

E-mentoring: Using Computer Mediated Communication to Enhance the Mentoring Process

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ABSTRACT: The information age is changing the dynamics of many relationships, including mentoring. This article defines traditional mentoring according to its function and effectiveness and then expands the definition of mentoring to include computer-mediated communication (CMC), or “e-mentoring.” We propose that e-mentoring holds promise for redefining mentoring relationships and changing the conditions under which mentoring is sought and offered. E-mentoring could potentially make mentoring relationships more available to groups that have previously had limited access to mentoring. Benefits of and barriers to e-mentoring are considered, as are strategies for establishing an e-mentoring relationship. E-mentoring resources are reviewed.

KEY WORDS: mentoring; e-mentoring; developmental relationships.

The benefits of mentoring to one’s academic success, career aspirations, and personal development are widely acknowledged. So, too, are some of the components necessary to a rewarding mentoring relationship—one being the ease and frequency of interaction and communication. Technological advances and, in particular, forms of computer mediated communication (CMC) such as e-mail, listservs, chat groups, and computer conferencing offer the potential for enhancing the mentoring process. As yet, however, little thought has been given to how CMC might be incorporated into the mentoring process. The purpose of this article is to explore how various forms of CMC might be employed in the process of mentoring, whether in formal mentoring programs or in more informal individual mentoring relationships.

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What is Mentoring?

“Half-human, half-God; half-male, half-female; believable yet unreachable . . . Wisdom personified; A paradoxical union of both goal and path”—thus reads the description of Mentor, the mythical mentor from Homer’s *Odyssey*, put in charge of Odysseus’ son Telemakhos. The journey motif that overlays modern day mentoring emerged from earliest classical literature. So, too, emerged the image of a mentor as a wise person, guide, and stand-in parent who assists in the protégé’s growth and development.

In recent times popular forms of mentoring have been associated with career, academic, and psycho-social development. The 1970s saw a burst of eye-catching articles on the importance of mentoring to career advancement (Collins & Scott, 1978; Kanter, 1977; Levinson, 1978; Roche, 1979). Mentoring was heralded as necessary to achieving personal and professional success; and mentoring programs were put in place in schools, corporations, and professional associations. Individuals were counseled to “find” a mentor, somewhere, anywhere.

From sorting through the books, articles, guidelines, and research studies over the last twenty years, several generalizations regarding mentoring can be made. First, the definition and functions of mentors vary widely; second, the effectiveness of formal mentoring programs is mixed; third, certain factors can be identified that enhance the potential for a successful mentoring experience.

Definitions and Functions

There is very little agreement in the literature as to what is and what is not mentoring (Jacobi, 1991; Merriam, 1983). Definitions range from a career sponsor to peer counselor to coach to a mentor in the more classical sense of someone who facilitates all aspects of the protégés development. Somewhere in-between a career sponsor and a classical mentor is someone “who oversees the career and development of another person, usually a junior, through teaching, counseling, providing psychological support, protecting, and at times promoting or sponsoring” (Zey, 1984, p. 7). Huang and Lynch (1995) describe the relevance of Taoist teachings to mentoring and define it as a process of shared learning and growth that promotes mutual benefit, interaction and support for both parties. Zey’s definition also points to what mentors actually do—their functions. They provide support and assistance where needed for facilitating the development of the protégé. Typically, they also model

attitudes and behaviors from which protégés can observe and learn. These middle-of-the-road definitions allow us to address how technology could enhance a broad range of mentoring relationships.

Formal mentoring programs can be found in business and industry and in all levels of education, elementary through graduate training. While there are numerous descriptions of these programs in the literature, there are few reports of systematic evaluations of the success of such programs.

Fagenson (1989) surveyed mentored and nonmentored men and women in business about their level of satisfaction, career mobility and opportunity, recognition, security, and promotion rate. She found that mentored individuals reported having greater satisfaction, career mobility and opportunity, recognition, and a higher promotion rate than nonmentored individuals. Protégés' perceptions of their career situations were not affected by their sex or job level.

