

Electronic Mentoring Programs: a Model to Guide Best Practice and Research

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Caption

Application of a model of structured mentoring to electronic mentoring (e-mentoring) programs, to identify practice and research issues, and to promote the use of a theoretical framework to guide e-mentoring programs.

Abstract

Electronic mentoring (e-mentoring) programs are providing unprecedented opportunities for establishing mentoring relationships. E-mentoring is the merger of mentoring with electronic communications and links mentors with proteges independent of geography or scheduling constraints. Unique qualities of electronic communications, such as the attenuation of status differences and the ease of thoughtful responses, make it especially promising as a medium for developing mentoring relationships.

In this paper, we apply a Model of Structured Mentoring to the e-mentoring format, to begin the development of best practices, to identify research issues, and to promote the use of a theoretical framework to guide the advancement of e-mentoring programs.

Electronic Mentoring Programs: a Model to Guide Practice and Research

Electronic mentoring (e-mentoring) is creating a revolution in mentoring that will continue to expand through the 21st century. By leveraging the growth in information technology, e-mentoring provides opportunities for mentoring prohibited by face-to-face mentoring programs (Muller, 1997). E-mentoring enables mentors and proteges otherwise constrained by time and geography to participate because e-mentoring programs connect participants through electronic communications, primarily email supplemented by web sites and electronic discussion lists. The reliance on electronic communication facilitates the development of mentoring relationships, since electronic communications allow for the attenuation of status differences and the ease of thoughtful sharing. Also, e-mentoring programs provide

unprecedented scalability; a core mentoring staff can service many more participants than feasible in face-to-face mentoring settings. Yet, the ease with which e-mentoring programs can be developed may belie the planning, administration, and resources required to make them successful (Education Development Center, 1998). Because of the physical distance between program coordinators and participants, the temptation is great to match mentors with proteges but then provide little in the way of the coaching, training, and follow-up required to obtain a high rate of successful e-mentoring relationships.

In this paper, we define e-mentoring and structured e-mentoring programs, identify their promise and highlight some potential pitfalls. Then, relying on our experience conducting a large-scale e-mentoring program, our past research and that of others in face-to-face and e-mentoring settings, along with research into the creation of virtual communities, we suggest a model for conducting structured mentoring programs and apply this model to the e-mentoring format. Our hope is that practitioners involved in conducting e-mentoring programs benefit from our insights so that these programs will deliver the expected benefits. We realize, however, that too often important support programs such as mentoring programs, operate with fewer resources than required. Under these circumstances, our desire is that the recommendations of this paper will not prove burdensome but may help facilitate the most effective utilization of the available resources.

In the process of applying this model to the e-mentoring format, we also identify open research questions pertaining to e-mentoring. We encourage applied researchers to address the research issues we identify, thereby increasing our understanding of and ability to implement successful e-mentoring programs. In addition, we hope to promote the use of a theoretical framework to guide the advancement of e-mentoring and e-mentoring programs.

Definition of E-mentoring and Structured E-mentoring

E-mentoring is the merger of mentoring with electronic communications and has also been termed telementoring, cybermentoring, or virtual mentoring. *E-mentoring* is a relationship that is established between a more senior individual (mentor) and a lesser skilled or experienced individual (protégé), primarily using electronic communications, and is intended to develop and grow the skills, knowledge, confidence, and cultural understanding of the protégé to help him or her succeed. *Structured e-mentoring* is e-mentoring that occurs within a formalized program environment, provides training, coaching, and structure to increase the likelihood of engagement in the e-mentoring process and relies on program evaluation to determine the impact on the participants (both proteges and mentors) and to identify improvements for future programs.

Structured e-mentoring programs vary in their program formats and target populations. Within a higher education context, examples of e-mentoring programs include pairing students with industry professionals for pre-professional support and encouragement or pairing new faculty with more experienced faculty in their fields at other universities.

