

ASSESSING THE TRAINING OF TECHNICAL PROFESSIONALS MOVING INTO MANAGEMENT

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Introduction

Even undergraduate engineering students want to become managers. In fact, statistics indicate that the career aspirations of 50% of all engineering students include moving into a management position within 5 years of their graduation¹. Moving from a technical professional to a tech-manager requires a different skills set. Technical professionals are required to be task-centered specialists while managers are asked to be people-centered generalists.

This paper reports the results of a study of a large, multi-site sample of managers who began their careers as technical specialists. Specifically, we investigated how much management training these managers had before and in the two years after their first management position. Finally, we conclude with recommendations to help improve the technical specialist's transition to manager, as well as suggestions for further research.

Conceptual Background

Organizations have recognized that some engineers want to be managers because management is often the only available avenue of advancement for them. Technical professionals have reported difficulties in transitioning to management, but their immediate supervisors consistently underestimated the difficulty of the transition². Several reasons exist for these difficult transitions. First, the technical professional loses control over direct work and must learn to work through others³. Secondly, the work itself undergoes fundamental changes as the emphasis shifts from content to process issues⁴. Thirdly, skills must change from task-oriented skills to people-oriented skills. Technical professionals have reported that the greatest difficulty in the transition is acquiring the skills needed to navigate the systems of their own organization².

Technical professionals enter graduate programs with the expectation of enhancing their promotability yet get little encouragement, help or recognition from their employers. A majority of employed engineers in an MBA program reported that they had no discussions with their employers about future growth opportunities after completing their MBA. These same engineers also reported that their employers did little, if anything, to recognize employees for degree completion. Perhaps as a

consequence of their employer's indifference, fewer than 25% of these students expected to be with their current employers 3 years after obtaining their MBAs⁵. With employer-provided training, research indicates that turnover is dependent on the type of training provided. Technical employees provided with technical training are more likely to leave their current company, while those provided with management training are less likely to leave their current company, but are more likely to move to other areas of the company⁶. It appears that when employer-organizations participate in the management development, education and training of technical professionals, both employees and employers benefit.

The Study

The test instrument was distributed to a graduate class of 50+ students. The majority of these students were practicing engineers or engineering managers, most of who worked in the southeastern United States. Students were asked to collect data and report the findings as part of a graduate course assignment. Each student was asked to collect at least 5 data points.

The respondent was to be a technical professional who had received formal education in a technical field like engineering or science, had been promoted into management, and had served as a manager for at least 5 years but preferably not more than 15 years. The resulting number of valid data points collected was 219.

Evaluation of Survey Data

On average the respondents spent close to the same amount of time as technical professionals (9.61 years) as they had as managers (9.12 years). On average the respondents were promoted at age 33. The majority (84.8%) of the respondents was promoted into management by the time they reached 40. The highest technical degree for the majority of the respondents (75.3% or 165) was a bachelor of science degree. Only 20.5% (45) of the respondents held a masters degree in a technical field while 4.1% (9) held a Ph.D.

Other demographics of concern and interest include race and gender statistics. Respondents were overwhelmingly Caucasian males. Only 4% were non-Caucasian and only 11% were female. The number of racial minorities entering engineering programs in universities around 1985 was between 6% and 8%, however the dropout rate was extremely large at between 55% and 70%⁷. This calculates into an average of 3% to 4% of graduating engineers. Given that the transition into management takes on average 10 years, a 4% racial minority value for managers surveyed is not surprising. The number of women entering university engineering programs in 1985 was 15%⁸. Considering again the 10 year professional tenure prior to management promotion, an 11% value of females in the population is within the expected range.

Extensiveness of Training

In analyzing the extensiveness of the training experienced by the respondents it became convenient to group the specific training categories into three major areas.

Technical skills were defined as those things that most technically oriented employees would find beneficial and which more directly related to the technical aspects of data analysis and decision making. This category included New/updated technical skills, Ethics/legal/compliance training, Project management, Process improvement issues, and Information systems. Management skills were defined as those areas concerned with relationship issues. This category included Participative management, Customer relations, Employee motivation, Negotiation/conflict resolution, and Leadership/supervision. A third category was defined as business skills and included Personal selling, Business development/marketing, and Financial management/accounting. The average number of hours of training per group was determined (Table 1).