A recent study of mentoring of women and minorities in computer science (Pfleeger & Mertz, 1995) illustrates the mix of results characteristic of the research as a whole. Fifteen mentor-protégé pairs in three universities and three commercial organizations participated in a day-and-a-half workshop on mentoring and were then followed over 18 months. Only three of the 15 pairs met the researchers' criteria for success; two other pairs were partially successful and two pairs were clearly unsuccessful. The authors conclude that "mentoring is very difficult" and that certain factors at both the organizational and personal levels must be in place for it to be successful (p. 18).

First, it appears that mentoring cannot be forced—like a blind date, merely pairing people up only rarely leads to the kind of relationship desired in a mentoring situation. Personal testimonials of successful mentoring and evaluations of "formal" mentoring programs underscore this point. Mutual respect, trust, and comfort are essential components of this relationship and must be allowed to evolve naturally. Second, both parties must be committed to the relationship, and expectations must be articulated. In formal mentoring programs, organizations involved must also be committed to the value of the program. As Pfleeger and Mertz (1995) note,

Mentoring cannot work as an afterthought. The most successful pairs brought energy to their relationship and made time for it, sanctioned by their home organizations. Even when mentor and protégé did not work in the same division of the organization, organizational and personal commitment overcame what otherwise would have been insurmountable obstacles. (p. 18)

Third, successful mentoring involves frequent and regular interaction. While this would seem to be an obvious component, in fact all sorts of barriers such as time, work responsibilities, geographic distance, and lack of trust often reduce if not halt interaction. In a study of on-line mentoring between students and teachers and subject-matter experts (Harris, O'Bryan & Rotenberg, 1996), for example, differing expectations with regard to turnaround time and frequency of interaction was the major problem in the program's success.

E-mentoring Defined

We have established that there are many definitions and roles of mentors, shown that some evaluations offer tentative evidence that formal mentoring works, and demonstrated that mentoring success has traditionally been assessed with regard to mutual commitment and frequent contact between the mentor and protégé. Less is understood about the dynamics, context, or results of e-mentoring.

Telementoring has been defined as "use of email or computer conferencing systems to support a mentoring relationship when a face-to-face relationship would be impractical" (O'Neill, Wagner, & Gomez, 1996, p. 39). Single and Muller (in press) further describe e-mentoring as a computer-mediated relationship between a senior individual who is the mentor, for a lesser skilled protégé with the goal of developing the protégé in a way that helps him or her succeed. They distinguish structured e-mentoring as occurring in a formalized program environment where training and coaching is made available for mentors and the outcomes are evaluated.

We propose a definition and conceptual framework from which to understand e-mentoring, building on Zey's (1984) definition. We define e-mentoring as *a computer mediated, mutually beneficial relationship between a mentor and a protégé which provides learning, advising, encouraging, promoting, and modeling, that is often boundaryless, egalitarian, and qualitatively different than traditional face-to-face mentoring.*

Only a handful of articles could be found that even suggest the potential of CMC for enhancing the mentoring process, and these do not focus on higher education. Three describe programs electronically linking students and teachers with tutors, experts, and/or data bases (Anonymous, 1995; Harris, O'Bryan & Rotenberg, 1996; O'Neill, Wagner, & Gomez, 1996).

Other than formal program descriptions, Moore (1991) reflected on the "mentoring possibilities" of communicating with his preservice

elementary education students through electronic mail. MacArthur and others (1995) report on a mentoring program in which experienced computer-using teachers mentored other teachers to use computers effectively in instruction. However, the actual mentoring was done in person, not on-line. Stell (1999) suggests that e-mentoring can be useful in establishing relationships between lawyers and paralegals. Interestingly, an entire issue of *Educational Horizons* (1995) devoted to mentoring fails to mention the potential of electronic mentoring, as does a *New Directions for Adult and Continuing Education* volume titled, *Mentoring: New Strategies and Challenges* (Galbraith & Cohen, 1995).

Three dissertations looked at various aspects of mentoring through electronic means. Folsom (1995) investigated the instructional effectiveness of embedding mentoring tactics in a module of computer-based instruction. Four treatment groups varied on the level of embedded mentoring tactics. He found that the tactics “perform[ed] an important role in student time on task” but did not have a significant impact on student achievement (abstract).

