# Professional Development Ideas for Students and Young Professionals

Krishnasamy T. Selvan and Cynthia M. Furse

This article suggests ideas that can help with professional development, particularly for students and young professionals. These ideas are largely based on the authors' perspectives and practices developed over three decades of engagement with their professions. Some ideas in this article are covered in one of the author's talks on this topic [1].

## WHO IS A PROFESSIONAL?

We may start by asking: What is a profession? "A profession is a disciplined group of individuals who adhere to ethical standards and who hold themselves out as, and are accepted by the public as, possessing special knowledge and skills in a widely recognized body of learning derived from research, education, and training at a high level, and who are prepared to apply this knowledge and exercise these skills in the interest of others" [2]. A professional is a member of a profession. "Professionalism is defined as the personally held beliefs of a professional about their own conduct as a member of a profession. It is often linked to the upholding of the principles, laws, ethics, and conventions of a Profession in the form of a code of practice" [2]. For example, the IEEE Code of Ethics [3] guides electrical engineering professionals.

### EDITOR'S NOTE

In this issue of the *IEEE Antennas and Propagation Magazine*, we have a very valuable article by Prof. Krishnasamy Selvan and Prof. Cynthia Furse on professional development ideas for students and young professionals (YPs). This is a must read for all students and early career young professionals as they look for guidance to shape their careers. The IEEE Antennas and Propagation Society (AP-S) YP Ambassador Program has been a great success in its debut year 2022. We are now seeking nominations for 2023 IEEE AP-S YP Ambassador Program. You will find the call for nominations in this issue of the magazine and at https://aps.ieee.org/committees/2023ypa. We have many more exciting articles planned for this column in future magazine issues. Anyone who would like to contribute to the "Young Professionals" column or have any suggestions on topics of interest, please contact me at cjreddy@ieee.org. Follow us on LinkedIn at https://www.linkedin.com/company/ieee-aps-yp for the latest updates and events that are of interest to AP-S Young Professionals.

CJ Reddy

## WHAT IS PROFESSIONAL DEVELOPMENT?

While career growth and professional development are sometimes used interchangeably, they are actually distinct terms. Career growth is "the process of climbing the career ladder," and professional development refers to one's continuous focus on improving "knowledge, skill set, and relationships" [4]. While it may be logically expected that the two go hand in hand, it may not be so across cultures and institutions for varied reasons. In this article, we focus on professional development as it is our belief that it significantly helps with individual and hence institutional and in turn national development. We will discuss aspects of professional development associated with specific roles (such as students in a class, research students, and people in academia/government and industry), though it is helpful to keep in mind that a majority of these points stand true for professionals in any role.

## STUDENTS

### IDENTIFYING INTERESTS AND SETTING GOALS

Some students pursuing engineering programs may have clear ideas of what they would like to do after completing their studies. Many students may not. If you are one of them, do not worry—it is quite normal! Either way, it is helpful to reflect on setting a goal. Goal setting involves making a choice, and that
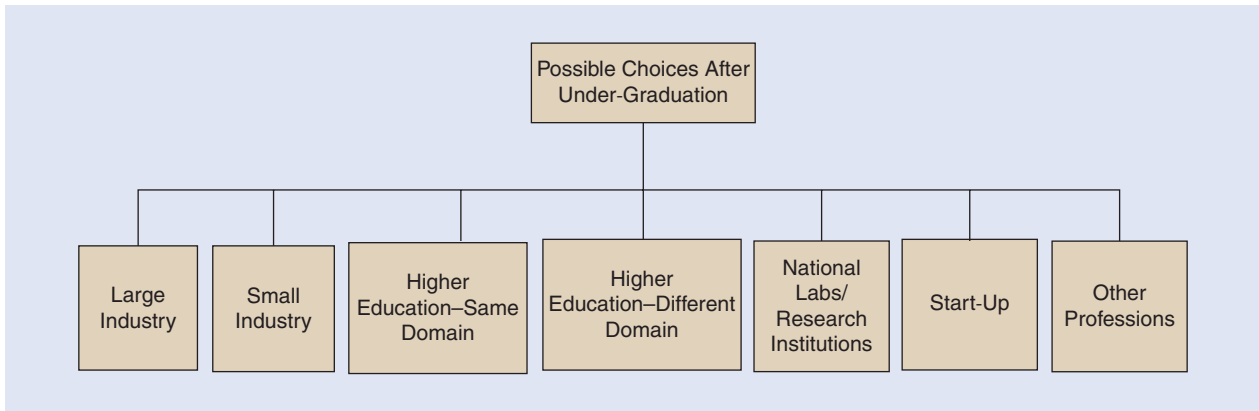
**FIGURE 1.** Making choice(s) from possible alternatives.

