

Transportation Education: Technical Training and Continuing Education

David J. Cyra

To the carrier and the shipper, transportation is a knot of government red tape that can be untied only by lawyers, tax consultants, and lobbyists. To the poor commuter, it is a road to hell paved with good intentions. To the cities which need better transit systems, it is a desire named streetcar. To the air traveler, transportation is the friendly skies full of fast planes, slow ticket counters, and hundreds of suitcases that look exactly like his. To the social scientists, of course, transportation is an intermodal, multi-purpose capability inherently responsive to the parametrical methodologies of interfacing disciplines. (Alan S. Boyd, former Secretary, U.S. Department of Transportation, 1968)

The rapid growth of transportation systems during the past 3 decades has posed unique challenges to transportation education in the 1980s. On the one hand, practitioners still need to be grounded in the technical skills offered, usually in academic disciplines such as engineering and urban planning. However, expanded service demands, coupled with financial constraints and complicated employee relations, make it essential that these same practitioners acquire the managerial skills necessary to run cost-effective, employee-efficient systems. In addition, the constant change and proliferation of technology, most notably in the communications and microcomputer fields, mean that transportation professionals must regularly participate in continuing education and technical training programs. This paper concentrates on continuing education and technical training and offers guidelines for how such programs can both reinforce and complement traditional academic courses.

INTRODUCTION

The most important thing about education is appetite. Education does not begin with the university and it certainly ought not to end there. (Winston Churchill)

In both the formal literature of transportation education and the informal discussions heard at meetings, there appears to be a confusion growing as to the distinctions, if any, between the terms continuing education and technical training. For whatever reasons, continuing education is associated with instructional overviews, that is, generalized, abstract learning, as opposed to hands-on or simulated learning. Technical training, on the other hand, is considered to focus

on the specific skills, knowledge, and behavior needed to accomplish day-to-day tasks in the workplace.

As the skill needs of transportation professionals have changed, however, the line between these two terms has become blurred. In short, there is a feeling that all professional education and training should share the best characteristics of these two concepts and that the terms should merge. In other words, the formerly static concept of continuing education should now include rigorous, hands-on learning that simulates real-life job situations, whether these situations be technical, interpersonal, or managerial. Likewise, the term "technical" in technical training should refer less to the content of courses, than to the manner in which it is treated. For example, a communications skill, such as speech-making, can be treated technically by defining its components in a step-by-step analysis.

Throughout this paper, then, the terms continuing education and technical training are used interchangeably to mean a type of professional education that seeks to simulate the managerial demands of the workplace and enrich the student participants with skills they need to face ever more complex demands for efficient operations and planning.

There are many catch phrases in the air today that emphasize the importance of continuing, relevant education for professionals in all fields. Maintaining professional vitality, career planning and management, human resource development, and so forth, are essentially similar concepts. They express in a positive way the situation experienced by both transport employees and employers, that is, their need to maintain knowledge and skills over a career span. Because, however, it is unrealistic to expect that any single undergraduate or graduate program could possibly be so comprehensive as to completely prepare the graduate for each and every professional situation, some type of continuing education or training appears to be mandated. What form this training should take is debatable. One way to establish it would be to take a systems approach and construct a continuing education working model.

A SYSTEMS APPROACH (1)

Although a man's work may indeed be a good clue to his personal and social fate, it is a clue that leads us--and the individual himself--not by a clear and unique track to a known goal, but into a maze full of dead ends and of unexpected adventures. (Everett Cherrington Hughes)

Continuing education for transportation can be divided into five distinct but related categories:

1. Inquiry. At this point the transportation community communicates or exhibits a question or problem.
2. Needs Assessment. Continuing education professional (CEP) works with the community to determine the nature and extent of the developmental needs.
3. Program Development. CEP identifies appropriate instructors and, with their input and that of the potential users, sets specific training objectives, appropriate site(s), and length of session(s).
4. Instruction. Strictly speaking, this refers to course implementation; however, the instruction period is also a fruitful time to gain insights into addi-

tional training needs (inquiry), determine the extent of the problem (needs assessment), and determine the types of people who could best address those needs (program development). From a systems point of view, it is here that the seeds of the recurring cycle are shown.

5. Work-site Performance. Participants return to their job environments with enhanced skills. One goal of any such training would be a heightened ability to identify additional training needs as the workplace changes, thus initiating the cycle again with an inquiry.