In a straightforward study of the effects of mentoring students via electronic mail on their achievement and attitudes in a graduate course in research, Hubschman (1996) found no significant differences between mentored and nonmentored students. However, “introverts” in the mentored group had higher achievement scores than introverts in the neutral group; they also “responded more often than extraverts in both groups” (abstract) suggesting the mentoring had some impact with introverts.

Finally, Shumard (1995) conducted a qualitative study of student teachers teaching their cooperating teachers how to telecommunicate via the internet. She found that mentoring and coaching were viable options for the diffusion of innovations and that the learning occurring between pairs of teachers was reciprocal.

Overall the literature thus far on electronic mentoring reflects only the most tentative forays into this potentially rich medium. Further, as is true of nearly all other work on mentoring, there is a wide range of behaviors and activities being labeled “mentoring.” Much still needs to be done in identifying those aspects of the electronic medium that limit as well as foster a genuine mentoring relationship.

E-mentoring in Context

E-mentoring is becoming available in a number of arenas, with educational institutions leading the way in the use of e-mentoring programs in both K-12 and higher education settings. E-mentoring crosses

boundaries of race, class and gender by targeting marginalized groups in society such as minorities, low income students, and young girls and women. This section describes e-mentoring programs in several contexts.

K-12 Programs

A plethora of e-mentoring programs target K-12 students. Bennett (1997) cites several examples ranging from lessons about animal behavior from primate ethnologists to discussions about race relations and civil rights with an anthropologist, to correspondence between high school girls in a computer science with a female NASA engineer. MOOSE Crossing (<http://www.cc.gatech.edu/elc/moose-crossing/>) is a text-based virtual reality environment designed to be a constructionist learning environment for children ages 8 to 13. Participants learn computer programming and improve reading skills in a self-directed, peer supported environment (Bruckman, 1998).

Teacher Support and Development

“MightyMedia” (<http://www.mightymedia.com/mentors/>), is a free, public service that enables teachers to mentor each other via email. This service pairs mentors for short or long-term relationships on issues of improving teaching techniques and troubleshooting classroom problems.

University-Sponsored Programs

Northwestern University’s “Co-Vis Telementoring” project paired scientists with students to engage in on-line inquiry-oriented science projects. The work of the CoVis Project was completed in 1998. The research is, however, continuing under the auspices of the Center for Learning Technologies in Urban Schools and a number of other research projects in the Learning Sciences Program at Northwestern. CoVis web site (<http://www.covis.nwu.edu/>) now serves as an archive for the project’s materials.

Additional e-mentoring programs at Northwestern include the “Telementoring: Making Connections Program,” which connects graduate students with professional school librarians. The “Preparing the Future Faculty” program contains information on how fifteen universities

match doctoral students with faculty members to develop the formers' careers in academia. The "CONNECTIONS E-MENTOR Program" at Northeastern University supports mentoring clubs between Girl Scout members, undergraduate students, and working engineers who are organized into Internet e-mentor clubs. This mentoring experience links participants to different age groups and works somewhat like a mentoring pyramid. Another university sponsored e-mentoring program is the University of Texas' "Electronic Emissary" project (<http://www.tapr.org/emissary/>). This program offers a broad range of subject matter experts to assist teams of teachers and students in schools.

Mentoring Centers and Corporate-Sponsored Programs

The "National School Network Telementoring & Mentor Center" (http://nsn.bbn.com/telementor_wrkshp/tmlink.html) is a community of innovators, working in over 400 organizations. Initially designed to have community members serve as mentors in an ongoing relationship with students to improve writing, the "MentorCenter" has evolved to provide additional resources of text, graphics, and sound available through the web.

The "Hewlett Packard E-mail Mentor Program" (<http://www.telementor.org/hp/index.html>) has over 1500 HP employees who are matched to mentor students from all over the world, both at risk and gifted (Goldman, 1997). The "AT&T Learning Network" (<http://www.att.com/learningnetwork/>) provides email responses from expert mentors to questions about integrating technology in the classroom.