Advantages of E-mentoring

E-mentoring is made possible by the increased availability of electronic communications on college campuses (Guernsey, 1997), in the workplace, in homes, schools and libraries. Electronic communications provide a flexible communication environment independent of time and space, and allows for asynchronous exchanges, thus making them an ideal medium for mentoring (Steinberg, 1992). Since failure to meet based on time and space constraints has doomed more mentoring relationships than any other factor (Noe, 1988) the asynchronous nature of e-mentoring alleviates this obstacle to the development of mentoring relationships. The flexible communication environment allows those located outside of the college campus to mentor students. Alumni/ae and professionals who do not have the time to meet a student face-to-face for a brief mentoring meeting can readily provide advice, suggestions, and support to students while sitting at their desks, workstations, or while at home. Therefore, e-mentoring extends mentoring opportunities to many more students and allows mentors to participate who otherwise would find the time investment prohibitive (Muller, 1997).

E-mentoring also profits from the unique communication qualities associated with electronic communications. Electronic communications possess qualities that foster the development of open, supportive relationships. Electronic communications result in the attenuation of status differences by concealing social cues that otherwise hinder communication between higher status and lower status individuals (Sproull and Kiesler, 1992). In addition, communicating while using email allows for the construction of thoughtfully written messages without the pressure of immediately responding, as in communicating orally.

Electronic communications have already changed the composition of communications on campus, increasing connections among faculty, students, and support staff (Bump, 1990; Kinkead, 1987) Sirc & Reynolds, 1990). In networked academic environments, students have more interactions with faculty (Hartman et al., 1991) and with each other (Althaus, 1997). Students who participate in on-line group discussions report greater cohesiveness within a learning group (Windschitl & Lesehm-Ackerman, 1997) learn more, and achieve higher grades than students taking part in face-to-face discussion groups (Althaus, 1997). Students who otherwise would not initiate contact with a faculty or staff member, feel more free to do so within networked environments (Harman et al., 1991; Kinkead, 1987). These attributes of electronic communications usage may indicate that it is a promising medium for promptly developing open and supportive mentoring relationships.

In addition, mentoring programs prove particularly useful for providing mentoring and socialization experiences for underrepresented minorities, who otherwise may not have such opportunities (Boice, 1993; Corcoran & Clark, 1984; Turner & Thompson, 1993). The same holds for e-mentoring (for a discussion relating to women in science and engineering, see Single & Muller, 1999).

E-mentoring holds much promise for higher education. Amidst this promise, we offer a note of caution. Early in its establishment, and too often today, the face-to-face mentoring movement met with disappointing results. Mentoring programs were initiated with good intentions but without adequate planning and resources (Freedman, 1992). Mentoring programs failed as they matched mentors with proteges but provided little in the way of training, coaching, or follow-up. Without high levels of program structure, proteges caught up in urgency failed to follow through on commitments (Boice, 1990; Diehl & Simpson, 1989); mentors never invested the time or energy to provide worthwhile support and encouragement to proteges (Dickey, 1997). These mentoring programs too often fell short of the program goals and the expected benefits of mentoring. Formalized mentoring programs were rated less successful and less beneficial than the naturally occurring mentoring relationships some fortunate newcomers found (Chao, Walz, & Gardner, 1992).

Practitioners and researchers quickly realized that training, coaching, and follow-up are required to extend the benefits of mentoring to a broader population of newcomers. As such, developing and sustaining a successful mentoring project is labor-intensive, requiring a program coordinator to provide training and ongoing communications with participants, to ensure involvement and the meeting of program goals (Wunsch, 1994). Proper program structure and personnel improve participant involvement and increase the benefits associated with mentoring programs (Murray, 1991). Based on these findings, structured face-to-face mentoring programs have proven successful on college campuses. Structured mentoring programs have aided new faculty teachers and graduate teaching assistants to improve their teaching abilities (Boyle & Boice, 1998b) and have increased the retention rates of minority undergraduate students (Campbell & Campbell, 1997). Other programs have supported new faculty, particularly women and faculty of color, as they adjust to the demands of the professoriate (Boice, 1990; Diehl & Simpson, 1989) and have lowered the attrition rates of women science and engineering students (Muller, 1991; 1993).

