Training Keeps AMP Connected to Customers

Built-in quality controls ensure the effectiveness of a new training program for engineers at AMP Inc., and higher-quality training means higher-quality products and services.

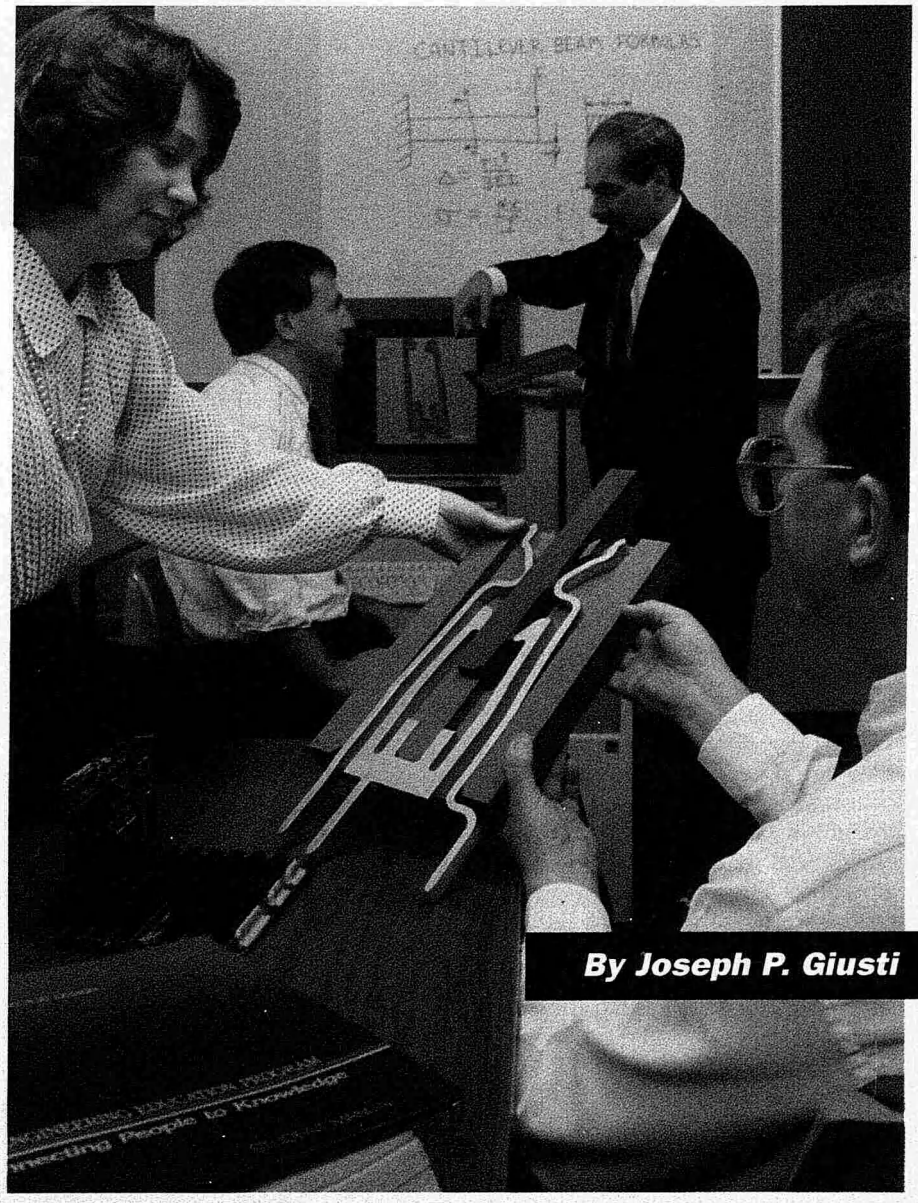
One of the most difficult tasks facing human resource development professionals at companies across America is measuring the quality and effectiveness of their employee education and training programs.

How does an HR department ensure that its courses are effective?

Before they initiate such programs, most corporate training departments conduct needs assessments. The assessments determine which skills require upgrading or which types of knowledge require updating.

Some companies recruit internal experts—people widely acknowledged by their supervisors and peers to be the best and the brightest in their disciplines—to design, develop, and teach courses. Training by in-house experts is a good way to bring real-world examples to the classroom, helping to ensure that training is effective.

Many businesses survey trainees to evaluate the effectiveness of courses. Other companies survey trainees' supervisors to gauge whether the courses have had a positive effect on employee efficiency, productivity, output quality, and morale.