Programs for Girls and Women

Many of the e-mentoring programs for girls and women exist to support their work in K-12 and higher education. A national program called "MentorNet" (<http://www.mentornet.net/index.html>) helps female students majoring in science, engineering, and mathematics gain mentoring through e-mail (Haworth, 1999). Brown University's (RI) Women in Science and Engineering—WiSE (<http://www.brown.edu/Student.Services/WiSE/index.html>) addresses issues faced by women who study sciences. The mentoring program links freshman and sophomore women who are exploring science careers with junior and senior women who have selected science majors. Reported insights shared by mentors include accomplishments and mistakes, course curriculum and

planning, study techniques, professors, opportunities for summer research, graduate school, and the life of a pre-med student.

Several e-mentoring programs exist to support professional women. The “Systers” (<http://www.systers.org/>) network for female computer scientists developed due to a lack of mentors available for women scientists. Girl Geeks Mentor Match (<http://www.girlgeeks.com/databaswe/mentormatch/>) provides menus and a database for selecting mentors. *iVillage.com* website for women, has a mentoring center, advice for mentors and protégés and a “mentoring classifieds” section (<http://www.ivillage.com/workingdiva/mentoring/mentor/articles/0,,55500,00.html>). The Office of Women’s Business Ownership (<http://www.onlinewbc.org/>) provides a network of training, counseling and mentoring services to help women start and/or expand businesses. *Women.com* (<http://www.women.com/>) has resources for career oriented parents.

E-mentoring to Benefit Marginalized Populations

The “Electronic Mentoring, Teaching, and Information Resource Network” (<http://www.aad.berkeley.edu/emtirn/emtirn.html>) project at Berkeley links faraway tutors via computer making electronic “field trips” possible. This program is designed for California students and teachers, with particular focus on minority, disabled, and urban and rural disadvantaged students in grades K-12, community colleges, and universities. The project includes outreach services, transition assistance, peer advising, counseling and academic advising, computer skills enhancement, faculty mentorships, research experience, and graduate preparation. University of Washington’s DO-It program (<http://www.washington.edu/doit/>) focuses on Disabilities, Opportunities, Interworking, & Technology. The program caters to people with disabilities to support their successful pursuit of academics and careers. DO-IT’s programs promote the use of technology to maximize the independence, productivity and participation of people with disabilities. Programs are offered as professional development for K-12 educators and post-secondary faculty and administrators.

The Nature of E-mentoring

“In this age of the Internet, innovative educators are combining the concept of mentoring with the reach and convenience of new telecommunications technology” (Goldman, 1997, p. 1). Telementoring, virtual

mentoring, or e-mentoring are terms used to describe computer mediated mentoring relationships. Goldman (1997) observes that

Mentors who may not have time for face to face meetings find telecommunications affords them the opportunity to still participate and share their expertise with young people . . . Telementoring is recognized as an important vehicle for exposing students to real world experience and as a support for school-to-work programs. (p. 2)

E-mentoring is not necessarily based on a wise elder dispensing advice and instruction to a protégé. Rather it is a mutually beneficial relationship that is highly versatile and can be adapted to work in a variety of settings. Bruckman views electronic mediated environments as, “not only a conduit for information, but as a context for learning through community-supported collaborative construction” (1998, p. 49). E-mentoring may happen between peers, one-on-one, one mentor may work with a team, or students may even provide mentoring to their mentors. Mentors may be professionals, business people, retirees, or parents (Goldman, 1997, p. 2). E-mentoring need not be bound by local or national culture, a factor that be both beneficial and detrimental.

The virtual medium provides a context and exchange that may not be possible to replicate in face-to-face mentoring relationships. The nature of the e-mentoring relationship may be qualitatively different when mediated through a computer. While information is certainly exchanged in e-mentoring, there is a level of support, counseling, and advisement that is absent from merely posting a request for help to a listserv or sending an email request. The mentor is sharing information in the context of helping the protégé learn and grow, and the relationship between the mentor and protégé sets e-mentoring apart from mere knowledge exchange and acquisition. E-mentoring assumes that a relationship exists between the mentor and protégé and that there is a mutual benefit for participating in the relationship.

We have defined e-mentoring as a computer mediated, mutually beneficial relationship between a mentor and a protégé which provides learning, advising, encouraging, promoting, and modeling that is often boundaryless, egalitarian, and qualitatively different than traditional face-to-face mentoring. This definition has two elements that distinguish e-mentoring from traditional mentoring: the boundaryless configuration of e-mentoring and the egalitarian quality of the exchange.