Some qualities of electronic communications make it even more important to provide program structure for e-mentoring programs than for face-to-face mentoring programs. The tendency to match e-mentoring pairs without the necessary structure and follow-up will be as, if not more, tempting compared with traditional mentoring programs. Contact among program staff

and participants is typically minimal, making it easy to overlook the necessity of creating a structured format to sustain regular interactions between e-mentors and proteges throughout the program duration. Therefore, the provision of mentor training and pair coaching is even more crucial within an e-mentoring format than within a face-to-face mentoring format, requiring a program coordinator to support the development of the e-mentoring pairs (Bennett, 1997).

By introducing a model of mentoring programs, then applying this theoretical framework to the e-mentoring process, we hope to spare e-mentoring some of the early failures experienced by the mentoring community. Our hope is that this exercise will assist in the planning and implementation of future e-mentoring programs, will prompt and guide future research on e-mentoring, and will stimulate the reliance on a theoretical framework to advance the development of e-mentoring and e-mentoring programs. When appropriate to illuminate concepts, we use examples from MentorNet, a nation-wide structured e-mentoring program that pairs women in the engineering and related science fields with industry professionals and supports them through year-long e-mentoring relationships.

A Model of Structured Mentoring

We developed a model of structured mentoring by identifying and incorporating the essential elements of successful mentoring programs. This simple, iterative model, developed out of our experience conducting and researching the mentoring process, was informed by knowledge of the mentoring literature, and evolved from an earlier model (Boyle & Boice, 1998b). Although developed within a higher education context, the model incorporates the fundamental elements for conducting a mentoring program, therefore can be adapted to a variety of mentoring program settings.

The theoretical framework, as can be seen in Figure 1, begins with Planning, moves to Structured Implementation, and ends with Assessment, directing a mentoring program from inception, through implementation, and finishing with program evaluation. The elements of the model are connected by three curved lines, which combine to form a circle and indicate the iterative nature of the model. The curved lines signify that sustainability should be a goal of any mentoring program. The curved lines also signify that the implementation of one year's program may require multiple iterations through the model. For instance, while in the planning phase, assessment issues need to be considered, especially if pre-test measures will be administered.

Planning

The planning phase spans from the time program coordinators identify the program population and goals through the introduction of the e-mentoring pairs. Planning lays the foundation that

will aid in the success of the individual e-mentoring pairs, and thus, the e-mentoring program as a whole. The primary goal of the planning phase is to ensure that the participants and the e-mentoring pairs are aligned with the program goals and objectives. Thus, the development of clearly articulated goals and anticipated outcomes of the program is a prerequisite of the planning phase. The planning phase addresses issues pertaining to recruiting, managing expectations, and the matching process, as shown in Figure 2.

Recruitment

Recruitment is the process by which potential mentors and proteges are notified of the e-mentoring opportunity. Adequate planning strengthens recruitment by addressing when to recruit, how to recruit, and potential obstacles to recruiting the target mentor and protégé populations.

When focusing on a higher education population, the academic year is the most logical duration for the mentoring relationships, therefore, recruitment occurs late in the summer or early in the fall. Recruiting early, before students and faculty are caught up in the daily activities of schoolwork, ensures much greater involvement in the mentoring process when compared with recruiting later in the year (Boice, 1992).

The recruitment process notifies potential participants of the opportunity, and directs them to visit the program web site. Since different information may be requested from the mentor and the protégé pools, two on-line applications forms are posted. The program goals and target populations guide the types of information requested on the application forms. Along with application data, it is very desirable to request phone numbers from the participants, to provide an alternative method for contacting the participants when technology problems occur. The application data is automatically converted to a database, alleviating the need for time consuming and error-prone data entry. The information gathered from the prospective mentors and proteges aids in the matching process, and is used to assess the program.

