



E-MENTORING

National Mentoring Resource Center Model Review

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Summary

This review examines research on digital and electronic forms of mentorship, or e-mentoring. The review is organized around four questions:

1. What is the documented effectiveness of this approach to mentoring?
2. What factors shape the effectiveness of e-mentoring among youth?
3. What are the intervening processes (mediators) that are most important in linking e-mentoring to youth outcomes?
4. To what extent have e-mentoring programs reached and sustained the engagement of intended youth, been implemented with high quality, and been adopted and sustained by organizations and settings?

To date, only a small number of empirical studies address these questions. With widespread use of digital and electronic communication being fairly new, however, it is not surprising that e-mentoring is a relatively under-investigated area. The research that does exist reveals the following preliminary findings:

- Evidence on the effectiveness of e-mentoring for improving youth outcomes is mixed, as in some effects are good and some are null; the limited number of studies that utilize a comparison group not receiving e-mentoring further complicate the ability to draw conclusions about its effectiveness.

- Although some e-mentoring formats, such as email interactions, have been successful in improving youth outcomes, it is not clear which formats work best for a given population of youth.
- Although there are several potential factors that could moderate the effects of e-mentoring, including race and gender of youth, most studies to date have only explored level and quality of interpersonal communication.
- Interaction frequency and relationship quality may be important mediators of youth outcomes in e-mentoring programs.
- E-mentoring programs that have been implemented and sustained seem to benefit from clear guidelines, structure, and organizational tools.

Insights for practitioners are provided at the end of this review. This commentary recommends that programs wishing to adopt and utilize electronic communication in their mentoring programs should always consider factors that would enable mentors and mentees to use the associated tools (e.g., mobile devices, websites). More specifically, programs are advised to clearly articulate why and how e-mentoring formats can facilitate or enhance mentor-mentee interactions, anticipate potential challenges and how to overcome them, and determine how staff roles may change to facilitate and support electronic communications.

INTRODUCTION

Electronic, online, or digital mentoring, often referred to collectively as e-mentoring, has grown in popularity over recent decades. This is particularly true as social media, text messaging, and online communications such as chat functions or emails have become popular (and sometimes primary) forms of communication, especially among young people. E-mentoring requires some form of information and communication technology (ICT), such as an Internet-connected computer, smartphone, or tablet.

There has been a rapid growth in diverse technology-mediated forms of communication in both formal and informal contexts. For instance, *computer-mediated communication*, which refers to email, LISTSERVs, chat groups, and computer conferencing,¹ is now a normal part of both professional and personal interactions around the globe. This term may feel a little dated, however, as many of these types of communications now occur with the use of smartphones and other mobile devices, not just computers. Another example of such communications are *social media forums*, which are online discussion environments that offer a safe space, friendship within the group, flexible help, and peer support for recovery and relapse prevention, such as for those with eating disorders² These interactions sometimes can be classified as examples of peer e-mentoring, especially when the communicators share characteristics such as illness, a social role such as mothers, or similar career types. Another type of digital platform is app-mediated communication, which is conducted through popular apps such as WhatsApp, Snapchat, Kik, or Viber.

The Significance of E-Mentoring

Why is e-mentoring so compelling? For one, in the past few decades, ICTs have transcended the geographical and psychological distance between people.³ This type of communication allows individuals who live at a far distance, and who perhaps will never meet, to communicate and build a relationship. In the context of mentoring, this means mentor pairs or groups are not bounded by

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Mentoring programs increasingly are designed to take advantage of **e-mentoring strategies** for a variety of desirable purposes, such as **mentoring for youth in rural areas**, those with **chronic illness**, those interested in **pursuing certain professions or higher education**, and those with **disabilities**.

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geographical location.⁴ It also allows communicators to overcome constraints associated with in-person meetings, such as scheduling or travel.⁵ E-mentoring could allow for a mentoring pair (or group) to build cohesiveness at a distance, thereby building social capital for young people who do not have it in close physical proximity.⁶ Mentoring programs increasingly are designed to take advantage of these e-mentoring strategies for a variety of desirable purposes, such as mentoring for youth in rural areas, those with chronic illness, those interested in pursuing certain professions or higher education, and those with disabilities.

Scope of Review

For this review, *e-mentoring* refers to mentoring conducted entirely or in part using electronic communication, such as email, text, social media, messaging applications, or computer platforms. This also includes the use of technology to support and/or enhance in-person mentoring relationships (for example, using email communications to stay in touch between in-person meetings or to share resources). The focus of this review is on e-mentoring as a supported modality for mentor-mentee communication within formal mentoring programs for youth (up to ages 18). Research on e-mentoring occurring in informal mentoring relationships is considered, however, as background where available. For the purposes of this review, e-mentoring also does not include the use of web or mobile device-based resources intended for joint use by mentor and mentee, or web/device-based mentor or staff training modules. For example, if a mentoring pair uses a website to practice math skills while together in person, this is not included as e-mentoring, but if they use a website/mobile app to interact and keep in touch in between in-person visits, that is included.

The present review examines the available research using the above definition to answer the following four questions:

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1. What is the documented effectiveness of e-mentoring for youth?
 2. What factors shape the effectiveness of e-mentoring among youth?
 3. What are the intervening processes (mediators) that are most important in linking e-mentoring to youth outcomes?
 4. To what extent have e-mentoring programs reached and sustained the engagement of intended youth, been implemented with high quality, and been adopted and sustained by organizations and settings?
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A literature search was conducted to identify journal articles, book chapters, and other types of reports and unpublished work that report findings pertinent to one or more of these questions. This search was conducted using library search engines, such as PsychINFO, Springer, and ScienceDirect, as well as Google Scholar. Keywords used in the searches included children, youth, e-mentoring, online mentoring, computer-mediated communication, and social media mentoring. Additionally, research referenced in relevant chapters and prior literature reviews in the area were reviewed for potential relevance. A total of 19 studies met criteria for inclusion in the review.

1. What Is the Documented Effectiveness of E-Mentoring for Youth?

BACKGROUND

With the rise of digital and social media as important forms of modern communication, it is natural to think they could play a useful role in mentoring relationships. Social media interactions, for instance, have been shown to be a source of or vehicle for social support, especially for those with weaker in-person support.⁷ Online support has been found to be predictive of lower incidence of depressive thoughts, and there is evidence to suggest it can buffer the effects of peer victimization.⁸ E-mentoring is also of interest because many existing programs were developed as a means to compensate when naturally occurring mentoring relationships were unavailable and when opportunities to participate in traditional mentoring programs (such as in-person meetings) were not possible. E-mentoring programs can create educational and vocational opportunities for disadvantaged or underrepresented populations.⁹

Findings from studies of *mHealth* (or mobile-device-led health interventions) for youth suggest that ICTs, particularly mobile phones, are an effective way to reach young people and to increase their knowledge and produce behavior change for health-related outcomes. *mHealth* interventions for youth have been shown to be effective in promoting behaviors such as adherence to medications,¹⁰ self-management of type 1 diabetes,¹¹ and utilization of sexual and reproductive health services.¹² Today's adolescents have ubiquitous access to mobile technology, and this is true across social status and location. These successes with *mHealth* could be used as a foundation for applying technology to youth mentoring.

