FEATURE ARTICLE

Mentoring in Geoscience

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Abstract

Mentoring provides early career professionals with personalized learning from experienced senior practitioners. Despite its obvious benefits, mentoring has unexpectedly low engagement rates. This paper identifies some of the issues that hinder engagement and proposes an approach based on modern professional mentoring practice. Mentoring is based on both parties accepting responsibility, in which the mentor facilitates learning rather than provides direct answers. The process can be either formal or informal. Formal mentoring involves structured programs whereas informal mentoring consists of casual discussions. Mentors can help with mentees' development in a wide range of subject areas, including geoscience technical and professional skills, careers, and personal support. The paper concludes with two sets of questions for self-reflection, one each for mentees and mentors. The questions suggest mentees approach mentoring with curiosity, clear goals, and self-awareness, while mentors should be altruistic, committed, and have strong ethics and interpersonal skills.

Mentoring Might Not Be What You Think It Is

Mentoring gives early career geoscience professionals a one-to-one opportunity for personalized learning from experienced senior practitioners. Mentoring goes far beyond geoscience and could be humankind's oldest approach to learning and development in every occupation. When public opinion is canvassed, the overwhelming majority regard mentoring as positive and beneficial, an assessment consistently supported by social science research. For example, Scandura et al. (1996) concluded that employees who have mentors not only earn higher salaries but also are better socialized, are more productive, experience less stress, and gain promotion more rapidly. Significantly, mentors share many of the same benefits as their mentees (Scandura et al., 1996; Klien and Cappelli, 2007). According to *Forbes* magazine (2020), 80% of US Fortune 500 companies have mentoring programs that positively affect business results. Given these benefits, one might think that everyone would be keen to engage in mentoring, but that is not the case.

Like many other professional institutions, the SEG has a Mentoring Committee with its own mentoring scheme. The SEG posts a list of volunteer mentors on its website, representing some of the highest achievers in economic geology in the world, but this group represents only about 1% of the SEG's total membership. The SEG mentoring scheme has experienced an unexpected lack of engagement. Similar trends occur in most other professions too. It raises the question: Why are there not more mentoring partnerships?

While it is impossible to know the answer, an informed guess about why more people do not engage in mentoring *is* possible. The well-recognized term "mentoring" has a wide variety of meanings for many different people. Although mentors should be experts in their own fields, very few mentors have received professional training in the practice of mentoring. My own experience and that of many other coaches and mentors whom I have spoken to shows that faulty assumptions and unresolved questions about what mentoring is and how it should be conducted are widespread across both mentors and mentees. In the hope of encouraging more SEG members to engage in mentoring, this article addresses some of the issues I have encountered.

Mentoring Assumes Self-Responsibility

At its simplest, a mentor is "an experienced and trusted adviser" (*The Concise Oxford Dictionary of Current English*, 1964). The word *mentor* is a widely used synonym, not only for "adviser" but also for "teacher," "guide," "coach," "sponsor," "counselor," "confidant," and "consultant," to name only a few possible roles.

When uncertain about modern mentoring practice, new mentors have sometimes challenged me with questions along the lines of "What if my mentee asks me something I cannot answer?" Such concerns reveal the implicit responsibility that mentors feel toward their mentees' education. To these I often respond with another fair, if surprising, question: "Why should that matter?"

Subsequent dialogue often leads to the conclusion that even if the mentor does know the answer, it is hardly ever helpful simply to spoon-feed mentees with what they want to hear. The above discussion highlights an important difference between teaching juveniles and mentoring adults. In school education, the teacher is responsible for providing information and guiding the learning process, whereas in all professional development activities, including mentoring, adult learners must proactively take responsibility for managing their own learning process. So the primary role of a mentor is that of a facilitator. Rather than giving information and instructions, the mentor should create the context for learning that helps their mentee gain knowledge on their own.

The Chartered Institute of Personnel and Development, one of the leading international institutions in human resources management, defines *modern workplace mentoring* as "a relationship in which a more experienced colleague shares their greater knowledge to support the development of an inexperienced individual. It calls on the skills of questioning, listening, clarifying, and reframing that are associated with coaching. One key distinction is that mentoring relationships tend to be longer term than coaching arrangements" (2025). Another distinction is that mentors are experts in the same profession as their mentees, whereas coaches are not usually professionals in that field.

Self-responsibility should be the starting point for both mentees and mentors. In the words of the great modern story-

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teller and filmmaker Steven Spielberg, "The delicate balance of mentoring someone is not creating them in your own image but giving them the opportunity to create themselves."

How Does Mentoring Work in Practice?