Since e-mentoring relies on email, the recruitment process also uses electronic communications. Therefore, recruiting within a single organization that has a centralized communication infrastructure is straightforward. To recruit mentors, a "Call for Mentors" email message is written and posted to an electronic distribution list, which would reach the target mentor population. While using electronic communications to recruit makes easy work of this stage, we do not suggest wholly relying on this medium. Strategically placed posters aid in the recruitment process, as do flyers and notices in newsletters. In addition, department chairpersons and professors serve as recruiters. Depending on the target mentor population, presentations at appropriate meetings on campus are also beneficial for recruiting. While recruiting face-to-face, keep in mind that if potential mentors are not regularly on-line, they

may not be good candidates for participation in e-mentoring programs. Likewise, a "Call for Proteges" email message can be crafted and sent out along the appropriate electronic distribution lists. As with recruiting mentors, various recruitment techniques are used whether the proteges will be undergraduate students, graduate students, or new faculty.

More often than not, the increased opportunities and connections made possible by e-mentoring allow mentors and proteges from multiple organisations and geographical locations to get involved. New issues arise as program coordinators recruit proteges and mentors several multiple universities and organisations, adding an additional layer of complexity to the recruitment process. When various organizations are involved, it is unlikely that the program coordinator will have access to the communication infrastructure at all organizations. Therefore the program coordinator will have to identify key organizations to target for recruiting purposes, then find program representatives who will be willing to recruit within their organizations. The program representatives need to have access to the organizations' communication infrastructure and understand the organizational cultures, which will influence the recruiting techniques.

When recruiting will occur at multiple organizations, the program coordinator creates recruiting materials, such as "Call for Mentors" email messages, "Call for Proteges" email messages, and posters, and makes them available on the program web site. In this way, the program coordinator supports the program representatives and ensures greater uniformity in communications, thereby increasing the likelihood that recruiting messages are synchronized with the overall goals of the e-mentoring program.

Managing expectations

Managing expectations includes communicating the program goals, eligibility criteria, and frequency of expected contact to the target mentor and protégé populations. Why is managing expectations so important? When participant expectations are aligned with program goals, face-to-face mentoring relationships meet more regularly and are rated as more successful (Boyle & Boice, 1998b), we suspect the same would hold true for e-mentoring relationships.

As part of managing expectations, program coordinators need to clearly delineate the program requirements. At minimum, all participants are required to have regular access to email and must be willing to participate for the duration of the program. In addition, the participants are informed about the frequency and types of email correspondence they will be receiving from the program staff.

To ensure that prospective mentors and proteges read and agree to the expectations, a Participant Guideline can be posted on the program web site. When the participants agree to the guidelines by clicking on an appropriate link, then they will be granted access to the web-based application.

Matching process

The matching process will vary widely depending on the mentoring program format, target population, and goals. Since the match is the foundation of the e-mentoring relationship, careful consideration is given to the method by which e-mentors are paired with proteges. The matching process is even more important in e-mentoring settings than in face-to-face mentoring settings. Why? In face-to-face mentoring settings, the participants usually share membership in an organization; therefore they already share a common setting and culture. In fact, a large part of the face-to-face mentoring relationship can be developed around helping the protégé understand the culture of a new organization. In contrast, e-mentoring occurs between mentors and proteges who share little, if any, organizational membership or inherently shared characteristics. Therefore, it is all the more important to match carefully the e-mentoring pairs, since helping participants find common ground as soon as possible is important to getting the relationship off to a successful start.