The challenges of e-mentoring. E-mentoring comes with its own set of challenges, however. On the most practical level, it requires access to ICTs, including computers or mobile devices (e.g., smartphones or tablets) and technical support for the technology and digital platform. The chosen technology also must be accessible to all mentors and mentees, which may be particularly challenging when working with specific populations, such as youth with disabilities. Mentors and mentees participating in an e-mentoring program also must be technology literate. If a mentor is not familiar with social media platforms, for example, using them to build a mentoring relationship may not be productive without sufficient training. Mentors and mentees also need sufficient ICT communication skills, such as reading comprehension and the ability to sufficiently express oneself through text and/or emojis (digital images used to express an idea or emotion in digital communication).⁹

Vast opportunities for e-mentoring practice. Despite these challenges, there is a tremendous opportunity to use ICTs in mentoring.¹³ E-mentoring programs utilized with some college-age populations (beyond the age range for this review) have found that personal and emotional interactions often develop between mentors and mentees, especially if the pair also meets face-to-face and student mentees do not have an alternative support network,¹⁴ or if the interaction via electronic means is a mandatory part of the relationship.⁵

RESEARCH

Seven studies included in this review reported findings that address the potential effectiveness of e-mentoring for improving youth outcomes. Five of these studies looked at the use of online interactions only, whereas the remaining two combined face-to-face meetings with online interactions.

One of the earliest studies of e-mentoring looked at interaction between mentors and mentees via email only in a program called the *Digital Heroes Campaign*.¹⁵ In this program, youth were matched with online mentors over a two-year period. Using a mixed methods approach (surveys, interviews, focus group discussions, email transcripts), researchers assessed the nature, types, and quality of relationships that developed in the program. They found that youth and mentors both perceived a positive impact as a result of the program; however, deep connections between mentors and mentees were relatively rare.

Another early pilot study examined whether or not e-mentoring had an academic and psychological impact on 32 high school students who were at risk of dropping out.¹⁶ Each student was matched randomly with a volunteer adult mentor recruited from the schools' business and educational partners. The pairs never met face-to-face—all communication was through email. In a comparison of program participants to nonparticipants, there were no significant differences between the two groups on self-esteem, career indecision, attendance, or academic achievement. However, rich dialogue occurred between the students and mentors, which suggested the program merited further exploration.

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In a recent evaluation of tenth grade students in the program in New York City schools, programmatic and survey data showed that those **students who were in the iMentor program scored higher than comparison students** after one academic year on measures of **interpersonal support, future planning, college aspirations, and career planning.**

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One of the more well-known e-mentoring programs for youth is the *iMentor College Ready* curriculum.^{17, 18} This program uses a “blended” approach to mentoring—ninth grade mentees communicate via email and meet face-to-face with college-educated mentors, as well as participate in weekly college preparatory classes. In a recent evaluation of tenth grade students in the program in New York City schools, programmatic and survey data showed that those students who were in the iMentor program scored higher than comparison students after one academic year on measures of interpersonal support, future planning, college aspirations, and career planning. The evaluation did not, however, show evidenced effects for five noncognitive outcomes, grade point average, chronic absenteeism, or the percent of students on track for graduation.

Another study looked at the effectiveness of a one-year online mentoring program in Germany for girls ages 11 to 18 in science, technology, engineering, and math (STEM) called *CyberMentor*.¹⁹ Female mentors and mentees communicated via email, online chats, and forums. In the evaluation, girls were assigned randomly to either the treatment group or a wait-list control group. Girls in the treatment group showed greater levels of desirable short- and long-term gains in STEM-related outcomes

compared to wait-list control participants after one academic year. These included STEM activity, knowledge of STEM topics, knowledge about university studies and jobs in STEM, confidence in one's own STEM abilities, self-assessment of STEM competencies, and intentions for academic elective choices.

A four-year mixed-method prospective cohort study at two pediatric hospitals in Canada used an online mentor as part of a way to empower youth with chronic health conditions in their transition to adult healthcare.²⁰ All study participants had access to an online transition mentor and the Youth KIT, a tool that includes goal-setting activities. The study found that participants had modest perceptions about the utility of the Youth KIT and online mentor. Overall, it was concluded that these two transition interventions were insufficient for empowering this sample of youth.

Another study sought to look at the practicality of and to develop an implementation model for an inquiry-based learning environment (IBLE) that included e-mentoring using videoconference.²¹ Inquiry-based learning is "an approach to learning that involves a process of exploring the natural or material world, and that leads to asking questions, making discoveries, and rigorously testing those discoveries in the search for new understanding."²² This study tested IBLE in a rural environment using a mixed-method approach focused on affective and cognitive outcomes; a pre-/post-test quasi-experimental designⁱ was nested in a case study of three eighth grade math classes in one rural school. Results showed that IBLE appeared to have enhanced students' learning, most significantly their affective development, including increasing their engagement and motivation, broadening their understanding of the relevancy of math and science in students' lives, and augmenting their awareness of roles and careers in math and science.

Another [study](#) used a randomized controlled design to look at the impact of an e-mentoring program for secondary school students (tenth through twelfth grades) with learning disabilities on their ability to identify post-school interests and goals and to map out the steps necessary to achieve them (transition competency).²³ Students from eight high schools were randomly assigned to a control or intervention group. The intervention participants were matched with a college mentor, with whom they corresponded via a virtual classroom and attended two college campus visits. In the control condition, students only received the college tour and a simulated college classroom visit. Results showed that students with disabilities in the mentored group outperformed students in the control group on four of five measures—transition competency (both self-reported and verified by the parents and student's special education teacher), self-determination, and social and academic connectedness.

CONCLUSIONS

1. The available evidence on the effectiveness of e-mentoring is mixed and does not allow one to draw conclusions about which formats work for which types of youth.
2. The evidence also does not permit even tentative conclusions about the effectiveness of e-mentoring for different types of youth outcomes.

ⁱ A quasi-experimental design often looks like an experimental design but does not include random assignment of participants.

