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Introduction

New engineering educators (NEE for both singular and plural forms) must integrate with senior engineering educators (SEE for both singular and plural forms) in pursuit of unit, institutional, and career goals. Considering the rapid change and increase in diversity in engineering education, perspectives may vary widely among faculty members and constituents of an academic unit. This can lead to diverse approaches for addressing challenges and opportunities that can leave NEE perplexed, frustrated, and inhibited regarding how to initiate and respond to discussions of such. This may be partially due to random individual-to-individual differences in opinion, but in some cases, may be due more to a predictable variation of viewpoints on a natural “life-cycle” progression of values and perspectives within an evolving career in academia.

In 1986, as a 5th-year NEE, the author wrote/presented the paper “Development, 'Survival', and Retention of Young Engineering Faculty: A Front Line View”\(^1\) at the ASEE/IEEE Frontiers in Education Conference in Arlington, Texas. It detailed the concept of “academic wealth” as the tangible, “bean counting” means for achieving initial success, promotion, tenure, and rewards for NEE, and presented ways to generate it. In 1997, the author presented “Long Term Optimum Strategies for New Engineering Faculty: A View from a Decade down the Road”\(^2\) at the 1997 ASEE Conference in Milwaukee. This detailed the concept of “academic balance”, and compared and contrasted it with “academic wealth”. Academic balance involves optimization of the many competing and sometimes contradictory demands upon a NEE’s time, energy, focus, and resources to achieve equitable distribution of success among institutional, career, and personal goals. It incorporates academic wealth, but goes beyond it to achieve a greater and balanced good that benefits all constituents.

The author offers the current paper to discuss two additional related concepts in the progression of perspectives, namely “academic vision” and “academic impact”. “Academic vision” builds upon “academic wealth” and “academic balance”, and is the panoramic view of what successful engineering, education, and engineering education truly entail, not only in excelling with and balancing tangible nuts-and-bolts details (teaching, research/scholarship, service, professional development, etc.; that is “academic wealth”), but also in less tangible aspects, including truly impactive role modeling, personal service, mentorship, and leadership. This deeper impact distinguishes “academic impact” from the broader “academic wealth”. “Academic vision” involves not only seeing, but assimilating, the big picture of “why” engineering educators do what they do in addition to “how”, with an eye toward lasting value, contribution, and legacy.

The paper will discuss recent trends\(^3\) in engineering education, for example, technology in the classroom, hybridization of curricula, and globalization, with potential to foster misunderstanding and contention between NEE and SEE viewpoints. It will suggest means to
minimize mismatch between perspectives and foster compromise, leading to effective achievement of unit goals and accommodation of the various perspectives and goals.

**Background**

NEE must quickly learn to transverse the political and cultural frameworks of academia. Although graduate students are sometimes exposed to some subtleties of such, they will have much to learn after getting in the trenches as NEE. Quickly coming up-to-speed is critically important for several reasons, two important ones being (1) to lubricate potentially frictional interactions with diverse SEE with well established viewpoints and (2) to play the promotion/tenure/rewards game. Although most relevant at one’s own institution, such issues are also important in the broader professional world.

The author had two primary mentors as a NEE, Dr. Albert Mink and Dr. Hal McCloud, at Arkansas State University. They provided candid insight from their many years of experience, and saved the author having to learn lessons the hard way by experience and mistakes. Not only did they provide down-to-earth savvy regarding campus politics, but also regarding those things that would be considered in the “bean-counting” associated with promotion, tenure, merit pay, other rewards, and reputation. Their counsel will always be remembered with gratitude.

This counsel, initial experiences, and associated successes led the author to coin the term “academic wealth” for diverse activities and accomplishments, both on-and off-campus, *perceived* by those in the chain-of-command, or by influential professionals off-campus, as being of value to them, the university, or the profession. This perception can include tangible value, as with research grants and indirect costs coming to the university, but also can have less concrete components, sometimes associated with publicity or image. It may also be related to tradition and stereotype, for example, if publishing in Journal X is perceived as prestigious, while publishing in a comparable Journal Y is not. However accurate or fair, the perception often ends-up being the “reality” in the rocky shores of academia, so heavily based upon judgment of others (chairs, deans, vice chancellors, reviewers, editors, program directors, etc.). This is particularly true as the tenure clock relentlessly runs the first 4-7 years. One must generate beans, go through hoops, and jump hurdles, while not making influential enemies or fatal mistakes, to make it to the all-important tenure goalpost, all within a short timeframe. Numerous manifestations of “academic wealth” were detailed \(^1\) in the author’s fifth year as a NEE.

