



Strategies to Retain Teachers in Engineering Colleges: Probable Causes and Possible Solutions

KEYWORDS

Technical Teachers, College Faculty, Higher Education, Occupational stress, Teacher Recruitment, Teacher Selection, Teacher retention, Teacher Supply and Demand.

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ABSTRACT *This study addressed the link between policies and practices related to teaching staff and sustaining and improving standards in higher education in India. Evidence from the literature has indicated that teaching is increasingly being given less priority in comparison with research in higher education. The total number of questionnaires mailed was 100, with a nearly equal distribution between Lecturers (51) and Professors (49). The number of instruments returned was 58, of which 56 were usable. Twenty-four responses were returned by the Professors (47%) and 32 were received from Lecturers (61%). It is clear from the above data of this study, in higher education institutions; there is no panacea to cope with the diversity of staffing required in higher education. Some institutions are more seriously affected than others by factors outside the higher education sector, such as location and competition in terms of pay and alternative conditions. The higher education sector frequently has few appraisals, mentoring, or career guidance schemes that are helpful to teaching staff. A number of stresses were identified in relation to teaching staff in higher education. The main report summarizes the evidence and emerging issues concerning recruitment, retention, and promotion of teaching staff in higher education.*

Introduction

The scope of educational activities that should take place in colleges has been, and continues to be, a matter of controversy. Most people involved with private colleges Created by abcagree that a major objective of colleges is to promote the scholastic achievement of the students (Goodlad, 1984). There is little doubt that teachers are directly involved in the academic progress of their students. Research has established that a relationship exists between teacher satisfaction and student achievement (Doyle & Forsyth, 1973; Goodman, 1980; and, Stanton, 1974).

In general, the findings tended to indicate that teachers in engineering colleges whose students achieve relatively high scholastically had higher morale than did teachers in colleges with relatively low pupil achievement. Similarly, student achievement tended to increase under teachers with high morale and decreased under teachers with low morale. It appears that teacher morale or satisfaction does make a difference in the scholastic achievement of students. For this reason, teacher satisfaction and a closely related issue, the retention of qualified teachers, has been a concern for several decades.

The literature review progresses from very broad, theory-oriented research to more specific studies concerned with technology teachers. The term "technology teacher" will be used as a generic term to include all Engineering, technology and industrial education and related fields.

Job Satisfaction of Teachers

Historically, job satisfaction was viewed as a continuum. Certain factors if present, contributed to job satisfaction; and if absent, contributed to job dissatisfaction, and vice-versa. Herzberg, Mausner, and Snyderman (1959) developed what has been called the Two-Factor Theory of job satisfaction or the Motivation-Hygiene Theory. In contrast to conventional theory at the time, Herzberg concluded there were certain conditions of employment that, if pre-

sent, acted as job satisfiers (motivators) and other conditions that acted as job dissatisfiers (hygiene factors).

The absence of motivators did not contribute to job dissatisfaction, nor did the absence of hygiene factors contribute to job satisfaction or motivation. Fourteen factors were identified as contributing to job satisfaction or dissatisfaction. The factors identified were: achievement, recognition, interpersonal relations, responsibility, advancement, salary, job security, personal life, status, working conditions, policy and administration, supervision, and the work itself. Herzberg believed these factors to be universal in the workplace. Several research studies have attempted to replicate and/or apply Herzberg's (1959) famous "Motivation to Work" study in educational settings.

Johnson (1967) identified five factors (achievement, recognition, interpersonal relations, work itself, and responsibility) that had statistical significance in affecting teacher satisfaction. Four factors (policy and administration, working conditions, status, and personal life) were significant in affecting teacher dissatisfaction.

