Why Have Students?

By Abraham Loeb on January 30, 2020

In an online meeting about our ongoing research project, my former graduate student proudly announced that he had just accepted a faculty position, and added: “I am number ten among your former graduate students who became professors”. His delightful news made my day. But merely a day later, in an independent online meeting, my former postdoc who recently started a junior faculty position, asked for advice: “Students slow me down because of the extra effort required to bring them up to speed. Should I take any students?”

This reminded me of the dilemma encountered by young members of academia whether to have kids. The tension set by the biological clock and the academic clock generates anxiety because of the extra duties and responsibilities associated with parenting. But a student-advisor relationship could be a win-win proposition for the careers of both. My answer was an unequivocal yes for many additional reasons.

There are obvious societal benefits to training and educating a new cohort of scientists. All researchers started as students and gained professional expertise from memorable mentors. Even those students who end outside academia benefit subsequently from their broad education when making important business or policy decisions.

In analogy to parenting children, the act of mentoring students enables scientists to promote the longevity of their academic DNA. Students carry the intellectual culture in which they were nurtured in much the same way as children’s behavior reflects their home. It is occasionally possible to identify the academic family from the way research is conducted and results are delivered. Personally, I had the fortune of collaborating with my academic grandchildren and recognizing faint echoes from my own academic DNA in them.

On my first day as a new assistant professor at Harvard, a young PhD student named Daniel Eisenstein knocked politely on my office door and asked if I am taking any students. I never regretted the positive answer I gave him that day. As it happens, he is currently a highly accomplished senior faculty member in my department. It is clearly advantageous to pre-select the most talented students to work with, but sometimes luck is more important. Over the years, I was surprised by some students who initially did not look promising but ultimately accomplished far more than their peers. Starting from a disadvantageous background, they needed time to catch up. Eventually, their unusual internal drive propelled them to great heights that reflected their unique talents. Helping students fulfil their potential is the greatest reward that a mentor can aspire to harvest.

Fifteen years ago, I noticed a broken branch on a young tree in the front yard of my home. The neighbor recommended cutting it off, but after close inspection I identified living fibers that were still carrying nutrients into it, and so I tied the branch to the tree with an insulation tape. Today, this branch grew to be the tallest in the tree. I enjoy staring at its
robust base which by now swallowed the insulation tape in a slow kiss that lasted years. It provides a living reminder on how important it is to strengthen students at the fragile beginning of their careers.

As department chair, I also noticed students who initially underperformed but then blossomed as soon as they changed advisors. Clearly, a successful PhD thesis is not only a measure of the student abilities but also of the interaction with the advisor. In my group, I use a broad menu of options to guide my students in a unique research direction that matches best their interests and talents. Diverse backgrounds are a blessing, since students with original perspectives have a better chance at cracking puzzles. My former students originated in equal numbers from the fields of physics and astronomy and I was blessed by most of them being women over the past decade.

As soon as I started to teach and mentor, I realized how to communicate my thoughts more pedagogically. During the process of explaining material to students who challenged me with tough questions, I also came up with new ideas. As Rabbi Chanina remarked in the Talmud: “I have learned much from my teachers, more from my colleagues, and the most from my students”.

Irrespective of how senior faculty organize their schedule, there are only 24 hours in a day. Having more troops allows them to win battles on more fronts than they would have had the time to explore on their own. But this metaphor reminds us of another benefit. There is a simple reason for why militaries recruit young people as soldiers. Early in life, youngsters are willing to run into dangerous territories without the financial or social baggage that would make them hesitate late in life. Similarly, students take bold steps in risky directions that a senior scientist would not dare taking and so their discovery potential is greater.

Without a bias from past experience, beginning students bring a new perspective to the scientific inquiry, one that is not tied up to tradition and conventions. This breath of fresh air leads to innovation. Fledgling researchers tend to unravel new frontiers that were avoided in the past due to traditional group thinking. Since they did not have time to acquire accolades or administrative responsibilities, young scientists are often less attached to their ego. This is the main reason I enjoy collaborating with them much more than with senior colleagues. Without self-assigned barriers or arrogance, science offers the privilege of extending our innocent childhood curiosity into our adult life.

Finally, it is fun to share the research experience with a group of people who can reminisce about it later. Mentoring offers an opportunity to establish an extended academic family. Some of your students will gladly organize your 70th anniversary fest and others may nominate you for the award that you always deserved but never received. You might even win this award by being more generous with members of competing academic families.
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(Credit: Nick Higgins)