2. What Factors Shape the Effectiveness of E-Mentoring Among Youth?

BACKGROUND

There are several factors we might expect to mediate the relationship between an e-mentoring program and youth outcomes, based on research on traditional mentoring relationships. These could include the youth and mentor's interpersonal histories, social competencies, the youth's developmental stage, mentoring relationship quality, program practices, and the youth's family and community context.²⁴ In an e-mentoring program, however, there may be several unique factors that could potentially moderate the effectiveness of a program for youth. These could include demographics, personal factors, interpersonal communication styles, accessibility issues, or program implementation factors.⁹

Demographics. Some youth, such as those in rural locations, may receive more benefit from e-mentoring compared to a face-to-face program with infrequent meetings.²⁵ Socioeconomic status (which may be confounded with race/ethnicity) may also be an influencing demographic characteristic, as youth from resource-poor areas may not have access to ICTs. On the other hand, lower socioeconomic status can lead to situations where e-mentoring is an ideal intervention. For instance, a youth's family, neighborhood, and school may be unstable sources of support,²³ not allowing for a youth to readily access naturally occurring mentors, or low income may make it impossible for a youth to access transportation to meet with a mentor. Finally, gender equality in the use of technology is crucial,⁴ and gender differences in the way males and females communicate via ICTs may influence the strength of an e-mentoring relationship.^{25, 26}

Personal factors. Both a mentor and a mentee's personal circumstances may impact the outcomes of an e-mentoring program. For instance, an individual's computer skills or adoption of ICT devices in general has the potential to influence the effectiveness of an e-mentoring program.^{9, 27} Youth in frequent crisis, without an alternative support network,¹⁴ and with needs that go beyond less frequent face-to-face meetings may also benefit from an ICT component, as it would allow them to reach a mentor much more quickly than would scheduling an in-person meeting to discuss issues.

Interpersonal communication styles. A mentor who is accustomed to communicating in-person as opposed to text or email may find an e-mentoring program limiting, whereas a young person may find it more appealing because ICTs are a primary mode of communication for today's youth. The lack of body language and nonverbal communication in e-mentoring may lead to misinterpretations and misunderstandings.¹³ However, mentors or mentees with social anxiety might find e-mentoring a more palatable mode of connecting.^{26, 28} Emotional maturity in general may be more important for an e-mentoring relationship as compared to a traditional face-to-face relationship, as e-mentoring requires the ability to disclose and share emotions online and in writing.^{9, 13} Without this ability, communication via ICT may be superficial or informational only.

Accessibility issues. The potential exists for e-mentoring to be more accessible for youth with intellectual and developmental disabilities who may have difficulty participating in face-to-face mentoring because of a lack of transportation and availability of direct support.^{28, 29} It may also allow for mentors and mentees with chronic health conditions or physical disabilities to still participate

in a consistent and reliable mentoring relationship, a crucial component for mentoring relationship strength and quality,³⁰ since the interactions could occur from their homes or schools, thus enhancing effectiveness.

Program implementation. Access to a stable mobile network or Internet service is essential for an effective e-mentoring program.³¹ The ability to access technological support could also be important when using ICTs to facilitate mentoring.³² Questions regarding security and confidentiality of an e-mentoring program may also influence how much information a mentor or mentee reveals in their relationship,²⁷ which can contribute to weaker or stronger relationship ties.¹⁵ The program materials must also be easy to use. For example, if all mentoring interactions occur in a virtual world, then familiarity with how the world works, or sufficient training on how to utilize all features, would be necessary. Finally, the use of e-mentoring models alone versus “blended” models where e-mentoring is combined with traditional face-to-face mentoring could each produce different outcomes for youth.

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RESEARCH

Six research studies assess possible moderators that contribute to the effectiveness of e-mentoring programs. These studies focus largely on demographic factors, but also the quality of the electronic interaction and some characteristics of the mentors and mentees themselves.

Demographics. A previously mentioned study investigating the impact of an e-mentoring program on students with learning disabilities and their ability to identify post-school interests and goals and the steps necessary to achieve them found that estimated effects on student outcomes varied according to student race and socioeconomic status.²³ Non-Caucasian students demonstrated more improvement on the measure of self-determination in relation to program participation than did Caucasian students, as did students from higher socioeconomic status backgrounds relative to those from lower socioeconomic backgrounds.

One case study looked at gender as a potential moderator of the effects of computer-mediated communication between high school students with disabilities and adult mentors.³³ The goal of the program was to promote the participation of these students in STEM fields. Differences in the content of the communication between mentors and mentees were found to be consistent with traditional gender roles; males were more likely to provide and seek information about the Internet and technology than were females, yet females communicated more frequently, shared more personal information, and had a personal tone in their interactions. This suggests that for e-mentoring programs focused on STEM, the programs may need to find a way to encourage female mentees to increase support-seeking related to the STEM topics themselves.

Another longitudinal observational study of a nine-month e-mentoring program looked at social capital as a possible factor moderating success.³⁴ In this program, mentees developed multiple

relationships with a “network” of mentors and communicated with their network entirely through electronic media. Results showed that students with an educational role model at home saw greater improvements in general and career-based self-efficacy than did students with no educational role model.

Personal factors. Only one study looked at personal factors as potential moderators of an e-mentoring program. This study looked at mentees’ preprogram attitudes and experience, specifically prior Internet use, previous experience with mentoring, motivation to participate in the program, and preprogram general self-efficacy as they related to outcomes focused on general, career, and fiscal self-efficacy.³⁵ Survey data was collected from students over one year in 50 schools in which at least two-thirds of the student population fell below the U.S. federal poverty line. All students were required to participate in the mentoring program. Findings showed that general self-efficacy prior to the program and motivation to participate predicted the development of a more positive relationship between the mentor and mentee. Having mentors in the past was not found to be a predicting factor related to program outcomes. This suggests that a mentee’s background and personal context may need to be considered at the start of an e-mentoring program in order to maximize the development of the mentor/mentee relationship.

Interpersonal communication styles. A qualitative study looked at primary communication via email, with three face-to-face meetings over an eight-month intervention period, between youth ages 15 and 20 with disabilities and mentors.³⁶ This study compared the characteristics of “successful” (exchanged more than 50 percent of required messages; evaluated by mentors/students/program coordinator/teachers as most successful) and “unsuccessful” matches who completed the program. Match and mentor characteristics related to perceived success included mentoring style (instructional vs. relational), communication frequency, communication style, and the amount of face-to-face meetings.

Accessibility issues. While several e-mentoring programs have been designed specifically to help youth overcome or cope with health issues,^{2, 20, 28, 33, 36, 37, 38, 39} none of the research looked at accessibility as a moderator of e-mentoring outcomes.