AMP Inc. Training Manager David R. Baker (standing) explains a computer-assisted design of an AMP connector, while AMP engineers study a model.

By Joseph P. Giusti

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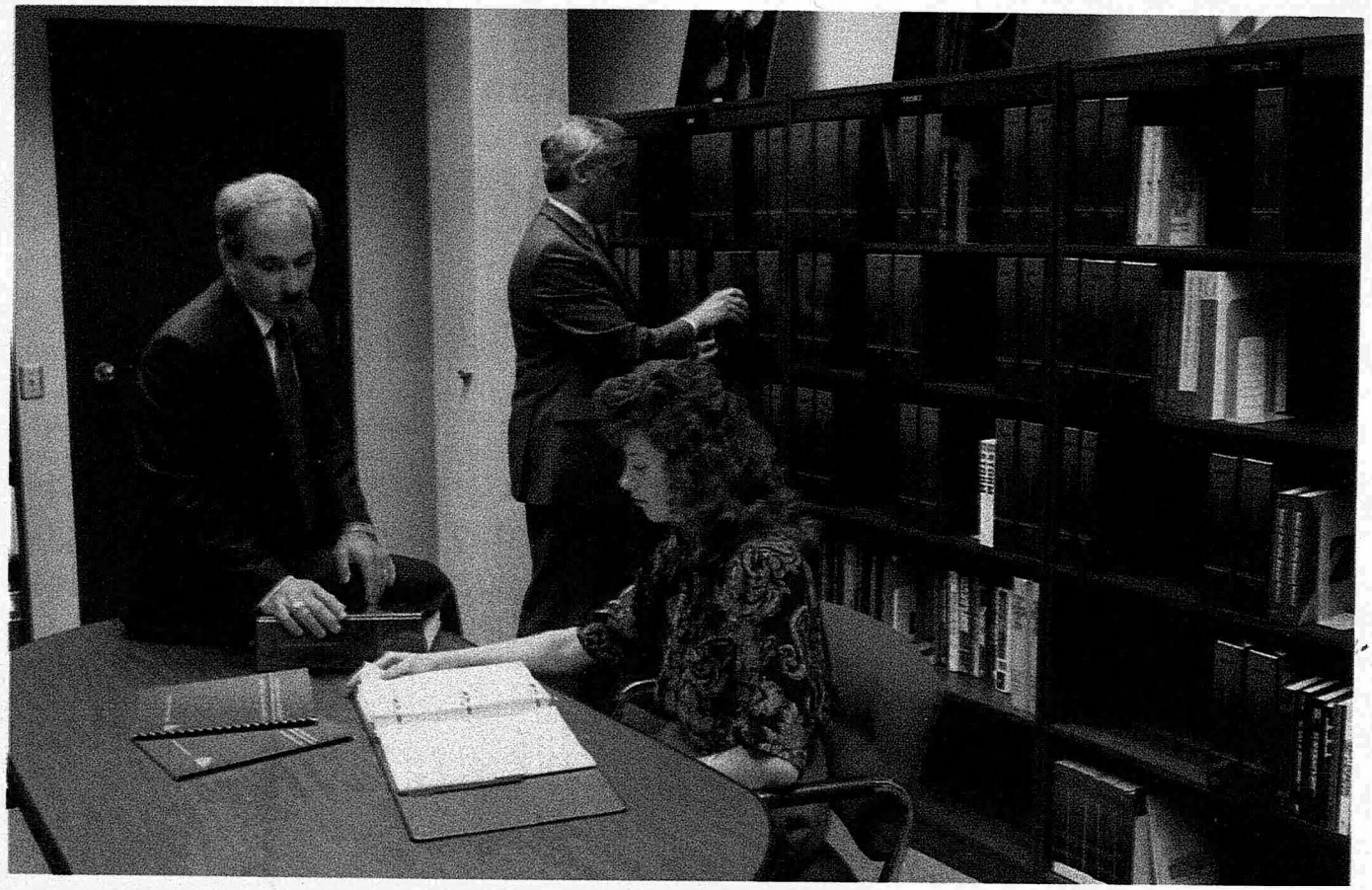

In AMP's library, David R. Baker reviews a training manual with engineer Janine Aull. In the background, Peter J. Graybash selects another module.

Some corporate training organizations have used a combination of those quality-assurance vehicles, but few have incorporated all of them.

