EXTRINSIC VERSUS INTRINSIC MOTIVATION IN FACULTY DEVELOPMENT*

Higher education succeeds or fails in terms of motivation, not cognitive transfer of information. To teach implies a transfer of information, and that is not the main purpose of higher education. To profess means to confess one's faith in, or allegiance to, some idea or goal. An effective professor is one who is intrinsically motivated to learn, because he/she will have the best chance to educate others.

Csikszentmihalyi (1982)

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IF WE WISH TO address the question of faculty motivation and vitality we must follow the findings of Wergin, Mason, and Munson [1] who suggest that the factor most predictive of success in faculty motivation and development is depth of knowledge about the faculty members themselves and their personal characteristics. Bess [2] also indicates that the best effects of such motivation will be realized by accounting for individual differences. However, there appears to be a paucity of data concerning the select sample of engineering faculty on which we wish to concentrate. In addition, there are many components affecting faculty motivation which are too diverse to discuss, *e.g.*, health, family situation, *etc.* This need for data on the faculty sample leads to the initial conclusion of this paper; we would be much more comfortable with any of the following tentative conclusions if we had thorough research information on the faculty of interest. We initially suspect, however, that the means of motivating faculty may be radically different from the means of motivating industrial workers.

Engineers draw upon sciences such as chemistry, physics, and mathematics for tools in application to technical problem solving, but here we must turn to softer sciences, *i.e.*, psychology and sociology, for tools in determining faculty characteristics.

But as engineers we typically have to make heuristic decisions based on incomplete data, accepting the risks involved and with the expectation that sequential heuristics, based upon more data, will be much better. Therefore we must make some inferences from the small data base on the collection of both engineering and science faculty, and hope to paint the silhouette of the faculty with a broad brush.

Engineers draw upon sciences such as chemistry, physics, and mathematics for tools in application to technical problem solving, but here we must turn to softer sciences, *i.e.*, psychology and sociology, for tools in determining faculty characteristics. Since the author has no formal training in either field, the examination should be considered somewhat cursory. In particular, I hope to show how the concept of stages in faculty growth and development are related to the motivation of faculty for effective professing.

STAGES IN FACULTY GROWTH AND DEVELOPMENT

The mathematician/philosopher Alfred North Whitehead [3] postulated three stages of education.

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The initial stage is the *Romance* stage in which the learner becomes enthralled with the potential of the subject area, but has only a fragmentary knowledge of what is involved in reaching that potential. The second stage is one of *Precision*, in which the learner fills in the detailed learning required to achieve the potential. Finally comes the stage of *Generalization*, when both the precise principles and romance are incorporated and connected to other areas of the learner's knowledge and life. While Whitehead's model of education was intended to describe optimal learning stages through the college years, similar learning stages may be postulated for other learners, such as faculty who encounter the field of teaching (for which they have had no formal training.)

Levinson, *et al.* [4] were somewhat more specific about stages of growth (particularly in the adult years), using a longitudinal study. It is worth noting that 20% of the Levinson group's sample was university faculty. That original work was supported and popularized by Gould [5] and Sheehy [6]. In their analysis, growth and development occur through a series of stable and transitional periods. During stable periods the adult pursues fairly clear goals. During transitional periods, however, individuals reorder priorities and change behavior in order to compensate for neglected dimensions.

There is a growing body of evidence that there are faculty career phases, especially in teaching and research components. Research phases appear to be bimodal in terms of productivity according to Blackburn, Behymer, and Hall [7] in their study of a large cross-sectional sample of 1,216 faculty. Productivity appears to increase from the entry level until the ages between 35 and 39, during which time faculty normally strive to obtain tenure and full professor status. There is a slight decline in productivity between the ages of 35-39 and 40-44 while faculty go through Levinson's mid-life transitional period. Productivity increases again with the resolution of the mid-life transition until the early fifties, and then there is a slow decline until retirement. Senior faculty still produce significantly more writings than junior faculty, even with this last decline. These findings are supported by Cole [8] who determined that roughly the same proportion of scientists in different age groups makes important discoveries. This is a direct refutation of the theory by Lehman [9] (brought about by questionable sampling) that most of the important discoveries are made by those faculty under thirty years of age.

Teaching development also appears to be bimodal (Baldwin and Blackburn [10]), although Blackburn [11] appeals for more data before coming to conclusions on the initial, somewhat anecdotal evidence. Their findings of the characteristics of teacher development are summarized in Table 1. There is an approximate parallel of teaching development to the above research development. Difficult times generally arise twice during a career. Teachers have difficulty during the early years when they are first learning how to teach (Stage I of Table 1); in this respect the increase in teaching productivity lags the research productivity by 2-3 years. The second difficult period occurs with periods of new or added responsibility (Stages II to IV) which involve new coursework, additional committee work, administrative duties, *etc.*

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Normally, career reassessment also occurs twice. The first period of reassessment is in the late assistant professor period (Stage II) when the faculty must explore contingency options in case tenure is not achieved. In the full professor period (Stage IV) there is also a time when he/she must decide whether to remain a classroom teacher or to try to diversify as a means of maintaining professional vitality.