Program implementation. No studies looked at technology as a moderator of e-mentoring outcomes for youth. One recent study did look at the program implementation practices of one-on-one versus group online mentoring in Germany as a way to encourage talented girls in STEM.⁴⁰ Girls in gifted education were mentored online by female STEM academics for six months in either one-on-one or group mentoring. The study found that group mentoring was more effective than one-on-one mentoring for several youth outcomes, including the proposition of STEM communication, the extent of STEM-related networking, more growth in STEM elective intentions, and participants’ importance in their respective STEM networks. Overall, this study suggests group mentoring may be a more successful way to reach gifted girls in STEM than one-on-one mentoring. The study did not, however, look at girls being mentored versus those who were not.

CONCLUSIONS

1. Some demographic characteristics, including gender, race, socioeconomic status, and having an educational role model at home, may influence the impact of e-mentoring, although currently available research does not suggest reasons why.
2. General self-efficacy and motivation to participate might be related to the development of a positive relationship between a mentor and mentee in an e-mentoring program, but it is not clear if this truly moderates program outcomes for youth.
3. Interpersonal characteristics such as mentoring style and communication style might moderate program outcomes, but there are no true tests of moderation to support this qualitative finding.
4. How an e-mentoring program for youth is implemented—one-on-one versus group—may be an important moderator. For gifted girls with interests in STEM, group e-mentoring seems to be more effective than a one-on-one format.
5. There are no known studies to date assessing how mentoring format—traditional, e-mentoring, or a blended model—affect youth outcomes.

3. What Are the Intervening Processes (Mediators) that Are Most Important in Linking E-Mentoring to Youth Outcomes?

BACKGROUND

Factors we might expect to mediate the relationship between an e-mentoring program and youth outcomes, based on research on traditional mentoring relationships, include social-emotional development of the youth, cognitive development, and identity development, which in turn affect the quality of a youth's parental and peer relationships, leading to better youth outcomes.²⁴

The level of engagement with e-mentoring materials, whether they are emails, a virtual reality, or a smartphone app, may, in part, determine the benefits of e-mentoring for a participating youth. For instance, if e-mentoring occurs in an interactive program, one activity may not be as engaging as a collection of activities. Furthermore, when using text-only communication, the recipient could be unaware of the sender's emotions unless the sender explicitly expresses them in the text or via emoji. Multiple studies have shown that "social presence" is essential for e-mentoring relationships to develop successfully.^{9, 39, 41}

If those invested in an e-mentoring program, including the mentor, mentee, and—in cases where the activity is school-based—the teacher, are not satisfied with the program, this is quite likely to influence program outcomes. The type of support a mentee may gain from an e-mentor, such as informational support, tangible assistance, social support, or emotional support, could influence outcomes.⁹ In a study of an e-mentor program for college students, for example, relationships in which students received more vocational and psychosocial support were associated with better outcomes,

including higher levels of career planning and intentions to continue the relationship.³² The same was also found to be true among mentors who reported providing more support. Relationship qualities, such as coordination of expectations, trust, self-disclosure, and empathy, could also be important links in pathways to positive youth outcomes.⁹ It is unknown how e-mentoring plays a role in these factors.

RESEARCH

Five studies focused on mediating factors that contribute to the efficacy of a youth e-mentoring program, each focusing on interaction frequency as a mediator of the ability of the e-mentoring to build self-efficacy in youth. In the first study,³⁵ the researchers looked at a longitudinal sample of students in the iCouldBe program, which is a not-for-profit organization that creates and manages online adult-youth mentoring programs targeting lower-income middle and high school students. All contact between the students and mentors was exclusively online and anonymous. Results showed that interaction frequency fully mediated the relationship between program antecedents (the mentee's previous Internet experience and initial participation motivation) and general self-efficacy. The same was true for motivation—interaction frequency was positively related to motivation, which was related to general self-efficacy and fiscal efficacy, as well as Internet use and program satisfaction. Mentee interactions partially mediated the relationship between career efficacy and Internet experience, career efficacy and motivation, and program satisfaction and mentee motivation. These results do not directly address the question of what processes mediate effects of e-mentoring program participation on youth outcomes. However, they could be informative in this regard based on the consideration given to differences in program experiences related to variation in outcomes for participating youth.

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They found that the relationship quality of the e-mentor network was **positively associated with general and career-based self-efficacy**, which, in turn, seemed to **enhance career aspirations of the youth**. Furthermore, even though the relationship between e-mentor network relationship quality and career-based self-efficacy was significant for both those with and without an educational role model, the **relationship was stronger** for those **with a role model**.

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DiRenzo and colleagues used longitudinal data from a nine-month e-mentoring program to look at the influence of formal e-mentor networks and family-based role models on psychosocial and career-related outcomes.³⁴ They found that the relationship quality of the e-mentor network was positively associated with general and career-based self-efficacy, which, in turn, seemed to enhance career aspirations of the youth. It should be noted, however, that the relationship between e-mentor network relationship quality and general self-efficacy was significant only for those with an educational role model in the family, not for those without such a role model. Furthermore, even though the relationship between e-mentor network relationship quality and career-based self-efficacy was significant for both those with and without an educational role model, the relationship was stronger for those with a role model.

The qualitative study of mentor-mentee interaction via email only, described previously, found a positive relationship between frequency of email contact and markers of relationship quality, including friendliness, mutual sharing, and deeper discussions of more personal issues.¹⁵

A process evaluation of a virtual world for pediatric transplant recipients looked at factors such as time spent online, initiation of chat conversations, initiation of activities, and out-of-world contact as possible factors contributing to a successful e-mentoring relationship.³⁸ The Camp Zora graphic virtual world was designed to create a community that offers psycho-educational support and the possibility of participating in virtual curriculum activities that address school transition and medical adherence. Quantitative data, which came from online chat transcriptions and out-of-world contact, included the number of logins, time spent online, and the number of objects, characters, and virtual spaces created during the study. Results showed that a successful relationship with an e-mentor was mediated through being a consistent presence online, initiating the majority of conversations and curricular activities, promoting relationships between other participants, and devoting attention to out-of-world communication.

Question one of the iMentor study described above¹⁷ looked at variations in implementation of the program across schools and its association with the strength of the relationship between a mentor and mentee. Specifically, they looked at the number of mentoring matches made, the number of iMentor classes held, the frequency with which students and mentors emailed, and the number of students who attended at least six events. They found the two schools that implemented the program with the highest fidelity had the highest mentor/mentee email rates and event attendance rates. They also found that these two schools had the highest student school attendance rates.

CONCLUSIONS

1. Studies assessing interaction frequency and relationship quality in e-mentoring show these factors have an influence on youth outcomes, such as self-efficacy and motivation.
2. While some studies did not directly assess what processes mediate effects of e-mentoring program participation on youth outcomes, their results could be informative based on the consideration given to differences in program experiences related to variation in outcomes for participating youth.

