Managing Your Engineering Career

Achieving Effectiveness as an Engineer

With the expansion of global economies, companies require diverse intellectual capital that can bring ideas and knowledge to the workplace to improve their competitive advantage.

These evolving trends in industry must be applied back into the engineering curriculum. Industry needs universities to respond with the following changes:

1. Retain strengths in math and physics fundamentals, plus enhanced information technology emphasis.
2. Increase emphasis on design and manufacturing skills.
3. New emphasis on breadth, context, and process related issues.

Getting Off to Right Start

You

- Make your mark in first few years
- Go extra mile and meet deadlines
- Look for visibility
- Learn the corporate culture

Boss

- Be careful in selection
- Understand the boss
- Keep boss informed
- Make boss’s job easy

Associates

- Don’t invade another division
- Make your complaints to the person responsible
- Keep old school ties
- You are the company’s representative

Charting Your Career

Career Fields

1. Operational (manufacturing, purchasing, planning, customer service and sales)
2. Research and Design (R&D for new systems)
3. Engineering Management (2/3 of engineers in the past have spent about the last 2/3 of their careers in some level of management responsibility)
4. Entrepreneurial (Form own company; Risk of failure are greater, but so is the potential reward)
5. Consulting (Designs, advise, solve problems on behalf of other individuals and organizations)

5. **Writing** (Writing for technical magazines, journals, technical editor or abstractor; preparing training & maintenance manual, preparing sales literature of technological product)
6. **Academic** (High school teaching , teaching pre-engineering subjects in junior colleges; Careers in universities can be taken as combination of teaching, research, consulting and writing)
7. **Other** (Something entirely different from engineering field)

Career Stages – Super (1957)

- Growth (birth to age14)
  - first awareness of career decisions
  - initial development of career aspirations, interest and abilities
- Exploration (ages15 to 24)
  - trying out tentative choices
  - transition involving training and trial in a beginning job
- Establishment (ages 24 to 44)
  - The first five years: trial period
  - 1 or 2 changes in field
- Maintenance (ages 45 to 65)
  - Hold on to the place achieved
  - Continues in established pattern
- Disengagement
  - Physical and mental power decline
  - Less participation then stops

Four Career Stages for Professionals – Dalton and Thompson

Apprentice learns to be an effective subordinate who demonstrates willingness to do routine assignments, yet aggressively searches out new and more challenging tasks. By leaving this field too early, the individual does not learn from the experience of others. . . .

Colleague building a reputation as a technically competent individual... The individual becomes less dependent and starts to contribute personal ideas about what to do in a given situation. Many professionals stay in this stage for the rest of their careers and have a reasonably successful career although their value to the organization dwindles over time. . . .

Mentor individual is able to take increased responsibility for influencing, guiding, directing, and developing other people. . . . The individual in this stage may serve with one or a combination of three roles: an informal mentor, a manager, or the idea person [gatekeeper]. . . . 80 percent of those who make it to this stage were perceived by the organization to be above-average performers.

Sponsor requires that the individual move up from influencing groups of individuals to affecting the direction of the organization or a major segment of it. . . . These people can play one or more of three roles: manager, internal entrepreneur, or idea innovator [the senior professional person in a field].

Communicating Your Ideas

Communication

A process by which information is exchanged between individuals through a common system of symbols, signs or behavior.

Communication is a two-way process which involves:

- Listening to others (Receiving) message
- Asserting/Expressing (Sending)

Communication is the art of getting your message across effectively through:

- Spoken words: first and simplest way
- Body language: can make or mar
- Written words: reflects importance
- Visuals: leaves greatest impacts

Importance of Communication

A survey conducted with 2600 UK employees clearly expressed the view that what was **most de-motivating of all was lack of communication from managers**, citing issues such as a complete absence of interaction, a general lack of feedback, or meetings taking place behind closed doors.

In the field of engineering, the information output may be specification, design , drawing, technical reports, or oral briefings which requires substantial resources and skill. Unless the information output is properly communicated, the meticulous engineering may be of little utility.

Engineers must perfect their communication skills while they transit to manager for effectiveness.

It is estimated that managers spend 90% of their time in communication

78% of their time: oral communication

- (59% in scheduled,10% in unscheduled meetings,6% on telephone,3% on managing by walking around)
- 22% on their deskwork which consist reading and writing

