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Key issues in professionalizing mentoring practices

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Mentoring has experienced a tremendous upswing over the past decades, which has only recently slowed down somewhat. One possible factor explaining mentoring's popularity are numerous case studies suggesting that it is one of the most effective ways of helping individuals to develop. Meta-analyses indicating effect sizes for mentoring that are below what would theoretically be possible appear to contradict the success stories, however. This circumstance raises questions about the professionalization of mentoring practices. We focus on seven key issues for future efforts at professionalizing mentoring. Key issues 1 and 2 address observation of the state of the art within formal mentoring when programs are planned and implemented: the consideration of recent research and of best practices. While both areas can overlap, they provide complementary sources of pertinent information for the professionalization of mentoring. Key issues 3–6 address the need to align mentoring activities to the specific context and goals of individual mentoring programs by observing idiographic program characteristics, mentoring dynamics, the orchestration of mentoring goals, and the provision of mentoring resources. Finally, key issue 7 highlights ongoing evaluation as the basis of the effective, continuous improvement of mentoring programs.

Keywords: mentoring; STEM; best practice; talent development; research; professionalization

Introduction

For no less than a millennium, the metaphor of dwarfs standing on the shoulders of giants has been used in imagery and as an aphorism[1,2] to illustrate the importance of earlier generations and more experienced individuals for the achievements of later generations or less experienced individuals. The giants can, in fact, include all manner of people: parents, teachers, colleagues, supervisors, and mentors. Biographical case studies of eminent persons and research studies in different expertise domains show the importance of mentoring for personal and skills development.[3–6] Hence, the rationale is strong for implementing this successful method in as many contexts as possible.

Historically, informal mentoring—mentoring that arises spontaneously due to mutual interest and provides interpersonal comfort[7–9]—has predominated.[10] In recent decades, mentoring relationships have been increasingly institutionalized and formalized.[10] In formal mentoring programs, mentees and mentors are assigned to each other, and mentors have specific, usually predetermined responsibilities related to their mentees' development, progress, and success.[11]

The overall numbers of formal mentoring programs are formidable. For the United States alone, more than 5000 youth-mentoring programs have been counted.[12] Similarly, it is now difficult to imagine universities, research institutions, or large companies not offering formal mentoring programs.[13–16] The target audiences and ends of these programs vary considerably. Among programs facilitating positive youth development, for example, various special youth populations are catered to, with programs targeting, among others, academically at-risk students, juvenile

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offenders, immigrant and refugee youth, or youth with disruptive behaviors.[17,18]

Despite the current ubiquity of mentoring programs, there is now tentative initial evidence suggesting the possibility of a recent wave of disillusionment about mentoring. An indication of this is the decline in references to mentoring in various forms of writing. Investigations of the frequency of the terms *mentor** and *mentoring program* (the latter term as a proxy of formal mentoring) in publications of the past 120 years suggest an increase in the terms' prevalence from the late 20th century into the second decade of the 21st century. More recently, however, both terms appear to have become less prevalent. In sum, interest in mentoring has experienced a meteoric rise and is now possibly evidencing the beginning of an apparently precipitous fall (Fig. 1).[a]

The recent decreases in attention given to mentoring in research and everyday communication may be indicative of the ineffectiveness of many mentoring programs as they are being implemented. Unfortunately, research findings show that mentoring programs do not always lead to positive effects.[12,14,16,19–21] On the contrary, the findings are extremely heterogeneous. Effectiveness of mentoring ranges from positive effects that have been counted among the strongest observed among educational measures[22–24] through moderate to small effect sizes—as mainly reported in meta-analyses[12–14,16,19,20,25–31]—down to, in some cases, even negative effects.[31–35] Researchers recently introduced the term *mentoring paradox*[36] when exploring the reasons for the unexpectedly large range of reported effects. The rationale of why individualized support via a suitable mentor should be effective is strong,[36] and case studies confirm that successful mentoring is possible. The overall lack of effectiveness appears to reflect a failure of many mentoring programs to successfully scale up inherently effective mentoring practices. The circumstance reflects a seeming, not an actual, contradiction and thus qualifies, as Ref. 36 argues, as a paradox. Earlier work corroborates this notion of a mentoring paradox. Ref. 42 notes the failure of many programs to replicate successful mentoring and attributes the failure to facile reasoning about how to scale up successful mentoring efforts along the lines of "if it worked before, it will probably work again" (p. 84). Implementing the same strategies and activities that were formerly deemed successful can easily fail if changing contextual factors are not taken into consideration. Moreover, Ref. 29 echoes an awareness of the proposed mentoring paradox and offers a way forward for mentoring research and practice when the authors suggest "remain[ing] realistic about the modest impact of these programs *as currently implemented*" (p. 423, emphasis added). The mentoring paradox thus reflects, we argue, a problem of professionalization.