6. Training Evaluation. Performance evaluations at all stages of the system are essential. At what point they are done is less important than that all facets of the training are fully covered. In practice, much training evaluation is done as part of the instruction. Some items that can be measured at this stage include (a) content, (b) relevance of perceived needs, and (c) presentation of materials to participants. Such evaluations should be performed by (a) participants themselves, (b) speakers (by means of pre- and post-tests), and (c) impartial observers trained to observe teaching and learning styles. In order that the systems cycle be complete, performance evaluations should seek to measure how much participants' colleagues and superiors believed the training contributed to company or agency operations.

Those of us who consider continuing education planning as a major professional activity might ask ourselves the following questions during a systems analysis of our activities:

1. Inquiry

- * What recurring questions or problems are evident in the transportation community I serve?
- * Who currently perceives these situations as problems (only me, management, labor, outside agencies)?
- * If a continuing education or training program were to address the problem, what would be the characteristics of the appropriate students or participants?
- * What people and groups set the standards for these students for knowledge, skills, and performance?
- * What role does each source of influence play that I should be aware of? How do they communicate? With each other? With the potential students?
- * How do I keep aware of people, trends, and events in my community?
- * What is the general level of need at the present time?

2. Needs Assessment

- * Which people and groups evaluate the potential students? What assessment methods do they use?
- * What strategies are appropriate to assess the students' current skills? How do I use the data obtained?
- * What role do I have in the assessment process?
- * How is information about students and needs communicated to continuing education teachers?

3. Program Development

- Which people and groups is it appropriate to include in planning the overall learning experience?
- What roles do each (including myself) play?
- What decision-making methods are used for the following?
 - (a) Learning goals and objects;
 - (b) Selection of resource persons and students; and
 - (c) Development of curriculum, teaching methodology, and assessment procedures.
- Are alternatives fully considered?
- How is the final plan to be approved, implemented?

4. Instruction

- Who are the major participants in the instructional phase (students, speakers, observers or monitors, facilitators)?
- What roles do each play? What is my role?
- Who has the primary responsibility for monitoring and control at this stage? How do I fit in?
- How is performance measured and should results be used?

5. Worksite Performance

- Who is responsible for post-training evaluation and assessment? When and how often is it done?
- Do I have a potential role at this point?
- What will be measured at this point and which techniques will be used?
- How will this evaluation-assessment be validated?

6. Overall Training Evaluation

- Did the instructions and training meet the perceived needs of the students? Their employers and superiors? The goals of the instructors and CEPs?
- Were all relevant members of the transportation community included at each stage of the training?
- During the instruction phase:
 - (a) How much time was devoted to student participation, straight lecture, hands-on experience and/or simulated work situations?
 - (b) Was the physical environment conducive to adult learning?
 - (c) Did the leaders and teachers respect the opinions of the participants?

Although this systems approach is a good way to analyze the cycles of professional training, the question remains as to who should be in charge of the cycle. Traditionally, each separate profession has taken the responsibility for continuing the professional training of its members. However, studies of both knowledge transfer in general, and continuing education in particular, indicate that there are many attitudes and skills shared by all professions. All professionals, whatever the field, indeed all people, whatever the job, need specific problem-

solving and communications skills to relate well to peers, subordinates, and superiors and to effectively present themselves and their ideas.

It is wrong to define job skills too narrowly. In transportation, a multidisciplinary field that draws its members from many professions, bus drivers, planners, and engineers all need communications and marketing skills; they simply use the skills to different ends. Although specific technical knowledge may vary from financial planners to maintenance personnel, the way they manipulate that knowledge in the current age of microcomputers can be similar.

In addition, in transportation, "who does what" varies considerably from state to state, from urban to rural transit. It is dangerous to think categorically about what an engineer does as opposed to a planner or a manager; a maintenance worker as opposed to a bus driver. Moreover, in certain systems, the engineer, planner, manager, maintenance worker, and bus driver are all one in the same.

From the preceding discussion, it appears more practical to structure continuing education training around the similarities, rather than the differences, among fields. Two ways to approach this would be to (a) discuss theoretically the three ways all people learn (basically through the modes of inquiry, instruction, and performance) and to (b) discuss the specific orientations all professions share.

THE THREE MODES OF LEARNING (2)

From the literature, the practitioner learns the rules; from experience, the ways in which they should be applied (2,p.45).

In structuring a continuing education program, planners will inevitably use one of the three traditional paths to learning. Ideally, continuing education training will be a collaborative effort among skill builders, students, employers, and educators. In structuring a continuing education program, these planners should probably use all of the three classical learning situations discussed next.

Inquiry Mode

This type of learning is often used in situations in which the outcomes are uncertain--establishing goals, working out compromises, projecting plans. It is a process of developing new ideas, policies, procedures, and so forth, using techniques such as discussion and encounter groups, seminars, clinics, brainstorming sessions, and the like. Such learning often cannot be evaluated immediately, but must await the future realization of projects goals.