A decade later, after succeeding at promotion and tenure and settling into mid-career, the author coined the term “academic balance” \(^2\). After the frenzy of generating academic wealth for tenure and promotion, typical NEE reach a point where the earlier heavy workload and time demands become wearsome and hard to sustain. These were often at the sacrifice of personal considerations such as family, hobbies, house/yard, finances, and health. The sacrifice is sustainable for a few years as an investment in one’s career, as the seeds that eventually yield successes are planted, but after roughly a decade, its starts to be less so, as the other
considerations, for example children, start rightfully clamoring for attention. One starts to become weary, particularly of the busy work and trivia that are not untypical of academia (for example, taking 2 hours for a committee to overly discuss and decide upon something that should have taken 5 minutes).

The wise professor will then reassess commitments and activities, including voluntary ones, and reorganize, combine, prune, and redefine the set toward balance (both within and external to the job) and optimal return-on-investment on the “academic wealth” still being generated. Professors who do not perform this readjustment will usually burn-out after a few more years. It will then be difficult to recapture passion for and commitment to the job and profession. This, as much as personality, is why some SEE occasionally appear cynical, uncooperative, and marginally productive in later years. This is exacerbated if SEE feel that they have been treated unfairly, or insufficiently recognized, appreciated, and rewarded, in earlier years. However, it can also occur among those who do not specifically feel this way if they do not, at mid-career, reassess, redefine, balance, optimize, and enjoy the job.

Another factor that leads some SEE to (seem to) become tired, cynical, marginally productive, and uncooperative is escalating change: in the university, profession (both education and engineering), and society. Different personalities have different tolerances for change, but more than a modest degree is stressful for most people. Unfortunately, engineering is a rapidly changing profession, with higher education not far behind. Add to this frequent changes in university leadership, mission, policies, and procedures, as well as significant personal life changes, and stress levels can elevate.

During this mid-career period of “academic balance”, one’s productivity may appear, as measured by tangible, countable accomplishments, to decrease somewhat. For some faculty, this can become permanent if one’s rebalancing has gone too far, with personal priorities dominating. However, for most, this is a period of retooling, not only with new knowledge and skills, but also with perspective, maturity, and purpose, both professional and personal. Professional and personal maturation should synergistically complement toward an integrated approach to career and life that was labeled by A.H. Maslow as “self-actualization”. This will include not only “academic wealth” and “academic balance”, but also “academic vision” and “academic impact”. Although the term “self-actualization” is sometimes regarded as pop psychology, it does present an ideal towards which the professoriate should aspire.

**Recent Trends/Changes in Engineering Education and Beyond**

The last decade produced significant trends in engineering and society that have yielded spin-off changes in engineering education and constituents. In some cases, a key question is whether changes in people cause the other changes, or do the other changes change people? It’s often some of both in an iterative spiral which can include either negative or positive feedback; some initial changes self-correct, but some escalate as things move past the “tipping point”.

Individually, some changes are marginal in impact, but cumulatively, may come together to make today’s engineering education profoundly different from that of twenty years, even ten years, ago. These complicate the definition of the optimal objectives of engineering education, and the job for SEE relative to the way that it was in their earlier years. On the other hand, most NEE have been immersed in these changes as part of their childhood, teenage years, and college experience, and do not view them as change as much as their older colleagues do. However, rapid change will eventually impact them also. Thus, it is not only specific changes that have impact, but even more so, the fact that rapid change in general has become inherent to modern life and technology. Although difficult, one must step-back and assess one’s career and life from a broad perspective. The following are trends that have become apparent in recent years.

