

Personal View: Three E's of Teaching: Enduring, Effective and Entertaining

M. U. HOSAIN

Department of Civil Engineering, University of Saskatchewan, Saskatoon, Canada S7N 0W0

The purpose of this paper is to generate a discussion on the ways to develop an instructional strategy that promotes lifelong learning and provides a stimulating classroom learning environment through effective and entertaining lectures. The term 'enduring' reflects the importance of a lifelong learning. What must we, the educators, do to keep abreast of the latest developments? What steps must we take to promote lifelong learning by our students? After all, we are in the business of 'educating' engineering, not 'training' technicians. One's knowledge of the subject matter is essential for 'effective' teaching, but is it enough by itself? In what other areas must an educator be competent? How to make lectures 'entertaining' to guard against boredom and promote learning? Is there a rule for humor in the classroom?

INTRODUCTION

THE COLLEGE of Education at the University of Saskatchewan organizes a lecture series entitled 'Focus on Teaching'. Educators from other faculties are invited to present an informal talk to faculty and senior graduate students in the Education Faculty Lounge. These sessions are intended to provide a forum for educators from different disciplines to learn from each other and examine ways to improve teaching and learning. Three years ago, I received an invitation from the College of Education to present a talk on my instructional strategy. Having accepted the invitation on impulse, I was faced with the difficult task of describing my teaching strategy since it evolved over a long period of time.

After considerable thought and soul searching, I finally realized that the instructional strategy I have been utilizing over the last ten years is based on the three E's of teaching: enduring, effective and entertaining. I believe that the three E's represent the three essential instructional objectives.

LIFELONG LEARNING

The term 'enduring' reflects the importance of lifelong learning. What must we do to keep abreast of the latest developments? What steps must we, as educators, take to promote lifelong learning by our students? First of all, we must continue to seek higher learning. Personal participation in research activities is one of the best ways to acquire new knowledge. In other words, educators must engage in research; not at the expense of, but for the sake of undergraduate and graduate teaching. Therefore, I

try my best to maintain a modest research program in my area of interest.

Regular participation in technical conferences is essential for engineering educators because conferences provide a forum for discussing the latest developments in one's field of interest. I find it necessary to attend at least two or three conferences every year to keep abreast of the latest developments. In areas such as computer-aided design and analysis, progress is so rapid that the contents of journal papers can become obsolete by the time they are published. Conference proceedings are a better source of current information.

To promote lifelong learning by our students, more emphasis must be placed on building a foundation. It is said that one acquires only 20% of one's knowledge from educational institutions. The other 80% must be achieved through one's own initiative. It is therefore more important for students to learn *how to learn* than to acquire more technical details. Experts on lifelong education recommend placing more emphasis on modeling attitudes, values and habits which promote personal growth. Engineering students must acquire reasoning skills, ability to make decisions, solve problems independently and interpret computer results correctly. According to Professor Emeritus Laurie Kennedy of the University of Alberta in Edmonton, Canada, 'we are in the business of *educating engineers*, not *training technicians*; the *e* goes with *e* and the *t* goes with *t*'.

I try my best to instil in my students the importance of forming a habit of reading books and making use of the library. Instead of posting problem solutions, I keep them in the library with the hope that when the students go there for the solutions, they may be tempted to pick up a book or

two. Graduating students are repeatedly advised to join a learned society, attend continuing educational seminars and workshops. According to a report prepared by the Committee on Career-Long Education for Engineers [1], 'The value of professional engineering expertise depreciates rapidly in many areas, so that obsolescence may become a serious problem as early as 3 to 7 years after completion of formal education.' I am convinced that one of the requirements for becoming a professional engineer should be membership in a learned society. While serving as a member of the Board of Directors of the Canadian Society for Civil Engineering, I was able to convince my colleagues to pass a resolution to this effect. Unfortunately, professional associations have not implemented such a policy as yet.