There are various methods for matching pairs of mentors and proteges. An important feature of the matching process is to let mentors and proteges know the process by which they will be matched. There are three different methods for matching e-mentoring pairs. The first method, called Participant Choice, posts biographical descriptions of mentors on a web site, then interested proteges can review the information associated with the mentors. This method poses confidentiality problems, so we suggest that programs do not place identifying and contact information on the web site. Rather, to launch an e-mentoring pair, the interested party contacts the program coordinator, who forwards a message to the mentor whose biography was posed. This method works when those available for listing on the web site are plentiful, and when one group will be recruited before the other group. Albeit, this method has significant drawbacks; Participant Choice allows proteges to choose inappropriate mentors or several proteges may choose the same mentor.

A second method is Uni-directional Matching. In this instance and as part of the application process, either proteges or mentors identify preferences for e-mentoring partners. Typically the proteges identify preferences. These preferences are based on the mentor's professional characteristics (i.e., position or field), personal characteristics (i.e., ethnicity or gender), or professional needs of the protégé (i.e. support in pursuing a major or pre-professional career tips). In this uni-dimensional preference based matching protocol, the program coordinator matches proteges' preferences with mentors' characteristics and interests.

A final method is Bi-directional Matching. Rather than only matching the interests and preferences of one of the two partners with the characteristics of the other, this method takes into account the interests and preferences of *both* the mentors and the proteges. This method increases the difficulty of the matching protocol. With a small number of mentoring pairs, hand-matching is feasible, and possibly most efficient. To perform a bi-directional preference based matching protocol for a large-sized e-mentoring program, however, we suggest development of an automated matching system. To develop the automated matching system, program staff must develop an algorithm for maximizing the quality and quantity of the matches. The algorithm will be influenced by the program goals. For instance, for the MentorNet program, pre-professional development for students is a central goal of the program. Therefore, matching proteges and e-mentors means weighting heavily similar fields of interest, such as civil engineering, chemistry or statistics. While this method is computationally intensive, it also provides a good exercise in making explicit the factors most important to the match and ultimately to the e-mentoring relationships. Even if the initial matches are done using a computer program, program staff review the matches before exchanging contact information between the mentors and the proteges.

Regardless of the matching protocol, we suggest allowing the mentors and the proteges to review, and accept or reject, their e-mentoring partnerships. This step allows the prospective e-mentoring pairs to feel ownership over, thus facilitating the establishment of, the e-mentoring relationship. In addition, it serves to weed out those who originally signed up for the program but who are not able to follow through based on lack of interest, technological difficulties (i.e., email related problems), and schedule changes.

Research questions

Since e-mentoring is in its infancy, many research questions remain to be answered. As e-mentoring increases, there will be increased demand for effective e-mentors. It will be helpful to examine what motivates mentors to volunteer for such programs (Single, Jaffe, & Schwartz, 1999) so we can develop materials aimed at recruiting effective mentors. Research questions pertaining to planning also address best practices for matching e-mentoring pairs. For instance, which matching variables are most strongly related to successful outcomes? Is the importance of matching variables based on both the e-mentor and protégé populations, or only the protégé population? In addition, which matching method is most effective, the Participant Choice, the Uni-directional or the Bi-directional match? Does this vary by the program populations? Finally, how do matching methods and closeness of match influence mentoring outcomes, such as involvement in the program and the benefits gained by both the mentors and the students? Addressing these research questions will allow us to recruit and pair e-mentoring participants most effectively.

Structured Implementation

Structured implementation distinguishes *structured* mentoring programs. The tasks associated with structured implementation are perhaps the most important, and overlooked, elements of a mentoring program. Structured implementation includes the training, coaching, and community building tasks that helps participants make the most of the e-mentoring experience (see Figure 3). The content of the training, coaching, and community building elements will be driven by the program goals and target populations.

Training

Training occurs at the beginning of the mentoring program and typically focuses on mentor training, although can include protégé training. For e-mentoring programs, training focuses on introducing issues relevant to the target population and general mentoring issues, such as enculturation (Boyle & Boice, 1998a). One goal of the training is to equip the e-mentors to be flexible about their expectations for the proteges, and to learn how to assess and respond to the needs of, rather than imposing personal expectations on, the proteges (Single, Muller, & Inoue, 1999). The training also provides suggestions for initiating and developing *on-line* mentoring relationships.