Johnson suggested that "the personality of the principal seemed to be the factor which controlled the attitude of teachers" and that "the findings of this study indicated that the organizational climate of colleges contributed to teacher satisfaction-dissatisfaction" (p.139). Sergiovanni (1966), in another replication of Herzberg's study in an educational setting, interviewed teachers to find out about events associated with their jobs that made them feel unusually good and unusually bad. According to Sergiovanni's classification of the teachers' responses, achievement and recognition were ranked first and second as factors contributing to good feelings about the job.

Robert Simmons (1970) found three "content" factors (achievement in the job, the work itself, and recognition) that contribute to satisfaction in teaching. Achievement

in teaching contributed most to satisfaction. Recognition from the principal was determined to be a significant part of the recognition factor. In a study of job satisfaction that focused on high school business teachers in Ohio, Lacy (1968) identified 27 factors that were significant for a high level of teacher job satisfaction. School administration was found to affect teacher job satisfaction. That is, teachers with a high level of job satisfaction indicated, "[they] received recognition for a job well done ... administrators had democratic methods of dealing with teachers" (p. 222). Graham (1985) believes that unreasonable burdens and too little time drive more people from the teaching profession than low salaries.

According to Graham, an approach that would make a big difference would be to reorganize teachers' days and priorities to save precious time that is lost. The suggestions offered by Graham centered primarily around working conditions: reduce class size, provide clerical help, reduce non-teaching activities, give every teacher a student assistant, seek help from parents, and provide monthly, on-teaching work days. Litt and Turk (1985) surveyed Technical teachers to identify sources of stress and dissatisfaction that might induce teachers to leave teaching. The results suggested, "the role teachers perceived for themselves and the college climate, particularly the relationship with administrators, may be extremely important in predicting job stress" (p.178).

The "context" aspects of work (e.g., working conditions, school policy, and salary) identified by numerous studies, serves only to reduce dissatisfaction in the lower-order needs identified by Maslow (1954); they cannot lead growth or satisfaction. The "content" aspects of teaching (e.g. recognition, and the work itself) correspond to esteem and self-actualization, the top of Maslow's hierarchy. Psychological growth and satisfaction depend upon successful job completion, so only those factors that are content centered (intrinsic aspects of teaching) can contribute to satisfaction.

Technology Teacher Satisfaction

Technology teachers have an instructional role that is different from man other teachers. The nature of their teaching is primarily the problem solving approach, frequently utilizing one-on-one instruction. Technology teachers tend to develop a sense of "ownership" over their labs, partly due to the amount of maintenance and other personal time they have invested in the facility. Lab sharing for technology teachers can be a source of frustration when needed supplies and/or tools for a class have been used or abused by someone other than the person who ordered and maintained them. In addition, many technology teachers have skills, which can be utilized in business and industry employment at salaries, and benefits that are frequently greater than they receive from teaching.

Steinbach (1979) to measure the level of job satisfaction for public secondary industrial arts teachers in Minnesota used the Job Satisfaction Questionnaire. The evidence from Steinbach's study indicated certain job reinforcers of industrial arts teachers were significantly associated with their level of satisfaction. The strongest associations were among the following characteristics: steady employment, working conditions, position in the community, feeling of accomplishment, supervisory competence, administrative support, judgmental freedom, organizational practices, authority, doing for others, and competitive pay.

Wright (1985) interviewed technology teachers to determine if relationships existed between esteem, autonomy, job satisfaction, and the intention to quit teaching. Wright found that teachers' over-all job satisfaction was positively correlated with the perceived amount of esteem and negatively correlated with the intention to quit teaching. The study also indicated that teachers' install colleges have more esteem, but lower salaries, than teachers in Government and aided colleges. Building principals could have tremendous impact on teachers' perceived esteem, and therefore, their over-all satisfaction and their intention to remain in teaching.

A significant finding from Wright's study was that neither actual salary nor the teacher's satisfaction with their salary was related to the intention to quit teaching. Perceived esteem was the variable most highly correlated with the intention to quit teaching. The research related to the variable "esteem" (recognition, praise, status, high-regard), based on Maslow's hierarchy, has identified several distinct groups from which teachers receive esteem (Johnson, 1967; Lacy, 1968;Sergiovanni, 1966; Simmons, 1970; and Wright, 1985). These groups included students, parents, the community, and school administrators.