Although the exact balance between the pros and cons of each could be debated, most are viewed with, at least, some concern by most engineering educators. NEE need to be aware that they can be red button issues, and color the “academic vision”, for some colleagues, particularly SEE.

1. **Personal Computer Technology:** Although not birthed in this last decade, personal computers (PC) continue to impact engineering and its education. Enhancement of processing speed, memory, and software capabilities have led to new engineering capabilities and applications, for example, in computer aided drafting/design. Most professors have periodically found that their current computers and operating systems cannot support upgrades in software. It is now imperative that engineering faculty be semi-expert in PC technology just to survive in modern engineering education, even if they have access to computer support staff (which is also critical to handle problems beyond the skills of a given professor). When computers work correctly, they are wonderful, but when they don’t, they invoke extreme frustration (for example, when an hour’s worth of unsaved work is lost due to a power failure or machine lock-up). Nearly all engineering practitioners, including students, have experienced a computer or peripheral device failing to operate due to hardware failure, software “glitches” or incompatibilities, viruses or worms, etc. Depending upon circumstances, this can be a huge problem, given the increasing dependence upon such systems as primary, rather than back-up, processing and storage devices.

2. **Internet/E-mail/Videoconferencing:** Similarly, Internet, e-mail, and videoconferencing use has escalated over the last decade. What was a novelty for some has now become a necessity for all engineering educators. When it doesn’t work correctly, the increasing dependence upon it can cause big problems. With routine communication within a university now frequently by e-mail, one feels paralyzed when the server is down. One can feel stress in not knowing what he/she may be missing and how important it is. This has led some to become almost obsessive-compulsive in constantly checking their e-mail, even from home, at all hours. Hand-held personal digital assistants and advanced cell phones now make this possible even in transit! Some have become tethered to e-mail, and some bosses now expect rapid responses at all times.
Similar issues apply to the Internet. It is now routinely depended upon not only for rapid retrieval of information (some of which may be questionable) on essentially any topic, but also, in some cases, for supporting e-mail, as well as business transactions (membership renewals, bill-paying, etc.). As with e-mail, non-availability of Internet service is a major problem if one is working on a project where it is critical.

Although not quite as established, videoconferencing via the Internet is increasingly assumed to be a capability of all engineering faculty (which may or may not be true). It is a powerful tool when used properly, but, with technical malfunctions, can disrupt an important electronic gathering. Although old fashioned tools such as telephones, FAX’s, and “snail mail” are still available, the fact that electronic communication has evolved into the default tool-of-use means that it may be awkward to utilize the other tools.

3. **Technology and Associated Pedagogy in the Classroom**: Related to 1. And 2. is increasing use of technology within the classroom. Although technology has always been a part of laboratory courses, only recently has it begin to compete with chalk and marker boards in lectures. Although offering advantages, there are disadvantages to slides, projectors, smart boards, web sites, distance learning, etc. when it comes to the discipline, effectiveness, and convenience of learning (and teaching). Chalk and marker boards may be “low-tech.”, but they rarely lock-up or go-down to cause big problems. In the author’s estimation, conventional lecture methods tend to promote better attention and note-taking since students cannot depend upon it all already being available on slides or the web. Regardless of one’s opinion, technology in the classroom will continue to increase, and both NEE and SEE need to become skilled and comfortable with its use, while also being vigilant that its use remains **truly effective** in promoting real student learning of critical fundamentals.

4. **Information Overload**: Related to the above, engineering educators are now overloaded with information. This includes not only needed information, but also unwanted e-mails with advertisements, spam, and opportunities (for example, conferences and on-line journals). Information that used to be sent through the U.S. Postal Service is now often e-mailed or posted on web sites, say, those of professional organizations. When using the Internet as an encyclopedia, one obtains a huge amount of information on a topic, with the ability to filter and sort it as much of a problem as insufficient information used to be.

This has several effects. First, it can be stressful and time-consuming to sort through all of this information. Second, even after doing so, one may still be somewhat unclear about what details are most important and/or true.

