

# **Reflections on Teaching, Research, and Service of a Faculty Member for Those Transitioning into a University Tenure Track Faculty Position**

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## **Abstract**

Achieving a career development as a university faculty member is dependent on having a vibrant thoughtful of how to combine the activities of teaching, research and service in a way that makes the best use of the time and resources available. Faculty members are expected to make substantive contributions to the learning of their students and to their field, as well as to make service contributions to the university and community. Faculty members are more likely to make considerable contributions when they have well-defined objectives and a clear plan for reaching those aims. This paper focuses on the challenge of managing the three responsibilities of the faculty member of teaching, research and service. Understanding this challenge and being prepared for it should help for a smoother transition. In addition to these responsibilities, authors suggested that one should not lose sight of the role model that a faculty member is and to recognize this from the start. This is the moral dimension of the life of the academic and has a great influence on the harmony of the workplace and the ability to tackle the many challenges of teaching, research, and services in such a way as to leave a lasting legacy.

## **Keywords**

Moral mission, new faculty, research, service, teaching.

## **1. Introduction**

On their first day of work, new faculty may hear something like, "Welcome to the Department. We're glad to have you here. Here are the keys to your office. Your lab is down the hall. Good luck." Other universities, offer the new faculty member. However, at the start of a career there is much to learn. For this reason, this paper has been written to provide some friendly advice and suggestions to a doctoral student/ postdoc/ who aims for a tenure track faculty position.

Some universities provide assistance to the new faculty in developing his or her road map in the form of a mentor as well as other sources of advice to help build a good foundation for what he/she intends to be a lifelong career. If one is in university that has developed such a mentoring program you are off to a good start.

The availability of mentors in teaching and research support and of other sources of professional advice is well established in the Faculty of Engineering and Applied Science in Memorial University. A number of experienced faculty members recognized as outstanding teachers and/or accomplished researchers have been nominated to serve as mentors to help guide and to provide support to new faculty members in developing their teaching and research activities. In addition, help in developing teaching skills and effectiveness is offered through a partnership between the Faculty of Engineering and Applied Science and the teaching and learning specialists in the DELTS Office (Distance Education, Learning and Teaching Support). DELTS provides seminars as well as a number of advanced technology resources for faculty, including Desire2Learn (Memorial's Learning Management System), online rooms

(to bring classroom discussions online), and lecture capture (to record and to share the professor's lecture notes with students in class).

Mentors also help new faculty members through advice and guidance in the preparation of research grants and may welcome them as co-supervisors on large research projects. The Associate Dean (Research), Engineering Research Office (ERO), Research and Development Liaison Officer and the Research Advisory Committee (RAC) actively support new faculty members in advancing research activities. In addition, there are several complementary tools and resources available to assist new faculty members, including Computing and Networking Support (Division of Technical Services) which provides custom computer assemblies, repairs, upgrades, and system design, technical consultation for computer and network related projects, servicing of computers, and various other services. Finally, the CREAT Information Systems Group (CREAIT-ISG) and the Atlantic Computation Excellence Network (ACENet) also offer scientific computing services and resources for researchers as well as assisting new faculty.

All these supportive actions in the Faculty of Engineering and Applied Science have been an important factor in the major growth and success in research programs, contracts, grants, collaborations and other activities that has occurred.

## **2. Personality Characteristics of the Faculty**

Personality characteristics and interpersonal skills play a crucial issue in how well faculty carry out teaching, research and service activities and in the smoothness of the path towards and ultimate success with tenure; early life experiences and one's mental outlook will influence the ability to manage (Dickson et. Al, 1984). A majority of studies in the area of faculty effectiveness have linked it with an outgoing nature, confidence, maturity, calmness, low anxiety, an empathetic personality, sensitivity, and problem-solving ability rather than problem making (Gage, 1965), and (Matteson, 1974). Further, those teachers have also been found to be effective who are not dominated by a neurotic need for power and authority (Hamacheck, 1969) and (Mohan, 1965). These personality traits influence the behavior of the faculty in diverse ways, such as in interaction with students, selection of teaching methods and learning experiences for the classroom, and in working with students and faculty colleagues on research projects.

Students learn from a teacher's personality in the classroom even if there is no informal interaction between student and teacher. The optimum personality is one that is able to create and maintain a healthy work environment in the classroom, research lab, and the department. Colleagues and students who feel comfortable and supported in their interactions with faculty are able to learn and be more productive.

The authors suggests and highly recommends that new faculty members take a personality test (e.g. Myers Briggs) to evaluate their strengths and weaknesses and their personality type) as preparation for their faculty career. This test provides very useful information in understanding yourself and others.