For new mentors and mentees alike, one stumbling block may be a lack of knowledge about mentoring conditions, structure, and processes. It is an unavoidable fact that organizations cannot compel anyone to participate in mentoring with any expectation of success. The principle of individual responsibility means that both members of a mentoring pair must be volunteers. It follows that it must be the potential mentee's responsibility to initiate the process of seeking a mentor, and it is up to the mentor to accept or decline once they are approached.

There are two types of mentoring, formal and informal (Garvey et al., 2014). Formal mentoring involves structured programs with centralized administration, whereas informal mentoring consists of casual, ad hoc, and unstructured discussions. In formal mentoring, a would-be mentee signs up to a scheme and, perhaps after personality testing and matching assessments, is allocated to a mentor. The pair then arranges an initial scoping meeting without commitment. The purpose is to begin getting to know each other and discuss the conditions under which they might work together. They explore the specific subject of the mentoring work, meeting frequency, timing, and possible areas of difficulty—such as conflicts of interest, confidentiality, and individual responsibility. Subsequently, they make an active decision whether to work together. If they do, they agree to a so-called contract, which is neither formal nor written. The mentoring itself normally takes place over a short series of private sessions lasting 60 to 90 minutes each, held over a mutually agreed period (e.g., a month or two), and followed by a review. Formal mentoring is always outcome oriented. (For additional details, see Arthurs, 2022.)

Informal mentoring is very common and may not even be recognized as such. A junior colleague simply approaches a senior colleague and asks for help. Whether this results in a one-off meeting or a series of discussions depends on if and how a unique relationship develops. Informal mentoring has been the norm in organizations for centuries. Indeed, there are probably a great many more informal workplace helpers than those who would call themselves mentors or sign up for a mentoring scheme. For the would-be mentee, however, it takes courage and social skill to initiate the process. Schemes that do not include centralized administration with detailed tracking and reporting, such as those run by the SEG and other professional institutions, are a halfway house between formal and informal mentoring. They provide only a simple contact-initiation service that allows mentoring pairs to meet and make their own, usually informal, mentoring arrangements.

There's More to Geoscience Mentoring Than Just Giving Information

A new geoscience graduate might think, *I've just been awarded a PhD from a top university. I have the most up-to-date information in my field. How could a mentor help me?* This new graduate may be confusing information with practical knowledge. Every profession has practical or experiential knowledge, often quite arcane and tacit, that can be demonstrated but may be difficult to explain. One example of this kind of knowledge is heuristics, that is, rules of thumb or shortcuts used to reach a quick conclusion. This is just like "getting your eye in" during geological mapping. For this approach to work well, users need to understand the underlying (perhaps unrecognized) assumptions and what their limitations are. It is experience and know-how applied to practical effect.

Carl Rogers (1902–1987), one of the most influential psychologists of the last century, distinguished between two types of learning based on the learner's needs. Cognitive learning involves intellectual and academic knowledge, whereas experiential learning focuses on gaining something the learner needs for significant personal or practical use. Experiential learning is why veterans like me, who graduated before the concept of plate tectonics was invented, can still be effective geoscience mentors.

A Range of Mentoring Subjects

There are at least four broad subject areas for mentoring: technical and scientific, professional skills, careers, and personal support.

Technical mentoring

As a matter of course, new recruits must learn practical geology and other geoscience skills on-site. Mentors, therefore, must be experts in the specific skill sets required for each particular role. For example, a mine geologist in an underground lode gold mine will have a different but overlapping skill set compared with that of an exploration geologist looking for porphyry copper deposits at the grassroots stage. In general, a good role model for a technical mentor is an experienced and well-respected research supervisor, someone who guides and discusses rather than "teaches." In practice, what works well is a tutorial-style interaction that requires the mentee's preparation and active contribution.

Technical mentoring is so common that many people assume all mentoring is limited to specialist technical and scientific knowledge. If that were the case, it would simply be a form of on-the-job training. However, professional geoscience practice involves far more than scientific and technical subjects alone.

Professional-skills mentoring

Distinct from purely technical expertise, professional know-how involves acquiring knowledge and practicing skills that are integral to the job. Mentoring provides an excellent context in which mentees can develop their communication skills, such as writing reports, delivering presentations, and working effectively within a team. The professional-skills subject area also includes strategic thinking, administration, training, negotiation, leadership skills, and understanding specialist laws and practices, such as mining law, local regulations, and environmental protection.

Career mentoring

Mentors can support mentees in career management by, for example, guiding them through professional licensing, pursuing advanced and specialist qualifications, or transitioning into new areas of work. While mentoring is normally limited to discussion, some mentors extend their support by introducing their mentees to individuals within their own professional network. This is an aspect of mentoring more accurately termed *sponsorship*. It is a mark of

special favor and mentees should not automatically expect it.