EFFECTIVE TEACHING: ENHANCEMENT OF THE LEARNING PROCESS

One's knowledge of the subject matter is essential for 'effective' teaching but it is not enough by itself. The lecture material must be presented in a way that suits students' needs and levels of understanding. In what areas must an educator be competent? According to education experts, areas of teaching competence must include theoretical knowledge about learning and human behavior, attitudes that foster learning and a repertoire of teaching skills. Currently, the only skill one needs to qualify as an engineering educator is the ability to successfully complete a Ph.D degree. One is expected to acquire teaching skills by trial and error, of course at the expense of the students. Many educators believe that it is essential to provide some teaching skills to novice professors.

How can lectures be made effective? In survey after survey, students at the University of Saskatchewan have identified *organization* as the most important trait amongst competent lecturers. *Clarity of presentation* is cited as the second most important characteristic. I place considerable emphasis on these two factors. I prefer to use the blackboard for routine lectures although a companion set of the entire lecture notes is available on transparencies. The transparencies are used only for reviewing material covered in the previous lecture before a new lecture begins [2].

I suffered immense guilt in the early years of my teaching career as I felt I was unable to teach well. The guilt has finally been replaced by a sense of satisfaction and joy of teaching. Looking back, one factor which influenced the transition most was the decision to make use of 'semi-notes'. These are special sets of printed lecture notes which permit rapid progress while still allowing eye contact between the instructor and the students [3].

The distinguishing feature of these lecture notes is a half-finished format: the reason for the 'semi-notes' designation. The students are only required to fill in the blank spaces while the lecture is being

presented. This half-finished format is a compromise between the practice of providing the students with a fully prepared set of notes and the presentation of blackboard-oriented lectures without the use of any prepared lecture material. The former encourages absenteeism and fails to draw undivided attention of those present, while the latter is time consuming and often ineffective for engineering courses where the lecture material invariably contains complicated diagrams, tables, etc. I believe that the adoption of this teaching method contributed significantly towards the improvement of my teaching skills.

For engineering courses on computer analysis and design, I use a system which allows students to acquire basic engineering knowledge as well as an adequate grounding in computer analysis and design within the traditional time limits. The system is briefly described in a previous paper [4].

As indicated earlier, lecture material must be presented in a way that suits students' needs and levels of understanding. This usually results in targeting the lectures towards the average student. With the bright students in mind, I assign 'extra challenge' tasks which are not mandatory and carry no extra credit.

PROMOTION OF LEARNING THROUGH ENTERTAINING LECTURES

It is generally known that entertaining lectures promote learning by guarding against boredom. I find that lectures can be very interesting to the students if the material relates to 'real-world situations'. A lecture on the 'lateral torsional buckling of beams' can be extremely effective if the students are first shown slides of the collapse of the Save-On-Foods building in Burnaby, British Columbia [5]. I used the problem shown in Fig. 1 in my Engineering Analysis course for first-year students. Of course, the students became very attentive when I linked this problem with the failure of the walkways in the Hyatt Regency Hotel in Kansas City [6]. On 17 July 1981 the second- and fourth-level walkways of this hotel collapsed onto a crowd assembled for an early-evening tea and dance, killing 113 persons and injuring 186. The failure is said to have been caused by the replacement of continuous support rods with pairs of offset rods as shown in Fig. 1.

Another technique I often use to improve learning involves the inclusion of interesting information on the personalities of certain scholars or historical notes on certain engineering developments. For example, the students will pay more attention to a discussion on Hooke's Law or Castigliano's Theorem if they are first exposed to certain interesting anecdotes concerning these great masters. I found the students more receptive to absorbing technical details on the construction of the tunnel between England and France after they were first

PROBLEM 1

Find the force carried by each nut.

