2006-79: PROFESSIONAL DEVELOPMENT GUIDELINES FOR ENGINEERING TECHNOLOGY FACULTY

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Actionable Professional Development Guidelines for Engineering Technology Faculty

“If you hold a theory strongly and confidently, then your search for evidence will be dominated by events that confirm your theory.”¹ Consider how a person commences each automobile driving experience. Some enter the car then affix the seat belt then activate the ignition; a logical sequence. However, most drivers are right handed; the ignition is on the right; the keys are in their right hand upon entry. The first action is putting the key into the ignition switch. Not logically, but more often drivers will start the car first then affix the seat belt and then administer other functions (sound system, mirrors, seat positioning). The former sequence minimizes fuel consumption and auto wear. In the USA assuming five seconds of useless motor idling per start-up due to cognitive bias, 35 million gallons of wasted fuel occurs and 300,000 additional tons of carbon dioxide are added to the atmosphere yearly just from the vehicles sold in 2005.²,³ But once the subconscious becomes procedurally comfortable, the former, more logical, sequence cannot occur. More importantly, once a cognitive bias becomes entrenched, despite knowledge of the bias, intellectual attempts to overcome it are unlikely to succeed.⁴

Francis Bacon (1620): “The human understanding when it has once adopted an opinion (either as being the received opinion or as being agreeable to itself) draws all things else to support and agree with it. And though there be a greater number and weight of instances to be found on the other side, yet these it either neglects and despises, or else by some distinction sets and rejects: in order that this great and pernicious predetermination the authority of its former conclusions may remain inviolate…”⁵

University of Notre Dame Management 231 identifies six cognitive bias initiatives. These are summarized below.⁶

1) Prior Hypothesis Bias: relying on prior beliefs about the relationships between two variables even in the face of contradictory evidence.
2) Escalation of Commitment: continuing with an action when it is rational to stop.
3) Reasoning by Analogy: using an example gained from one situation to apply to another that appears similar.
4) Representative Bias: assuming that a result from a small sample is representative of the larger population.
5) Illusion of Control: overconfidence in one’s ability to control events
6) Framing: Making different decisions depending upon how the problem is presented.

Promotion and tenure committees at the academy, the fragile ego system, can suffer affliction from parameters described by 1), 3) and 6). First 1), and particularly regarding Engineering Technology faculty working in science and/or engineering colleges, judges have achieved promotion via activities divergent from what ET faculty can reasonably accomplish. Actionable issues stem from the foundation provided by Aghayere, et al.,⁷ which is definitive regarding examination of role differentiation and of opportunities depending upon university mission statements and actual work load emphases. The latter is often misinterpreted regarding the former, particularly when ET faculty members are...
considered for promotion and tenure; particularly when liberal artists and scientists predominate at university level tenure and promotion committees.

Of course, universities and colleges differ with respect to mission, resources, faculty credentials and opportunities. Also, face to face student experiences vary, depending upon institutional mission thus either limiting or enhancing the amount of time any faculty member can devote to other than teaching excellence. The Aghayere, et al., analogy is telling.

From Figure 1 the amount of time available for scholarship and service versus teaching contact hours varies. It is reasonable to expect more research and service from faculty responsible for 6 contact hours per semester (typical of faculty at research oriented programs) than from faculty responsible for 12 contact hours per semester (typical of ET). The difficulty for ET faculty arises when the institution cannot or will not differentiate between science and liberal arts efforts and ET and so consciously or unconsciously enforces discrimination.

Secondly 2), differences in the ET mission can be overlooked. Promotion and tenure decisions revert to the liberal artist mirror image. One major university faculty guidebook is suggestive. Definition of Engineering Technology as follows: …Engineering Technology provides “excellence in research, teaching and service relative to the technical concentrations of the department.” Since “research” is first in line, despite whatever is consciously espoused, research is the most important consideration; it is first and foremost in the mind’s eye of promotion committee members. And so in the promotion evaluation process without excruciating and unlikely effort unless the ET applicant looks just like science faculty, engineers and liberal artists regarding research, the promotion application can be snubbed.
Nearly all observers see either a young or an old woman. And seeing either makes it difficult to see the other. “The human mind has difficulty coping with complicated probabilistic relationships, so people tend to employ simple rules of thumb that reduce the burden of processing such information.” Clearly, the mind-set of traditional liberal arts promotion criteria cannot be easily amended. ET wasn’t in on the original academic definitions of scholarship and so ET scholarship suffers from many generations of academic myopia. Finally, of Figure 2 and so of the traditional externally funded/refereed minutia scholarship requirement: “Cognitive biases are similar to optical illusions in that the error remains compelling even when one is fully aware of its nature. Awareness of the bias, by itself, does not produce a more accurate perception. Cognitive biases, therefore, are exceedingly difficult to overcome.”