Technology Teacher Turnover

There are several studies of technology teachers who had left teaching (Dye, 1981; Edmunds, 1982; Lindsey, 1979; and, Tomlinson, 1982). The results of these studies provide a foundation from which to build. Vocational industrial education teachers in Texas who had quit teaching cited salary as the primary reason (Lindsey, 1979). In addition, three of the top ten reasons were related to the teachers' relationship with the school administration. In another attempt to identify factors involved in vocational industrial teachers' decision to leave teaching, Dye (1981) identified several characteristics where mobile teachers differed from stable teachers. Mobile teachers were defined as those who had left a teaching position while stable teachers were defined as those who remained in teaching. Low teaching salary was identified as the most significant difference between mobile and stable teachers. Mobile teachers had a low opinion of teaching salaries, whereas stable teachers had a relatively high opinion of teaching salaries. Mobile teachers were found to feel significantly less support by the local school system than did stable teachers. The issue again appears to be one of individual perception. Dye's (1981) and Wright's (1985) results would suggest that teacher *perceptions* of conditions are perhaps more important than "actual" conditions in affecting job satisfaction and the intention to continue or discontinue teaching. This perception presents a challenge to the building administrator: how do they make technology, or any other, teachers *feel* that they are supported. Regardless of budget appropriations, the building administrator must convey the spirit of program support to the teachers. Technology teacher turnover and filling technology vacancies have

Become significant problems in many states. Technology teachers in Illinois, for example, have had a turnover rate as high as 14% per year. The technology teacher vacancy situation has been further compounded by the reduction in the number of graduates that are certificated and elect to teach technology. During the ten-year period from 1992-2002, the number of persons that graduated with eligibility to teach technology in Illinois declined by 68%. In addition to the attrition from teaching by first and second year technology teachers, significant numbers of veteran teachers are approaching retirement age. In 1980, 17.5%of

all industrial education teachers in Illinois were 50 years or above (Tomlinson, 1982). Similarly, Devier and Wright (1987) assessed the status of technology education in Ohio and reported some rather alarming data. In 1987, 25% of all practicing technology teachers in Ohio were either retiring or eligible to retire within the next five years (1987-92). Perhaps even more alarming, 50% of the technology teachers would be retiring or eligible to retire within ten years (Devier and Wright, 1987).

In an effort to determine if the supply of new technology teachers would be able to keep pace with the demand to fill vacancies, Devier and Wright (1988) surveyed teacher education institutions and secondary school district superintendents in Ohio. The projected supply of graduates certified to teach technology, which is down approximately 50% from 1980, cannot meet the retirement rate in the best-case scenario. In the worst case scenario, in which not all graduates decide to teach, many teachers elect early retirement, and the state mandates a proposed technology education course in the middle grades, the supply will be just one-fourth of the demand! Although no one can accurately predict demand, it would appear that the current supply of technology majors in college (1988-92) would fall short of the demand. The effects of school climate are readily apparent to the trained observer; yet, school climate is incredibly complex and difficult to assess empirically. Recent studies have clearly indicated the importance of the principal's leadership style in determining the school climate (Goodlad, 1984; Lipsitz, 1984; Sergiovanni & Starrett, 1983; and Wright, 1985). One manifestation of the school climate is the professional freedom afforded to teachers to carry out their assignments in support of the school's mission. The importance of achievement, recognition, and organizational climate for teacher satisfaction was documented by Johnson (1967), Lacy (1968), Sergiovanni (1966), and Wright (1985). The principal, then, may influence these factors. Lipsitz (1984), Sergiovanni and Starrett (1983), Weller (1982), and Wright (1985) concluded that the administrator was one of the key factors influencing teacher morale and satisfaction.