One form of electronically supported training is moderated discussion groups, likely to work best with smaller-sized e-mentoring programs. In this type of training, pioneered by the Education Development Center (1997), a group of e-mentors (or proteges) are invited to subscribe to an electronic discussion group. Once everyone is subscribed, a moderator posts a case study and solicits responses from those on the list. The moderator periodically adds summary comments and questions that encourage additional discussion. After a designated time, the moderator posts another case study and continues facilitating the on-line training groups from a minimum of two weeks up through several weeks. The drawback of this training method is that for the duration of the training, and depending on the list size, the e-mentors receive a large amount of email. A benefit of this type of training is that the e-mentors (or again, the proteges) see the actual responses of others in the same situations, build a sense of community within the group, and experience greater involvement with the e-mentoring program as a whole.

One method for giving the trainees more control over the training experience is to develop a web-based threaded discussion list, where the participants visit a web page to access the discussion. An advantage is that the discussion is sorted by topics, so the trainees can read and respond to the topics that they find relevant. A second advantage is that the trainees do not receive a large influx of email to their personal accounts. A drawback is that trainees expend additional effort to access the web-based threaded discussion lists and so may not

attend to the training messages as often as they would if the messages were sent directly to their personal email accounts.

Another form of electronically supported training is a web-based training tutorial. This type of training is much more intensive to set up, yet is more scalable and recommended for large e-mentoring programs. Much like the tutorials developed for introducing users to new software, this is an interactive tutorial. Web-based training tutorials allow multiple mentoring participants to access the tutorials simultaneously and at their convenience. Such a tutorial introduces prospective e-mentors to an appropriate case study for the protégé population, then allows the e-mentors to provide a hypothetical response. Next, the e-mentors are guided through sample responses. These sample responses are annotated to highlight the benefits or deficiencies of various responses. A similar tutorial is developed for proteges. The program staff decides whether completing this tutorial is a pre-requisite for being matched in an e-mentoring relationship.

Coaching

Coaching is different from training. While training occurs at the onset of a program, coaching occurs throughout the program. Coaching, in a networked environment, is delivered via email messages containing discussion suggestions or mentoring tips that are appropriate for the program goals and population. The coaching messages are short email messages and are sent weekly or every other week. Separate messages are tailored for and sent to the mentor and protégé populations. The frequency of the coaching messages is dependent on the program goals and target populations, and is a ripe issue for research and evaluation. Having electronic distribution lists set up by e-mentors, proteges, and any other appropriate sub-categories (such as lower division undergraduate students, e-mentors of lower division undergraduate students, etc.), make the process of sending out coaching messages relatively straightforward. The coaching messages conclude by soliciting feedback from the participants, asking them to contact the program staff if the e-mentoring relationship is faltering or if either partner is uncomfortable with the email exchanges.

Coaching messages serve multiple purposes. First, they provide incentives for the mentors and proteges to stay in contact (Voice, 1992). If the email exchanges have lagged, then the coaching prompts provide an opportunity to start up the exchanges again. Second, the coaching messages guide the e-mentoring pairs along the phases of the mentoring relationship, starting with initiation and moving through cultivation and separation to redefinition (Kram, 1983). Third, the coaching messages contain additional resources for the participants and help broaden the scope of their interactions. Fourth, the coaching allows the program coordinator to stay in contact with the individuals in the e-mentoring program. By

keeping the lines of communication open, it allows the program coordinator to consult, to trouble shoot, and to rematch, as needed.

Community building

For participants of face-to-face structured mentoring programs, group meetings appear to be widely beneficial and highly rated by the participants (Boyle & Boice, 1998b). These meetings give the participants a sense of involvement with the full program and with their organization or field as a whole. In addition, it provides opportunities for participants to get additional ideas for discussion topics, allows e-mentors to give one another advice, and grants proteges the opportunity to get additional points of view. How is a group meeting format applied to the electronic setting? Electronic communities, facilitated by electronic discussion lists, provide the same opportunities for e-mentoring participants.