Third, and related to organizational politics, information is not the bottleneck and source of political power that it used to be. Historically, strategic information in an organization was carefully controlled, and those in-the-know were generally either in the inner circle
or politically very savvy with an under-the-table contact network. Now, many things are broadcast to everybody with a single click of the mouse or website posting. This is exacerbated by the ease by which e-mails can be forwarded and the tendency of some to electronically gossip and tell everything that they know. Anybody can now have their 15 minutes of fame/infamy via websites, blogs, and mass e-mails.

Fourth, no longer is expertise in a subject exclusively the domain of true specialists. Now, anyone can use a search engine and become a quasi-“expert” on anything. (Medical doctors and attorneys have to deal with this with patients/clients, as do engineering faculty with students who have become Internet “experts” on a subject - including all of its myths and urban legends, for example, perpetual motion). However, such individuals usually don’t know what they don’t know.

Fifth and troubling to engineering educators, it is now expected that faculty will be able to really assimilate this wealth of information. This includes recitation of program and profession statistics and current events in detail from memory, for example enrollment numbers and minority percentages.

It is clear that being able to quickly retrieve, filter, organize, record, recite, and (correctly/accurately) utilize this huge amount of information has become a critical skill for all engineering educators. This will continue to require increasing skills with modern information technology, as well as a mindset attuned to these new ways of doing things.

5. Simulation and Virtual Reality versus Actual Reality: Computer-based simulation, computational and graphical, has replaced portions of what used to be hands-on physical experiment-based activities, both in the practice and education of engineering. Although offering powerful advantages, and saving time in design and analysis, the flip side is that one must continuously maintain competence in computer hardware, software, and networks. Last year’s powerhouse graphics or simulation package may be this year’s dinosaur. Furthermore, something is (potentially) lost while something is gained, not only familiarity and expertise with actual measurement of physical phenomena, but also an intuitive sixth sense about physical measurement, and limitations and common sense thereof. Some modern students are whizzes with computer simulations, but aren’t sure how to use a clamp-on meter or analog oscilloscope. One can argue that such skills are not as important in engineering now as in the past, but like insurance after an automobile accident, when they are needed, they are needed, and an engineer will not always be aware of when they may be needed in the future. Emphasis on computer simulations can also consume class time that historically was devoted to covering fundamentals. As with all of the trends discussed in this section, balance has to be struck between well-proven historical methodologies and new and (potentially) improved ones.
6. **Hybridization of Academic Disciplines**: Another recent trend is hybridization of academic disciplines, both in academia and profession(s). This offers certain advantages, for example, resource pooling and broader perspectives on problem solving. It reflects increasing hybridization of disciplines in the real world, and escalating merger of historical boundaries between professions. However, some in engineering and science education feel that it has become too free-and-easy, with new academic programs established in response to any change in academic winds, and associated anticipated funding and publicity. For example, many colleges and universities in the United States are now jumping on the alternative energy bandwagon, in some cases without sufficient contemplation of perceived benefits versus costs, risks, and long-term viability. Some have forgotten that the same bandwagon came around in the 1970s after the first “energy crisis”, but passed from the scene a few years later as petroleum prices and supplies stabilized and government funding dried-up. Similar arguments could be made about environmental studies. Although alternative energy and the environment are important topics, it is not clear that new hybrid academic programs are always the best way to address the education about such.

This trend has made it necessary for faculty, chairs, and deans to be flexible and non-territorial about their disciplines, faculty, and resources, and willing to submit to whatever hybridization mandate comes from above, regardless of the wisdom, cost, or viability. Such arrangements can be “win-win” for everyone, but they can also be boondoggles if not carefully assessed and planned with long-term viability rather than short-term expediency in mind. They tend to be viewed less favorably by SEE with a vested interest in the status quo and their territories than by NEE in the building stage.

7. **Changing Student Mindsets, Habits, and Preparation**: As is bemoaned among engineering faculty, particularly SEE, student mindsets, habits, and preparation for college (seem to) have evolved in recent years. One hears conflicting opinions of whether this is overall good or bad, but most opinions reflect a serious concern about how these changes really affect the bottom-line quality of engineering education and graduates. This topic could be the subject of a dedicated paper by itself, and typically evokes spirited discussions. A generation gap factor is involved, with NEE typically feeling less concerned about these changes than SEE, and sometimes naturally a bit defensive about discussions of such.