Table 1: Extensiveness of Management Training

Topic Area	Before 1st		After 1st	
	No Training	Mgmt Position	No Training	Mgmt Position
New/updated technical skills	25%	20.5	30%	16.6
Project management	39%	12.6	20%	17.0
Ethics/Compliance	27%	10.7	16%	15.3
Information systems/technology mgmt	49%	9.8	39%	10.7
Process improvement/cycle time reduction	51%	8.6	37%	13.4
AVERAGE for Technical Skills	43.2%	12.44	28.4%	14.60
Leadership/supervision	33%	15.3	11%	25.3
Employee motivation	56%	7.0	29%	13.6
Negotiation/conflict resolution	55%	6.8	30%	12.5
Participative management/empowerment	61%	5.9	31%	12.8
Customer relations/service satisfaction	59%	4.6	40%	11.0
AVERAGE for Management Skills	52.8%	7.92	26.2%	15.04
Financial management/accounting	52%	9.1	42%	10.7
Business development/marketing	71%	4.0	58%	6.3
Personal selling	74%	3.3	67%	4.7
AVERAGE for Business Skills	65.7%	5.47	55.7%	7.23

Before the first management position, the top four individual categories of training were New/updated technical skills, Leadership/supervision, Project management, Ethics/legal/compliance. The weakest individual categories were in Personal selling, Business development/marketing, Finance/accounting. Considering the aforementioned grouping the technical skills had an average of 12.44 hours of training. Management skills had an average of 7.92 hours of training. The least extensive group was the business skills with an average of 5.47 hours of training. On average respondents had 118 hours of training before transitioning to management, half of which were directed toward the technical training areas. Therefore, prior to the transition, the manager is receiving the most extensive training in his/her technical discipline or more technical aspects of management decisions.

From Table 1 the same trend was observed in considering training after the first management position, however, the total number of training hours did increase (170 hours after transition). The same top four individual areas (Leadership/supervision,

Project management, New/updated technical skills, Ethics/legal/compliance) account for a little over 74 of the total hours. The technical skills grouping and the management skills area tied in terms of extensiveness with an average of 14.6 and 15 hours of training, respectively. The final area, business skills, remained the least extensive with an average of 7.2 hours of training.

Also included in Table 1 is the percentage of respondents who received no training in the categories indicated. Of the 3 groupings, business skills was the area in which the most people (average of 65.7%) received no training prior to transition. Management skills had an average of 52.8% of the respondents receiving no training. And 43.2% of the respondents received no training in the technical skills area. After transition more respondents received training in all areas but most significantly in the management skills area. Only 26.2% received no training. The number of people receiving no training in the technical skills area dropped from 43.2% to 28.4%. Business skills experienced the smallest decline in the number of respondents not trained dropping from 65.7% to 55.7%.

Specificity of Training

Prior to transition into management there were only three areas in which as much as 47% to 48% of the respondents who received training indicated receiving very specific training: New/updated technical skills, Ethics/legal/compliance and Information systems/technology management. These three are in the technical grouping. The other areas in this grouping were Project management with 34% and Process improvement/cycle-time reduction at 30% for an average of 41.2%. In all areas the majority of respondents received general training over specific training. Of the respondents who had training in the business skills grouping, an average of 29% had specific training related directly to the job. More general training was experienced by 71% of the respondents. Of the respondents who had received training in the management skills area, 27% had experienced job specific training (Table 2).

After transition to management the respondents appeared to have experienced more training relevant to their work situation. Respondents indicated that they had received specific job related training in six categories: Ethics/legal/compliance, Financial management/accounting, Project management, Leadership/supervision, Information systems/technology management, and New/updated technical skills. Four of the top six categories were from the technical skills grouping. The lowest average percentage (44%) of respondents having specific training was seen in the management skills grouping. The other two groupings, technical skills and business skills, had 53% and 48%, respectively of respondents receiving job specific training.

Transition to Management

The ease of transition and initial success as a manager was indicated from the percentages of respondents who agreed with the six questions shown in Table 3. A total of 79% of the respondents agreed to some degree that they had transitioned from a technical position into management easily. However, 72% agreed that managing was

Table 2: Specificity of Management Training

Topic Area	Before 1st Position		After 1st Position	
	Specific	General	Specific	General
New/updated technical skills	48%	52%	49%	51%
Project management	34%	66%	56%	44%
Ethics/Compliance	47%	53%	64%	36%
Information systems/technology management	47%	53%	49%	51%
Process improvement/cycle time reduction	30%	70%	45%	55%
AVERAGE for Technical Skills	41%	59%	53%	47%
Leadership/supervision	32%	68%	52%	48%
Employee motivation	28%	80%	37%	63%
Negotiation/conflict resolution	27%	73%	39%	61%
Participative management/empowerment	20%	80%	42%	58%
Customer relations/service/satisfaction	28%	72%	49%	51%
AVERAGE for Management Skills	27%	75%	44%	56%
Financial management/accounting	30%	70%	60%	40%
Business development/marketing	28%	72%	42%	58%
Personal selling	29%	71%	41%	59%
AVERAGE for Business Skills	29%	71%	48%	52%

harder than technical work. When asked about performance, 82% were satisfied with their first year as a manager and 71% had earned a superior rating for that first year as a manager. A resounding 91% would make the same decision again to move into management. And 94% had frequently been given additional management responsibilities during the transition period (Table 3).