requires learning about what choices are available. For an engineering career, you might be interested in large or small industry, perhaps even creating your own start-up, higher education at either a research or teaching institution, national laboratories, or other research institutions, or using engineering as a stepping-stone to other professions, such as law, medicine, politics, or other government service. Figure 1 depicts these possibilities. Take every advantage to learn about these choices, such as by attending seminars, lectures, career fairs and panel discussions, talking with a mentor, doing an internship, and so on. Any opportunity you have to talk with a working engineer gives you a chance to explore possibilities for yourself. Start career exploration and goal setting NOW! The earlier it is done, the more time you will have to prepare for the career you really want!

In case you are not clear about what goal to set, it may help to shortlist one or more of the possible options, which can be done by best aligning your interests and potential. The next step should be to identify the set of competencies necessary for each of the possible goals. This may be done for example, by discussing with a mentor, or by doing research on the Internet. Once this identification is done reasonably carefully, it may lead to the natural retention of some choice(s) based on the weighing of one's strengths and limitations, thus helping in pruning the options. It is possible that in some cases the students are not able to identify any specific goals even after reflecting on the possible choices. In such a case, it will be helpful to do the previous exer-

cise for as many of the available avenues as possible. When the requirements for each possibility are considered with some care and weighed against the individual's strengths and weaknesses, it may lead to the dispensing of some choices and retention of others. It may be noted here that certain skills are usually necessary for most, if not all, of the options. These are as follows:

- reflective or critical thinking
- positivity
- oral and written communication
- confidence.

All opportunities and avenues for exploration—class presentations, coordination opportunities, accepting/offering peer mentoring, participating in cultural programs, attending seminars—in the college environment must be made use of to improve these soft skills.

## WORKING ON NECESSARY STRENGTHS

While the goal(s) thus set is fairly a long-term one, working toward it requires short-term planning. For example, let us assume a student has set the goal of joining a core engineering industry after graduation. In addition to the previous generic skills, pursuing this goal will

require, among other things, a strong foundation in relevant subjects and an awareness of industry trends. Working on each of these requires specific time commitment and weekly goals, for instance. Thus, it is important to set short-term goals, which when combined, will lead to attaining the long-term goal. One approach to effectively do this is to prepare weekly plans, implement them, and to take stock at the end of each week. The authors have personally found such an approach to be very effective. It may so happen that stock-taking at the end of some weeks will disappoint—but that's okay and is most definitely normal as long as one corrects course for subsequent weeks. To this end, one important mistake to avoid is habitual procrastination. A truly deep understanding of the fact that every moment comes just once in our lives is more than adequate to avoid this pitfall!

Another important aspect to focus on is the quality aspect of our engagement. That is to say, the path to be followed to reach the position of "what is desired" from "what is" should be clearly understood. In Figure 2, Path A represents a way that may not lead to the desired goal, while Path B is more
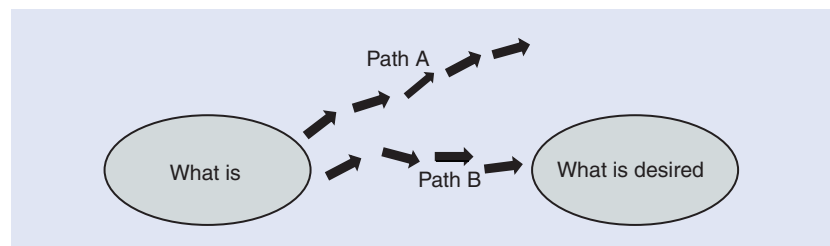


**FIGURE 2.** Following a reasonable path to reach goal.

likely to be successful. This figure tries to illustrate the following: Let's say one needs to strengthen fundamentals in a certain subject. To that end it is important, for example, to make use of quality resources—whether they are books or web resources or attending workshops or anything else of the sort. If a workshop is attended just for the sake of it (say), it is clear that one cannot expect to have achieved the desired outcome. In turn, this means that before attending a workshop, one considers the details, such as schedule and speaker profiles. Similar considerations, of course, also apply to other activities. If we work without appropriate reflection, it may make us feel like we are working toward the goal, but it may not actually lead to the desired results. In general, a good question to reflect on is "why we do what we do." For example, higher education academics from around the world have reflected on why they teach in [5]. The more often we ask this question, the better it will be!