The Communication Process

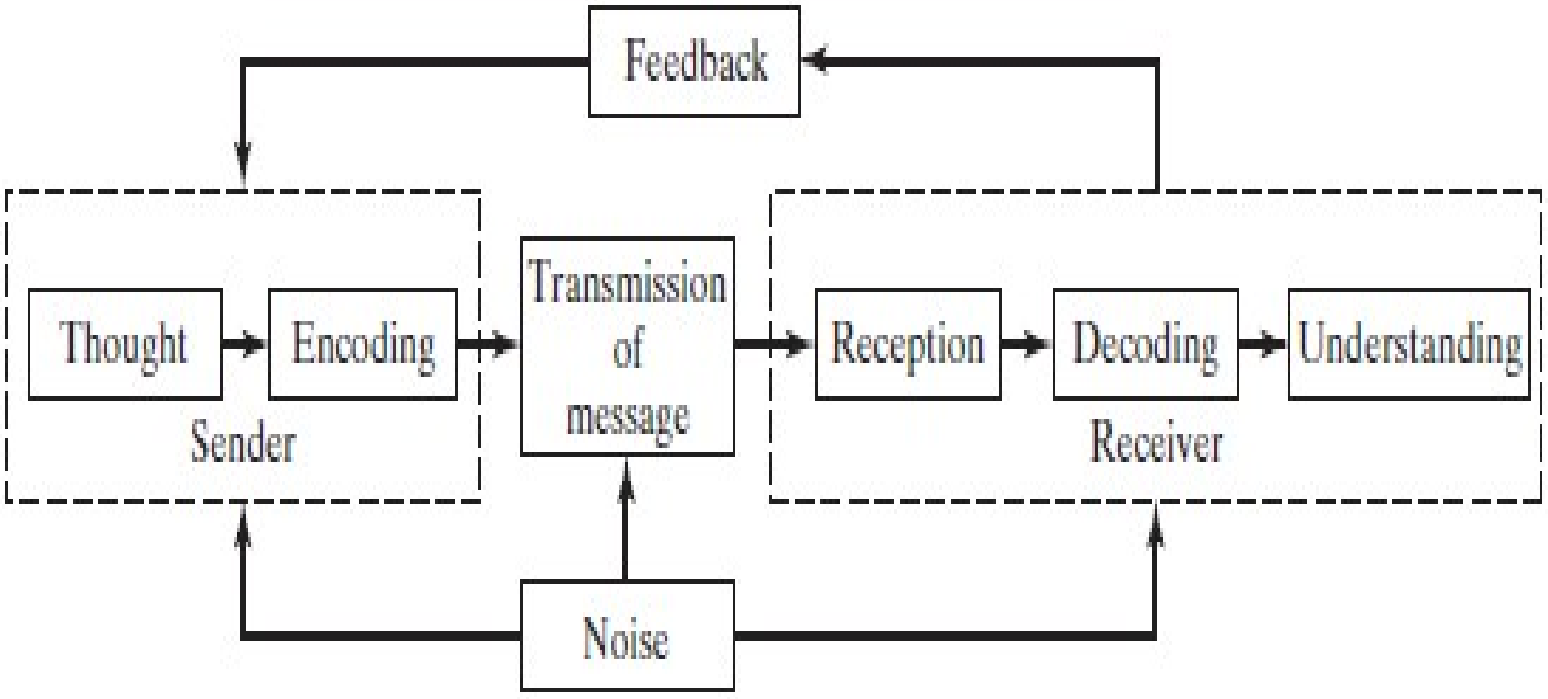

Figure 17-2 Communications process model. (From Harold Koontz and Heinz Weihrich, *Management*, 9th ed., McGraw-Hill Book Company, Inc., New York, 1988, p. 463.)

Table 17-1 Characteristics of Common Communication Methods

Communication Method	Speed	Feedback	Record Kept?	Formality	Complexity	Cost
Informal conversation	Fast	High	No	Informal	Simple	Low
Telephone conversation	Fast	Medium	No	Informal	Simple	Low-medium
Formal oral presentation	Medium	High	Varies	Formal	Medium	Medium
Informal note	Medium	Low	Maybe	Informal	Simple	Low
Memo	Medium	Low	Yes	Informal	Low	Low-medium
Letter	Slow	Low	Yes	Formal	Medium	Medium
Formal report	Very slow	Low	Yes	Very formal	Complex	High

Source: Paul R. Timm, *Managerial Communication: A Finger on the Pulse*, 2d ed., 1986, p. 59. Adapted by permission of Prentice-Hall, Inc., Englewood Cliffs, NJ.

Other factors in effective communication

- Active listening
  - The art of effective listening is as important as effective communication. Listen positively and attentively, allowing the speaker to make his or her point. Analyze the speaker's attitude and frame of mind.
- Non verbal communication
  - The relative influence of the verbal, vocal, and facial aspects of oral communication:
    - 7 percent: Verbal (words used)
    - 38 percent: Vocal (pitch, stress, tone, length, and frequency of pauses)
    - 55 percent: Facial (expression, eye contact)

Communication Tools of Special Importance to the Engineer

The Written Report

- The results of engineering studies are often documented in formal written reports and executive summaries, and the usefulness of the study is determined by whether the report is (1) read and (2) understood.

The Oral Briefing

- A briefing is an oral presentation of analyzed and synthesized information.
- Effective briefing skills are essential for your success, for the busy executives who will make the final decision on whatever you are proposing often can be approached in no other way (and this may be their principal opportunity to assess your capability for greater responsibility).

Visual Aids

- Tools: OHP, PowerPoint, slides Prezi, Flipcharts, etc.

Staying Technically Competent

The Threat of Obsolescence

The Knowledge Explosion

Organizational Obsolescence

Obsolescence

"the process of passing out of use or usefulness"

"the process of being replaced by something newer or better"

Persons are obsolescent technically if, when compared to other members of their profession, they are not familiar with, or are otherwise unfitted to apply the knowledge, methods, and techniques that are generally considered important by the members of their profession.

Organizational Obsolescence

Three areas in which managers can make improvements and thus avoid having an obsolete organization: reward technical contribution, reduce barriers to movement, and focus on careers.

Methods of Reducing Obsolescence

Mastering the Technical Literature

- Need to stay knowledgeable about wide range of technology
- Professional literatures, research papers

Continuing Education

- Formal graduate level university courses
- In house course offered by the employer

On-the-job Activity

- Personal growth on the job
- Challenging work assignment Opportunities provided by the supervisor

Technical Societies Membership

Accreditation, Registration, and Certification