To set up electronic communities, the program coordinator presents e-mentors and proteges with a number of lists to which they may subscribe. Electronic discussion lists are set up based on topics of interest to and characteristics of the mentor and protégé populations. Of particular interest to e-mentors is a closed-mentor list, so they can get feedback and advice from one another. Research on electronic communities suggests that a moderator, who prompts early introductions and periodically seeds the list with discussion topics, aids in the development of a robust and enduring community (Single, Muller, and Cunningham, 1999).

Issues and research ideas

There are multiple research questions associated with the structured implementation phase. First, we need to determine the most effective and efficient methods for training delivery, and whether the optimal training delivery methods depend on the type and the size of the mentor and protégé populations. A second research issue has to do with the delivery and the content of the coaching messages. How frequently should these coaching messages be sent? What content is most useful for those engaged in on-line mentoring? Does the frequency differ with the target protégé populations, or with the target mentor populations?

Additionally, what topics of community building forums are most useful? Should participation in an electronic discussion group be mandated or a voluntary part of participating in an e-mentoring program? Research into these questions will help improve the structured implementation that e-mentoring programs provide to the participants.

Assessment

With e-mentoring in its infancy, research, assessment, and evaluation are needed to identify best practices associated with conducting e-mentoring programs. Assessment helps to improve, and to measure the value associated with, e-mentoring programs. In the assessment

phase, program coordinators focus on collecting and analyzing data to support the goals of refinement, scalability, and sustainability. As with any project, a pilot program can provide invaluable information, which facilitates conducting both the program and the program evaluation.

There are at least two modes for collecting assessment data using electronic communications, email delivered or web-based assessment instruments. Assessment data are also collected using phone and paper surveys. As part of the Assessment phase, we recommend collecting three types of data: involvement data, formative data, and, summative data, as listed in Figure 4.

Involvement data

Involvement data measure participants' involvement with the program and is defined as the frequency of interactions a mentoring pair has throughout the program. In mentoring programs, the frequency of face-to-face interactions and the frequency of email exchanges are positively related to beneficial mentoring outcomes (Campbell & Campbell, 1997; Cummings & Finholt, 1996) and to the continuation of the mentoring relationship for the duration of the program (Boice, 1992). Nonetheless, most mentoring programs report that full participation by the participants is unlikely (for examples, see Dickey, 1997).

As one way of collecting involvement data, the program coordinator requests e-mentors and proteges to rate their and their mentoring partners' participation (or involvement) in the program at a midpoint and at the end of the program. Involvement data can serve a formative function; analyses examining relationships between involvement data and program variables will help to inform future programs in order to increase participant involvement. Such analyses are conducted by examining the frequency of the e-mentoring pairs' interactions in relationship to the frequency of the coaching messages or to the closeness of the e-mentoring match based on similar career interests. If the e-mentoring pairs who receive weekly coaching messages interact more consistently than the e-mentoring pairs who receive monthly coaching messages, then future programs should send out weekly coaching messages. Also, involvement data can serve a summative function; involvement data collected from pilot programs, or early renditions of programs, serve as valuable benchmarks against which future program involvement is measured. Although involvement data can be subsumed under formative and summative data, it is a central indicator of mentoring success and therefore warrants its own category.

Formative data

Formative data are data that, once analyzed, will guide the alteration or enhancement of a program; the main audience for formative analyses is the program staff (Herman, Morris, & Fitz-Gibbon, 1987). Formative data are collected throughout the duration of the program.

