

for the primary transit functions, but mixed groups are encouraged. They result in team building and a greater appreciation for overall organizational operation.

Polytechnic's training program is a unique university-industry cooperative effort for training that appears to be successful. It represents just the beginning of appreciation for the potential role that universities are able to play in providing management training to transit systems. Management faculty teamed-up with transportation faculty can offer transit systems state-of-the-art approaches for solving persistent problems that top management has merely adapted to rather than solved.

The specific role for universities shown by this project is as a consultant to managers of training programs. The need for training departments to enter the world of operating managers and develop training programs based on skill deficiencies that cause performance problems is the key element of the program. The role of the university was in the identification of these deficiencies and the design of a curriculum to correct them.

The shift of emphasis in transit training from instruction in general managerial training courses and into the role of internal consultant is the key to success. The strategic orientation of training departments should be based on changing the organization and not on educating it. The new role would then be toward organization development in addition to, not instead of, skills training.

The university offers expertise in the performance of analysis techniques, approaches to behavioral modeling, applications of team building in training (to build empathy and personal networks among managers across functional positions), the application of strategies for organizational change to training courses, and many other state-of-the-art possibilities. Teams of faculty can also provide transit operators with appropriate mixes of exper-

tise in management, transportation, industrial engineering, and other specialties.

One elaboration of the techniques suggested previously, for example, would be the application of strategies for organizational change. One of the many approaches used in private organizations by management consultants is diagnosis of systemic problems based on confidential interviews. This bottom-up approach focuses on the participative formulation of problems by category, impact, and cause. It also protects those participating managers from recrimination in low-trust climates. The formal diagnosis provides management with a map for action. Where problems are based on skill deficiency, training programs may be designed that focus on the skill deficiency that is causing the performance problem.

Diagnostic techniques can be taught to training department personnel on a phase-out agreement with the university team. Where trusting climates exist, systematic group meetings for diagnosis contribute toward the goal of team building as information is gathered for the formal diagnostic report. The overall approach toward helping the organization change is organizational development, just one of the many possible beneficial relations that can be formed between university faculty teams and transit agencies. Where universities and transit operators can form cooperative working teams, the results are seen in more effective training, which increases the potential for significant improvements in performance.

A detailed report on this training program has been submitted to UMTA and is available through the Polytechnic Institute of New York (1).

#### REFERENCE

1. R. Roess. A Training Program for Transit Middle-Managers. Polytechnic Institute of New York, Brooklyn, N.Y., final rept. to UMTA, Aug. 1982.

## Introduction: Revolution or Evolution in Transportation Education?

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The transportation profession is facing a fundamental change in the approaches used in analysis. The catalyst for this change has been the development and rapid use of microcomputer technology and software throughout the profession. Many of the transportation engineering and planning exercises that were once done manually or required extensive computer application have been adapted to a microcomputer environment--easy to use with rapid turnaround. At a recent seminar sponsored by the Institute of Transportation Engineers, 25 percent of the transportation professionals today were estimated to use microcomputers. Within two or three years this number might reach 50 percent or more.

The rapid introduction of the microcomputer into

the profession places a special burden on transportation educators. Universities must teach students with this new capability and prepare them for this new working environment; however, a dilemma arises over the approach used to present this material. One school of thought argues that the technique provides the answer and all one must do is train students how to use the technology. Another group argues that, although the technology is important, students must still be educated in the approaches and procedures that produce the answers.

The two papers that follow address the issues related to this educational dilemma. These papers represent the beginning of a debate that might last for some time.