From the vantage point of the sociology of education,[43] the term professionalization includes descriptive and prescriptive definitional facets. Descriptively, professionalization implies the existence of an activity that fulfills a "crucial social function" (Ref. 44, p. 162; see also Ref. 45) and requires its practitioners to possess specialized skills. Prescriptively, professionalization bespeaks a need for the "improvement of status and the improvement of skills" (Ref. 44, p. 162) within a given domain or practice and may imply a sense that such changes are beneficial for those receiving the service. Mentoring clearly fulfills the descriptive definition—mentoring fulfills a crucial function in society and mentors must know how to work as mentors. The problem of professionalization relates to the prescriptive side of professionalization. The increased interest in and

[a]To gauge the overall and scientific interest in mentoring, we reviewed word-usage data for the terms *mentor** and *mentoring program* in various written usage contexts. To observe the terms' prevalence in scientific discourse, we carried out a bibliometric investigation of *mentor** (i.e., *mentor* with its various endings) and *mentoring program* in all records in PsycInfo, a leading database of scientific literature in psychology and allied behavioral sciences, between 1900 and 2020. To understand the same terms' prevalence in nonspecialized discourse, we carried out a culturomic investigation[37] of *mentor** in fiction published between 1900 and 2019 in the 2020 version of the Google Books English fiction database as well as of *mentoring program* in the database of Google searches, Google Trends, for the period from January 2004 to August 2020. While our broad-brush renderings of word usage in big data should be viewed with great caution,[38] our investigations of the Google Books and Google search data followed best practices for the investigation of these datasets[39,40] and appear to at least also be reflecting cultural trends rather than merely artifacts of the data collections.

