


Why We Teach – Part II

Reflections from higher education academics from around the world

Krishnasamy T. Selvan 

Part I of this series [A1] presented reflections from five higher education academics on why they teach. This second part features the contributions of five more academics, also based on [1], and in conclusion draws up some important common threads that emerge from all of the accounts.

WHY I TEACH

Ashwin K. Iyer, University of Alberta, Edmonton, AB, Canada


I believe that an effective learning environment, particularly in engineering, is one in which educators engage themselves continuously in learning how best to teach. The natural result of this process is teaching their students how best to learn. This premise has helped me to establish my goals as a teacher and as an advisor to my graduate students (Figure 1).

I think that one of the best things instructors can do is to genuinely care for their students' progress, and to build trust with them. I try to employ my own passion for the subject as a tool to inspire students and counteract their natural aversion to highly abstract mathematical or physical concepts. I try to locate and reveal the inherent

EDITOR'S NOTE

In this issue, we are bringing an interesting article in conjunction with the "Education Corner" column (where you can find part I of this article). Dr. Krishnasamy Selvan compiled perspectives from various faculty members across the world, why and how they teach and what teaching means to them. This article (parts I and II) can provide insights and inspiration to early career young professionals who are in academia as well as to students who plan to take teaching as their career.

We have many exciting articles planned for this column in future magazine issues. Anyone who would like to contribute to the "Young Professionals" column or has any suggestions on the 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 IEEE Antennas and Propagation Society Young Professionals.



CJ Reddy



FIGURE 1. Ashwin Iyer (center) interacting with students.

intrigue in theories, techniques, and tools, and imbue them with physical meaning as a means to foster an engineering intuition. In doing so, I hope

to equip my students for a lifetime of discovery through self-teaching.

So why do we teach? I believe that we are compelled to teach for two

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principal reasons: the first is our love for the science and application of our fields of study, and the second is because we feel that we have a responsibility to pass on the knowledge imparted to us with fidelity and authenticity. For me, a major factor in this sentiment is the immense impact that great teachers have had in all aspects of my life, both in engineering and in my extracurricular activities. Also included among our great teachers are the great scientists and mathematicians and philosophers who came before us, from whom we inherited this profound knowledge and to whom we owe a great debt of respect and gratitude. I think it is very important to inculcate in our students this same sense of respect and gratitude so that our students may one day themselves become great teachers.

John Mitchell, University College London, London, United Kingdom

Engineers change the world. Since the first industrial revolution, the ingenuity and inventions of engineers have shaped our lives and created the world we live in today. While those inventions have often been conceived for our benefit, unfortunately it has not been uncommon for them to also come with side effects that have a lasting negative impact on the environment and its inhabitants. From early on in my career, I wanted to be one of those engineers who has a positive impact on the world, and at first, I thought it would come through my research. However, as my career developed, I came to realize that for most academics, although their research pushes the boundaries of knowledge forward, if you really want to have real impact, the way to do this is through the development of the next generation of engineers. It is the future graduate engineers that we are teaching today who will be instrumental in addressing the huge societal issues we are on the brink of today.

What excites me about teaching is the chance to shape the nature of the future of engineering: developing engineer graduates that are creative, attuned with their societal responsi-

We have a responsibility as educators not just to impart knowledge, but also to develop our students' understanding of the wider context in which this knowledge will be applied.

bility, that promote the diverse teams that will be central to inclusive solutions, who can lead and communicate clearly in multiple domains, and who, of course, are technically excellent. We have a responsibility as educators not just to impart knowledge, but also to develop our students' understanding of the wider context in which this knowledge will be applied. We do this through the examples we use, the context we provide to those examples, and most importantly through the approaches we guide our students to take to solve the engineering problems we present.

For the last few years, while still teaching, my role has mainly been on shaping curriculum, at University College London and with other partner institutions. But despite being engulfed in a more educational leadership role, there is still something that is energizing about being in the classroom. Although I still enjoy the

more traditional lecturing I do, it is the project-based learning classrooms that hold the most excitement: the opportunity to interact with, rather than talk at, an engaged class, engrossed in tackling an authentic and challenging engineering problem. To see the class collaborating, researching, brainstorming, and evaluating innovative and sustainable solutions fills me with hope that the next generation of engineering will not repeat the mistakes of the past and will make the changes to the world we all hope and need to see.

Sally Male, The University of Melbourne, Melbourne, VIC, Australia

I earn my livelihood contributing to society using my engineering knowledge through collaboration, teaching, research, and leadership (Figure 2). I teach to give students from all backgrounds the opportunity to develop attributes for them to also lead successful lives, making significant and essential contributions to society using engineering and technology. Through reflection, I learn from the experience.