The perceived/debated changes typically fall under one or more of the following categories:

A. High school preparation less rigorous and thorough, and sometimes more “politically correct”, than in the past.
B. Students too used to an overly affluent and leisurely lifestyle, with an associated compromise of work habits and work ethic, including those associated with studying.

C. As implied by 1.-5. above, students more skilled and comfortable with, and dependent upon, computer/electronics-based technology (including overly powerful calculators) than real world/ hands-on technologies, with a decreased sense of reality and sometimes confused sense of the ethics associated with their use (for example, is copying-and-pasting information off of the Internet “really” plagiarism?).

D. Related to B. and C., students used to and insisting upon immediate communication and associated answers or gratification, for example, by cell phone, e-mail, or personal digital assistant.

E. Students more apt to question, negotiate with, and sometimes disregard authority and rules than in the past.

F. Students living such multi-faceted lives that college is not the top thing on the priority list, with other distractions dominating.

G. Specifically, increasing college costs now forcing many students to work significant hours per week (as much as 30-40 in some cases) to pay college and other expenses, with concurrent decrease in time, focus, and motivation to excel in college \(^8\), or even participate in student professional organizations and other extracurricular activities. This has become a major problem in some engineering programs, including the author’s.

There is still debate on whether these are truly detrimental, or just another manifestation of every older generation bemoaning the younger one(s). Society has always been in a state of change, and, on balance historically, most such changes have ended-up being more positive than negative. However, the negative perception of these changes among SEE is something of which NEE need to be cognizant, and it behooves educators everywhere to be vigilant and discerning about trends that have potential to end-up being more negative than positive.

8. Overemphasis on Assessment, Statistics, “Research”, and New-and-Improved Pedagogy in Educational “Innovation”: Another controversial issue that concerns SEE is increasing (over) emphasis on assessment, quantification, and statistics in research and innovation in education, and apparent disproportionate influence of educational “theorists” (versus “practical” engineering educators), sometimes without any engineering degree, in engineering education. Obviously, quantification, when possible, objective, reproducible, accurate, and precise, is a hallmark of good research, certainly that in science and engineering. However, beauty is often in the eyes of the beholder with less tangible things such as truth, beauty, love, and educational effectiveness.
Without raising a firestorm here, suffice it to say that there are many engineering educators who are not convinced that all of this is beneficial to the big picture, and think that the forest is getting lost in the trees, so-to-speak, in some cases. Sometimes, long-term antidotal evidence and intuition-based opinions are just as valuable, if coming from experienced educators, as the latest survey statistics, which are often based upon small ensembles and time periods, and can sometimes be massaged to yield a variety of conclusions. NEE need to be aware that SEE may not be enamored by the supposed need to prove every observation on engineering education by numbers, and may not be enthusiastic about every new pedagogical fad that comes along based upon such.

9. **ABET EC 2000**: Similar statements apply to the relatively recent assessment-based ABET EC 2000 accreditation criteria for engineering programs. Although the intentions were valid, many engineering faculty feel that the comprehensive learning objectives/outcomes/assessment paradigm required by EC 2000 has in many cases burgeoned to an unwieldy and burdensome framework of work that goes far past the point of diminishing returns. It has taken-on a life of its own and become a case of “groupthink” in which no one dares to talk about the emperor’s new clothes, given the extreme importance of ABET accreditation to a program. Unfortunately, the process has its weaknesses and limitations, and has a marginal return on the investment on the huge number of person-hours required to implement it. Not all of this is ABET’s fault. Some universities were too ambitious in setting-up their particular methodologies. ABET does receive and consider feedback about the process. However, in some cases, particularly in smaller engineering programs, the ABET workload, on top of standard teaching, advising, service, research, professional development, and administrative duties (not to mention spending $\approx 2$ hours a day on e-mail), has become a major irritant, and elicited significant grumbling under the table. NEE need to be aware that all may not be exactly as it seems on the ABET front at some institutions, although they will have to become quickly calibrated to whatever methodology their institutions are utilizing.