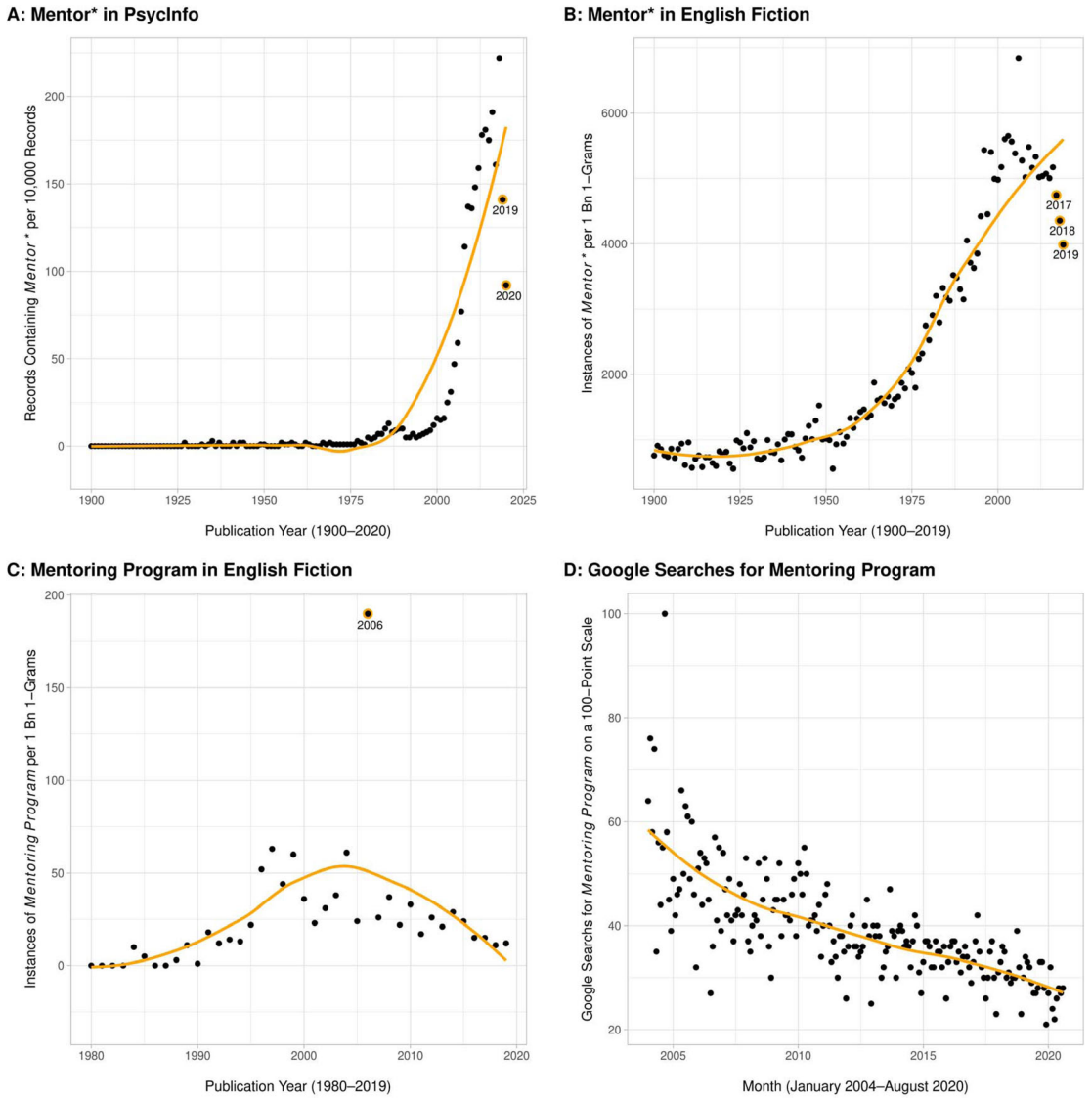

Figure 1. **Usage of the terms *mentor** and *mentoring program*, 1900–2020. PsycInfo from the American Psychological Association is a leading database of scientific literature in psychology and allied behavioral sciences. *Mentor** includes the word with all endings (e.g., *mentor*, *mentors*, *mentored*, and *mentoring*). The 2020 version of the Google Books English fiction corpus collects all words and 2-word (2-grams), 3-word (3-grams), 4-word (4-grams), and 5-word (5-grams) phrases that appear at least 40 times in the scanned books.[37] The Google Books English fiction corpus has been validated for use in investigating cultural questions.[39] The Google Trends dataset provides search-volume data for search terms on a 100-point scale for all Google searches worldwide.[40] The regression line was calculated with the locally estimated scatterplot smoothing method, using local nonparametric polynomial regression.[41] The gray area reflects the 95% confidence interval.**

salience of mentoring attests to a major increase in its status. However, concomitant improvements in the skills of mentors and the skillfulness of mentoring programs have lagged behind, as we will show in the remainder of this article.

Our review of the mentoring literature, our own mentoring research, and our experience with creating and operating mentoring programs opened our eyes to seven areas in which mentoring practices appear amenable to professionalization in the

prescriptive sense and in which initial evidence suggests that additional attention from scholars and practitioners is needed to increase standards. Dealing with these seven issues can lessen the discrepancy between the great theoretical promise and modest empirical reality of mentoring programs and, thereby, help individuals and societies to reap greater benefits from investments in all manner of mentoring programs.

Seven key issues in professionalizing mentoring practices

The issues we identify reflect our preoccupations within research and mentoring practice. Other classifications can certainly be envisioned. Our classification commences with two issues related to the state of the art within formal mentoring, because mentoring practices that fail to consider the state of the art are likely to yield suboptimal results. Here, (1) recent research and (2) best practice are the focus. While both areas can overlap, they provide complementary sources of pertinent information for the professionalization of mentoring.

An awareness of the state of the art is, however, not enough to ensure effective mentoring practices. The conditions and the objectives of each mentoring program are unique and always situated in a specific context. Accordingly, their implementation requires situational adaptations to the given circumstances. It can be assumed that in successful mentoring—as described in some of the case studies mentioned above—it was precisely appropriate situational adaptations that made these mentoring relationships so successful. The situational perspective suggests four additional key issues in need of observance: (3) idiographic program characteristics, (4) mentoring dynamics, (5) the orchestration of mentoring goals, and (6) the provision of mentoring resources.

The consideration of the state of the art and situational aspects is not a static, one-off process. A program cannot inform its approach to mentoring by checking these issues off in a list. Rather, their consideration must be part of a dynamic, self-improving approach that we argue can easily be overlooked—particularly in light of the ubiquitous cultural awareness of the basic soundness of the idea of learning from one's forebears and more experienced contemporaries.[1,46] Therefore, key issue 7 highlights ongoing evaluation as the basis of self-improving mentoring programs.

Key issue 1: awareness of the state of the art within mentoring research

Theoretical and empirical insights can easily be overlooked when mentoring programs are being planned and implemented.[21] A failure to consider research helps explain low levels of program effectiveness[12–14,16,19,20,25–31] and also the premature discontinuation of mentoring relationships.[47,48] Despite the existence of detailed findings on the components of successful mentoring, the approaches to planning and implementing many programs are often simplistic. Many programs have made use of a nonspecific friendship model of mentoring.[19] The assumption behind this model is that a supportive relational bond between mentor and mentee is sufficient to effect positive developments for the mentee. The research literature suggests,[12,19,26–28,49] however, that mentoring programs are typically successful when they take targeted approaches in which the mentoring relationship is seen as a context for intentional, targeted skills development and in which various other success criteria are attended to. Success criteria include organizational conditions, such as adequate planning and preparation, an appropriate duration, regular exchanges between the mentoring partners, the definition and pursuit of clearly defined goals, or the creation of an appropriate learning environment for the mentee. Additional program features also matter, such as mentee–mentor matching, training and ongoing support for mentees and mentors, and the design and production of educationally meaningful offerings for program participants. Recent findings provide support for the assertion that organizational details are critical for the success of mentoring activities. Ref. 47, for example, illustrates with its findings the importance of program staff for determining the success of mentoring outcomes.