Instruction Mode

The instruction mode is what many people associate with traditional teaching situations--the dissemination of established skills or knowledge. This dissemination can require either passive or active participation from students. Most people concerned with positive educational experiences for learners, whatever the subject or level, agree that the more active the participation by students (such as group problem solving, simulation, or role playing), the better the learning.

In the instruction mode there are specific skills and information to be mastered. Such mastery can be evaluated throughout the learning process by any number of formal and informal means.

Performance Mode

This type of learning is achieved after both the goals set through inquiry and the skills demonstrated through instruction are internalized by habitual professional activity. Evaluation of this mode is performed by peer groups, professional associations, and government examiners.

What these three modes of learning mean for continuing education can be stated simply. Each profession is constantly challenged by new discoveries, new technology, and new techniques. To change outmoded practice, the leaders of the profession, either on their own or at the prodding of public and government groups, must initiate an inquiry as to how best to incorporate new ideas into the profession as a whole. Once specific goals are set, current and aspiring members of the profession can be instructed in general and specific applications. Concurrent with this instruction will be the development of performance measures so that professional standards can be maintained after instruction is complete.

It appears obvious that, if they share nothing else, the various professions could at least collaborate in refining techniques and strategies for inquiry, instruction, and performance as these relate to adult professional learners. However, I believe the various professions, both within and outside of the field of transportation, share a potential for a much greater collaboration.

COMMON CHARACTERISTICS OF PROFESSIONS

Just as the whole world is a school for the whole of the human race, from the beginning of time to the very end, so the whole of his life is a school for every man, from his cradle to the grave. . . .Every age is destined for learning, nor is man given other goals in learning than in life itself. (John Amos Comenius)

In Power and Conflict in Continuing Professional Education (2), Stern introduces a new concept to replace the static, elitist values he perceives as traditionally associated with the notion of the professions. Instead of specific, fairly well-defined exclusive professions, Stern outlines certain professionalizing attitudes and activities that can characterize workers in any occupation (2, pp.33-54). The degree to which the occupation's work force shares in these attitudes and activities becomes the constant measure of its professionalism.

Certainly such an idea is particularly appropriate in transportation, where transit and highway managers often come up through the nonacademic ranks. It is likewise appropriate as transportation receives greater percentages of public monies, because such federal and state support mandates broader service orientations. Finally, such a notion is very much in tune with the ideals of quality circles and team dynamics currently making the rounds in training seminars.

What, then, are some of these attitudes and activities that characterize professionalizing occupations?

1. A constant redefining of the mission and theoretical framework of the job: Why do it? In transportation one such redefining has led to an emphasis on the rights of the handicapped to accessible public transit.

2. The second professionalizing characteristic is the need for continual problem solving: how to build a better mousetrap. Whether it is how to run well-maintained buses, how to bring a dissension-wracked agency into harmony, or how to build a bridge in difficult terrain, the professional is constantly trying to find new ways to do things better.

3. A third professionalizing attitude is the constant relating of theoretical knowledge to worksite practice: how to relate the learning to the job. Professional literature supplements but cannot replace the education acquired from actual practice. From the literature the practitioner learns the rules; from the experience, the way the game is played.

4. Personal improvement or self enhancement is the fourth characteristic of a professional. Such improvement is not limited to obvious job-related skills, but extends to such areas as art, music, and so forth. Intellectually, there is no sharp delineation between occupational talents and extra-occupational skills. Many forms of outside-the-job learning can have definite, practical career bonuses by bringing new outlooks and clients into focus.

5. Communication skill is the fifth characteristic of a professional--the ability to persuade others of the utility of new ideas and products. In a work world that is constantly changing, communication skills are necessary to prepare for and adjust to new technologies and orientations.

6. The sixth characteristic is service-related: the need to bring tangible benefits into the lives of others. Certainly, as transportation becomes increasingly dependent on public funding, the service orientation of the profession must increase proportionally. Any continuing education and training must take this into account, especially by providing ways to measure these benefits.

The real professional is aware of the need and force of change and welcomes change as an opportunity to improve performance. This is true whether the professional is a doctor, a transit manager, or a bridge builder.

PRINCIPLES OF ADULT LEARNING

Where my reason, imagination, or interest were not engaged I would not or could not learn. (Winston Churchill)

Bryant (3) has identified seven principles of adult learning that should be considered here. They correspond to general principles of information transfer that hold true for all communication.