One company that has is AMP Inc., based in Harrisburg, Pennsylvania. AMP, a *Fortune* 500 designer and manufacturer of connectors for the electrical and electronics industries, has adopted a multidimensional approach to training its engineers.

The approach seems to be working. AMP's two-year-old Engineering Education Program—which so far has delivered instruction to about 3,000 employees in 28 courses—is having a positive effect on achieving such high-impact corporate goals as reducing new product development time, increasing the company's responsiveness to its customers, improving product quality, and lowering production costs.

Through the preparation of course materials for the program, AMP's training department is becoming, in effect, the keeper of the corporate knowledge base. The 10,000-plus pages of student manuals compiled to date are documenting the company's expertise. Texts are updated regularly, with new information appended as it is acquired.

In the past, many of AMP's internal experts were reluctant to communicate their discoveries of better design and manufacturing methods. The Engineering Education Program is facilitating the transfer of knowledge among AMP's internal experts at company sites worldwide.

AMP had a supportive tradition of continuing education and ample experience with it. Then, in early 1987, the company decided to supplement its engineers' training with the wide-ranging Engineering Education Program.

By that time, AMP was discovering that engineering excellence—once obtained by simply offering jobs to talented graduates—now requires ongoing efforts to improve employee performance and the corporation's knowledge base. Rapid advances in technology pointed to the need for an in-house, structured program aimed at retaining leadership in the marketplace.

Origins of the program

AMP Inc. has long been a stable, profitable corporation recognized for design and manufacturing excellence. The company—with 22,000 employees across the United States and in 26 other countries—has earned its reputation in part because of the benefits of career-long education for its managerial and technical personnel.

The Engineering Education Program adopted the following mission statement: "To identify, develop, and instill engineering knowledge and skills that will ensure that AMP processes and products continue to reflect the highest standards of excellence for customers."

From the program's inception, the originators recognized that its goal was to produce excellent products for AMP's customers. At the same time, program developers also realized the need to "sell" the training to internal customers: to engineers who would be taking the courses, to the engineers' managers, and to corporate officials.

Reasons for the program

The Engineering Education Program was initiated by Chet Timmins,

vice-president of the company's automotive/consumer business group. The program's creation was prompted by individuals and organizations within AMP's engineering community and supported by corporate management.

Reasons for the program's creation mirror concerns shared by many American businesses:

- AMP wasn't aggressively investing in its human resource base. As a result, Timmins says, "we were losing some of our ability to produce innovative products, even though providing creative solutions for the marketplace has long been our forte."
- There had been no centralized corporate focus on engineering training. The decision of whether to embrace training was usually left to the managers of the individual engineers.

The goal of AMP's overall quality effort—called A Journey to Excellence—is achievement of excellence in products and services. According to Harold W. Narigan, AMP's vice-president of quality, the goal "would be impossible without first focusing on engineering excellence. This requires a corporate-wide commitment to education and training."

- Standards often varied between departments and facilities. "Some individuals and departments were following different rules and working according to different procedures than the rest of the company," says Linn S. Lightner, director of engineering assurance.
- The company was losing valuable expertise as some of its experts retired or opted to take early-retirement incentives that had been offered.

"With all of these developments taking place at once," Timmins says, "AMP had to change its view of training" from a budgetary cost to a necessary investment. "We had to regard our employees as our most valued asset, and keep up with rapidly emerging technologies."

Design of the program

Cornerstones of the program include the training department's existing resources and expertise, as well as a newly chartered, 12-member Corporate Engineering Education Steering Committee. The committee was made up of leaders from the various engineering functions within AMP's operations and technology organizations.

The steering committee focused its initial activities on identifying essential subjects for serving customers' short- and long-term needs.

To accomplish that, the committee asked work teams representing all of the company's engineering disciplines to list the training, skills, and knowledge that they felt would be required by the year 2000 to keep AMP on the cutting edge of technology. From that information, committee members drew up a comprehensive list of engineering education requirements and established priorities among the listed requirements.

The steering committee then translated that inventory into an initial list of 25 courses, ranging from 4 to 80 hours long. Courses fit into the following program structure.

- The core curriculum contains fundamental courses relevant to all engineering disciplines. Included are courses on the company itself: its organization, businesses, and special resources. For example, one 12-hour core curriculum course, called AMP Product/Organization Orientation, looks at the company's products and organizational structure, its industry and major markets, and basic connector design and performance characteristics.
- The Focused Occupational Curriculum targets specific engineering specialties and consists of comprehensive courses. For example, one such course, the 32-hour Plating Engineering Practices, offers instruction on relevant engineering practices and technical job skills.
- A group of specialized courses supplements the curricula. These courses are specific and cross-disciplinary. For example, during Creativity For Engineers, a one-and-a-half-day, highly participatory workshop, students learn to better understand creativity and develop action plans for expanding their creative skills.