### CONFIDENCE

It is widely acknowledged that confidence is an important quality in the journey of personal and professional development. At the same time, overconfidence is not encouraged. For an interesting list of features of these two qualities, one can refer to [6]. At what stage does one feel confident enough to embark on a task? This is perhaps an important question to contemplate. While there may not be a straightforward answer to this question, we may consider the following situation to develop an understanding. Let's say I want to learn to swim. Do I directly plunge into a deep pool? No, right? Usually what I would do is to theoretically understand some fundamental ideas of swimming, and then to try swimming in a shallow pool. If, on the other hand, I think that I should perfectly understand all aspects of swimming before I enter a pool, could I ever actually swim? By contrast, if I thought that I could easily swim and just jumped into a deep pool, what might then happen? So, we all need adequate preparation before showcasing a new skill, such as public speaking. As I then begin speaking, my skill starts to improve gradually but with certainty.

### LIFE-LONG LEARNING AND OPENNESS

Life-long learning ability is an important quality for every professional—novice or experienced. This could involve a whole gamut of pursuits—attending workshops, enrolling in online courses, going back to university to pursue higher degrees, learning new things from another skilled professional, reading literature, books, and tutorials, and similar things. Life-long learning is important, as "current and future workers face not only changing jobs requiring new and emerging skill sets but also multiple careers as some occupations disappear and others appear, seemingly overnight. These changes are driven by some of the major forces in our society today, such as technology and the public health crisis, but also by globalization, environmental crises, as well as political and economic instability" [7]. An attribute closely related to, and perhaps something that plays a key role in controlling our ability to learn for a lifetime, is the ability to be open to ideas and possibilities. The history of science, the inevitable uncertainty in all aspects of life, and the approaches of great innovators are some pathways through which we learn to appreciate the need to be open to new ideas and thoughts [8], [9].

### GETTING A STRONG REFERENCE LETTER

How does one get a strong reference letter? The considerations for students and employed graduates are of course, different. For an undergraduate student, will doing exceedingly well in assessments alone be sufficient to obtain a strong letter of recommendation from a faculty? Hardly! In any case, grades are stated in the transcripts and would be redundant in a reference letter! The letter should contain the strengths of the student as personally observed by the referee in their interactions. To illustrate this, some phrases from actual references provided by the first author to his undergraduate students are reproduced next:

"At a point of time, the team was stuck with the problem of optimizing the antenna feed. X put in considerable efforts to fix it and ensured that the work got back on track."

"Y demonstrated his oral articulateness in the discussion sessions that were an integral part of the course. He delivered seminars on various topics and was very insightful during the brainstorming sessions in the classroom."

"S took up the responsibility of organizing the class into diverse teams, such that every student had an opportunity to play to their strengths."

"K has been closely involved in a research project with my Ph.D. student and another peer. She contributed towards the design and analysis of a fractal-based multiple-input, multiple-output antenna. She also contributed to writing the manuscript."

Thus, in order to get strong references, it is important to be an active student in the class and to answer and ask questions, make use of presentation and volunteering opportunities, visit the professor's office hours, and so on. Getting involved in faculty-directed research and projects could be another extremely effective way of developing the professional relationship that leads to a great recommendation letter. It is also ok to remind the person you are asking for the letter of the activities you might like them to mention in the letter, and to ask if they are comfortable giving you a strong reference letter.

### RESEARCH STUDENTS

In general, a Ph.D. is a program that prepares one for embarking upon a research career. Thus, it marks a beginning, not an end in itself. (This is one reason postdoctoral experience, where one demonstrates a more independent research capability is often valued by recruiting organizations.) Pursuing a research degree, such as a Ph.D. can be

an exciting journey for the student as well as their supervisor. While universities have varying requirements for the degree, what are the competencies the candidate should aim to develop during the course of their program? Some of these are as follows:

- Critical appreciation of literature is important both as it gives knowledge about the work done in the field of research of the candidate and a context for their research problem. Typically, a Ph.D. student may review 150-200 papers.
- Implied in the point above is the ability to identify quality resources. The reader may refer to [10] to get some ideas on how this can be done.
- Ability to make scholarly presentations and to be able to handle questions and comments.
- Ability to write technical papers and reports clearly.
- Attending reputable, field-specific conferences: Why field-specific meetings? Because it is at such meetings that the chances of meeting and interacting with experts working in the same area are very high.
- Propensity to come up with research ideas
- Critical thinking
- Confidence
- Ability to start developing a professional network.