4. To What Extent Have E-Mentoring Programs Reached and Sustained the Engagement of Youth, Been Implemented with High Quality, and Been Adopted and Sustained by Organizations and Settings?

BACKGROUND

Challenges to overcome in e-mentoring. One key challenge to overcome in an e-mentoring program is skill deficiency, including reading comprehension and expressive written communication,

as well as computer, Internet or ICT device skills, or typing ability. These limitations may lead to a lack of interest in the program or a misunderstanding of electronic correspondence if not properly addressed.^{9, 13, 35, 39} E-mentoring is naturally dependent on functioning technology, and time delays may lead to feelings of abandonment, panic, and/or frustration for both the mentor and the mentee.^{9, 13}

Best practices for implementing e-mentoring. A previous review⁹ provided a checklist for program developers who want to be successful in implementing an e-mentoring program for youth: establish program goals, recruit participants, match pairs or groups, provide ongoing support, and evaluate the program's implementation and outcomes. Just like in traditional face-to-face mentoring, it may be important to consider each phase of the program.

In addition to these typical phases for consideration, other factors that could be equally critical for e-mentoring, included:

1. selecting appropriate and accessible ICT, including various communication channels;
2. establishing frequency of contact and appropriate expectations for frequency;
3. supplying tutorials and conducting retraining for both mentors and mentees;
4. establishing expectations for the longevity of the relationship;
5. considering ways to build relationship quality, emotional closeness, and interaction levels;
6. engaging the participants through online task-based activities; and
7. developing mechanisms for support and involvement of the parents/guardians.^{9, 42}

It may also be helpful to point out the possible advantages of using e-mentoring compared to traditional face-to-face methods to new mentors before they are matched with a mentee.²⁷ This may be especially important for mentors who are older or are not as confident in their use of ICTs. In fact, some observers have suggested that programs focus on what e-mentoring can contribute rather than what it lacks in comparison to face-to-face program models.¹⁴ Finally, mentees could be encouraged to initiate contact in e-mentoring relationships in order to engage in a symmetrical communication process.²⁷ This constant electronic feedback by mentees may counter hesitations that e-mentoring is less engaging than face-to-face interaction.

RESEARCH

Five of the studies included in this review were reflective of efforts to engage in e-mentoring in a high-quality programmatic way. The first example is a study that assessed 26 lengthy email relationships between students in seventh to twelfth grades and volunteer scientists who advised them on science projects.⁴¹ In this study, students were assigned to work in research teams. The teacher then matched the teams with a volunteer mentor with some expertise in the area. Student teams communicated with their mentors via email to seek expert advice when they faced a problem with their project. The mentor would then respond with suggestions and data sources. Factors that predicted the sustainability of a mentoring relationship in this study included relationships that have "productive utility" for students. In other words, instances where the mentors helped steer students toward more manageable approaches to thinking about their projects were seen as a benefit. Another factor that appeared to help sustain these relationships was "lightweight" interaction—i.e., requiring as little as 15 minutes of time per week.

A case study was conducted for an Internet-based mentoring community for college-bound youth with disabilities called DO-IT.³⁷ This e-mentoring community is made up of high school and college students, graduates of the program who are now in college or employed, and mentors who are volunteer college students and working professionals. DO-IT uses Internet discussion lists to allow mentors and mentees to talk about topics of mutual interest in a group style of mentorship. The program is designed to support students with disabilities to pursue STEM and business fields. The case study outlines insights from the program experiences that may facilitate successful implementation of an e-mentoring community: establish goals for the program; select appropriate technology for communication; develop the communication structure (such as initial messages, replies, and forwarded messages); develop procedural and behavioral guidelines for mentees, mentors, and parents; recruit and orient participants; introduce new mentors and mentees to the community; provide supervision and ongoing support of mentors; manage online discussions through question prompts for individual encouragement; and evaluate the program by seeking feedback from community members and updating the application and training materials as needed. All of these factors were believed to have led to the sustainability of the program, which has been ongoing for decades.

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The case study outlines insights from the program experiences that may facilitate successful implementation of an e-mentoring community: **establish goals** for the program; **select appropriate technology** for communication; develop the **communication structure**; develop **procedural and behavioral guidelines**; **recruit and orient** participants; **introduce new mentors and mentees** to the community; provide **supervision and ongoing support of** mentors; **manage online discussions**; and **evaluate** the program.

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One early study of “telementoring” looked at a program for students in seventh to twelfth grades who had lengthy email relationships with volunteer scientists who advised them on science projects.⁴¹ Classroom observations and preliminary interviews were used to collect data at three different time points. The telementoring served as a practical way to provide support for ambitious science learning, as indicated by students being able to think through their project approaches more productively and with continuing motivation. In order for it to be sustainable, however, the researchers recommended, based on their findings, that students’ work should be made more visible to the mentors than what email alone provides. Also, teachers were found to require organizational tools to help them manage the program.

A qualitative study examined the use of e-mentoring to provide social and emotional support for Israeli youth ages 15 to 20 years who had socioemotional disabilities.³⁹ The mentors also had disabilities. Each mentor was matched with two mentees, and they were expected to communicate by sending at least two email messages per week for about four months. Findings supported the potential of e-mentoring for personal development and empowerment of this population of youth; however, most of the mentors and mentees considered the e-mentoring process to be a barrier to developing a personal relationship. For instance, they reported a lack of “reciprocal self-disclosure,” where one partner’s disclosure is followed by the disclosure of others, which may happen more

naturally in a face-to-face interaction. The irregular pace of email also frustrated the mentors, and participants expressed desire for more face-to-face contact in addition to the e-mentoring component. Despite some of these dissatisfactions, the majority of mentors and mentees rated the program as an enjoyable experience.

Finally, the study that looked at developing an implementation model for IBLE²¹ also documented challenges in the process of creating an IBLE environment. These challenges included students' lack of knowledge of current math and science use in existing professions, the technical quality of videoconferences, camera/monitor use and setup logistics, and the students' physical comfort during the sessions.

CONCLUSION

1. E-mentoring programs that have been implemented and sustained seem to benefit from clear guidelines, structure, and organizational tools.

IMPLICATIONS FOR PRACTICE

(Mike Garringer, MENTOR: The National Mentoring Partnership)

As electronic communication seeps into more facets of modern life, especially for youth today who are growing up as what many have described as “digital natives” who will never know a world without instant communication at one’s fingertips, it is understandable that youth mentoring programs would be thinking about how to incorporate online communication into their services or even to make the entire mentoring experience “virtual.” But the adoption of virtual communication in the mentoring field has been far slower than it has been for society as a whole—a 2016 survey of youth mentoring programs in the United States found that only 1 percent of programs identified as primarily using an e-mentoring model, and only 3 percent indicated they have matches that meet online some of the time.⁴³ So while both youth and adults may be glued to their screens, those devices are not being integrated into mentoring as much as one might expect.