Motivation and professional identity are associated with learning. Dawn Bennett and I [2] found that engineering students need support to improve their awareness of future engineering

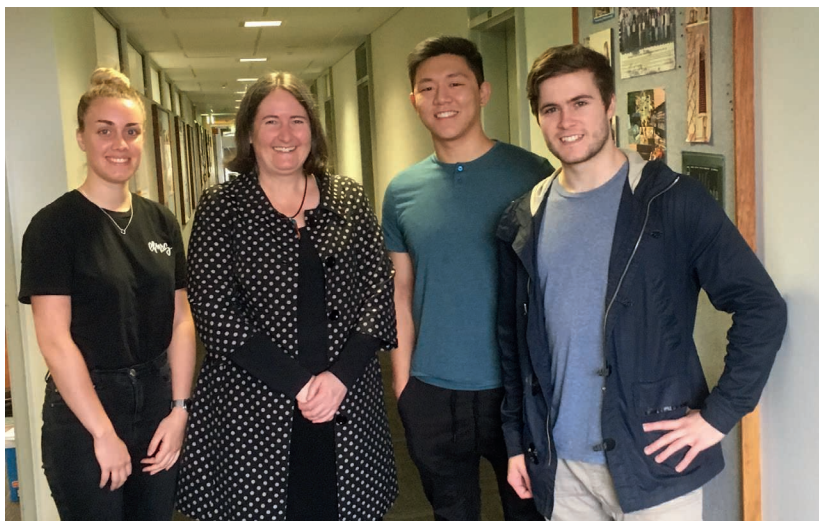


FIGURE 2. Sally Male (second from left) with her students.

roles they could have, and the relevance of their studies to these futures. As teachers, we have a responsibility to design and implement curricula to support students to understand the value of engineering practice to society, to see possible future roles that they perceive to be appealing and achievable, and to recognize the relevance of their learning to their futures. Consequently, we have a responsibility to design opportunities for students to engage with practice and with practitioners.

I designed the electrical and electronic engineering design project subjects to support students to experience engineering practice and engineering workplaces, and to engage with professional engineers. Students worked in teams on projects offered and cosupervised by industry. Many of the student teams met the industry partners in the partner's offices, and used tools that were used in the workplace. I employed team supervisors who were also practicing in industry, and I worked with these engineers to develop the design processes used by the students. For example, the students prepared technical queries submitted to the industry partners, kept technical query registers, implemented configuration management, and held design review meetings. What a tremendous buzz it was to learn from graduates that they used their learning from my subjects every day in their graduate jobs, and that many had secured employment through their design projects.

Whether it is in a lab, a meeting, or a project, anywhere you take the opportunity to communicate and share ideas among others becomes a place where teaching occurs.

Curricula consist not only of syllabi, but the environment that shapes a whole learning experience. Students learn about what is valued by interacting with teachers and experiencing the culture within our faculties. As teachers, we influence the culture and model professional engineering. Students develop professional identities aligned with the values teachers demonstrate. For example, if teachers value professional communication, teamwork, inclusion and safety, then these are likely to become part of the professional identity that students develop. If teachers value only technical elements of the curriculum, then students are likely to follow suit and therefore be insufficiently prepared for graduate employment.

I lead the Teaching and Learning Laboratory in the Faculty of Engineering and IT at the University of Melbourne. It is my honor to now have a role with responsibility for leading research-informed enhancements to engineering and IT education. I have the opportunity to

support academics to be aware of students' needs and support academics in delivering the opportunity and environment that students need, especially engagement with practice and a strong faculty culture. We collaborate with teachers, students, and practitioners to make research-informed enhancements

to teaching and learning through exploration, capable development of teachers, supporting teachers, and evaluating teaching initiatives.

Every teaching role, from demonstrator and tutor to subject coordinator, program coordinator, to teaching the teachers, is significant in the education system, students' lives, teachers' growth, and the future profession and society.

Shrikrishna V. Kulkarni, Indian Institute of Technology Bombay, Bombay, India

Teaching, by practice, is a very noble profession. In order for it to be fulfilling, teaching should be a choice and a passion, not a compulsion, because a mentor's attitude is often strongly reflected on their mentees. The relationships formed between students and their teachers are sacred, and have been so since ancient times. For example, many tales of ancient India feature the vital roles *gurus* (teachers) have on their *shishyas*' (students)' upbringing. The key to preserving the sanctity of these relationships is for teachers to also be willing learners (Figure 3).