Table 3: Respondent Performance in First Management Position

	Disagree	Agree
Transition easily from technical position to management	21%	79%
Managing was harder than technical work	28%	72%
Was satisfied with performance during the first year as manager	18%	82%
Earned a superior rating for first year as manager	29%	71%
Would make the same decision to move into management	9%	91%
Have frequently been given additional management responsibilities	5%	95%

Discussion of Results

Technical professionals who have managerial aspirations can expect to transition into a management position within an average of ten years after becoming a professional in the workforce. This translates into an average age of 33 for expected promotion into management. As a technical worker progresses in his/her chosen profession, the further past 40, the less likely it is for that person to realize opportunities of joining the ranks of management or at least advancing into middle and upper management.

In considering management training this study found that, in general, technical professionals are poorly trained for a transition to management. A significant percentage of managers in this study received no training either before or after they became

managers. On average those that did receive training received the equivalent of three college courses prior to becoming managers and four college courses after becoming managers. Comparing the extensiveness of the training received prior to the first management position to the extensiveness of the training received after the first management position, it is obvious that more training was received after the position was secured than prior to the transition. The emphasis prior to the management position was on the technical issues of the job. This was expected since this type of training would have a direct impact on the current job environment. The technical area is what would be most familiar to the working professional, and thus would naturally be sought by this type individual. The least training was received in the business skills area. These skills are most often used by higher level managers in a technical environment and therefore, less consideration was given these in terms of training prior to a management position. However, this trend continued after the transition into management. Business skills remained the weakest area in terms of training. Management skills gained ground at this juncture, equaling the amount of training in the technical areas. The average total number of hours increased by 44% after the transition. Overall after the transition to management training hours did increase but technically oriented training still accounted for a major portion of the training of first time managers.

In terms of specificity of training, without exception, training is more general prior to the transition to management. With the technical skills having more job specific training followed by management skills and business skills. After the transition to manager the specificity of training in all areas increased. With the most dramatic increases coming in management skills and business skills. But, specific training in technical skill areas and general training in management and business skills tends to be the common experience.

In light of the findings regarding extensiveness and specificity of training the performance of the respondents was rather surprising. Overall the respondents self evaluation of their performance was quite good. While the majority of the individuals surveyed found the transition to management difficult, they were satisfied with their performance. This was supported by the fact that their performance ratings were high and they were frequently given additional management responsibilities. An overwhelming majority of the managers would make the same decision again, indicating a general satisfaction with their career choice.

These positive results generate a plethora of questions, most notably why were the managers successful given the lack of formal training? This initial study would seem to indicate that formal training may not be essential to managerial success nor satisfaction. What this may indicate is that managers learn their craft in other ways than formal learning situations. These may include informal learning, mentoring and/or personal observation. Another possible explanation is that the rate of change in high technology organizations (which is the dominant focus of most firms in the study) is so fast that the Darwinian approach is observed. Yet another explanation would be that both first time managers and their immediate supervisors have reduced expectations for the performance

level of these new managers. This is exactly because they have had no formal training and are expected to increase performance as they gain experience on the job.

The decision to transition into management was appropriate for most, yet most found management to be a more difficult challenge than the technical role from which they had come. Additional training both prior to and during the transition would seem to help alleviate this problem and give the new managers tools to use in dealing with the people aspects and business issues which are lacking in their technical education.

Recommendations

A majority of respondents viewed the transition into management as an easy one, however, they viewed the actual job of management as more difficult than the technical job. This is not surprising given the lack of formal training they received both prior to and after transition. More extensive and specific training would ease this problem. More training in the areas of management skills as well as business skills would be appropriate. The majority of the training they are currently receiving is heavily weighted toward the technical skills.

Because of the surprising results regarding performance of first time managers given a dearth of training, several areas of future study can be identified. It would be interesting to determine to what they attributed this overwhelming success. Did they receive other forms of training? Was there mentoring (formal or informal) conducted? Did they experience formal on-the-job training that provided feedback and assistance? A related question addresses why they were satisfied with their performance. Were they actually successful that first year or were expectations lower due to the understanding that they had little formal training? Finally, what were the areas of the managerial job that resulted in the difficulty for these first time managers?

It is clear from this study that a lack of formal training does not necessarily impact managerial success. Further study needs to be conducted to learn what the role of formal and informal training is and how to properly utilize each to increase and improve the ease into management as well as heighten managerial success.

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