## **3. Professional Activities**

University students are generally aware that a professor has three responsibilities - teaching, research, and service. However, it is not until one becomes a faculty member that the challenge of managing and carrying out these three functions in the most effective way for students, the department, and yourself becomes a daily and sometimes testing reality. Although these responsibilities appear to be in conflict, it is, indeed, possible to succeed in them by appropriate strategic planning and time management. This paper offers some insights and strategies based upon the author's experiences.

### **3.1 Teaching Activities**

For new faculty, teaching will take up a good amount of time during the first few years. But this time spent on the development of lecture and course materials will pay off in later years when only an annual or bi-annual updating of materials will be needed.

New faculty will be concerned that the early years of teaching and the preparation required will take time away from research. For the broad community beyond the university the primary goal of a university is, indeed, seen as

teaching. There is, then, a perceived conflict between the university's role in imparting existing knowledge and its mandate in generating new knowledge. In view of the time required to get up to speed on assigned courses, the department should, in my opinion, give the faculty member the same courses for no less than five years.

New faculty should keep in mind that teaching is what students and the community at large see as the primary purpose of the university and so it is a societal responsibility in our path toward a tenure track position. Like some other educators, I believe time given to teaching and to research is not completely independent or unrelated. I have found that being involved in experimental research complements my teaching in that I am able to insert experimental data from my research into the lecture and in so doing show the relevance of the research to the practice of engineering. Therefore, research can inform your teaching and your teaching can inform your research. I have also found that being involved in volunteering for culturally diverse organizations and communities on and off campus while I was student developed communication skills that I later used in teaching large engineering class sizes with students from diverse backgrounds.

As a new faculty member, you may not initially have graduate students to help you with your research. However, as you are teaching undergraduate students, especially in large introductory courses, you will be gathering information on student performance through quizzes, exams and project work. This can be the place to find students for summer jobs to support your research work. Becoming an undergraduate project supervisor also provides opportunities to invite good students into the graduate program in your area of research. If you are a teacher with a positive attitude to students, a good personality and a passionate teacher who cares for teaching and for students, qualified students will seriously consider graduate work with you. This can be a very successful strategy and valuable time management as students who have worked with you as undergraduates have some understanding of your research interests and lab facilities. At the same time, you will have some knowledge of the student's personality, integrity, character, and communication skills.

### **3.2 Research Activities**

Across university systems research takes many forms that involve various approaches and tools; none is superior to the other but are more or less suitable to the discipline, e.g. qualitative vs. quantitative. In the engineering context, which is the writer's domain, experimental research requires lab space, apparatus, machine shops, technical support and materials. The costs can be very high and the design and creation of an experiment time consuming. Also, in some engineering research the running of a single experiment may take weeks and months and the work can be repetitive and tedious. Research of a more theoretical nature involving mathematics and computer modeling does not require such expensive facilities, but for validation of the results of theoretical work or computer modeling there should be reliable experimental data. So today's engineering research commonly uses both research approaches. Once a computer model has been validated by experimental work it may then be used to examine a possibly wide range of problems. Unless there is already a well-equipped lab for experimental work with good technical support, a research program that is focused on computer modeling will give an advantage to the new faculty member in establishing a research program and publications. It is the writer's opinion that a combination of computer simulation, theoretical analysis, and experimental validation provide the essential ingredients for success in gaining tenure.

Some educators recommend that new tenure track faculty should be given more time to develop their research activities (Brent et al, 2001), (Bube, 1990), and (Soukup, 1999). Provision should be made for this by offering lighter teaching loads in the first two or three years of an appointment.

It should be noted that different engineering institutions have different research demands within the tenure-track process. Some institutions are highly research focused and place more weight than other schools on the faculty member being able to generate extensive funding, to develop independent lines of research, and publish at a rapid rate. This level of research requires forming collaborative research groups across campus and developing a national and international reputation and connections. Other engineering institutions have a broader mission that places less focus on research and so there is somewhat less pressure on the faculty at least in this matter. There will usually then be a greater emphasis on teaching with a modest level of research. At the other end of the spectrum, in some institutions, positions are offered in which teaching and service are the only functions.

### **3.3 Service Activities**

The third professional responsibility or activity of the new faculty member is service. This is generally considered as the least important of the three. Typically, weights are assigned for service, teaching and research in annual faculty evaluations in engineering institutions and may be different from one institution to another. For example, Professors in the Faculty of Engineering and Applied Science at Memorial University are assigned a combination of undergraduate and graduate teaching amounting to four 3-hour lecture courses per academic year or their equivalent per academic year plus research, scholarship, creative and professional activities, and academic service, which may involve the use of one's expertise in the external community. The scope of all these responsibilities may vary from time to time and from individual to individual. For the majority of Faculty members, however, the principle duties are in teaching and research. In percentage terms, a typical distribution would be 40 %, 40 % and 20 % in teaching, research, and service, respectively. In general service is held in a narrow range of 5 % to 10 %. The literature provides other insights on weights for evaluating teaching, research, and service activities (Seldin, 1980), and (Wankat, 2002).

