), 37–42.
- BORDIA, P., DiFONZO, N. & CHANG, A. (1999). Rumor as group problem solving: developing patterns in informal computer mediated groups. *Small Group Research*, 30(1), 8–28.
- CAPPEL, J.J. & WINDSOR, J.C. (2000). Ethical decision-making: a comparison of computer-supported and face-to-face groups. *Journal of Business Ethics*, 28(2), 95–107.
- DARLING, L.A. & OGG, H.L. (1984). Basic requirements for initiating an interdisciplinary process. *Physical Therapy*, 64(11), 1684–1686.
- DRINKA, T.J.K. & CLARK, P.G. (2000). *Health care teamwork: interdisciplinary practice and teaching*. Westport, CT: Auburn House.
- DUBROVSKY, V.J., KIESLER, S. & SETHNA, B.N. (1991). The equalization phenomenon: status effects on computer-mediated and face-to-face decision-making groups. *Human-Computer Interaction*, 6, 119–146.
- HARASIM, L. (1987). Teaching and learning on-line: issues in computer-mediated graduate courses. *Canadian Journal of Educational Communication*, 16(2), 117–135.
- HARASIM, L. (1990). On-line education: an environment for collaboration and intellectual amplification. In: L. HARASIM (Ed.), *On-line education: perspectives on a new environment*. New York: Praeger.

- HOLLINGSHEAD, A.B., MCGRATH, J.E. & O'CONNER, K.M. (1993). Group task performance and communication technology: a longitudinal study of computer-mediated versus face-to-face work groups. *Small Group Research*, 24, 307–333.
- HUMPHREYS, J.F. (1996). *A course in group therapy*. New York: Oxford University Press.
- JARVENPAA, S.L. & LEIDNER, D.E. (1998). Communication and trust in global virtual teams. *Journal of Computer-Mediated Communication*, 3(4), 1–30.
- JONASSEN, D.H. & KWAN, H. (2001). Communication patterns in computer mediated versus face-to-face group problem solving. *Educational Technology, Research and Development*, 49(1), 35–51.
- KOVACICH, J. (1996). Interdisciplinary team training on the information superhighway. *Journal of Interprofessional Care*, 10(2), 111–119.
- KOVACICH, J., COOK, C., PELLETIER, V. & WEAVER, S. (1997). Building interdisciplinary teams on-line in rural health care. In: P. KNIGHT (Ed.), *Masterclass: learning, teaching and curriculum in taught master's degrees* (pp. 137–148). Wellington House: Cassell.
- LEICHTENSTEIN, R., ALEXANDER, J.A., JINNETT, K. & ULLMAN, E. (1997). Embedded intergroup relations in interdisciplinary teams: effects on perceptions of level of team integration. *Journal of Applied Behavioral Science*, 33(4), 413–434.
- MOORE, M.G. (1993). Three types of interaction. In: K. HARRY, M. JOHN & D. KEEGAN (Eds), *Distance education: new perspectives* (pp. 19–24). London: Routledge.
- NADAN, M. (1997). Commitment of social service staff to interdisciplinary care plan teams: an exploration. *Social Work Research*, 21(4), 249–259.
- OCKER, R.J. & YAUERBAUM, G.J. (1999). Asynchronous computer-mediated communication versus face-to-face collaboration: results on student learning, quality and satisfaction. *Group Decision and Negotiation*, 8, 427–440.
- PATEL, V.L., KAUFMAN, D.R., ALLEN, V.G., SHORTLIFFE, E.H., CIMINO, J.J. & GREENES, R.A. (1999). Towards a framework for computer-mediated collaborative design in medical informatics. *Methods of Information in Medicine*, 38(3), 158–176.
- PETRIE, H.G. (1976). Do you see what I see? The epistemology of interdisciplinary inquiry. *Journal of Aesthetic Education*, 10, 29–43.
- POSTMES, T., SPEARS, R. & LEA, M. (2000). The formation of group norms in computer-mediated communication. *Groups*, 26(3), 341–371.
- RUBERG, L.F., MOORE, D.M. & TAYLOR, C.D. (1992). Student participation, interaction and regulation in a computer-mediated communication environment: a qualitative study. *Journal of Educational Computing Research*, 14(3), 243–268.
- SHORTLIFFE, E.H., PATEL, V.L., COMINO, J.J., BARNETT, G.O. & GREENES, R.A. (1998). A study of collaboration among medical informatics research laboratories. *Artificial Intelligence in Medicine* 12(2), 97–123.
- SPROULL, L. & KIESLER, S. (1991). *Connections: new ways of working in the networked organization*. Cambridge, MA: MIT.
- VROMAN, K. (1997). A guide to problem-based learning using computer mediated conferencing. www.ume.maine.edu/ITHCRA/
- WALTHER, J.B. (1992). Interpersonal effects in computer-mediated interactions: a relational perspective. *Communication Research*, 19, 52–90.
- WALTHER, J.B. (1995). Relational aspects of computer-mediated communication: experimental observations. *Organization Science*, 6, 180–203.
- WALTHER, J.B. (1997). Group and interpersonal effects in international computer-mediated collaboration. *Human Communication Research*, 23, 342–369.
- WARSCHAUER, M. (1997). Computer-mediated collaborative learning: theory and practice. *The Modern Language Journal*, 81, 470–481.
- YOUNG, N.A. (1998). Problem-based learning: using cases to drive the learning process. *Journal of Dental Education*, 62(3), 235–241.

Copyright of Journal of Interprofessional Care is the property of Carfax Publishing Company and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.