Such research findings continue to receive scant attention when mentoring programs are being planned and implemented. There are signs, however, that due to developments in the field and institutional pressure,[50] more and more programs are drawing on research findings or at least considering best-practice guidelines that reflect such findings when planning and implementing programs and for accreditation efforts.

Key issue 2: utilization of the state of the art in best practices

Various efforts are underway around the world to identify best practices and to systematically document these in the form of best-practice guidelines or recommendations. A recent example of these efforts is the consensus study report[11] of the National Academies of Sciences, Engineering, and Medicine. The report aims to close "the gap between what we know about effective mentoring and how it is practiced in higher education" (Ref. 11, p. x). The *Elements of Effective Practices for Mentoring* and its supplements[51–57] from the organization MENTOR: The National Mentoring Partnership provide research-based guidelines on organizational and structural hallmarks of effective mentoring in general as well as for specific areas (e.g., STEM and workplace mentoring) and formats (e.g., group mentoring and online mentoring). The guidelines also describe which hallmarks apply during various stages of mentoring program operation. The stages include mentor and mentee recruitment, mentor and mentee screening, mentor and mentee training, matching between mentees and mentors, initiating mentoring relationships, monitoring and support of mentoring, and facilitating closure of mentoring relationships.

Following descriptions of best practices and research-based guidelines can lead to more successful mentoring. Yet, doing so is not a simple matter akin to following a recipe. Best-practice descriptions and guidelines must be suitably applied to a given program and context. Guidelines on training for mentees and mentors, for example, should include general aspects—the fundamentals of establishing a mentoring relationship—that apply relatively independently of the domain and the respective program. Yet, training programs also need domain-specific and program-specific components to make mentoring successful.[58] A training program that makes sense for mentors in a mentoring program in science, technology, engineering, and mathematics (STEM), for example, will have contents that differ from a training program for mentors in a mentoring program within the performing arts. Yet, even training programs within the same domain (e.g., STEM) require different program-specific approaches, depending on the stage of development of the mentees (e.g., secondary school students, graduate students, postdocs, or assistant professors),[6] the desired outcomes (e.g., socioemotional wellbeing or outstanding achievements), or the way the program is implemented (e.g., online versus offline).[59]

Mentoring is a complex educational measure. Its effectiveness depends on those responsible paying attention to research findings and best-practice guidelines, already starting when a program is being conceptualized and planned. As the examples given in this section illustrate, the application of such guidance must be part of a larger holistic approach within a given program. The lessons and guidelines provided by researchers and practitioners need to be interpreted faithfully and, at the same time, in a contextually appropriate manner that heeds the circumstances arising from the system consisting of each mentee and their environment.[36,60] The key issues arising from this perspective include considering idiographic program characteristics, recognizing mentoring dynamics, the orchestration of mentoring goals, and the provision of mentoring resources, each of which we will now describe in more detail.

Key issue 3: consideration of idiographic program characteristics

Effectiveness assessments of meta-analyses and best-practice guidelines are based on the average results and success criteria of many programs. As such, they cannot account for the various unique characteristics of the individual mentoring programs under consideration, which we refer to as idiographic program characteristics. Therefore, considering the results of meta-analyses and best-practice guidelines when planning and implementing new mentoring programs only ensures with a certain probability that newly developed programs will be successful. It does not, however, allow for reliable conclusions to be drawn about any one specific new program due to each program's idiographic characteristics, even if a given program takes all best practice guidelines into account.

Idiographic aspects include, for example, the target groups, the mentors and mentees who are participating in a given program, and the context in which a given program is being implemented. The same mentoring program can achieve markedly different outcomes depending on the age and cultural and demographic background of the participants.[11,61] We know, for example, that mentees' decisions to

study a STEM field were more strongly influenced by mentoring experiences when they were not the children of parents working in a STEM field.[62]

The areas and domains in which programs are situated also vary considerably and influence how effective chosen approaches to mentoring will turn out to be. This partially explains the greater effect sizes observed for academic and workplace mentoring than for youth mentoring described in a quantitative review of mentoring research conducted in these three areas.[27] Furthermore, characteristics of the implementation of mentoring programs can have different effects in different domains. In the case of mentee–mentor matching practices, for example, same-gender matching appeared advantageous for underrepresented groups of mentees (e.g., girls and women) when mentoring was focused on STEM.[63] In other domains, the same-gender matching practice appeared to be of little consequence for program outcomes.[64,65]