Boundaryless Configuration

E-mentoring is distinctive because it challenges the conventional wisdom that mentoring must be based on a personal, face-to-face

relationship. It opens the possibility for relationships that cross boundaries of time, geography, and culture unlikely to happen under the classical model. E-mentoring allows new definitions of mentoring. The World of Telementoring site advocates the construction of personalized definitions of telementoring that are applicable in individualized contexts (<http://www.tapr.org/~ird/Wadbrook/telementoring/WebQuest.htm>). There are many resources on the web to support mentoring such as the Mentors Peer Resources: A Guide to Mentor Program Listings site (<http://www.peer.ca/mentorprograms.html>), and the National Mentoring Center (<http://www.nwrel.org/mentoring/otherres.html>)

E-mentoring programs promote both formal and informal online exchanges between students of all ages and working professionals when a face-to-face relationship would be impractical (1996, O'Neill, Wagner & Gomez). It has low barriers to entry, requiring Internet access, an email account, and minimal investments of time (Goldman, 1997). It is highly time efficient and can be engaged in at the convenience of both the mentor and protégé. Further, large amounts of information can be exchanged between the mentor and protégé in a short time span.

Egalitarian Quality of the Exchange

E-mentoring has the potential to cross barriers of race, gender, geography, age, and hierarchy that are rarely crossed in traditional mentoring relationships. By offering a “safe” context for establishing relationships between diverse parties, e-mentoring holds the potential to erode some of the traditional power dynamics that tend to structure mentoring relationships. E-mentoring, for example, might encourage women and persons of color to explore non-traditional occupations by providing access to role models and advocates. E-mentoring programs can help women to break into fields traditionally dominated by men, such as math and science. “Because [non-traditional] fields have grown up with a male-oriented culture, there are often unspoken or subtle expectations for behavior and ways to get things done that are less accessible for women. A mentor can provide that kind of information” (Muller in Haworth, 1998, p. 12). Sproull and Kiesler (1993) have suggested that markers of social status are less visible in electronic communication, thus rendering them less important to the overall exchange.

Historically, women and minority groups have had fewer opportunities for mentoring because they were viewed as high risk protégés (Hansman, 1998; Murrell, Crosby, and Ely, 1999). While technology can be viewed as an impersonal approach, the medium promotes easier

access and perhaps more candid communication than would occur face-to-face. The cultural baggage and stereotypes that accompany race, gender and social class become invisible in a virtual forum, freeing the mentoring to become the focus. According to Hite (1998), white males in positions of power faced political damage if the “different” protégé failed; they have also been and were more susceptible to charges of sexual harassment. Thus, their mentoring was invested in low risk protégés who were assured of success (i.e., white males). The virtual realm increases the safety of mentoring such groups.

Challenges of E-mentoring

Although e-mentoring can be relationship driven, boundaryless and egalitarian, cultivating a successful relationship poses challenges. Participation in this realm requires access to computer technology and computer literacy. Public access is becoming more available, for instance through libraries, but owning and maintaining a computer can still be prohibitive for some. Finding the right mentor and developing a relationship may be problematic for the individuals who are fortunate enough to possess the electronic resources. Virtual intimacy may be difficult to obtain, particularly if the parties have never met in person. Making virtual matches may also require several tries. Developing the levels of trust and confidence to sustain the relationship take time, familiarity, and work. Finally, miscommunication can occur on a number of levels in e-mentoring, especially if the parties have only a virtual relationship with a frail commitment. E-mentoring may not be a timely process if one or both parties is not conscientious about making quick responses to requests for information or advice. These relationships may also be characterized by less commitment based on the ease with which one can initialize or end, strike up or out, virtual relationships.

Establishing an E-mentoring Relationship

There are several steps involved in initiating and sustaining effective relationships. First, e-mentoring involves having the proper equipment—a computer that has a modem with access to the Internet, Electronic Mail and the World Wide Web. One must also be familiar with additional resources such as Newsgroups and List servers.