10. **Service-Learning, Volunteerism, and Other Activism**: Well before the recent change in presidential administration that has further focused upon them, there emerged a refocus on community organization, activism, and volunteerism that the nation has not seen since the 1960s. As with most of the discussed trends, this cuts both ways. When focused upon worthy causes and activities, these can benefit a region and its citizens, as well as foster a needed sense of community. They can provide needed assistance to the disadvantaged and hurting. They can be an opportunity to enhance the character and compassion of young people and should be a clearly good thing. However, volunteerism should be fully voluntary, not mandated, coerced, peer-pressured, or indirectly fostered via a systems of carrots and sticks (for example, tax, pay, or other financial incentives).

This has had some effect upon higher education. Examples include increasing emphasis upon service learning, community engagement, etc. Some universities now encourage
faculty to become involved with the community and region in ways not directly associated with education. This is not necessarily bad, but is worthy of vigilance. The danger is that priorities can be misaligned, and the bottom-line reason for a university’s existence, to educate students, can get lost in the fray. A faculty member can end-up with too many such commitments, compromising excellence in all of them.

A couple of considerations apply. First, NEE should assess the benefit-cost/risk ratio of such, particularly relative to promotion and tenure. Unless a university rates them very highly, one’s time might be better spent in writing proposals and papers, and perfecting one’s teaching. Second, if encouragement to participate evolves into coercion, either subtle or direct, there are strong academic and personal freedom issues involved. For example, it is fitting to donate to charities, but if one is told behind closed doors that the university wants 100% of its faculty and staff to donate to a specific one, and pressure is applied to do so, the line has been crossed. SEE, already tenured and promoted, are generally more attuned to such potential improprieties. NEE would be well-advised to contemplate what they say, and why they say it, even if sounding a bit extreme. With universities under pressure to generate revenue, and associated publicity and good public/governmental relations, some may compel activities historically not part of standard duties, for example, providing factory-floor technical assistance to new industries (which historically has usually been handled via external consulting) and jumping at every possible grant opportunity. Academic freedom, both in instruction and in research/scholarship, is one of the tenets of the American university system and has to be vigilantly guarded from encroachment and micromanagement.

11. Exaggerated Emphasis on Political Correctness, Diversity, Self-Esteem, and Other “Touchy-Feely” Factors: Although exhaustedly debated for years, no discussion of trends concerning educators would be complete without mention of the perception, by some, that modern academia has gone well past the point of diminishing returns in promoting the mantra of “touchy-feely” factors such as “political correctness”, “diversity”, “self-esteem”, “revisionism”, and “experiential learning”, just to name a few. It is not the author’s goal here to re-debate these, but it is worth the observation that overemphasis on these in some institutions does detract from efficient delivery of a solid and realistic education to some students. In instances where subtle or blatant coercion is applied to faculty to conform in promotion of these, critical academic freedom may be violated. Academic freedom has to cut both ways and cover all viewpoints within reason. NEE should be vigilant about any coercion, and realize that engineering educators are probably less amenable to these factors than, say, liberal arts faculty, and that SEE are probably less so than NEE. Proposing some new “touchy-feely” innovation among a cadre of SEE with conventional views about education, grading, and student learning will probably not be well-received. NEE should tread cautiously in these things and
discretely determine how much support exists before openly proposing such and confronting serious SEE opposition.

12. Globalism and Travel: The “globalism” of engineering and engineering education has escalated recently\(^9\). For example, many American professional engineering and science societies now occasionally hold conferences overseas, or are co-participants in such. Matriculation agreements between American and foreign universities are on the rise, and American universities solicit international students, and send American students overseas on exchange programs. Journals increasingly have an international set of authors, editors, and readers.

There are benefits to these, because the world continues to get smaller in all fields including politics, economics, the environment, and entertainment. Obviously, educational isolationism in today’s world would be counterproductive. However, some of this occasionally goes too far, again past the point of diminishing returns and into the realm of political correctness and bandwagons.