The author's personal experience is that some faculty members are much more disposed than others to devote time to serve on department and university committees and external professional associations. If the person's upbringing has modeled volunteering, they often will continue this activity into their university careers. However, for a tenure track person this is an area that should not be overdone because research and teaching are, at that stage, much more important. That is not to say that service is less important to the work of the university but that the reality is that it does not carry much weight at tenure time. Later, when tenure has been achieved, service can be increased. With increased maturity and experience the extension of the outreach of a faculty member's service beyond his or her department can have far reaching and beneficial effects for the university's relationships with the outside community.

Other activities for a later stage in the faculty member's development include becoming a reviewer of papers for a research journal and associate or editor-in-chief of a journal, or a committee member in an engineering society. These service activities contribute to a positive image, prestige, and reputation for the institution, and give recognition and visibility to the faculty member that can sometimes open other doors, e.g. research funding.

It is my opinion that service activities of new faculty should focus on the Department's administrative functioning and its strategic planning. These experiences will put the faculty member in a place of knowledge and experience to later consider a role as Head or Associate Head of the Department; in due course, sitting on university level committees will broaden his/her knowledge of the university and establish new contacts.

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#### **4. Moral Mission**

I believe that professors are scholars not simply because of their speeches, research papers, teaching, research, and service activities. I believe the moral quality in all these actions as faculty is the primary factor for true success and true professionalism in all they do. Integrity, respect, strong listening skills, discretion, positive communication, constructive criticism, honesty, transparency, concern, sensitivity, initiative, and courage, will ensure the faculty member will create a legacy as a scholar that is more lasting and important than papers and speeches. One should always adhere to rules, policies, and procedures and seek to work harmoniously and professionally with faculty colleagues despite individual differences of views and personality.

Faculty members can be valuable role models for students and enhance the education process through the qualities discussed above because they are not just imparting information but helping to shape the personality of students who will be the citizens and professionals of tomorrow. For example, the value of these qualities is well demonstrated at the University of Manitoba where I completed my graduate program. One university-wide teaching award is given to teachers selected by outstanding graduating undergraduate students to honor teachers who have made important contributions to their education. Recognizing that academic growth and development occurs over many years, the outstanding students are asked to recognize two teachers: one from their kindergarten to Grade 12 years and one from their years at The University of Manitoba. During the awards ceremony, each student comes forward with their two honored teachers to explain the contribution the teachers made to the student's educational experience and the influence on their path through their education. Without fail, students give great weight to the personal interest,

support, and sacrifice of the teachers often when they were having a difficult time in their lives. These were true “servant teachers.”

This award pays tribute to the faculty member as a role model. While there is no numerical scale to evaluate this aspect of a future faculty member at the hiring stage or even later, it is recognized and deeply valued by students and by the university. It is a vital quality to have in the workplace environment and should be evaluated in reference letters and the interview as best as can be achieved at that time. Some candidates may not be suited to the role of a faculty member and if hired may create problems both for themselves and the institution.

## 5. The Virtuous Cycle

Teaching, research and service form a triad of the primary activities of the faculty member. Rather than seeing them as independent activities, they can be viewed as forming a “virtuous circle.” Students exposed to high quality teaching and learning experiences become appreciative alumni and some develop a passion to pursue graduate research. Good research benefits society and evokes positive evaluations of the university which, in turn, helps bring funding and draws high quality faculty. Also, excellent students are attracted to a university that is famous for the quality of teaching, and research. Service activities, notably those external to the university build bridges and closer working relationships with industry personnel and open opportunities for developing joint university-industry relationships and useful contacts for employment of students. Fig. 1 illustrates the virtuous cycle and how faculty can influence graduate students who will be the future new faculty members.