There are several ways to begin the relationship. It may be based on prior face-to-face contact, but this is not mandatory. Protégés tend to

seek mentors based on useful subject matter expertise or skills. Virtual strategies for seeking mentors include contacting the potential mentor via electronic mail, joining a listserv and posing questions or asking for advice, searching on the World Wide Web for resources and contacts, tapping professional associations, or submitting postings to special listservs (See the e-Sources reference list at the end of this article).

Once the mentor and protégé are identified, the relationship is formalized through the sharing of expectations. A formalized relationship means that the parties establish regular times to communicate. Frequent exchanges are recommended because they help maintain the continuity and flow of the mentoring conversation. Long periods of absence online often lead to disinterest or misunderstandings and should be avoided. Many formal e-mentoring programs expect communication at least twice weekly to establish the relationship. In addition to electronic messages, utilizing a mixture of communication mediums such as faxes, telephone calls and even snail mail is recommended. Of course, it is important to meet face-to-face if possible. This can only serve to strengthen a relationship that is working on a virtual level.

Fostering familiarity was determined as another key determinant of success in several of the formal mentoring projects. Students rated as most successful those relationships in which mentors were comfortable sharing their personal lives and expertise online. For example, the Electronic Emissary (<http://www.tapr.org/emissary/>) project asks mentors to share personal histories and experiences to initiate conversation. Other programs require mentors and students to prepare personal biographies and write about their academic, professional, and personal interests as a means of introduction. Both the mentor and protégé should decide how to evaluate the e-mentoring process. This could be as simple as periodic process checks between the parties to assess how the relationship is working and consider ways for improving it.

Some e-mentoring programs have formal facilitation. This is based on the experience that some degree of online facilitation and support for mentors is necessary. In content-specific mentoring projects such as Electronic Emissary, a team of students and a teacher are linked to a mentor to work on projects. Online facilitators serve as coaches who follow up with mentors, students, and teachers; monitor progress; and keep conversation going.

Finally, it is important to end the mentoring relationship on a positive note. Several projects have instituted summarizing activities that help add closure to the relationship. This might amount to a written

Table I
Strategies for E-mentoring Relationships

Strategies for mentors	Strategies for protégés
Understand the person's hopes and fears.	Know your goals for the relationship.
Share background information.	Share background information.
Work to develop familiarity.	Seek a mentor you can trust.
Be honest and open.	Work to develop familiarity.
Get a mentor yourself.	Be prepared to work and act on your mentor's advice (or explain why you aren't).
Help protégés understand and agree with your style of intervention.	Take the lead in the relationship.
Expect to learn and benefit from the relationship just like the protégé.	Initiate frequent contact.
Work at building trust and at feeling it yourself in the relationship.	Ask your mentor for help with things you are struggling with and cannot find the answer easily.
Recognize that mentoring is a process that has the potential to change both of you.	Seek feedback from the mentor about how the relationship is working.
Initiate frequent contact.	
Seek feedback from the protégé about how she or he thinks the relationship is working.	

assessment of the online relationship or a more elaborate project report that is shared online. Table I offers strategies for both mentor and protégé for enhancing the success of the relationship.

E-mentoring: The Future

The possibilities for e-mentoring are as endless as the Internet. The extent to which this medium will be used for mentoring is unknown as are the best ways to maximize the nature of this medium for this purpose. There are other questions raised by this model of mentoring. What steps result in effective e-mentoring relationships? What can we learn from current e-mentoring relationships? How effective is e-mentoring compared to traditional mentoring? What are the ethical considerations of e-mentoring? What are the benefits? Who will benefit? What is the nature of learning in an e-mentoring situation? How will e-mentoring matches be determined? What training is necessary? What is the focus of e-mentoring? What are the mutual benefits? How can the relationships be sustained over time?

E-mentoring offers a contemporary method of facilitating learning and mentoring in this technological age. Traditional models of learning,

organizing, and teaching are being challenged in an age of rapid change and scientific advancements. Increasingly, the world is becoming more global economically, politically, and socially. Technology is facilitating this shift by promoting mentoring across boundaries that can be social, economic, cultural, or physical. E-mentoring also assists in linking diverse parties together in the spirit of learning, a core strength in this shrinking, global economy. The path is wide open for applying technology for human development. Mentoring electronically is a primary area for exploring these important questions of learning and development.

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