Some faculty members seem to “jet-set” frequently to this and that international meeting, conference, or opportunity with little hesitation. In some instances, this may be justified. However, such trips are highly expensive when money is tight for universities. Furthermore, after the “9/11 (01)” tragedy, such travel became more regulated and inconvenient due to security concerns. The biggest irony is that such travel occurs in an era in which very sophisticated communication modes, for example, large bandwidth videoconferencing, as well as e-mail and reliable international telephone protocols, really make much of this unnecessary, at least, as far as actual communication is concerned.

However, globalism is here to stay and NEE must be prepared to accommodate it. As with most of the other trends, NEE need to understand that it may not be nearly as popular with SEE and/or provincial faculty as with NEE or those initially from overseas. Such faculty may take a dim view of NEE using limited travel funds for expensive overseas trips that they perceive as questionably necessary. The even less secure may feel threatened by having their worlds seemingly encroached by international influences. NEE should proactively communicate the benefits of such travel and interaction in terms with which SEE can relate and empathize.

**Academic Impact and Academic Vision**

The trends discussed above are often perceived differently by NEE than by SEE. All can be interpreted from both sides, either as positive or negative developments, and as opportunities for or impediments to innovation. Opinions depend upon several factors, including personal background, institutional culture, and even personality. However, all are worthy of continuing observation and discernment. Every generation has been concerned about potentially disruptive change\(^10\), and hopefully, most of the trends will end-up being more positive than negative.
How faculty at mid-career or later view activities or supposed innovations depends upon the benefit-to-cost/risk ratio, that is, the “academic efficiency” in payoff versus time, energy, money, and focus invested. These become more limited and valued as the years roll-by, and, after the “building” years in which one is aggressively pursuing tenure, promotion, reputation, and influence, a point is reached beyond which one may abhor busy work without a clear payoff. This payoff does not have to be for the faculty members themselves, but it has to be for someone or something: students, colleagues, institution, community, or profession. Of course, the type and extent of payoff required for satisfaction track with the time and effort expended. However, hours of wheel spinning, bureaucracy, paperwork, or discussion for no good reason become distasteful to SEE because of increasing perception of what really matters and what doesn’t to the greater good, a fuller understanding of the value of and limitations upon time and energy, and a weariness setting-in after many years. Some distaste may arise even from boredom due to the sameness of the job year after year: “Been there; done that; seen that”, as history repeats itself, for example, in academic politics and administrative turnover. Although new trends may ebb and flow, human nature remains the same, and yields the same basic issues over and over again. This produces both savvy and cynicism/skepticism among some SEE that may appear curmudgeon-like to NEE, but which are usually based upon underlying wisdom and broad perspective from years of observing patterns over and over again (for example, a new “mission statement” periodically whenever the leadership or political/funding winds change).

Thus, to complement “academic wealth” during the early years, and “academic balance” and “academic efficiency” in the middle years, faculty in the waning years of their careers cherish “academic impact” and exhibit “academic vision”. “Academic impact” is the bottom-line ramification(s), hopefully beneficial, ensuing from investment of time, energy, focus, money, and resources. It is more than just “academic efficiency” in that it is not only the benefit-to-cost/risk ratio (efficiency) that one desires to maximize, but is just as much the scope and impact of the benefit independently of the cost. That is, if a goal or cause is highly beneficial to oneself or others, it may be worth a significant time and energy investment, even in a relatively “inefficient” process. An example would be writing multiple grant proposals to see a new formal undergraduate research program for $50,000, when one would receive greater and more efficient payoff by writing proposals for several hundred thousand dollars focused upon a cutting edge engineering research topic such as nanotechnology, with summer faculty salary and new equipment funds included, particularly if one is already a recognized expert in the field.

“Academic impact” involves assessment and selection of activities among the many available to make every day count for tangible benefit to somebody or something. It involves defending academic freedom so that one can maintain the autonomy and flexibility to make this selection within certain bounds. It involves avoidance of fluff, fads, and bandwagons in favor of substance, and streamlining bureaucratic busywork and other trivia as much as possible.