The two periods of difficulty in teaching, the period of decline in research productivity, and the periods of career reassessment all provide clues for strategies to approach the problem of motivation, as discussed below.

FACTORS IN FACULTY MOTIVATION

While there is a sizeable amount of data on other motivational theories, *i.e.*, expectancy theory and behavior modification theory, one of the clearest and most applicable motivational theories is the so-called "Needs Theory" derived from the work of Maslow [(12, 13]. In this concept, Maslow proposed a hierarchy of needs of the individual, shown below in successive degrees of fundamental needs:

1. **Self-Actualization Needs**
2. **Esteem Needs**
3. **Belongingness Needs**
4. **Safety Needs**
5. **Physiological Needs**

The Needs Theory suggests that the lower needs on the hierarchy (levels 4 and 5) are the first ones

encountered, and the higher needs are realized only after the lower needs are gratified. The stronger the deprivation of a need, the more it dominates; the more a need is gratified, the less important it is and the more important the next higher need becomes. Schneider and Zalesny [14] suggest that faculty, by their autonomous nature, appear to have the needs which are the most mature. The academic environment attracts people who tend to be oriented to self-initiated behavior. Aldefer [15] indicates that frustration of growth (self-actualization) needs increases the desires of relatedness satisfaction, and frustration of relatedness leads to the desire for existence gratification. In other words, frustrated researchers might turn to affiliation available through teaching; frustrated teachers might move to another institution, extend their education, or participate more in administration.

McKeachie [16], Csikszentmihalyi [17] and Deci and Ryan [18] all indicate that faculty are intrinsically motivated and have limited positive extrinsic motivation possibilities. Intrinsic motivation is coincident with the highest levels of Maslow's need hierarchy, while extrinsic motivators are appropriate for those on the lower levels of the hierarchy. Organizational structure, external rewards (such as promotion and pay), and feedback are examples of extrinsic reward systems—which are seen as somewhat self-defeating when used in a controlling manner. If extrinsic rewards are used, then faculty may slacken their efforts once full professorship and tenure have been obtained; such administration may build in a never-ending spiral of salary increases in hopes of continuing faculty motivation.

Centra [19] suggests that when self-actualized people encounter a discrepancy between one's self-theory and other evidence, there is motivation to take action. Csikszentmihalyi [17], McClelland, *et al.* [20], and Litwin and Stringer [21] all suggest that intrinsic motivation is reinforced by slightly imbalancing (a) the challenges to the faculty, with (b) the skills the faculty have to meet the challenge. If the challenge severely outweighs the skills, then frustration occurs; if the challenge (such as teaching a course multiple times) does not require stretching the skills, then boredom occurs. Optimally, challenges are addressed which allow concerted efforts to lead to success.

Deci and Ryan [18] indicate that intrinsic motivation appears to work equally well for both teachers and learners. A teacher who is intrinsically motivated

TABLE 1
Faculty Characteristics and Experiences at Five Stages of the Academic Career

I Assistant Professors in the first three years of full-time college teaching	II Assistant Professors with more than three years of college teaching experience	III Associate Professors	IV Full Professors more than five years from retirement	V Full Professors within five years of retirement
• Idealistic (sometimes unrealistic) career ambitions	• More confident of their skills than are novice professors	• Enigmatic	• At a career turning point	• Generally content with their career achievements
• Enthusiastic about the job	• More politically sophisticated • Know how their institution works and how to get things done	• Enjoy peer recognition associated with tenure and promotion	• Reduced enthusiasm for teaching and research	• Quite limited goals for the remainder of their professional career
• Adjusting to novel occupational demands	• Apprehensive about upcoming tenure evaluation	• Becoming integral part of their institution. Actively involved in college activities, especially major committees	• Sometimes question the value of academic career	• Gradually withdrawing from various responsibilities
• Concerned about succeeding as a teacher	• Seeking recognition and advancement (confirmed by receipt of tenure)	• Generally satisfied with career progress to date	• Must decide to continue same career activities or move in different directions (choice between stagnation and diversification	• Fear their knowledge is out-of-date
• Eager to engage in scholarship	• Experience disappointment if career does not measure up to original expectations	• Sometimes nagged by fear that career has plateaued, that there is little room left to advance professionally	• Seek to extend career (influence) beyond own campus through consultation, professional organizations	• Somewhat isolated from younger colleagues
• Unfamiliar with informal operations and governance (power) structure in their higher education institution	• Question their future in higher education and occasionally consider career alternatives		• Limited opportunities for change; advancement can lead to disillusionment at this stage	• Try to cope with problems independently
• Receptive to assistance from more experienced colleagues				• Only half will take advantage of formal professional growth opportunities • Particularly comfortable with service to department or college

After Baldwin & Blackburn [3]

seems to enjoy the activity for its own sake and has a good chance to get the student to seek the intrinsic rewards of learning. If a teacher is extrinsically motivated, students might conclude that learning is worthless in and of itself, and lacks inherent value. Whitehead [3] says that the ideal of a technical education is to be ". . . a commonwealth in which work is play and play is life." Two action systems are cited to yield intrinsic rewards in teaching: (1) changes in student performance attributable to teacher actions, and (2) the continuing integration of new information on the teacher's part.