Mentorship structures or formats also create idiographic program characteristics that can influence effectiveness. For example, differences in program effectiveness have been tied to whether a program relies on a classic one-on-one format, in which one mentor and one mentee are matched into a mentoring dyad,[66] or on alternative formats that match more than one mentor and mentee. Alternative formats are termed differently across the literature.[57,67–70] They are frequently described as group mentoring or collective mentoring and sometimes further specified according to the number of mentees and mentors (e.g., many-to-many, many-to-one, or one-to-many mentoring). Positive effects have been documented for one-on-one and group-mentoring formats.[11,65] Findings from studies of individual formats suggest that each format has advantages and disadvantages, such as an easier facilitation of relationship building in one-on-one mentoring[71] or a better provision of networking opportunities in group mentoring.[72,73] Systematic comparisons of various mentoring formats remain rare, however.[11] The few studies of which we are aware suggest that format differences influence how participants communicate and network[72] and the overall effectiveness of mentoring programs.[73]

Despite a substantial body of research on the conditions of effective mentoring, including numerous meta-analyses,[12–14,16,19,20,25–31] idiographic program characteristics make it difficult to derive clear guidance about how to plan and implement individual programs. The best strategy for those planning and implementing programs is to look at those programs that appear the most similar with regard to their objectives, design, and context.[52–57] Plans for a peer-group mentoring program within the teaching profession, for example, should consider studies of similar programs.[74]

Research-based best-practice guidelines contribute to making mentoring practices more effective. They should be considered wherever possible. Many of these guidelines are important for mentoring success regardless of the program and the context of the program. There is, however, room for improvement in this area. A systematic examination of selected idiographic program characteristics via quasi-experimental study designs would shed more light on the conditions of successful mentoring and allow best-practice guidelines to be more effectively applied to idiographic program characteristics. For example, such quasi-experimental studies might compare different mentoring formats (e.g., one-on-one to many-to-many mentoring). To find out which format is most effective, comparable mentees and mentors should be randomly assigned to participate in the different mentoring formats in an otherwise identical program. A comparison of the developmental trajectories of the mentees of the different formats might then show which of them is most effective.

Quasi-experimental designs offer a means of systematizing our understanding of at least some idiographic program characteristics and transforming these through scientific observation into nomothetic (i.e., rule-based) program characteristics, for which research-based best-practice rules of thumb can be applied with more confidence. However, quasi-experimental research with randomized groups of participants remains rare within mentoring research.[21] Greater investments in such research would undoubtedly be worthwhile by contributing to the overall level of professionalization within mentoring.

Key issue 4: consideration of mentoring dynamics

Mentoring is a path-dependent activity. In other words, the significance of a mentoring activity always depends on the concrete history of an individual mentoring relationship as well as on various

developmental aspects. In the past, mentoring programs have considered at least two dynamic perspectives during their implementation. We describe the two perspectives in turn.

The first dynamic perspective constitutes the relationship dynamics that programs need to take into account as mentoring relationships unfold over time. Researchers have distinguished four sequential phases in a mentoring relationship. The phases are not necessarily discrete. They can have different durations and can overlap.

Ref. 75 differentiated the phases of initiation, cultivation, separation, and redefinition. During the initiation phase, as mentoring starts, mentees and mentors are getting to know one another. They communicate enough to establish a productive mentoring relationship. The ensuing cultivation phase typically lasts the longest and is the most intense phase of mentoring. During the cultivation phase, instrumental functions (e.g., in mentoring activities addressing a mentee's academic or career development) and psychosocial functions (e.g., in mentoring activities addressing a mentee's personal development) play an important role and mentor and mentee engagement peaks. During the separation phase, the nature and intensity of the mentor–mentee relationship changes. Interaction frequency typically decreases, and the mentee's autonomy increases. Finally, during the redefinition phase, the mentoring relationship ostensibly ends or transforms itself into, often, a long-term, collegial friendship that is characterized by a peer bond, informal contact, and mutual support. From phase to phase, mentors' and mentees' roles and the support measures change.[6,75] Effectively implemented mentoring programs prepare mentees and mentors for these changes and offer them targeted support in each of the four phases.

The second dynamic perspective focuses on the mentee's own development. Depending on a mentee's development and their developmental needs in cognitive, social, and emotional areas, different mentoring roles and functions become important. In the area of cognitive development, for example, we note research on individualized learning in talent development, which has illustrated across various domains the importance of taking into consideration a learner's own developmental stage for individualized learning in general[3] and mentoring in particular.[6] In an influential retrospective investigation of the developmental trajectories of eminent individuals in a variety of domains—music, art, swimming, tennis, mathematics, and science—Ref. 3 documented how those individuals involved in talent development as well as their roles and functions changed as the learners progressed from beginners toward eminence.

During the "early years" (Ref. 3, p. 512), the focus of talent development is on giving learners a chance to fall in love with a topic, idea, or domain. Those responsible for educating the beginner encourage playful engagement with a domain and share a sense of joy and fascination about the domain.

In the next phase, the "middle years" (Ref. 3, p. 518), talent development shifts focus to acquiring the skills, knowledge, and values of a given domain. Learning is no longer largely a playful exercise. It becomes demanding and is characterized by what was later described as deliberate practice,[76] that is, systematic, effortful practice focused on the gradual achievement of higher levels of domain-specific skills and competencies. This style of learning requires more extensive and specialized instructional support through suitably qualified individuals. Socioemotional support also becomes more important as learners begin to encounter setbacks and experience self-doubt.