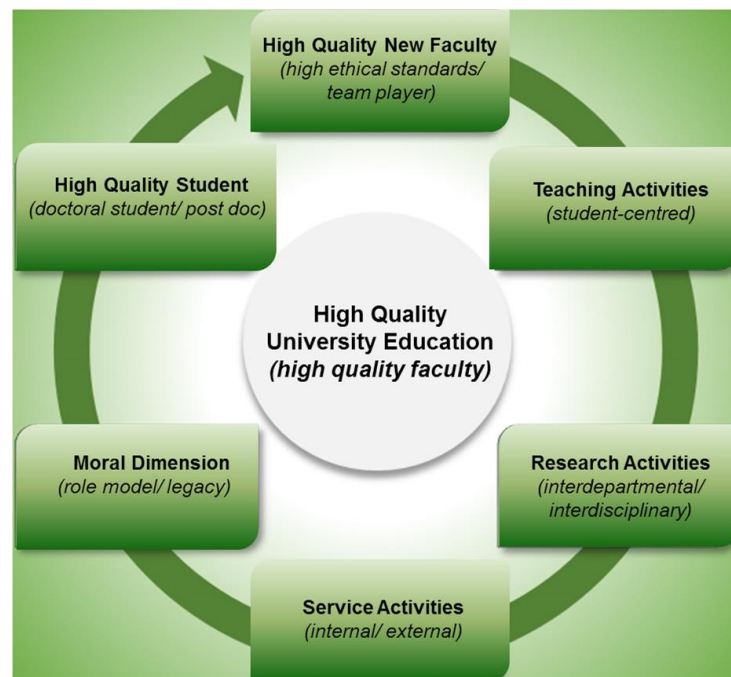


Figure 1. The virtuous cycle

## 6. Conclusions

This paper provides some personal reflections on the three roles of the professor in teaching, research, and service activities, for those who are planning to go to graduate school and then on to a tenure track position. In addition, the author believes that there is a dimension in the role of the faculty member that is primary in achieving true excellence as a scholar that might be called the moral dimension or moral mission or leaving a legacy.

On the occasion of the 60<sup>th</sup> birthday celebration of the famous astronomer, Carl Sagan, the President of Cornell University, Frank Rhodes, said, “I want to salute Carl Sagan as the embodiment of everything that is best in academic life in scholarship, teaching, and service. Carl is an inspiring example of the engaged, global citizen. He is a master

of synthesis, and he has used that skill to engage us as a society in some of the biggest issues of our time. With the conscience of a humanist and the consummate skill of the scientist, he addresses the needs of the society in which we live, and we are the richer for it.” (Terzian, 1997). That is a legacy every faculty member should aspire to leave.

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## **Biographies**

**Aezeden Mohamed** has a B.Sc., M.Sc., and PhD degrees in Mechanical and Manufacturing at the University of Manitoba, Canada. His areas of research are experimental in nature includes but not limited; mechanical properties, materials characterizations, corrosion and corrosion control, and biomedical engineering. He has carried out research and taught at the University of Manitoba and Memorial University in Canada. In addition to his technical research interests, he earned diploma in Higher Education Teaching from University of Manitoba, Canada. He has published over 10 papers in Canadian Engineering Education Association. Currently, he is a Senior Lecturer at the University of Technology, Papua New Guinea.

**John Yuahan Pumwa**, is a Professor of Mechanical Engineering and the Acting Dean of Engineering at the PNG University of Technology. Professor Pumwa’s research interests are in the areas of Tribology (friction, wear and lubrication), engineering materials, friction and wear, energy, biodiesel and renewable energy, modeling and simulation and engineering education. Prior to joining the faculty at Mechanical Engineering, PNG University of Technology, he was a member of the production engineering team at New Britain Palm Oil Limited. He joined the company immediately after graduating from the PNG University of Technology.

Professor Pumwa graduated from the PNG University of Technology with her BEng., degree in Mechanical Engineering. He also graduated from the University of Wollongong, N.S.W., Australia with a MEng (Hons) in Mechanical Engineering. He also graduated from Texas A&M University with a Ph.D. degree in Interdisciplinary engineering. He is a Fellow of the American Society of Mechanical Engineers (FASME) and a Fellow of the Institution Engineers, PNG (FIEPNG) and a member and Chartered Engineer of the Institution of Mechanical Engineers (MIMEchE), UK. Professor Pumwa completed his postdoctoral research at Korea Advanced Institute of Science and Technology (KAIST) with Professor Nam Soo Woo. Professor Pumwa was also attached at Baylor University, Engineering Department as a research Professor conducting research in biodiesel production and testing using coconut oil with supervision of Professor Walter Bradley in Waco, Texas.

Professor Pumwa has taught a number of courses in mechanical engineering; statics, dynamics, mechanics, engineering materials, ethics, failure analysis, vibration and design of experiments. He has served as a Acting Vice Chancellor for almost a year while waiting for the Vice Chancellor to arrive on campus. He has served on a number of university committees (admissions, staffing and appeals) and also board member of PNG Ports for a number of years. He is currently teaching failure analysis to final year students and engineering ethics to third year mechanical engineering students.

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