As noted in the review, there are meaningful challenges to implementing e-mentoring, ranging from issues of technology access and use, to philosophical concerns about the ability of participants to get what they need out of a relationship that does not meet in-person at least occasionally. But it does seem inevitable that electronic communication will be a meaningful part of mentoring relationships moving forward—the tools of modern communication are simply too ubiquitous to not be integrated in increasingly important ways. As youth-serving programs wade into these waters, they might find increased success by following the axiom of “people, not platform.” Programs that want to utilize electronic communication in mentoring often get hung up on the bells and whistles of the technology itself—the use of video, the ability to monitor interactions, the notifications and alerts, etc. But whether your program is integrating electronic communication into a primarily face-to-face program or using it for all of the mentor-mentee interactions, there should be considerable thought put into *how and why* people will use the tools provided, especially since the review here notes that there are mixed findings about the types of platforms that work best and the many considerations that might moderate the effectiveness of an e-mentoring approach. The following questions and

topics can help mentoring programs integrate communication technology effectively.

1. HOW WILL OUR MENTOR-MENTEE INTERACTIONS BE BETTER FACILITATED, OR PERHAPS HINDERED, BY ELECTRONIC COMMUNICATION?

This review notes several ways in which research suggests technology can be an asset for mentor-mentee communication. It may alleviate geographic distance, allow participants with physical disabilities greater access to mentoring experience, overcome some of the

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It does seem inevitable that **electronic communication** will be a **meaningful part of mentoring relationships** moving forward—the **tools of modern communication** are simply too ubiquitous to not be integrated in **increasingly important ways**.

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awkwardness and shyness of initial in-person meetings, and allow youth to communicate with mentors on a more frequent and less time-bound basis. It may allow a child's mentor to be just a few clicks away at all times. Notwithstanding the early stage of research in this area, it appears that there are ways in which communicating electronically may be preferable to face-to-face communication or, at the very least, offer beneficial opportunities for additional mentoring exposure and more real-time interactions. Informed by the findings of this review, program staff should map out the reasons they think electronic communication can help facilitate a better mentoring experience for youth and volunteers (and likely avoid proceeding if they are unable to come up with a convincing list of reasons as to why it could be an improvement).

But even if there are compelling reasons to offer or allow online communication between mentors and mentees, programs will also need to anticipate some of the potential challenges noted in questions two and three of this review and plan accordingly. These challenges can include:

- **Access to technology, both for mentors and mentees.** And if participants would be using their personal devices for this communication, is there a philosophical or ethical concern about offering something that not all mentees could participate in or take advantage of? Imagine being the only mentee in a program paired with a mentor who can't text you or who can't follow your accomplishments on Facebook. Some young people could have a radically different mentoring experience if technology is available inconsistently across the participants.
- **Use of the technology.** Even if participants have access to the technology, are they equally familiar with it? Is it easy to use? How will it impact the relationship if one of them struggles to use the tools as intended?
- **Rules around the use of technology.** During what hours can mentees write to their mentors? What communication types are allowed (email, text, social media, etc.)? What

are mentors allowed to do or say via technology? What are the expectations around frequency and volume of interaction?

- **Changes in technology.** If your program invests in one form of digital communication, will that approach still be viable in five years? In ten? The pace of change in communication technology is staggering, and it can be a struggle for resource-shy nonprofits to keep up. In [one interview on e-mentoring](#), researcher Kevin O’Neill noted, “In recent years I have found high school students in my e-mentoring programs increasingly frustrated with having to post messages to their mentors in my secure forum and wait for replies. They ask why their mentors are not available on instant messaging or on Facebook.” So even when a program invests in a platform that is currently “state of the art,” as I’m sure this forum was at the time, participants can, within a few years, feel like they are using a platform that is not up to their expectations.

Perhaps the last consideration around the use of electronic communication at the relationship level is thinking about whether this type of communication will make users feel more or less comfortable in forging a deep or otherwise beneficial relationship and whether they even have an ability to do that within an electronic medium. This review notes research suggesting that it takes a certain level of maturity to share personal information online and that some youth may not feel comfortable putting some things about their life in writing and hitting “send.” (Of course, it may be equally true that it could be easier for some youth to disclose things online rather than in person.) It may be challenging for mentors to bond with a youth without face-to-face interactions, or in a program that combines the two, the risk may be that electronic communication supersedes the in-person time in a way that is undesirable or negates the trust, empathy, and mutuality that is essential to mentoring relationships. Programs must think through these pros and cons and consider whether using electronic communication is a net gain for participants or perhaps not worth the challenges.

2. WHAT IS THE ROLE OF STAFF IN FACILITATING AND SUPPORTING ELECTRONIC COMMUNICATION?

Although not discussed in much detail in the review, it is important to consider the many ways in which staff will have to support the e-mentoring efforts. Just because mentors and youth can text each other furiously throughout the day does not mean they will not have the same types of issues and need the same amount of monitoring and support as would in-person matches. In fact, the research considered in this review points to several things staff should be prepared to address:

- **Ensuring matches are communicating frequently and meeting each other’s expectations.** As noted in the review, the frequency and content of electronic communications seems to mediate the effectiveness of the experience. Without regularly scheduled in-person meetings, matches can become “out of sight, out of mind.” Programs will need to consider whether they want to provide discussion prompts, send reminders to write frequently, or otherwise reach out to participants to

make sure they are talking frequently enough, as well as about the right things. It is also possible to have pairs that spend a lot of time communicating but just at a surface level or in ways that leave one or both of the participants dissatisfied. All of this prompting, monitoring, and spurring of proper participation will take a lot of effort on the part of the staff. Programs should expect and plan around this critical aspect of ensuring effective electronic communication.

- **Offering help in smoothing over communication hiccups.** One of the challenges of electronic communication noted in the review is that there are no visual clues to help fill in the nuances of a conversation. All participants have are the words on the screen, which can easily lead to misunderstandings and disagreements about tone or intention. There can also be challenges related to the timing of responses^{3/4}it is easy to think of scenarios where one person shares something personal and expects a reply that is delayed for a whole host of reasons that have nothing to do with the content of the message. It is entirely possible that, depending on the circumstances and persons involved, electronic communication can increase the stress and anxiety around forming a mentoring relationship rather than relieving it. Programs should think carefully about how and when staff can step in and keep the matches on track.
- **Preparing participants for e-mentoring.** Needless to say, any program that wants to heavily use technology will need to make sure participants can use it effectively. In addition to all the things mentors and mentees must be trained on regarding how to do the work of a relationship, there is an added layer of training to get them comfortable with using the technology in a way that does not interfere with the relationship itself.