It also involves adherence to one’s primary mission. For a full-time researcher, this may be performing the best and most impactive research possible in a worthy, socially-beneficial topic.
For an administrator, it may be striving to optimally promote the university’s objectives by getting things done through people, while exhibiting empathy, loyalty, and support to one’s faculty, staff, and students.

However, for most faculty, the bottom-line reason for their jobs, indeed their real legacy, is to educate students into scholars for life, successful practitioners in a career, and good citizens, family members, and human beings. As the author’s former dean, the late Dr. Albert Mink, used to say, “When it’s all said and done, all that really matters is what we do for the students; all of the rest is just fluff”. Although perhaps a bit simplistic in today’s complex university environment, it still rings basically true. The impact upon student welfare, direct or indirect, should be the benchmark by which almost all potential actions and activities are assessed and chosen. That’s not to say that other factors, including one’s personal benefit, are not important, but if a significant investment of time, energy, focus, and resources does not benefit students in some way, direct or indirect/long-term or short-term, it should be assessed even more carefully and perhaps rejected in favor of those that do.

Related to “academic impact” is “academic vision”. “Academic vision” is the broad, long-term perspective on university life and career. It is seeing the forest in spite of the trees, and the patterns, repetitions, and subtleties in academic life, both the tangible and intangible. It is built upon experience, objective assessment, and logic relative to a diverse academic career, but also involves a strong intuition regarding “academic impact” and application of the Golden Rule relative to other people. It involves being able to quickly sum-up and evaluate the wisdom of potential opportunities, and recognize potential fallacies and unintended consequences of academic fads and bandwagons.

“Academic vision” is different from the “vision” frequently mentioned in job advertisements. The latter is often more akin to “academic wealth”, that is, a semi-random and sometimes aggressive pursuit of a smorgasbord of opportunities and accomplishments that look good to one’s superiors and on a résumé. It frequently is just a synonym for jumping on whatever the current fad is, often in the name of organizational revenue or image.

Conversely, true “academic vision” involves moderation, balance, caution, reticence, and empathy in terms of the broad panorama of academia and its human constituents. It involves becoming an academic sage and senior statesman whose words and wisdom are taken very seriously both by those above and below in the chain of command. It involves being able to provide solid, calm, logical arguments for one’s positions on illogical issues such as human nature, human relations, and campus politics. It involves respect for and loyalty to the history and culture of one’s institution, region, and profession in terms of underlying fundamental tenets, rather than bandwagons of expediency, popularity, and funding.

As mentioned earlier, “academic vision” in conjunction with “academic impact” is akin to the “self actualization” coined by Maslow in his hierarchy of human needs. The two serve as the
capstone on a successful career of productivity and service, in which one’s wise views, words, and actions are recognized and sought-out by colleagues, staff, and students. NEE and SEE should seek-out each other and form a mentoring relationship. This will allow the NEE to take advantage of the “academic vision” of SEE and observe and emulate the “academic impact” of their actions. It will allow SEE to once again tune-in to the fresher world of the NEE and associated “grapevine” of information, minimizing any tendency toward obsolescence, stagnation, and obstinacy that can affect some SEE. Such a relationship is truly a “win-win” situation, not only for the mentor and NEE, but also for the academic unit, university, and profession. It fosters understanding, tolerance, and compromise, and minimizes formation of faculty cliques and associated contention.

Thus, NEE should appreciate the various stages in the natural life cycle of engineering faculty: “academic wealth” in the early years, followed by “academic balance” and “academic efficiency” in mid-career, followed by “academic impact” and, most important, “academic vision” in the senior years. A faculty member should strive to optimize pursuit of each in the indicated career stage. Part of “academic impact” and “academic vision” involves being able to objectively analyze the pros and cons of any new academic or societal trend. More importantly, NEE should strive to accentuate the advantages and potential opportunities of such, and either squelch the disadvantages or transform them into advantages. Both NEE and SEE should mutually respect each other’s particular phases in the academic life cycle and strive to benefit from each other in a synergistic/symbiotic relationship, to the benefit of not only themselves, but also the department/college, university, profession, community/region, and nation.

**Bibliography**