Finally 3), decisions on promotion and tenure for ET faculty in science and/or engineering colleges arrive at a committee of liberal artists in a negative light. The expectation that a promotion or tenure package will not fulfill the highly refereed, funded and esoteric level of those of committee members is hugely disadvantageous. It’s like pinch hitting for a batter who already has a 0-2 count; looking out to the mound where last year’s Cy Young winner is grinning back.

**Establishing a Workable ET Paradigm**

Likely at Hi-Falutin-U, even if it realizes the discriminatory bias; even if every Dean of Science, Engineering and Technology (‘Technology’ last in line) understands the difficulties facing ET faculty regarding promotion and, perhaps, tenure; even if such deans are sympathetic to the ET plight; remediation will not occur through natural evolution. As previously stated no compelling rationality will change enough mind-sets to accommodate reward based upon differentiated contribution and effort. Through Aghayere, et al., the ET community has established its own professional development
criteria independently of the liberal arts model. Of course, teaching excellence, service and scholarship are necessary but the evaluations of sufficiency need amendment.

Of the adjudicated milestones leading to promotion and tenure the ‘scholarship’ roadblock as perceived by liberal artists and scientists and embraced by the university community, stymies Engineering Technology faculty development. And though perception might not change, its relevance to application (fact and deed) within the meaning of the institutional mission must be examined and amended. Cognitive bias again: from the major university mission statement: “Both quality and quantity of research activities and publications are clearly important performance expectation elements for the engineering technology faculty. However, definitions of research and publication are modified to accommodate distinctly different program objectives and faculty experience.”

Okay, fine; recognized and so stated; the potential difference of ET from other academic missions. Next sentence: “Evidence of primary authorship of refereed journal articles is a requirement in the evaluation for promotion and tenure.”

Never mind; true role differentiation denied. ET faculty must look like liberal artists to be considered for tenure and promotion. Importantly, from Figure 1 if an ET faculty load is 12 contact hours (or an overloaded 15), and the colleague participates extramurally with industry (an ET necessity), scant time remains to accomplish refereed authorship.

Conclusions

Dispelling the cognitive bias roadblock is a daunting mission. The first step toward remediation would be a cognitive effort to define the problem. Regarding tenure and promotion instead of relying on preconceptions and/or numbers of whatever (dollars, articles, contracts, etc.), a committee should focus on the following: ‘Is this person enough of a company asset to warrant promotion or tenure?’ Just posing the question allows each judge to understand his/her bias through their response. One judge proclaims: “absolutely not; insufficient refereed journals authorship.” Another: “But perhaps if we count industrial consulting contracts as equivalent to refereed authorship...” If enough people are involved, all biases are likely to be brought up for discussion. Which brings up point two: involve more people in the decision process. Since ET focuses on supplying industries with competent technical management from BS programs, a little of ‘the customer is always right’ should influence whether a promotion and/or tenure candidate is an institutional asset. Another process beneficiation would be to expose committee members to alternative analytical processes at the time of adjudication. Suppose each committee member is asked to solve the New York Times crossword puzzle before beginning deliberations. What describes an American symbol in eight letters? How about describing what a valet might be in sixteen letters. Tough questions and there are many possible answers. Of course, solutions depend upon context of the situation but simple appreciation of potential different answers represents a step toward overcoming cognitive bias. Finally, each adjudicator and each outside agent and several graduates might complete the following table. Clearly, the chance for an appropriate valuation increases with the number of submissions.
The university recognizes the importance of teaching excellence as evidenced via student and peer level evaluations.

The university recognizes that Engineering Technology faculty may accomplish practical rather than esoteric research. Therefore, conference proceedings, extramural participation regarding national and international peer level organizations leading to publications, professional licensure development and maintenance, and refereed publications are considered equivalent.

The university recognizes participation in faculty committees and service benefiting the community.

The university recognizes the unique opportunity of Engineering Technology faculty to enhance general funding through work with local industry and through supporting external continuing technical education. These activities are considered monetarily equivalent to generation of external overhead monies through esoteric research activities.

Ultimately, peerage will determine disposition of collegial promotion and tenure applications; whether a candidate represents and promotes true value to the university community. True value obtained for the institution through intellectualisms not held hostage by cognitive biases.

References and Notes


Data combine from references 2 and 3 to determine CO₂ output based upon 90% of drivers being right-handed, 50% of right-handed drivers cognitively biased toward starting the automobile before accomplishing other needed functions. Stoichiometry: $C_8H_{18} + 12.5O_2 \rightarrow 8CO_2 + 9H_2O$.


For the examples given try UncleSam and GarageDoorOpener. These analogies are not obvious but the point would be to force respondents to think globally thus if not overcoming, at least understanding myopic prejudicial affectations.