Analyses of formative data allow program coordinators to determine program, pair, and participant variables associated with successful e-mentoring pairs. Formative data that are used to evaluate *program* elements include participant ratings of the training and the coaching elements. Participants identify the helpful elements of the training and identify which coaching messages are most and least useful, thus providing information beneficial for improving future program implementations. Formative data evaluating *pair* variables include examinations of the matching protocol and content of the mentoring interactions. Analyses examining the matching protocol in comparison to mentoring outcomes provide information for improving future matching processes. Formative data focusing on *participant* characteristics examine personal characteristics and preferences of e-mentors and proteges in comparison to the mentoring outcomes. As an example, MentorNet conducted analyses of mentor characteristics in relationship to the success of the e-mentoring relationships. In this instance, the mentor characteristic was their reason for volunteering to be an e-mentor. The results suggest that an e-mentor's willingness to respond to the student's concerns (versus imposing expectations on the student's needs), seem favorable for the mentoring relationship (Single, Muller, & Inoue, 1999). In this final instance, the results of formative data focusing on participant characteristics influence training for future e-mentors.

Summative data

Summative data is used to determine the value of the e-mentoring program and how well it achieved the program goals. Summative analyses often include a standard for comparison, such as a control group or an alternative, but similar, program. Summative analyses address sustainability and expansion, with stakeholders and funders as the primary audience (Herman, Morris, & Fitz-Gibbon, 1987).

Goals for an e-mentoring program often focus on increasing the proteges' knowledge, attitude, or behaviour within an area. Summative analyses focus on proteges' knowledge, attitude, or behaviour in comparison to a control group; this is achieved by administering a questionnaire to both groups at the end of the e-mentoring program and comparing the results. Summative analyses also focus on how proteges' knowledge, attitude, or behaviour *change* by administering a pre- and post-test to both the experimental and the control groups, and comparatively evaluating the differences. Finally, summative analysis could have a longitudinal element and focus on retention issues, such as whether women students who participate in an e-mentoring program are more likely to persist in where they are underrepresented.

Research questions

We list a few of the various research questions pertaining to the assessment phase. The first has to do with acceptable response rates and the methods of survey delivery. How does survey delivery influence response rates? Are participants in an e-mentoring program more likely to respond to email, web-based, phone or mailed surveys? What would be considered acceptable response rates for each of these types of instrument delivery? In addition, there are open questions about acceptable involvement rates for e-mentoring programs. Even with fairly intensive intervention on the part of the program coordinator, few programs have full compliance and involvement by the participants. Therefore, what is an acceptable benchmark level for involvement with an e-mentoring program?

Summative analyses for e-mentoring programs are highly dependent on program goals and target populations. Issues related to summative analyses reflect closely the issues associated with face-to-face mentoring programs (see Campbell & Campbell, 1997, for a discussion).

Discussion

E-mentoring provides a new medium for mentoring, allowing additional mentors and proteges to participate in mentoring programs where participation in a face-to-face program would be difficult or impossible. Unique qualities of electronic communications foster the development of mentoring relationships on-line. To maximize the benefits for participants in e-mentoring programs, we can build on the lessons learned from face-to-face mentoring programs.

In this paper, we present a Model of Structured Mentoring. The various phases of this model, Planning, Structured Implementation, and Assessment, guide us through issues to consider and address while developing and conducting e-mentoring programs. The exercise of applying the model to the e-mentoring format also serves as a vehicle to raise open research issues.

While there have been various theoretical frameworks to guide the mentoring process (e.g., Anderson & Shannon, 1988; Kram, 1983), we know of few other frameworks that guide the development of the mentoring *program* process. Through the presentation of a Model of Structured Mentoring, we not only hope to promote the scrutiny of its individual phases, but also of the model as a whole. As such, the theoretical model needs to be tested against e-mentoring programs, and the goals and outcomes of the programs. Through this exercise, we can refine this model as a framework for guiding the development, implementation, and research on electronic mentoring programs.

References

Contact either MentorNet (www.mentornet.net) or Kim Rickard (krickard@apesma.asn.au) if you have difficulty reading these references and would like to follow them up.

References

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