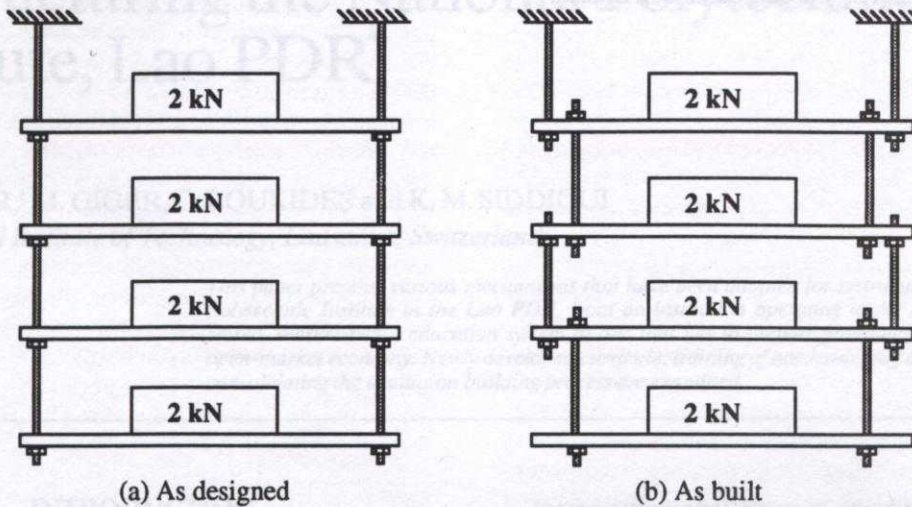


Fig. 1. Problem assigned to first-year students.

presented with an historical background of this project.

Is there a role for humor in the classroom? According to Korobkin [7], humor has a definite role in the classroom. Humor does not compromise credibility, it promotes learning by enhancing student-teacher rapport, attentiveness and inter-

est, retention of material, motivation, positive attitude and creative and divergent thinking. Humor is said to reduce academic stress, anxiety towards subject matter, dogmatism and class monotony. It can also promote bonding. I believe that finishing lectures on time is one of the most entertaining things a teacher can do for the students!

REFERENCES

1. National Academy of Engineering, *Focus on the Future: A National Action Plan for Career-Long Education for Engineers*, Report of the Committee on Career-Long Education for Engineers, Washington, DC (1988).
2. M. U. Hosain and Pamela Hauer, Utilization of microcomputers in teaching a course in structural analysis, *1984 ASEE Conference Proceedings*, Salt Lake City, pp. 850-854 (1984).
3. M. U. Hosain, Effective teaching using semi-notes, *ASCE Professional Issues Engng Ed. Pract.*, **120**(2), 193-197 (1993).
4. M. U. Hosain and S. Sokhansanj, Computers in education, 1990 International Summer Meeting of American Society of Agricultural Engineers, Columbus, OH (1990).
5. D. J. Closkey, Report of the Commissioner Inquiry Station Square Development, Burnaby, British Columbia (1988).
6. Engineering News Record, Connection Cited in Hyatt Collapse, *McGraw-Hill Construction Weekly*, 4 March (1982).
7. Debra Korobkin, Shared laughter and learning, *College Teaching*, Fall issue (1988).

M. U. Hosain is a professor of civil engineering at the University of Saskatchewan, Saskatoon, Canada. Born and raised in Calcutta, India, he received his M.Sc. degree in 1963 from the University of Manitoba, Winnipeg, Canada and completed his Ph.D. degree in 1968 at the Technical University of Nova Scotia in Halifax, both in structural engineering. A fellow of the Canadian Society for Civil Engineering, Dr Hosain's research interests are in the areas of steel and composite structures, computer-aided analysis and design of structures. He is a member of the Canadian Standard Association's Technical Committee on Steel Structures [CSA S16.1], and chairperson of its Subcommittee on Composite Construction. He is a Professional Associate of the Canadian Institute of Steel Construction. As much as he enjoys doing research, Professor Hosain's first love has always been teaching. At the fall convocation in 1988, Professor Hosain was awarded the University of Saskatchewan's Master Teaching Award. In 1993, he was selected by the students of the campus as one of the first ten winners of