Most of the courses are designed and developed by AMP's internal experts, often with the assistance of members of the Engineering Education Steering Committee. More than 150 engineering experts have worked in teams of 3 to 15 members on each course's content. University professors with expertise in the different disciplines serve as consultants to the experts, helping with course design and development.

Many of the courses are taught by

their developers. Outside instructional specialists help the in-house instructors by providing personalized coaching as well as workshops on course development and teaching.

To evaluate the effectiveness of course materials and instructional methods—as well as classroom ambience—university professors with at least 15 years of experience serve as consultants. They visit each classroom and observe such things as the instructor's enthusiasm and energy, attitude toward students and subject matter, and use of manuals and visual aids. The consultants then evaluate each course presenter according to a 19-item assessment form.

The professors are experts in evaluating classroom instruction and student response, but AMP does not assume that they are knowledgeable about the subject matter of the courses. They are not asked to judge the information's completeness, accuracy, or timeliness. That makes it easier for the professors to observe and evaluate instructors' verbal and nonverbal teaching techniques. They share their evaluations with the instructors and the program managers.

Vehicles for ensuring quality

The following four mechanisms have been developed to monitor and evaluate the Engineering Education Program's quality and effectiveness:

Students are surveyed at least twice during each class. A brief, midcourse reaction sheet asks them to rate the teaching and class content on a scale of 0 to 9. It also inquires into whether they feel the class will enable them to meet their learning goals.

The instructor tallies the survey results during a break and then immediately discusses them with students. The purpose of the questionnaires is to allow midcourse adjustments when necessary and to reinforce good teaching when appropriate. Results are confidential to instructors and students.

At the end of each course, students are asked to complete a 29-item survey called the Participant Assessment of Course Quality. On this questionnaire, trainees evaluate the instructor as well as the class content, organization, and materials, among other areas. For greater accuracy, the evaluation form has been adapted from a standard developed by the American Society of

Engineering Education.

Results are shared with instructors, course developers, and program administrators. The combination of the assessment forms and the reports from the professors' classroom visits provides a full picture of the impact and effectiveness of each course on students.

Instructors assess course design and development. They look at the quality and quantity of subject matter and at the student manuals' formats, contents, and prescribed uses. Questionnaires also seek feedback on the program's administration and on the services made available to the teachers. Results of the evaluations are reported to instructors, course experts, and the Engineering Education Steering Committee.

Corporate managers assess program quality during monthly meetings of the Engineering Education Steering Committee. These managers are from outside the training department. Their meetings typically begin with presentations by course developers and instructors, followed by discussions of any pending changes that may result from emerging technologies, instructor experiences, or advice from participants and their supervisors.

Often, steering committee members offer constructive recommendations on how to modify course content and improve classroom activities. They have also suggested development of additional classes.

The steering committee also keeps AMP's corporate management apprised of the program's efficacy, cost, and strategic value.

Outside consultants with expertise in both curriculum development and engineering conduct a fourth quality-control phase, dubbed "Q-4." After a course has been conducted at least twice, supervisors of trainees may be randomly selected for extended interviews, held six months after the training.

First, the supervisors are given an orientation about the program and the specific course being examined. Then, through questionnaires and interviews, supervisors comment on the relevance of course materials to their subordinates' job roles and responsibilities. They also assess the impact of the course on employee productivity, efficiency, output quality, and workplace morale.

According to the program's timetable, by the end of 1990, Q-4 reports will be issued for 12 different courses.

A few sample comments received so far from trainees' supervisors illustrate the kinds of skills that are being upgraded. One manager of employees who have completed the project management course says, "The course has given them tools for organizing, determining specific goals and objectives, and developing plans."

Adds a supervisor of employees who took a course called Financial Overview For Engineers, "Participants now feel more confident about themselves in addressing financial issues and participating in discussions."

A manager of graduates of the Computer Capabilities Overview course says that the trainees "have gained new confidence in working with AMP's different computer systems."

It's working

AMP is realizing many specific benefits from the Engineering Education Program. Its multidimensional structure uses ongoing input from diverse employees at various levels to ensure that relevant and timely courses are being taught. And, the program's participatory format provides regular feedback on its effectiveness.