Teacher Retention Survey Survey Design

A research study was designed to identify reasons teachers leave the profession as well as possible solutions to this problem. A questionnaire was developed which listed twelve possible causes of the teacher retention problem and ten possible solutions to the problem. The factors were derived from the literature review and input by professionals in the field. The respondents were asked to rate these factors on a Likert-type, five choice scale. A value of "1" referred to either a low probable cause of the teacher retention problem or a low possibility of being a partial solution to the problem, and a value of "5" represented either a strong probable cause of the teacher retention problem or a strong possibility of being a partial solution to the problem.

Return

The questionnaires were mailed to Lecturers and professors of various Engineering Colleges. This sample represents a "secondary source" for research focused on teachers. It was determined that this was the most expedient method to collect the data given the operational parameters. The total number mailed was 100, with a nearly equal distribution between Lecturers (51) and Professors (49). The number of instruments returned was 58, of which 56 were usable. Twenty-four surveys were returned by Professors

(47%) and 32 were received from Lecturers (61%).

Discussion of the Survey Data

The data obtained from the survey are reported in Tables 1 - 6. The possible causes of the teacher retention problem are presented first (Tables 1 - 3) followed by the possible solutions (Tables 4 - 6). The factors, which were listed on the questionnaire, are rank ordered by their mean ratings in Tables 1 & 4. Tables 2 - 3 and 5 - 6 list additional factors suggested by the two groups of respondents. The write-in responses provided by the Lecturers and Professors for both possible causes and possible solutions were content analyzed. Four themes emerged from this analysis: Administrative, Professional, Economic, and Classroom/Student. Write-in responses were usually fragmented, incomplete sentences. Analysis was therefore subject to interpretation and thus used for discussion purposes only.

The data in Table 1 on the possible causes of the teacher retention problem indicate that "lack of support by administration" is most important (mean 4.12). This was the only factor listed with a mean above 4.0. The second and third rated causes were "low salary/lack of benefits" and "budget restrictions". These two items both pertain to economic factors. The second relates to the teacher's personal life and the third relates to the teacher's professional life. The fourth rated factor, "lack of academic freedom/choice of teaching assignments, etc." may also be considered as an Administrative factor. Thus, two of the top four rated factors are related to administration.

Table 1
Possible Causes of the Teacher Retention Problem (n=56)

Rank	Cause	Rating
1	Lack of Support By Administration	4.12
2	Low Salary/Lack of Benefits	3.91
3	Budget Restrictions	3.88
4	Lack of Academic Freedom / Choice of Teaching / Assignments, Etc.	3.85
5	Student Apathy	3.52
6	Lack of Facilities/Equipment	3.43
7	Student Conduct	3.38
8	Lack of Opportunity for Promotion	3.23
9	Lack of Basic Job Satisfaction	3.10
10	Low Status In Community	2.89
11	Extra Duties i.e., Lunchroom Monitor, etc.	2.86
12	Forced Participation In Extra Curricular Assignments	2.74

Table 2 lists additional causes of the teacher retention problem as reported by state supervisors of technology education. The twenty-four (24) responses were categorized according to the four themes established. Professional Reasons included seven (7) responses (29%), Economic Reasons seven (7) responses (29%), Administrative Factors six (6) responses (25%), and Student-Classroom Factors totaled four (4) responses (17%).

Table 2

Additional Causes Reported by the Lecturers (n=24)

Professional Reasons (7): Low status among colleagues outside technology education, Lack of understanding of technology education revolution, Difficulty accomplishing necessary public relations work, Lack of involvement in shaping curriculum, college policy, Lack of opportunity for professional improvement, In-service activities not within reasonable distance, and Lack of financial support for continuing education.