The implicit assumption in this application of Needs Theory is that those attracted to engineering education are gratified by the relatively unstructured academic world, have strong self-actualization needs, and enjoy a moderate challenge and risk. Thus these individuals would take advantage of an opportunity to grow and develop, if that opportunity were made available, with some encouragement and no stigma.

IMPLICATIONS OF CAREER PHASES

The recognition of the clues provided by the phases in a career allows administrators to capitalize on a professor's knowledge, expertise, and interests in order to increase intrinsic motivation. There is also a severe caution against the use of extrinsic motivation such as occurs on an industrial scale; extrinsic motivational techniques appear to be hazardous to the long-term health of faculty.

For younger faculty, one might capitalize on up-to-date research knowledge by having novice faculty members teach advanced courses rather than introductory ones. Some of the responsibilities of younger faculty might be relieved while they are learning the art of teaching during the first difficult years. Younger faculty typically appreciate formal workshops and seminars on the state-of-the-art, both in research and in teaching methodology.

Funding, facilities, and release time reserved for mid-career faculty could generate new enthusiasm and halt professional entropic effects. Administrators could provide a challenge, or even retraining, for those faculty who have reached an easy, perhaps boring, part of a career. One could encourage career planning to assist in consciously and systematically examining the alternatives. In particular, a flexible leave and internship policy would allow resolution of some of the mid-life career uncertainty.

Senior faculty could play a major developmental role as a mentor or teaching consultant to beginning or adjunct faculty. Such mentorship has been indicated to be a positive influence for both junior and senior faculty, provided there is eventual growth away by both parties (Levinson, *et al.*, [4]). Senior faculty, in particular, appear to like designing an individual program, rather than (say) partaking in a workshop with others. Such faculty could undertake "senior statesman" projects such as long range planning, studies of student attrition, or work with alumni groups. Temporary administrative jobs might be offered to those faculty. In some cases early retirement and outplacement should be considered as alternatives.

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IMPLICATIONS OF MOTIVATIONAL STUDIES

Motivational factors indicate the need for an environment which increases intrinsic motivation while supplying extrinsic motivators as informational tools only. Increasing amounts of administrative control and increased concern about promotion and tenure are both seen as counter-productive in the long run. Extrinsic rewards appear to reinforce intrinsic motivation only when they are given in a positive, informational sense.

Intrinsic gratification is gained by encouraging satisfying relationships with students and colleagues such as is brought about by small classes, by continued exposure to students beyond the normal single-term class, and by networking with colleagues for teaching discussions. Intrinsic satisfaction is also brought about by providing a sense of autonomy, perhaps from a sense of input to the curriculum, a choice concerning courses to be taught, and more formative and less summative evaluation procedures.

Intrinsic motivation also occurs when intellectual stimulation occurs. This stimulation must meet the criteria that it changes the way people think about the subject area. For example, stimulation may be gained by participation with industry, either in open-ended problem-solving courses, in team-teaching normal courses, or by consulting in ways which enrich the faculty's intellect and put him on the frontier of knowledge. Sabbaticals, summer work, workshops, and short courses to do research/teaching development can also provide such stimulation. Ultimately, elec-

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tronic media (expert systems, video transmission, *etc.*) might be used to bring the most up-to-date technology and best practitioners within the reach of all interested engineering faculty.

CONCLUSION

As Nehari and Bender [22] suggest, it is not just the transmission of information, but the transmission of meaning that is important to vital teaching. Education succeeds when the student becomes intrinsically motivated to acquire the learning, and to look upon the activity as an end in itself. A teacher who sets an excellent role model for the students, both in terms of personal enjoyment and intellectual curiosity, has a good chance to teach the students similar enjoyment.

Before we can consider environments for encouraging faculty, either as teachers or as researchers, we must consider faculty as individual human beings, with human characteristics. At most, this paper may be considered to provide some clues, based on a larger engineering/science faculty sample, concerning the developmental stages and motivation on the formation of an environnent to encourage vital teaching.

Faculty see the opportunity and resources to improve their professional skills in somewhat the same light as unused computer availability; if opportunities are made available in a non-threatening manner, the faculty will naturally seek and use them.

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