

PREPARING STUDENTS FOR A CAREER IN STATISTICS

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With the rapid growth in the field of statistics such as big data, data science, predictive analytics etc., current students have several choices to consider for their career as a statistician. Statisticians work as collaborators in various industries and academic institutions. In today's competitive world, focusing only on mastering new statistical techniques and software is not sufficient. On the contrary, one needs to strengthen both their problem solving abilities and soft skills, which are rarely taught. These take time to develop but are essential for a successful collaboration. Students should find a mentor who can guide them in achieving and mastering these skills. This interactive session will touch upon various aspects of employability skills and career development.

BACKGROUND

Over the past few years, there has been a rapid growth in the field of statistics. New opportunities are being presented to the students with high demands from areas such as big data, data science, predictive analytics etc. Thus, current students have several choices to consider for their career as a statistician.

Although mentoring and its benefits are recognized in many disciplines, it has not made its ways into the field of statistics until recently. Inclusion of a mentoring component in undergraduate or graduate school can greatly enhance the learning process and get students ready for the real world. Students often view their teacher or thesis advisor as a mentor. But that may be more appropriate from an academic point of view and not beneficial from a global perspective of one's future career. Given my experience working in a health care organization, my primary focus here is on a collaborative statistician career in health care industry. But the concept can be adapted to any other industry where statistician presence is required. Ideas presented here have been adapted from my prior presentations and with my role as a mentor for many students.

There is increased awareness of need for mentoring for statistician working in health care industry. Statistician in a health-care setting routinely collaborates with multi-disciplinary teams which include clinicians, nurses, lab scientists, administrators and IT professionals. Each of these fields has people with very diverse training, skillset and personality. Primary collaborators here are busy clinicians, who are expected to engage in research. This begs the need for many soft skills that are not taught in usual university curriculum.

WHAT SOFT SKILLS ARE NEEDED FOR STATISTICIANS?

Success in a collaborative environment requires multidisciplinary skills that often come with experience. It begins with good academic, scientific and administrative mentoring, and learning about the collaborative disease area or discipline. Developing an understanding of the histological and biological characteristics of the disease, and data on current treatment trends and research areas of focus in that disease area is important. A critical understanding of the clinical nomenclature and clinical implications of the different statistical designs and analyses is vital to make the connection from statistical to clinical relevance. In the setting of clinical trials and prospective studies, this also requires an understanding of the data management aspects of the trial. Working collaboratively with data managers and IT professionals to understand the data structure and data elements that need to be captured during a trial is thus essential

Effective communication skills are a key to establishing and sustaining a successful collaboration with busy clinician investigators. This includes speaking, listening, writing and presenting ideas, concepts and results. A thorough understanding of the disease area is needed, since the clinical investigator often has limited time. The statistician needs to be able to engage the right communication strategies to understand the goal and scope of the project in terms of clinical relevance. With long distance work relationships or multi-site projects, this can be challenging

based on the mode of communication used; face to face meetings versus video conferencing versus phone calls (Derr, 2000). Each has its strength and weakness. In addition, collaborators need to be kept informed on the progress of ongoing projects, and reasonable timelines for project completion must be communicated. This again is especially relevant with distributed statistical centers where faculty, collaborators, data managers and IT support are all located in different institutions and face-to-face meetings happen rarely.

Because collaborative statisticians often deal with multiple demands on their time, teamwork, project management, prioritization, delegation and multitasking are essential to keep projects on target. Leadership skills in terms of team building, conflict resolution, creative problem solving, strategic planning, and short- and long-term goal setting are essential.

HOW CAN ONE ACQUIRE SUCH SKILLS IF THESE ARE NOT TAUGHT IN PRIOR TRAINING?

Mentoring becomes a critical component of the learning process. Mentorship is a relationship in which a more experienced or more knowledgeable person helps to guide a less experienced or less knowledgeable person in the respective area. The mentor may be older or younger than the person being mentored, but she or he must have a certain area of expertise. It is basically a learning and development partnership between someone with vast experience and someone who wants to learn for career growth (Farren, 2006)

Mentoring is a process for the informal transmission of knowledge, social capital, and the psychosocial support perceived by the recipient as relevant to work, career, or professional development; mentoring entails informal communication, usually face-to-face and during a sustained period of time, between a person who is perceived to have greater relevant knowledge, wisdom, or experience (the mentor) and a person who is perceived to have less (the mentee)(Bozeman, 2007).

How can one find a good mentor? This depends on where you are at with your career. One needs to develop some networking skills which may be challenging. Meeting individuals within your field may be the easiest alternative. Graduate students don't have to limit to just their academic advisor. Talking to seniors, peers or other faculty even members of other departments would help. Hopefully, with proper mentoring, you will follow the right career path – this is the first key step. Within the health care setting, one can establish connections with senior members within their own department who may be helpful as a guide in terms of promotions. Others outside the department may also open up new avenues for career growth. Mentoring is not just limited to junior members neither does it have to be a long-term relationship. An individual will have many mentors during the various stages of his/her career.