It is worth noting that all of the six core Standards of [The Elements of Effective Practice for Mentoring](#) apply to e-mentoring programs as well. From recruitment all the way to match closure, programs must be prepared to think about how the technology will influence how staff meet those standards. In some cases, electronic communication between mentors and youth may make their jobs easier. But in others, programs may find that e-mentoring is actually more labor-intensive for staff, particularly if maximizing the frequency and quality of those interactions is a must.

3. PLAN CAREFULLY FOR THE ROLLOUT OR INTRODUCTION OF TECHNOLOGY INTO THE PROGRAM.

After thinking about all those “people” considerations of e-mentoring for mentors, youth, and staff, a program will eventually need to turn its attention back to the “platform” and figure out exactly how all of this will work. Programs may find it helpful to develop a formal technology implementation plan. One school district in Texas [offers a nice guide to developing e-mentoring programs](#) that suggests these simple components and concepts for effectively implementing technology in a mentoring context:

Design a technology implementation plan that includes:

- *A communication system that will meet the needs of the program and its participants;*
- *A communication system that is safe and reliable;*
- *Clearly defined technology requirements of partner organizations;*
- *The defining of technology-related roles and responsibilities among program participants;*
- *Determining whether the mentor and youth participants need e-mail accounts or computers and whether your program will provide them;*
- *Policies regarding privacy and security of participant data and communication; and*
- *Policies regarding access to communication content, including privacy. Who will be allowed to view e-mails and under what circumstances will they be viewed?*

Hopefully answering questions such as these will allow programs to effectively integrate the use of technology platforms into their services and mentoring relationships. The fast-paced, connected, digital world humanity is now developing demands that mentors, mentees, and practitioners thoughtfully plan for an increased technological role in their work.

REFERENCES

1. Bierema, L., & Merriam, S. (2002). E-mentoring: Using computer-mediated communication to enhance the mentoring process. *Innovative Higher Education, 26*, 211–227. <https://doi.org/10.1023/A:1017921023103>
2. Kendal, S., Kirk, S., Elvey, R., Catchpole, R., & Pryjmachuk, S. (2017). How a moderated online discussion forum facilitates support for young people with eating disorders. *Health Expect, 20*, 98–111. <https://doi.org/10.1111/hex.12439>
3. Risquez, A. (2008). E-mentoring: An extended practice, an emerging discipline. In S. Kelsey & K. St. Amant (Eds.), *Handbook of Research on Computer-Mediated Communication* (Vol. 2, pp. 656–677). Hershey, PA: Information Science Reference.
4. Bennett, D., Hupert, N., Tsilalas, K., Meade, T., & Honey, M. (1998). *Critical issues in the design and implementation of telementoring environments*. New York, NY: Education Development Center's Center for Children and Technology. Retrieved from http://cct.edc.org/sites/cct.edc.org/files/publications/O9_1998.pdf
5. Kasprisin, C., Single, P., Single, R., & Muller, C. (2003). Building a better bridge: Testing e-training to improve e-mentoring programmes in higher education. *Mentoring & Tutoring, 11*, 67–78. <https://doi.org/10.1080/136112603200054817>
6. O'Neill, D. (2011). Local social capital through e-mentoring: An agenda for new research. *Learning, Media and Technology, 36*, 315–321. <https://doi.org/10.1080/17439884.2010.521510>
7. Kim, H. (2014). Enacted social support on social media and subjective well-being. *International Journal of Communication, 8*, 2340–2342.
8. Cole, D., Nick, E., Zerkowitz, R., Roeder, K., & Spinelli, T. (2017). Online social support for young people: Does it recapitulate in-person social support; can it help? *Computers in Human Behavior, 68*, 456–464. <https://doi.org/10.1016/j.chb.2016.11.058>
9. Shpigelman, C. (2014). Electronic mentoring and media. In D. L. DuBois & M. J. Karcher (Eds.), *Handbook of youth mentoring* (2nd ed., pp. 259–272). Thousand Oaks, CA: SAGE.
10. Graves, M., Roberts, M., Rapoff, M., & Boyer, A. (2010). The efficacy of adherence interventions for chronically ill children: A meta-analytic review. *Journal of Pediatric Psychology, 35*, 368–382. <https://doi.org/10.1093/jpepsy/jsp072>
11. Cafazzo, J. A., Casselman, M., Hamming, N., Katzman, D. K., & Palmert, M. R. (2012). Design of an mHealth app for the self-management of adolescent type 1 diabetes: a pilot study. *J Med Internet Res, 14*, e70. <https://doi.org/10.2196/jmir.2058>
12. Ippoliti, N. B., & L'Engle, K. (2017). Meet us on the phone: Mobile phone programs for adolescent sexual and reproductive health in low-to-middle income countries. *BMC Reproductive Health, 14*, 1–8. <https://doi.org/10.1186/s12978-016-0276-z>
13. Ensher, E., Heun, C., & Blanchard, A. (2003). Online mentoring and computer-mediated communication: New directions in research. *Journal of Vocational Behavior, 63*, 264–288. [https://doi.org/10.1016/S0001-8791\(03\)00044-7](https://doi.org/10.1016/S0001-8791(03)00044-7)
14. Risquez, A., & Sanchez-Garcia, M. (2012). The jury is still out: Psychoemotional support in peer e-mentoring for transition to university. *Internet and Higher Education, 15*, 213–221. <https://doi.org/10.1016/j.iheduc.2011.11.003>
15. Rhodes, J., Spencer, R., Salto, R., & Sipe, C. (2006). Online mentoring: The promise and challenges of an emerging approach to youth development. *Journal of Primary Prevention, 27*, 497–513. <https://doi.org/10.1007/s10935-006-0051-y>
16. Culpepper, D. (2008). *Determining the quality and impact of an e-mentoring model on at-risk youth*. [Doctoral dissertation]. Retrieved from University of South Florida Scholar Commons. <http://scholarcommons.usf.edu/etd/198>