## PROFESSIONALS IN GOVERNMENT/ACADEMIC ORGANIZATIONS AND INDUSTRY

### WORKING IN AN ORGANIZATION

Let us say a fresh graduate has joined an organization of their choice. Now, how should they pursue professional development? Being fully committed to one's work is a quality that will lead to both personal satisfaction and professional respect in the medium-to-long run. On a general note, organizational goals ought to be consistent with your professional goals. However, because of a wide variety of reasons, it is possible in some cases that the organizational goals may show some inconsistency with your professional

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goals. What should one do under these circumstances? While this is a difficult question to address, one way out might be to see that your professional actions are consistent with organizational *and* professional goals.

### COLLEGIALITY

The term *collegiality* can be understood as "the relationship between individuals working toward a common purpose within an organization" [11], and by extension, within a professional community, such as the IEEE Antennas and Propagation Society. This is very important, as most professions are self-regulated and largely depend on unwritten rules for effective functioning. A collegial workplace leads to a "sense of belonging, open communication, cooperation and support among staff, effectively managed conflict," and can help with "a high work satisfaction" [11]. Needless to say, collegiality may be invoked when one's promotion is considered [12]. Thus, it is important that a young engineer contemplates on this highly desired quality and develops to become and remain a highly dependable, approachable, and knowledgeable professional.

### VOLUNTEERING

Making one's services available for common good, be it within one's organization or the broader profession, can help in excelling in one's career. Volunteering can help one experience aspects of an organization or profession they normally do not interact with, and in developing new skills, including leadership skills. It can also lead to excellent networking prospects. When with "warm attitude" one undertakes "engaging interaction" with their volunteer network, the kind of collaborations possible in the future

can be very valuable [13]. The authors of this article can personally testify to the aforementioned desirable benefits of volunteering.

### ORGANIZING SKILL

The ability to organize a program, meeting, scheme, or anything similar, is an extremely important skill. Broadly, the general processes involved in skillful organization are as follows:

- Reflect on the objectives, or in other words, the reasons why the program/scheme/meeting is organized, and list them (see, for example, [14]). Depending on what you are organizing, this may involve discussion with other stakeholders.
- Contemplate on what is required to work towards each of the objectives.
- Prepare a plan of action, taking into account budget and other constraints as appropriate.
- Implement the plan, taking care to collect qualitative and quantitative feedback at appropriate stages.

Well-organized programs usually require adequate investment of time and energy. Especially when the program objectives are educational or professional, it may be important not to look for desired outcomes in quantitative terms in the short-to-medium term [14].

### CREDIBILITY AND INTEGRITY

What is credibility? It is the "quality of being trusted and believed in" [15]. Naturally, in any organization it is extremely important for every stakeholder—employee, manager, or leader. By developing competence in one's field of work, by taking responsibility and by presenting verifiable information at all times, one can build credibility. Integrity, a related idea, entails open communication, being reliable and responsible, exhibiting consistency between words and actions, and standing up for one's beliefs [16]. It is not difficult to see that these characteristics are extremely important in an organization as they "promote a positive workplace culture by promoting trust and respect" [16].

## EFFECTIVE COMMUNICATION

The eminent Indian philosopher J. Krishnamurthy [17] has said that life is a movement of relationship. We know that to relate is to communicate—whether verbally or nonverbally. In the context of this article, however, our concern is with oral and written communication. Whether at home or at work, our actions are largely directed by the communication we receive and give. It therefore goes without saying that clarity of communication is a central factor in our understanding others and in our being understood. Now, when we try to understand the broad ideas of how we communicate, say orally, we grasp the complexity involved: the speaker thinks a thought, translates it into words using their (limited) vocabulary, and transmits it through speech. The listener receives these words, deconstructs the meaning using their (limited) vocabulary and attempts to grasp the meaning. Even in this situation, as we can see, a "perfect" communication is difficult. When it comes to one-to-many or many-to-many communication, the challenges are obviously too many! Thus, on the one hand, communication is life, and on the other, communication is challenging! An implication of this dichotomy is that everyone needs to keep working on their communication skills. How can one work on this? Making use of presentation and speaking opportunities in class and participating in club activities are some methods. Inculcating the good practice of regular reading is another excellent way that can help.