A willing mentoring team should include members not restricted to just statistics, but also from the collaborative areas that the statistician is working with. This team should spend time with the mentee regularly to groom them at a scientific and academic level. Part of this process should involve assessment of the complete portfolio of the statistician at least annually and encouragement of the faculty to attend clinical meetings and interact with data managers. There are a few basic expectations that need to be met by both mentor(s) and mentee.

WHAT CAN A MENTOR DO?

Mentor should;

- Carve out time for mentee: listen and offer suggestions for situations the mentee may feel unprepared to handle on their own.
- Be willing to share your knowledge and experience
- Point the Mentee in the right direction to identify resources and suggest alternative approaches
- Encourage and support – provide opportunities!
- Provide positive and constructive feedback
- Work with the mentee to identify and set realistic goals
- Assess the complete portfolio of the mentee at least annually, and encourage mentee to attend clinical meetings, interact with data managers etc.

WHAT CAN A MENTEE DO?

Mentee should;

- Ready to Learn– strong desire to learn new skills and abilities
- Take charge of your own professional development
- Try new things–be willing to fail and then to recover
- Set your own goals, and work towards them
- Find your mentor(s):
- In today’s environment of multidisciplinary research, multiple mentors are needed for the different aspects of collaborations.
- Look for opportunities to attend professional meetings and network with other professionals
- Clinical conferences are a great way to jump start your learning
 - Take a course or two to understand the clinical area
 - Sit down and talk with your clinical collaborators about the disease, treatments etc.
- Be willing to be flexible and adapt to the changing landscape of research
 - Keep abreast of new developments
- Mentoring can facilitate acquisition of skills and information, BUT
 - Ultimately, individual effort is needed to guarantee success!

EFFORTS TO INCREASE DEVELOPMENTAL REALTIONSHPIS

EXAMPLE 1: ACADEMIC INSTITUTIONS

Biostatistics collaboration course was developed at McMaster University a few years ago (Thabane et. Al 2006; Thabane et al., 2008). The main objectives of the course were to promote enthusiasm and commitment to excellence in statistical collaboration in clinical research; to enhance communication of statistical issues to non-statistician collaborators; to build statistical self-sufficiency and develop skill in applied statistics; and to enhance a culture of collaboration among statisticians and non-statistician researchers. The course used a combination of lectures and tutorials led by faculty members, videotaped consulting practice sessions, and internship with mentoring of each student by an experienced biostatistician. Similar efforts were done at University of North Carolina at Chapel Hill, which Includes mentoring as part of student apprenticeship positions within the Department of Biostatistics. UNC (Bangdiwala, 2006).

EXAMPLE 2: STATISTICAL ORGANIZATIONS

Statistical associations such as American Statistical Association have started recognizing the importance of developmental relationship in the career advancement of statisticians by offering short courses, webinars and presentations at national meetings. Statistical organizations also have developed a short one-page guide for a statistician learning to be an effective mentor or mentee. The idea is that this guide can explain the basics for starting a mentoring relationship, such as the four stages in a mentoring relationship (establishing rapport, identifying goals, assessing progress, and moving on). This is shared with attendees at national meetings to jumpstart a mentoring relationship. At least one free networking event is organized in more informal setting to ease the attendees. This is offering opportunity to meet others in our profession which helps share ideas and contribute to the statistical profession. Finding a mentor has its challenges especially to those biostatisticians that work at smaller institutions and, keeping that in mind, these organizations have also made attempts to mentor mentee matching. These programs are evaluated on an annual basis for further improvements.

Oral presentation will discuss insights from personal experience as mentor and mentee. Novel ideas and strategies for effective communication, making organizational impact and navigating through career path will be presented. These concepts would be readily translatable to other fields of science, technology and humanities.

They have started a few programs on an annual basis where the mentor and mentee matching is done. Each one is expected to fill out brief survey form expecting what they hope to get out of such relationship. Based on this matching is done in such a way that mentor and mentee

may get at least one face to face meeting at a national conference. Future contacts via conference calls are scheduled by mentor and mentee based on their mutual availability. At the end of the year each one is expected to fill out a survey based on their experience over the prior year and this feedback is used by organization to improve the process for future year.

FINAL THOUGHTS

Career opportunities for students studying statistics are increasing rapidly. Students need to invest time in preparing for that by seeking advice from mentor. Mentoring can be a rewarding experience and can improve communication skills, leadership skills, offer opportunities to learn new perspectives. It also can contribute towards the career advancement. Benefits to mentee are countless too. These include receiving wisdom, advice and encouragement, person with whom to discuss problems/concerns, friendship, role model. Given the collaborative nature of statistician's job, developmental relationships are important for statisticians working in health care setting.

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