Economic Reasons (7): Greater opportunities in industry, Teachers leave when jobs in industry are available, Stayed in teaching long enough to obtain benefits prior to beginning second career, Attractive retirement offers, Lack of winter and summer vocations available, and State economy.

Administrative / Teaching Schedules (6): Administrative paperwork, 4 - 5 hours daily preparations at high college level, Class scheduling (decreases student options), Program reductions - lack of support, and Curriculum not required at college, therefore students are not enrolling at college.

Classroom / Students (4): Lack of support for discipline, Large class sizes, Working only with low ability students, and Teacher burnout.

Table 3 lists additional causes of the teacher retention problem suggested by the Professors. The nineteen (19) responses were categorized as follows: Professional Reasons - 8 (42%), Administrative Reasons - 7 (37%), and Economic Reasons - 3 (16%). By comparison, 29% of the Lecturer's responses were related to Economic Factors. Both groups reported the largest number of responses related to Professional Reasons.

Table 3
Additional Causes Reported by Professors (n=19)

Professional Reasons (8): Low status on faculty, No real-

Table 4
Possible Solutions to the Teacher Retention Problem (n=56)

Rank	Solution	Rating
1	Increased federal, state, and local financial support of education.	4.40
2	Stronger parental support for the educational process.	4.40
3	Refocusing of attention on the part of school administration from external issues to internal issues - teacher support.	4.18
4	Minimum 20% increase in all teachers salaries.	3.84
5	Use of paraprofessionals for extra duties i.e., lunchroom monitors, etc.	3.68
6	National campaign to reform public opinion of teaching.	3.68
7	Less attention to retaining all students in school at all costs and more attention to working with students who want to learn.	3.60
8	Relocation of authority in selection of course content, instruction, etc. to allow for all teachers to participate in choices.	3.50
9	Creation of broad-based teacher recognition at all levels i.e. teacher of month etc.	3.47
10	Development of Master Teacher Hierarchy to create a promotion ladder.	3.29

Table 5 lists additional solutions to the teacher retention problem suggested by the responding Lecturers. The twelve (12) responses were categorized as follows: Administrative Practices - 5 (42%), Professional Activities - 4 (33%), Economic Factors - 2 (17%), and Classroom Issues - 1 (8%).

Table 5
Additional Solutions Reported by Lecturers (n=12)

Administrative Practices (5): Re-establish administrative links with the teaching process, Publish standards for college board member participation and responsibility, Vocational education is not just a national program - support at the local level, Reduce class sizes to 22:1 (18:1 with mainstreamed special needs students), Working relationship of counselors with ALL students and teachers, not just college bound or "academic"

life experiences to relate classroom instruction, In-service support not available for new technologies, Lack of teacher's rights, Too much responsibility placed on teachers: checks for physical, sexual, and drug abuse; morality; etc, State organization weak, no real support for teachers, Stress: health effects, and Pressure to make changes.

Administrative Reasons (7): Low support from faculty and guidance personnel, higher graduation standards, little time for electives, declining enrollments, dropped from minimum standards, Teachers forced out due to cutbacks caused by other course requirements, Legislative requirements, and Transferred to other programs.

Economic Reasons (3): Other opportunities arise; Retirements and Graduates do not have adequate preparation for jobs.

Classroom / Students (1): Students get off too easy

Table 4 lists the mean ratings of the possible solutions to the teacher retention problem identified on the survey. "Increased funding for education" and "stronger parental support for education" were tied for first with a mean rating of 4.4. The respondents also felt strongly that school administration should shift their focus from external issues to internal issues (mean 4.18).

Professional Activities (4): More participation and support for subject/speciality organizations instead of generic groups, Paid sabbaticals for education, self-improvement, study, and recertification, Promotional efforts for technology education, and Professional staff development: financial and administrative support for out-of-state travel to national conferences, workshops, and seminars; Continuous skill development and induction trainings for teaching staffs; allow teachers to participate in industry-sponsored workshops.