Finally, during the "later years" (Ref. 3, p. 524), learners require support from individuals with highest levels of knowledge and expertise in their talent domain. In reviewing the responses of numerous eminent individuals, Ref. 3 concluded that the point of the later years of talent development was transforming technical mastery into a unique style. Here, creativity and innovation become hallmarks. During the latter stage of talent development, the matching of learners with mentors is no longer a matter to be determined by a program. Rather, leaders in a given domain select their own mentees and grant them access to their networks. Domain leaders help their mentees learn how to deal with the pushbacks they will inevitably experience when they begin to present new ideas and threaten the status quo of their domain.[6]

Studies of career development corroborate the observations of talent development research for how mentoring needs to attend to each mentee's own developmental trajectory. At various stages in their careers, mentees need different mentors and different mentoring activities to achieve

desirable mentoring outcomes. One study of 430 faculty members at universities in the United States,[77] for example, showed that researchers who were supported by a variety of mentors as they progressed from one career tier to the next achieved more professionally. Assistant professors with mentors within their professions, associate professors with mentors hailing from outside their workplaces, and full professors with mentors within their organizations enjoyed the highest levels of objective career success, respectively. Moreover, assistant professors with multiple sources of mentors achieved significantly higher levels of both objective and subjective career success in comparison to those whose mentors were all from one source and in comparison to those who had no mentor.[77]

In line with these findings, Ref. 78 suggested a multiple-mentoring perspective as an approach to support the career development of professionals who have been transferred by their employers to other countries or who have taken jobs in foreign countries. The variety of mentors was crucial for helping "expatriate protégés" (Ref. 78, p. 525) to adjust and develop in business contexts. Their perspective addresses how such expatriates need multiple mentors and different forms of mentoring (formal, informal, peer, and hierarchical mentoring) to facilitate their professional development during the predeparture, expatriation, and repatriation phases of their international careers.

Key issue 5: the orchestration of mentoring goals and mentoring expectations

Mentoring is a contextualized process involving numerous participants. Much of what we have discussed in this article is relevant for those responsible for designing mentoring programs. However, it is important to also remember that the professional conceptualization of a mentoring program also requires the contributions of others. Adapting a program to local circumstances requires considering the goals and expectations of all stakeholders involved in the program during its conceptualization, planning, and implementation.

Orchestrating the goals of all stakeholders is an important prerequisite of successful mentoring (see the discussion of ontological M-spaces in this volume, Ref. 36). Earlier research has focused on the goals and mutual expectations of mentors and mentees. While it constitutes only part of a larger picture, we look more closely at this partial aspect as it is illustrative of the larger issue of orchestrating the goals of all stakeholders in a mentoring program.

Mentors negotiate multiple support roles. These can include, for example, those of guide, advisor, teacher, coach, role model, sponsor, supporter, counselor, intellectual sparring partner, and even friend.[79,80] The roles often overlap and cannot always be disentangled.[81] The existence of multiple ill-defined mentor roles is problematic in that it can exacerbate or even lead to unclear expectations about the mentoring. Unclear or competing expectations can lessen the effectiveness of mentoring and cause participants to give up on the mentoring.[82–84]

Effective mentoring relies on mentors and mentees having clear ideas about what mentoring entails, how it is distinct from other support measures, and what expectations for a given mentoring experience are realistic.[65,81,10] All stakeholders need to understand that mentoring is relational and developmental, has instrumental (e.g., career-oriented) and psychosocial functions, and includes phases and transitions in which mentoring roles will change.[6,65] The aforementioned examples of mentor roles will apply differently during different phases of mentoring.[6,80] Moreover, it is important to consider when planning a mentoring program that mentors will show preferences for different roles and accordingly invest differing amounts of energy in certain roles.

In reality, mentees and mentors will have disparate expectations in some cases, and the discrepancies contribute to making mentoring less effective.[82,83,85] Hence, the clarification of mentees' and mentors' expectations and of whether these are compatible as well as the rectification of incompatible expectations are essential for effective mentoring.

A study in the field of management with doctoral candidates and assistant professors as mentees and associate and full professors as mentors illustrated such divergent expectations.[82] The mentors' expectations focused on mentees' career-related behaviors; the mentees' expectations for their mentors focused on social-support behaviors. The study also included a finding illustrating why aligning expectations is worthwhile. Met expectations mediated the relationship between the career-support behaviors and social-support behaviors exhibited by a

mentoring partner and the resulting perceptions of relationship effectiveness and trust.