1. Learners must want to learn; they must view their learning as somehow personally essential. The role of the continuing education professional is crucial here because he or she can directly control this motivation. One way is by sensitively matching the learning to the learner and by making the workplace relevance explicit. Another is by selecting appropriate instructors; those who will win the respect of the students without alienating them by failing to respect their experience.

2. The learning environment should be characterized by physical comfort, mu-

tual respect, freedom of expression, and acceptance of differences. Physical comfort covers a lot of ground. It includes spatial factors such as lighting, elbow room, and sufficient breaks, as well as ventilation, plenty of visuals, and hand-outs that synopsise major points so that students are spared the pain of taking notes. Mutual respect between students and instructors is especially important when, in many cases, the students will have direct experience with the problems under discussion and will have great potential as additional resources. For the same reason, students must feel free to both disagree with and supplement the teaching with their own opinions.

3. The students must perceive the goals of the learning experience to be theirs. Here, too, the CEP plays a potentially important role. In the earlier discussion of the stages of the continuing education cycle, program development was mentioned as a major part of the process. When a transportation need has been identified, the CEP must carefully structure the learning to fit that need and target it to the correct student learners. He or she does not do such planning in a vacuum, but in collaboration with practitioners, employers, and potential instructors. If the relevance of the learning is made explicit and the particular objectives of each part of the instruction is made sufficiently clear, students will have no trouble embracing the learning goals.

4. The learners must accept a share of the responsibility for the planning and implementation of the learning experience in order to have a commitment to it. As in principle 3, the role of the CEP as a facilitator is crucial. Recent studies of information and technology transfer show that potential users should be included at each step of research designed for them in order that their input and interest is guaranteed. Likewise, potential students, the ones with firsthand knowledge of the particular problems the learning is attempting to solve, cannot be ignored in the program planning stage.

5. The learner should participate actively in the learning process. Only by actively engaging the students, whether by simulations, hands-on practice, or group discussions, will an instructor be successful. Here, too, the CEP can exert a powerful influence. He or she can ensure that extra-classroom activities are planned to encourage students to get to know each other. Ideally the students will be peers, with much in common beyond the problems under consideration in the classroom. If students are comfortable with each other outside the classroom, they are less likely to be shy with one another inside it. Such good social vibrations not only improve the learning atmosphere in the classroom, but also provide opportunities for the learners to form networks for future information exchange.

6. The learning process is related to and makes use of the experience of the learners. Postman and Weingartner, in Teaching as a Subversive Activity (4), make the point that "we can, after all, learn only in relation to what we already know." The adult learner processes new information through a mental screen of his or her own experience. This has several implications for the CEP. Every student will not, for instance, have a common experience window either quantitatively or qualitatively. Such variety makes them valuable resources for one another. An effective instructor will be able to take these experiences, both good and bad, and use them as the specific examples of the points he or she is making. Both as a social ice-breaker and as a valuable guide for the teacher, it is a good idea to have participants identify themselves at the beginning of a workshop or seminar and describe their work responsibilities and what they hope to obtain from the learning experience.

7. The learners have a sense of progress toward their goals. Students can only make progress toward goals that are already defined. The CEP can help adult learners set these goals for both the short run of an individual course and for the career long term.

THE CONTINUING EDUCATION PROFESSIONAL: WHO APPEARS TO FIT THE ROLE?

Human service is the highest form of self-interest for the person who serves. (Elbert Hubbard)

The effective CEP is a strategist who designs learning environments (situations, events, activities) in which people are given opportunities to learn. Such environments should:

1. Provide an opportunity to practice or try out the new information;
2. Make it possible to apply the information to a complex problem; and
3. Show how the information can be applied to other, similar situations.

The CEP must be responsive to a complex transportation-related network that includes employers, public officials, university professors, government administrators, practitioners, transport community leaders, and users of transportation services. The CEP may play various roles within these groups, from information resource person to designer of short courses, as well as initiator of applied research. There is no single role that defines a successful CEP, but it is clear that he or she must be skilled at serving many masters.

As noted earlier, there has been some debate as to whether CEPs should come from the ranks of the profession itself, from universities, or from professional consultants. Where they come from is much less important than what personal skills they bring to the job.

One way to view the CEP is as a specialist in information transfer. After all, he or she must identify transportation needs, collaborate with practitioners, teachers, and transportation users to determine the nature and extent of the problem and to help communicate with students in solving the problem and meeting the need. Finally, he or she must evaluate how well the information presented served to meet the perceived need.

Peake (5), in a report for the National Aeronautics and Space Administration entitled "The Human Element in Technology Transfer," outlined the personal characteristics necessary for a successful information transfer specialist. They certainly apply equally well to the CEP who is also involved in altering current behavior patterns and initiating change. Following is a list of questions to ask when selecting a continuing education professional.