The supervisor comments listed above are examples of the kind of feedback that instructors and program administrators have received about the sharpening of students' knowledge, attitudes, and skills. But the Engineering Education Program has made other contributions to AMP. No significant statistical data have yet been compiled, but interviews with AMP managers, experts, and program participants confirm the program's accomplishments.

Flaws in product designs—one of the factors behind the program's creation—have steadily declined. "We have noticed a reduction in the number of complaints from our customers," says Timmins.

Concurs Lightner, who has served as chairman of the Steering committee since the program's inception, "There is very strong evidence that, because of some of the skills the program is upgrading, we are getting better designs and completing projects more efficiently."

Timmins points to a closer rapport between AMP employees across functional lines. He adds, "I feel there's also been an improvement in employee morale. Employees view this training as a reflection of our commitment to them, and of the value we place in them."

Lightner says many longtime employees—20- and 30-year company veterans—say they wish that AMP had initiated the program a lot earlier in their careers. "That desire indicates they feel the program has real value for them, too, and is proving to be helpful in their work," he says.

Shorter cycle times

The Engineering Education Program, according to Narigan, teaches skills essential to the implementation of such leading-edge manufacturing concepts as simultaneous engineering. This methodology integrates design and production processes to reduce cycle time—the time required to bring a new product from concept to market.

According to Narigan, "Cycle time reduction is critical if AMP is to remain competitive in an increasingly sophisticated technological environment."

The project management course has been particularly beneficial to reducing cycle time, according to Ben Bennett, associate director of product planning. AMP has needed about six years to conceive, develop, and roll out complex products, explains Bennett, a member of the company's Business Development Group. The goal is to cut that cycle time in half, he says.

"The project management course has given us better insight into all of the elements required to take a product from design to production," Bennett says. "We are aware that we've adopted some pretty aggressive goals. But we feel that the training we're receiving is being directed toward meeting our objectives."

The Engineering Education Program is enabling AMP to trim by 50 percent the cycle time required for less complex products, too: from three years to 18 months. Dave Fleak, a methods engineering supervisor and a former design engineer, says that is especially important because AMP's competition in that segment has also become keener.

"Now we have a larger number of

smaller competitors who have the structure and capability to introduce new products within 18 months," Fleak says. Due to AMP's upgraded skill and knowledge base—along with the introduction of simultaneous engineering techniques—"many of our smaller new products are now being produced much more efficiently," he observes.

Resources and standards

Two of the program's other accomplishments have been to identify internal experts in various AMP disciplines and to uncover, document, and update common standards.

"One of the program's real benefits is that it not only teaches employees how to do things through sharpening their skills, but shows them who to go to if they need help," says John Richtarik, supervisor of industrial engineering. Richtarik has also developed and instructed classes.

Since instructors are using real-world case studies and AMP "language" when teaching courses, the student manuals and class notes are serving as "cook books," Richtarik points out. "When, in the future, trainees need to know something like how to put together a capital request for a piece of equipment, they can find the process outlined in their notebooks, step by step," he says.

Employees used to have trouble finding information about the "AMP way" of doing things, according to Joseph A. Fink, a development engineer. "There wasn't any one place where we could look or find out who could assist us," he says. The course manuals, Fink adds, "have provided us with a tremendous wealth of information that is constantly being updated." Some employees are keeping their own lists of internal experts and swapping names and phone numbers.

The identification and documentation of common AMP standards is having a positive effect. Despite the existence of a corporate standards department, some of the standards that are now being taught had been undocumented before the program's core curriculum was implemented.

Graduates of core curriculum courses are learning to perform their jobs with less individuality and fewer idiosyncrasies, and to apply originality and creativity where they matter most for AMP: where they improve processes and products.

The realities of today's marketplace require that a corporation become one company worldwide. The AMP training organization's identification and maintenance of corporate standards in all engineering areas is helping to achieve that goal.

As Fink explains, "If the entire company is performing basic tasks the same way, there will be fewer conflicts over individual methods, less room for error and miscommunication, and improved product quality."

The Engineering Education Program is providing employees with the skills and knowledge necessary for AMP to remain competitive. Because of the program's responsiveness to its internal customers—employees who take the courses, their managers, and corporate officers—it enables AMP to keep external customers satisfied as well, through increased responsiveness, improved product quality, and timelier, more creative solutions for the marketplace. ■