Key issue 6: provision of mentoring resources

Our discussion of aligning the planning of mentoring programs with the realities of a given program context has yet to address another key area in which the specific context matters a great deal. Mentoring success depends on many resource-related factors. They include—but are not limited to—financial, social, cultural, didactic, time, equipment-related, infrastructural, and motivational resources.[36] In some cases, a resource shortfall can create a general effectiveness bottleneck for an entire mentoring program. Even a mentoring program that is designed carefully according to best-practice guidelines might, nevertheless, encounter a major stumbling block on its way to being effective.

The professionalization of mentoring practices, therefore, requires that mentoring programs be equipped with adequate resources. The provision of adequate resources is, however, not a simple one-off matter. The aforementioned dynamic nature of mentoring means that resources, too, must be continually reassessed and provisioned. Each mentoring experience within a given program and the mentoring program itself are dynamic processes. Hence, programmers must think of ensuring adequate resources as an ongoing responsibility that cannot be planned too far in advance. This circumstance can pose a great challenge for programs that depend on complex, static bureaucratic systems of funding allocations that set a high bar for justifying the fiscal probity of spending. Program coordinators and managers must be utterly convinced of and fully comprehend the inherently dynamic nature of effective mentoring to have a reasonable chance of convincing those in charge of purse strings of the necessity of their variable, seemingly fickle resource-allocation requests.

Key issue 7: ongoing evaluation as the basis of self-improving mentoring programs

Substantial financial resources are flowing into mentoring programs. Although we do not know of any reliable overall estimate of the direct and indirect investments in mentoring programs, the extent of mandates for grant funding that encourage or require organizations to provide mentoring schemes as a precondition of research funding (e.g., Ref. 86) provides an indication that the overall funding stream going into mentoring is now very large. Nevertheless, many mentoring programs are evaluated either haphazardly or not at all.[11,21,28,87] Thorough, systematic evaluations are, however, crucial. Outcome or product evaluations are an essential component for understanding whether investments in mentoring programs are worthwhile, and ongoing evaluations of processes within operating mentoring programs are essential for understanding how individual programs achieve—or fail to achieve—outcomes as well as for making adaptations possible to ensure that programs become more effective over time.

When evaluations are implemented, they frequently fail to fulfill scientific standards.[21] Their explanatory power and utility for program improvement are thus curtailed. A common source of such inadequacy stems from evaluations being limited to inexpensive satisfaction surveys conducted when programs conclude or participants leave.[21,88,89] Satisfaction surveys cannot tell us whether a program has been effective.[90] To illustrate our claims about product and process evaluations and provide readers with a way forward, we describe four key aspects of high-quality evaluations of mentoring programs.

First, evaluations require measures that are appropriate for capturing program outcomes. The measures should capture authentic program-relevant behaviors in a manner that is as objective as possible. If a mentoring program intends to increase mentees' career success, then quantifiable measures, such as salary, publications, or promotions, are better than questionnaire items tapping mentees' or mentors' impressions of mentees' career success. When a questionnaire is employed—for example, to assess socioemotional outcomes of mentoring—the scales that comprise the questionnaire must be the product of rigorous development. Scientific development of psychometric instruments is a costly process. It involves painstaking theoretical grounding of an evaluation's measures and procedures in an auditable, transparent manner as well as extensive pretesting of the scales' reliability across relevant demographic groups and assessment of their validity.[11,90]

Second, evaluations need to capture changes. Rather than only providing for snapshot assessments when programs end or participants depart, useful evaluations require designs that record

pertinent data about program participants and program implementation at least before and after program participation. Pretest–posttest designs give researchers the information needed to ascertain whether a given mentoring program leads to positive changes on stated program outcomes. Ideally, such designs should also include multiple measurements during program participation. When evaluations include repeated assessments of participants during the mentoring, it becomes possible for researchers to also investigate developmental trajectories of participants and the system factors that are shaping the mentoring.

In the case of an online mentoring program for girls in STEM,[72,91] for example, a design that included pretest and posttest measures as well as repeated measurements over the course of program participation allowed researchers to investigate the development of various mentoring outcomes in mentees (e.g., their certainty about career goals or their STEM activities). Continuous collection of logfile data made it possible to also investigate the influence of program characteristics (e.g., mentees' STEM-related communication and mentees' networking behavior on the mentoring platform) and their influence on mentoring effectiveness.

Third, useful evaluations require comparisons with control groups. Understanding whether positive changes observed for mentees during participation in a mentoring program are attributable to the mentoring they experienced in the program requires comparing the developmental trajectories of mentees with those of groups of nonmentored individuals.[90] Barring such a comparison group, any positive changes observed for mentees in a given program could reasonably also have been caused by nonprogram-induced development or other factors outside of the program.

However, even when control groups are included, these are not always appropriate. Conclusions about mentoring-induced changes can only be drawn when they are based on a comparison with a randomly chosen control group of maximally similar individuals. When a conclusion is based on a comparison with a poorly chosen control group, it is possible that perceived differences between the participating mentees and the control group are not reflecting an effect of the mentoring program on the participating mentees but instead characteristics of the individuals themselves.