Personal-support mentoring

Mentors can help mentees navigate potentially troublesome subjects in which personal and professional issues collide. This includes work-life balance, motivation, confidence, grievance issues, and interpersonal conflicts. New mentors sometimes say, "I don't want to give advice on careers or personal problems." During the initial scoping meeting with a new mentee, it is fair to limit the extent of the relationship by explaining that you will not be offering personal advice. However, if you do choose to help in this way, you can provide invaluable support. Just remember, and remind your mentee, that the principle of individual responsibility applies here too. Giving direct advice by saying, for example, "If I were you, I would…" is hardly ever helpful. The best approach is to ask open, empathetic questions without imposing your own opinion. The delicate art of facilitation does not entail leading mentees to a solution but rather helping them think through issues and arrive at their own solutions.

Closing Thoughts

This wide range of subject areas means that no single mentor possesses the personal experience and skill needed to provide support in every aspect of a mentee's development. Throughout our careers, all of us will need a range of professional helpers. A good mentor is skilled at knowing how and when to *refer on*, coaching jargon for suggesting someone else who may be better able to help.

Over a lengthy career, I have been fortunate to meet many wonderful mentors. My career has been filled with adventurous travel and interesting geoscience alongside marvelous colleagues in many different countries. Of all these experiences, few things have given me as much personal satisfaction as mentoring. If you have not already done so, I urge you to try mentoring for yourself.

Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?

– T.S. Eliot, choruses from "The Rock," 1934

Key questions for mentees

1. What are you curious about? Accept that you are responsible for your own career. It is essential, therefore, that you choose the subject that you want to be mentored in. An effective way to begin identifying and refining your future goals is to reflect on immediate, in-the-moment unresolved issues or areas of curiosity that keep rising from your own subconscious. These thoughts may cover any of the subject areas considered above—geoscience technical matters, professional skills, career questions, and personal support.

2. What do you want to achieve with a mentor? Before starting, reflect on your hopes and expectations, as well as what you want to gain from mentoring. A good mentor will often return your question to you, albeit in a different form. Mentoring is facilitation. Every mentoring session should be outcome focused. If you can cover the hard yards in person, then the credit for eventual success is yours alone.

3. What strengths do you bring? An evidence-based assessment of your strengths will help you find solutions. You should proactively work on your chosen subjects, showing evidence of self-responsibility and initial effort. A good mentor will help you fill in the gaps and guide you forward.

4. What might stop you from engaging in mentoring? Effective mentoring helps create self-awareness. It is private and confidential. You should honestly reflect on potential barriers, such as shortage of time, lack of confidence, or lack of social skills, and seek help with coping strategies if needed.

5. How would you find a mentor? Responsibility for managing your career after graduation is yours alone. Therefore, you must initiate the mentoring process. Building a mentoring relationship takes time and trust. You might look for a mentoring scheme, such as that offered by SEG, or initiate informal conversations with potential mentors. Always approach potential mentors with professionalism and respect. Remember, they do not have to agree to work with you. We are all volunteers doing our best.

Key questions for mentors

1. Why would you want to be a mentor? Mentoring is altruistic. If you want to just tick a career box or use a mentee to play a corporate game, please do not start mentoring. Accepting the principle of self-responsibility means that you cannot take credit for your mentees' successes. That said, mentoring offers a great deal of quiet personal satisfaction, albeit vicarious. We are exercising the facilitation skill.

2. In what ways could you help mentees? We all have signature skills, unique to ourselves. What are yours, and are you willing to pass them on? Also ask yourself, what subject areas do you *not* want to engage in or need to know more about? It is surprising how much we can learn from our mentees.

3. How much time and effort are you prepared to commit? You will not help your mentees by being unavailable because of other work pressures. Good mentoring includes preparation as well as engaging in face-to-face meetings. Decide in advance how much time and effort you want to allocate to all aspects of mentoring and stick to it.

4. What interpersonal skills do you bring to mentoring? Good mentors are good, active listeners and skillful questioners. They are compassionate, self-aware, interested, and curious about themselves and other people. They know how to build trust and can manage their own reactions appropriately. Most importantly, they are committed to obeying professional ethics, putting each mentee front and center as their most important concern in the moment. Kindness and trust, words not often heard in academic combat and thrusting business meetings, apply here.

If you doubt that you have all these virtues, do not worry. Just hold the honest intention to do your best for your mentees. In due course, you can augment your skills through training and practice.

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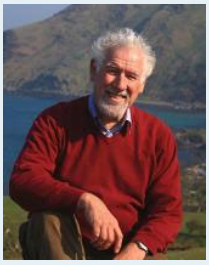

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