- * Sensitive: Can the person relate well to the very different types of people found in all echelons of the transportation community, from corporate moguls to cab drivers? Can he or she speak their very different languages?

- * Motivated: Does he or she have a genuine interest in serving others, and the self-discipline necessary to work independently in difficult circumstances?

- * Analytical: Can he or she identify problems and measure their extent?

- * Cooperative: Is he or she a nonauthoritarian who does not resent authority in others? Are his or her goals put at the service of client goals?

- * Charismatic: Does he or she have the leadership qualities necessary to bring diverse groups into agreement?
- * Flexible: Can he or she change behavior to meet varying demands and pressures?
- * Aware: Can he or she see the social and political implications of information and situations?
- * Disciplined: Is he or she able to pursue many different goals simultaneously without scattering resources? Is there honest inquiry and curiosity? Is time budgeted wisely?
- * Imaginative: Can he or she be innovative in assessing needs, finding speakers, and structuring the learning environment?
- * Persuasive: Can he or she present ideas effectively in speaking and in writing?

General Background

- * Experience: Does he or she have sufficient breadth of experience to be able to relate to the diverse technologies of the workplace?
- * Interests: Do his or her hobbies, outside activities, and community work demonstrate a variety of knowledge and a desire to serve?
- * Education: Has he or she pursued a course of professional enrichment through some type of continuing education and training?
- * Accomplishments: Are his or her achievements novel or routine? Did they occur frequently or in spurts? What honors has he or she been given? Does he or she have the respect and recognition of peers?

All of these attributes can be summed up under the general headings of human relations skill and intellectual competence; the human relations skill is the more important of the two. No amount of intelligence can make up for an inability to communicate.

ACTION PLAN FOR IMPLEMENTATION

Probably we would all agree that too few transportation professionals continue to learn throughout their lives, and that the continuing education programs currently available are fewer and less enticing than they could be. Transportation practitioners are not, after all, clamoring at the gates of continuing education. Whether this is due to a genuine lack of interest or to a failure of continuing education to adequately address their needs is debatable. We know, in any event, that the entire transportation community can benefit from relevant continuing training: the student can benefit from the advancement and confidence that comes from increased job skills; the employer can benefit from the increased efficiency the students bring back to the job; the transportation public can benefit from more streamlined service. The challenge we face, then, is how to make continuing education "a consummation devoutly to be wished," rather than a burden to be borne. Some actions that would help include the following:

1. The transportation professional associations should be encouraged to take increased responsibility for fostering a zest for learning among their members.

Students of any age must be motivated in order to learn, but this individual, personal motivation comes from a recognition of the value of the learning. These groups are ready-made resource networks the CEP can use both in assessing needs and in promoting training programs.

2. Continuing education planners should encourage professional attitudes and pride among all workers. They should make clear the relevance of their programs to the various specific transportation occupations, especially when these programs teach nontechnical skills not traditionally associated with the job. They should also place the training and the job in the larger transportation context so that a certain pride in working in the field is fostered.

3. A CEP who wants to be truly effective and efficient should consider taking a systems approach to structuring continuing transport education. He or she should take care that their continuing education programs result from a collaboration among all members of the transportation community, as well as professionals from outside the field with good skills to offer. A good exercise might be to record how he or she currently plans programs and to compare this with the activities described in all stages of the system cycle.

4. The three modes of learning should be taken into account when planning continuing education programs. Inquiry, instruction, and performance should all be incorporated into program learning. The best mix of these should be determined by collaboration among students, teachers, and employers.

5. Transportation professional associations should collaborate with employers and government agencies in planning and providing training. Although each separate occupation has its unique body of knowledge, each also shares many information and skill needs with the others, even some outside transportation per se. Greater collaboration could achieve substantial financial economies and could help ensure better quality and program effectiveness.

6. The principles of adult learning need to be incorporated into program development of continuing education courses. The traditional lecture simply does not work well with adult learners. They need to believe that their opinions and experience are respected and that there is confidence and trust between teacher and student.

7. The continuing education professional is, in a sense, in the information and technology transfer business. Many of the personal qualities appropriate for a transfer specialist are also those of an effective CEP. Probably the most important of these is an ability to communicate and relate comfortably with many different kinds of people.

The final point I would like to make is that continuing education should be considered the responsibility of each member of the transportation community, not just a select few. The identification of needs and a program to meet those needs cannot be done by any one person or group, but must come from a natural collaboration of all segments of the community. Working together we will achieve far more than the sum of our individual efforts.

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