Defining and recruiting an appropriate control group requires a careful analysis of the individuals for whom a given mentoring program is being offered. In one study, for example, the authors showed that the girls who had registered for a Germany-wide extracurricular online mentoring program in STEM differed on a number of individual and environmental variables in comparison to other girls and boys across Germany.[92] Had the authors compared the developmental trajectories of the mentees in the program with the developmental trajectories of a nationally representative random sample of boys and girls of the same age, for example, the resulting comparison would have been useless as a basis for understanding whether the mentoring program was effective. That comparison would mainly have shown that the developments of a certain group of girls who applied for such a program were more advantageous. In such a case, what is needed is a control group of same-age girls who also expressed a desire to participate in the same extracurricular program. Among all comparable individuals who express the same interest in the same mentoring program, a group is then randomly selected to enter a waitlist control group and to start participating in the program at a later point in time. This procedure ensures that positive developments of mentees can be confidently attributed to the program and not to characteristics of individuals who apply and participate in such a program.

Only evaluations that attend carefully to these three key aspects are capable of providing insights into the effectiveness of mentoring programs. Such evidence is essential in light of the enormous investments of money and personal time in mentoring by governments, businesses, and volunteers. However, as noted, evaluations should look at more than the mere fulfillment of stated program outcomes. Therefore, fourth, process data should also be collected, as programs are running, to allow for data-driven improvements to mentoring programs by way of a systematic understanding of what elements within a given program are working well and which are not. Process data refer to all manner of information about how participants in a mentoring program—mentees, mentors, and program staff—are interacting with one another and utilizing the program. Process data can be collected observationally (e.g., participants' communication and networking data) or by querying participants.

Ongoing evaluations can look, for example, at how various variables (e.g., mentee–mentor relationship quality or frequency and quality of mentee–mentor interaction) contribute to mentoring success or under which conditions advantageous mentoring effects can be reached (e.g., self-efficacy cross-over between mentors and mentees).[93,48] Such investigations may also compare different features within one program, for example, by looking at different mentoring formats (e.g., comparing online with offline mentoring or one-on-one with group mentoring) or different training concepts and, thereby, capture the aforementioned idiographic program characteristics. Findings on the mechanics of ongoing mentoring programs are essential for improving offerings over time and understanding how programs achieve—or fail to achieve—desired outcomes.

Conclusion

Mentoring can positively influence individual development in any domain and with regard to manifold outcomes over the life span. More than a thousand years of cultural intuition—as illustrated by the on-the-shoulders metaphor discussed above—and a strong theoretical rationale bespeak its intrinsic promise. Moreover, the last 25 years have witnessed a dramatic increase in the institutional and popular attention paid to mentoring as a formal educational measure (Fig. 1). At the same time, the mentoring paradox draws our attention to the fact that mentoring programs have frequently failed to live up to this promise. The signs that general and professional interest in mentoring and mentoring programs may have waned somewhat in recent years (Fig. 1) may be indicative of disenchantment on the part of various stakeholders in light of the less-than-expected return on investments in formal mentoring and warrant further investigation.

In response to these circumstances, we endorsed the notion of a mentoring paradox—an only seemingly contradictory set of circumstances—because our review of the available evidence suggests that the unexpectedly low efficacy of many mentoring activities reflects practical shortcomings of how mentoring is currently being implemented. These shortcomings can be addressed and ameliorated. To this end, we proposed that a professionalization problem—defined as a gap between the innate capacity of mentoring to effect positive change for mentees and the level of skill with which mentors and mentoring programs implement mentoring—is a current major impediment to more effective mentoring.

We then identified seven key issues in professionalizing mentoring practices. For each key issue, we offered a brief characterization of the issue and suggestions about how the reality of the given issue can be improved in mentoring research and practice. Key issues 1 and 2 focused on how the state of the art from mentoring research and best practice can be better utilized when mentoring programs are being conceptualized, designed, and implemented. Key issues 3–6 highlighted ways in which more effective practices of mentoring programs need, furthermore, to come to terms with the situated nature of mentoring activities. On a case-by-case basis, program planning and implementation must adapt existing guidelines to fit the idiographic program characteristics, the mentoring dynamics, the complex orchestration of mentoring goals, and the necessarily dynamic provision of mentoring resources. Finally, key issue 7 drew attention to the necessity of scientifically rigorous ongoing evaluations—of outcomes and processes—for ensuring that mentoring programs are efficacious and for understanding how to continuously improve existing offerings.

With our article, we intend to stimulate debate on how researchers, policymakers, and practitioners can work together to help individuals more through mentoring to develop their potentials. This debate is worthwhile because mentoring has an enormous potential as an educational tool. The discussion is also necessary in light of the fact that poorly implemented mentoring can actually do more harm than good.[31–35] We, therefore, advocate efforts to understand and showcase professional mentoring practices and shed light on those in need of reform.

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Competing interests

The authors declare no competing interests.

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