So why do I teach? There is a unique and immense sense of satisfaction that can be derived from teaching: the joy of making a lasting positive impact on students and society. On a more personal level, a lot of learning can take place through teaching. I believe that the learning never stops if we have the right attitude. Anticipating questions from students and coming up with answers often proves to be an opportunity to learn by deeply examining the concept in question. This approach,



FIGURE 3. Shrikrishna V. Kulkarni speaking to students.

therefore, stimulates further intellectual growth. Further, I enjoy teaching conceptually advanced subjects to students, as the satisfaction on their faces after comprehending such topics becomes a source of joy.

I enjoy teaching because interacting with a new set of students every year keeps me feeling young and fresh. It is a very versatile field where one can experiment with numerous methodologies and techniques to cater to different audiences. A wide variety of pedagogical techniques are available to teachers, including flipped teaching, shared learning, or colearning. Every instructor takes unique approaches based on their expertise and understanding of the subject.

The process of sharing my expertise is a two-way street, where just as I impart students with knowledge, they inspire me with new research ideas. All in all, it proves to be a very enjoyable and satisfying process.

Tzyh-Ghuang Ma, National Taiwan University of Science and Technology, Taiwan

Why we teach is such a broad and difficult topic to unpack. Of course, the most straightforward answer would be “to make money” or “to pay the bills.” But the real answer is not as simple as that, which is why it helps to classify it into three separate categories: *what* we teach, *where* we teach, and *how* we teach.

Let me commence with *what* we teach. As a young academic in the beginning of my career, I had felt that every student should have the ability to apply rigorous mathematics to solve complex problems in electromagnetism. As I gained experience, I realized that I just wanted students to have a basic understanding of how waves propagate to stimulate their interest in electromagnetic waves. I have come to realize that what we teach should satisfy the desires and meet the requirements of the students, and not the expectations of the teachers. This has inspired me to cultivate a more student-centric method of teaching.

The second category is *where* we teach. Where we teach is not limited to a classroom. Whether it is in a lab, a meeting, or a project, anywhere you take the opportunity to communicate and share ideas among others becomes a place where teaching occurs.

Last but certainly not least, *how* we teach. The future generation is keenly focused on visualization. A great way to implement this ideology into teaching is by utilizing digital media and the future generation’s online presence to establish a peer-level connection with students. This develops interest among students and engages them, therefore creating a vibrant and interesting classroom environment.

Hence, in addressing the what, where, and how of teaching, a conclusion can be drawn on *why* I teach.

Author’s note: From his account, three key points emerge as to why Prof. Ma teaches: to make a living, to help students enjoy and learn the subject, and to share ideas using all appropriate opportunities so as to both help students and to derive personal satisfaction.

CONCLUSIONS

From the accounts of academic colleagues on why they teach, presented here and in [A1], common themes emerge. Enthusiasm and passion for the subject are expectedly shared aspects, as are the opportunity to shape students to become open-minded, lifelong learners, and the prospect of making a positive impact on the profession and society, all of which emerge as intrinsic motivating factors for them. When teachers pursue noble goals such as these, they can find great satisfaction in their work.

Of course, even when teachers have these higher motivations, extrinsic motivators like adequate salary, reasonable autonomy, and a supportive and collaborative workplace can further improve the “attractiveness of faculty positions and the academic life” [3], and in turn faculty well being and job satisfaction. It is refreshing to note in this context that India’s National Education Policy 2020

[4] has sought to “help reestablish teachers, at all levels, as the most respected and essential members of our society, because they truly shape our next generation of citizens.”

When these intrinsic and extrinsic motivating factors align, passionate teachers are produced, attracted to and retained by the profession, thereby positively contributing to society.

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APPENDIX: RELATED ARTICLE

[A1] K. T. Selvan, “Why we teach – Part I: Reflections from higher education academics from around the world [Education Corner],” *IEEE Antennas Propag. Mag.*, vol. 65, no. 6, pp. 48–51, Dec. 2023, doi: 10.1109/MAP.2023.3320587.

REFERENCES

- [1] SSN Institutions. *Why We Teach – Reflections of Higher Education Academics*. (Aug. 13, 2021). Accessed: Oct. 6, 2023. [Online Video]. Available: <https://www.youtube.com/watch?v=OSf5XZ5p0Tc>
- [2] S. A. Male and D. Bennett, “Threshold concepts in undergraduate engineering: Exploring engineering roles and value of learning,” *Australas. J. Eng. Educ.*, vol. 20, no. 1, pp. 59–69, May 2015, doi: 10.7158/D14-006.2015.20.1.
- [3] K. T. Selvan and K. F. Warnick, “Engineering program accreditation: Where have we been and where should we go,” *Adv. Eng. Educ.*, to be published.
- [4] “National education policy 2020.” Government of India. Accessed: Sep. 2, 2023. [Online]. Available: https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