Economic Factors (2): Benefits package equal to public, government and I.T. sectors; and same increase in salary as public, government and I.T. sectors.

Classroom / Students (1): Use Distinguished Professors, Visiting Faculties, Industrial Experts or Para-professionals to assist technology teachers in providing tutorial services, etc. for special education students who are mainstreamed into regular classroom.

Table 6 lists additional solutions suggested by the association presidents. The sixteen (16) responses were categorized as follows: Administrative Practices- 9 (56%), Professional Activities - 6 (38%), and Economic Factors - 1(6%).

Table 6
Additional Solutions Reported by Professors (n=16)

Administrative Practices (9): View technology education as vital as the core program, Program support from the central administration, Support leave time for professional events, conferences, State support for student organizations, Require the subject of technology education, Teachers need to have more of an actual hand in decision-making, Involve local business, In-service support/availability for new technologies, and Include technology education in the minimum standards.

Professional Activities (6): Annual teacher recognition, Increased teacher enrichment program, Increased involvement with maths, science curriculum, Provision of adequate graduate courses, and National campaign to increase awareness of technology education.

Economic Factors (1): Limit income potential of private sector careers so they aren't so darn tempting.

A review of Tables 2, 3, 5, and 6 would indicate that, although there is general agreement between the Lecturers and the Professors, the Professors tended to indicate a higher need for increased professionalism, which may be enhanced by administrative practices. Similarly, the Professors tended to place less emphasis on the economic factors than did the Lecturers. The data from this survey support the literature previously cited. The causes of the teacher retention problem reported in this study are very similar to those identified in the literature. Similarly, the possible solutions suggested by the respondents in this survey closely parallel those solutions listed in the literature.

Conclusions and Recommendations

It is difficult to make broad generalizations from this study alone. However, there are several common themes between studies reported in the literature and this study. It must also be recognized that there are variables over which there is no control. Similarly, there are factors, which may be too expensive to address realistically.

Conclusions

1. A primary reason that technology teachers leave the profession is "lack of support by administration." This was documented in numerous studies cited in the literature review and by this study.

2. Salaries were consistently identified as a source of dissatisfaction. However, research has also indicated that perhaps the teachers' *perception* of their salary compared to other professionals or groups may be more significant than actual salary. Regardless, salaries have been identified as a source of dissatisfaction, but not statistically related to the intention to quit teaching.
3. Other possible causes of teachers leaving the profession-included budget restrictions lack of control over teaching assignments, student apathy, and lack of equipment and facilities.
4. This study identified two main areas of concern that may be possible solutions to the teacher retention problem: administrative practice and professional activities. Frequently, these two are very closely related.

Recommendations

The following are specific recommendations that may have a significant effect on teacher satisfaction and retention:

1. A representative from AICTE or Affiliating University should meet with each state's Engineering College principals and the Management Representatives to present the findings of this study.
2. Develop and disseminate a series of monographs (or idea books) that are specifically targeted to teachers with limited facilities and budgets.
3. The AICTE should continue to support legislation to increase minimum salary levels for teachers. Salaries should be *perceived* as on a par with comparable professionals.
4. The Promotion and Salary to be given purely based on the qualification and experience not based on the specialty of Engineering.
5. The staffs those who produces better results (i.e., 95 % and above) to be recognized and rewarded monetarily or certificates or in the meetings.
6. Management should encourage the staffs for higher educations and skill development programs by the way of granting leave permissions and sponsoring.
7. Instead of six days, Five days working order to be followed to reduce the mental fatigue of students and staffs.
8. The Workload to be given as per AICTE norms.
9. The time of paper valuation in winter as well as in summer to be announced as compulsory vocation to teaching staffs.
10. The author recommends that AICTE endorse a study to determine if the supply of new technology teachers is going to be adequate to replace those teachers leaving the field. Also, are new technology programs being planned for the middle grades, and if so, how many additional teachers will be needed.

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