17. Merrill, L., Kang, D., Siman, N., & Soltani, J. (2016). *Focus on mentee-mentor relationships: The 10th grade implementation of iMentor College Ready Program*. New York, NY: The Research Alliance for New York City Schools. Retrieved from http://steinhardt.nyu.edu/research_alliance/publications/imentor_focusonrelationships
18. Merrill, L., Siman, N., Wulach, S., & Kang, D. (2015). *Bringing Together Mentoring, Technology, and Whole-School Reform: A First Look at the iMentor College Ready Program*. New York, NY: The Research Alliance for New York City Schools. Retrieved from http://steinhardt.nyu.edu/research_alliance/publications/imentor_first_look
19. Stoeger, H., Duan, X., Schirner, S., Griendl, T., & Ziegler, A. (2013). The effectiveness of a one-year online mentoring program for girls in STEM. *Computers & Education*, *69*, 408–418. <https://doi.org/10.1016/j.compedu.2013.07.032>
20. Gorter, J. W., Stewart, D., Cohen, E., Hlyva, O., Morrison, A., Galuppi, B., . . . Trace Study Group. (2015). Are two youth-focused interventions sufficient to empower youth with chronic health conditions in their transition to adult healthcare: a mixed-methods longitudinal prospective cohort study. *BMJ Open*, *5*, e007553. <https://doi.org/10.1136/bmjopen-2014-007553>
21. Li, Q., Moorman, L., & Dyjur, O. (2010). Inquiry-based learning and e-mentoring via videoconference: A study of mathematics and science learning of Canadian rural students. *Education Technology Research and Development*, *58*, 729–753. <https://doi.org/10.1007/s11423-010-9156-3>
22. National Science Foundation. (2005). *Inquiry: Thoughts, views, and strategies for the K-5 classroom*. Arlington, VA: National Science Foundation.
23. Collier, M. (2009). *An investigation study of the effects of e-mentoring on transition planning for secondary students with learning disabilities*. [Doctoral dissertation.] Salt Lake City, Utah: University of Utah.
24. DuBois, D. L., Portillo, N., Rhodes, J. E., Silverthorn, N., & Valentine, J. C. (2011). How effective are mentoring programs for youth? A systematic assessment of the evidence. *Psychological Science in the Public Interest*, *12*, 57–91. <https://doi.org/10.1177/1529100611414806>
25. Wilson Jr., E. (2013). *Factors that influence communication in e-mentoring with urban alternative high school students*. [Doctoral dissertation]. KU ScholarWorks. <http://hdl.handle.net/1808/15058>
26. Pierce, T. (2009). Social anxiety and technology: Face-to-face communication versus technological communication among teens. *Computers in Human Behavior*, *25*, 1367–1372. <https://doi.org/10.1016/j.chb.2009.06.003>
27. Panopoulos, A., & Sarri, K. (2013). E-mentoring: The adoption process and innovation change. *International Journal of Information Management*, *33*, 217–226. <https://doi.org/10.1016/j.ijinfomgt.2012.10.003>
28. Durkin, K., Conti-Ramsden, G., & Walker, A. (2010). Computer-mediated communication in adolescents with and without a history of specific language impairment (SLI). *Computers in Human Behavior*, *26*, 176–185. <https://doi.org/10.1016/j.chb.2009.10.007>
29. McDonald, K., Balcazar, F., & Keys, C. (2005). Youth with disabilities. In D. L. DuBois & M. J. Karcher (Eds.), *Handbook of youth mentoring* (pp. 493–507). Thousand Oaks, CA: SAGE.
30. Rhodes, J., Reddy, S., Roffman, J., & Grossman, J. (2005). Promoting successful youth mentoring relationships: A preliminary screening questionnaire. *Journal of Primary Prevention*, *26*, 147–167. <https://doi.org/10.1007/s10935-005-1849-8>
31. Single, P., & Single, R. (2005). E-mentoring for social equity: Review of research to inform program development. *Mentoring & Tutoring: Partnership in Learning*, *13*, 301–320. <https://doi.org/10.1080/13611260500107481>
32. Murphy, W. (2011). From e-mentoring to blended mentoring: increasing students' developmental initiation and mentors' satisfaction. *Academy of Management Learning & Education*, *10*, 606–622. <https://doi.org/10.5465/amle.2010.0090>
33. Burgstahler, S., & Doyle, A. (2005). Gender differences in computer-mediated communication among adolescents with disabilities: A case study. *Disability Studies Quarterly*, *25*. <https://doi.org/10.18061/dsq.v25i2.552>

34. DiRenzo, M., Weer, C., & Linnehan, F. (2013). Protégé career aspirations: The influence of formal e-mentor networks and family-based role models. *Journal of Vocational Behavior, 83*, 41–50. <https://doi.org/10.1016/j.jvb.2013.02.007>
35. DiRenzo, M., Linnehan, F., Shao, P., & Rosenberg, W. (2010). A moderated mediation model of e-mentoring. *Journal of Vocational Behavior, 76*, 292–305. <https://doi.org/10.1016/j.jvb.2009.10.003>
36. Shpigelman, C. N., & Gill, C. J. (2013). The characteristics of unsuccessful e-mentoring relationships for youth with disabilities. *Qualitative Health Research, 23*, 463–475. <https://doi.org/10.1177/1049732312469115>
37. Burgstahler, S., & Crawford, L. (2007). Managing an e-mentoring community to support students with disabilities: A case study. *AACE Journal, 15*, 97–114.
38. Cantrell, K., Fischer, A., Bouzaher, A., & Bers, M. (2010). The role of e-mentorship in a virtual world for youth transplant recipients. *Journal of Pediatric Oncology Nursing, 27*, 344–355. <https://doi.org/10.1177/1043454210372617>
39. Shpigelman, C., Weiss, P., & Reiter, S. (2009). E-mentoring for all. *Computers in Human Behavior, 25*, 919–928. <https://doi.org/10.1016/j.chb.2009.03.007>
40. Stoeger, H., Hopp, M., & Ziegler, A. (2017). Online mentoring as an extracurricular measure to encourage talented girls in STEM (Science, Technology, Engineering, and Mathematics): An empirical study on one-on-one versus group mentoring. *Gifted Child Quarterly, 1*, 1–11. <https://doi.org/10.1177/0016986217702215>
41. O'Neill, D. K., & Gomez, L. M. (1998). *Sustaining mentoring relationships on-line: Proceedings of the ACM 1998 Conference on Computer Supported Cooperative Work* (pp. 325–334). Seattle, WA: Association of Computing Machinery. <https://doi.org/10.1145/289444.289507>
42. Miller, H., & Griffiths, M. (2005). E-Mentoring. In D. DuBois & M. Karcher (Eds.), *Handbook of youth mentoring* (1st ed., pp. 300–313). Thousand Oaks, CA: SAGE.
43. Garringer, M., McQuillin, S., & McDaniel, H. (2017). *Examining youth mentoring services across America: Findings from the 2016 Mentoring Program Survey*. Boston, MA: MENTOR: The National Mentoring Partnership. Retrieved from http://www.mentoring.org/new-site/wp-content/uploads/2017/07/Mentor-Survey-Report_FINAL_small.pdf