## NETWORKING

How does one develop a good network of colleagues? Before we answer this question, what does it mean to have a good network? Does casually meeting professional colleagues in conferences, or simply being a member of a professional body, and similar things lead to the formation of a respectable, dependable network? Possibly not. Membership in professional societies can greatly help in developing a network, provided one is an active member of the society. What does it mean to be an active member? 1) volunteer to be on commit-

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tees that focus on your areas of interest—for example the AP-S Education Committee, 2) contribute to the activities assigned to you during the course of your being on the committee, and contribute in the best way possible! 3) provide inputs and ideas that in your opinion can help the committee do better, 4) write good journal and conference papers, 5) attend conferences in your field (these are the best way to meet face to face with professional colleagues), and 6) make quality contributions to local chapters of the Society, where appropriate.

## SEEKING/OFFERING MENTORSHIP

Mentoring involves "helping and supporting people to manage their own learning in order to maximize their professional potential, develop their skills, improve their performance, and become the person they want to be," [17] and requires a "trusted relationship, a meaningful commitment" [18] between the mentor and the mentee. A great mentor "should care enough to be honest about situations and help you arrive at plans of action that will promote your career and educational goals" [19]. While the benefits of having a mentor are clear, the rewards for the mentors themselves include inner satisfaction, enhanced personal visibility, and shaping the culture of their organization [20]. It is common to have more than one mentor, and to choose mentors based on the skill sets you are trying to develop. A "matrix" of mentors can help identify and guide areas where you might prioritize your professional development efforts. To find a mentor, consider what you want to learn, and then reach out to people you observe with that skill, or ask trusted colleagues and senior professionals if they

can introduce you to someone with that skill. When you reach out to a mentor, have a plan for what kind of mentoring you are seeking, and share that with them (do you want to meet just once to discuss an aspect of your career, or do you want more detailed (and time consuming) mentoring, such as learning to teach or do research?). Do your homework before any meeting with your mentor(s). Decide what your question(s) is and do some of your own research on the possible answers before meeting. Then, you will have a good perspective on what options are available as you discuss them with your mentor. Don't forget to thank your mentor, and to follow up later with information on how whatever you tried went.

## DISCUSSION AND CONCLUSION

We believe an extremely important aspect of personal and professional development is to learn to face challenges and setbacks in profession and in life. Remembering that everyone faces challenges itself is important, as oftentimes people feel they are the only ones challenged. Readers who have watched the 1946 movie *It's a Wonderful Life* [21] might recall a most beautiful line from the movie with reference to the protagonist George Bailey, when the gods are talking about his needing help. When asked whether George is sick, the reply is: "No, worse, he is discouraged!" While always being encouraged (read motivated) is easier said than done, are there approaches one can try in the pursuit of this quality? We think yes, and the following are some possible ways in which this quality may be cultivated.

1) *Self-reflection*: A person who is self-reflective has better chances of being focused and committed, and therefore dependable. Being self-reflective, they do not look at the real or perceived limitations of others and mind their own business. In the long run, these aspects may help gain credibility and hence expert authority.

2) *Being more primarily driven by internal motivation factors and reduced dependence on external recognitions*:

While this could be somewhat difficult to achieve, just an effort to do this is likely to bring in some level of positive outlook.

3) *Developing a love for what one does*: This can truly do wonders to how one feels. Consequently, they radiate a positive vibe in their professional environment and are thus able to develop a great network over a period of time. By implication, this helps in avoidance of negative work ethos, thereby contributing to a healthy workspace/community.

4) *Every system, just as every individual, has varying levels of strengths and limitations*: While it is important to do what is possible to overcome the limitations, it is equally, if not more important, to leverage the strengths and do one's best in the interests of the individual and hence the system. Any tendency to focus too much on the limitations must be avoided.

5) *Understanding that there is nothing like a perfect decision*: All decisions are made based on imperfect information available at the time. So, while it is important to learn our lessons from decisions gone wrong, it is even more important not to regret making them in the first place.

6) *Importance of being prepared for the possibility that we are not able to attain our goal despite our best efforts*: When one prepares oneself conscientiously, however, a commendable overall professional development will have taken place, and that development will undoubtedly help in identifying and pursuing alternate avenues.

7) *Having the best of intentions and giving one's best*: This results in a positive outlook and can help in being cheerful a lot of the time.

8) *Having an element of faith*: This perhaps is important, as it can greatly help when one meets with challenges and setbacks in life, despite one's best efforts. This can also help with feeling peaceful and, by extension, lead to more congenial workspaces [22].

While it is evident that striving for personal and professional development needs time, a systematic approach, and a positive outlook, it can be a very rewarding goal to pursue. When individuals spend time and effort nurturing these qualities, they become more confident, cheerful, and productive thus contributing to better institutions and nations.

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