

A VIEW OF THREE EDUCATION AND TRAINING PROGRAMS

Staff education and training has long been an important part of life at APL. This article discusses the history, goals, and educational foundations of APL's Part-Time Study Program, Personal Computer Training Courses, and Management and Supervisory Education Program.

THE PART-TIME STUDY PROGRAM

As the pressure of wartime research and development declined in 1945, continuing formal education became a possibility for select candidates at APL. This change marked the beginning of what is now known as the Part-Time Study Program. At that time, the program was seen as a recognition of the dedication and proven ability of young men who had been forced to interrupt their formal education to contribute to the war effort at APL. In November 1945, Captain A. A. Burke of the Navy's Bureau of Ordnance outlined the policy of the Navy regarding its postwar relations with universities in a memorandum to APL's Director, Merle A. Tuve. As a result, the decision was made to subsidize the education of a select group of employees. By January 1946, Director Tuve negotiated formal procedures with the President of The Johns Hopkins University, Isaiah Bowman, and the arrangements were approved by the Board of University Studies. The first three staff members (two Ph.D. candidates, Major Joseph T. Massey and Erwin H. Shroader, and one masters candidate, Lieutenant Richard Cole) attended classes at The Johns Hopkins University, part time during the day, to fulfill residency requirements for graduate work. They continued to work part time as employees of APL.

Initially, the Part-Time Study Program was designed to facilitate the education of technical employees for projects of national importance. With the increased knowledge and skills acquired through formal course work, employees gained greater technical expertise, improved their job performance, and prepared for career advancement.

Even in the beginning stages of the program, four benefits were available: tuition reimbursement, part-time study leave, rearrangement of the work schedule, and tuition reduction. A staff member could qualify for one or more benefits during the same semester. Full reimbursement of tuition and laboratory fees was available for courses considered relevant to the staff member's job or to his or her future APL career, initially up to a cost of \$400 a year or 12 credits. The staff member was reimbursed upon satisfactory completion of the course. As tuition costs increased and students began to take courses in the summer, the limits were modified to permit reimbursement of costs of up to 18 credits per year at region-

ally accredited institutions. Since most universities offered courses only during the day, APL permitted staff members to rearrange work schedules by working evenings and weekends. For time not made up, the staff members could take part-time study leave, but they were not reimbursed.

By 1975, the program was extended to all full-time permanent employees, regardless of staff level or prior education. That year, the number of participants increased from 203 to 243. Nonprofessional staff members received reimbursement for course work considered pertinent to their APL careers, as well as the benefits of remission. They could not, however, attend classes during the day, because the federal wage and hour laws restricted them from working more than eight hours a day.

By extending the Part-Time Study Program to courses below the junior-year college level in 1975, the Laboratory greatly increased the types of courses and institutions available to staff members. This extension paralleled the expanding continuing education options being offered by organizations around the country. Although courses were usually taken at accredited institutions for credit, exceptions were made where pertinent courses were not available, including courses at trade, technical, and business schools. To offer even greater flexibility to staff members, tuition assistance was also provided for credit television courses and for credit courses scheduled on weekends and during intensive winter intersessions. Other options included cooperative education and credit for prior learning.

The establishment in 1964 of the APL Education Center, a collaborative effort between APL and The Johns Hopkins University Evening College, had a definite effect on program participation. The on-site presence of the APL Education Center enabled staff to attend advanced undergraduate and graduate technical courses after work rather than during the work day.

Since the start of the Part-Time Study Program in 1945, 786 degrees have been earned by staff members, consisting of 134 bachelors, 610 masters, and 42 doctorate degrees. Figure 1 shows the distribution of the degrees awarded over 5-year periods from 1960 to 1988. Five hundred forty-one degrees (or 60%) have been awarded by The Johns Hopkins University, and 420 (78%) of those have been awarded to staff members who completed their programs at the APL Education Center.

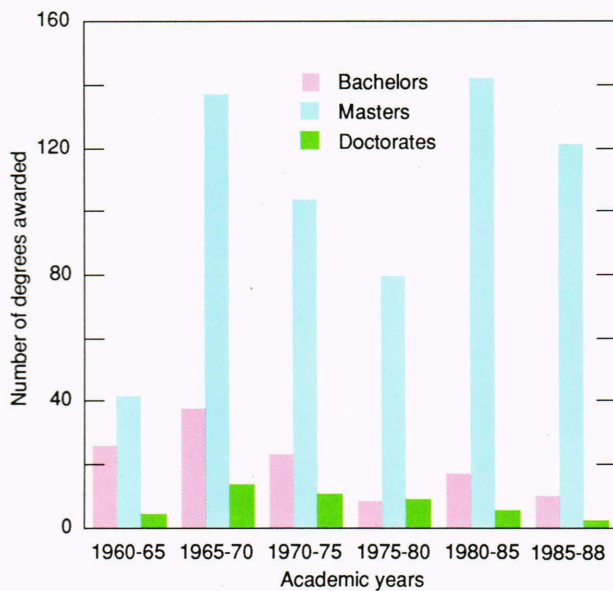


Figure 1—Degrees awarded through the part-time study program (1960–1988). (Note that the last span is for only 3 years.)

Currently, up to six hours a week of paid part-time study leave is available for staff members who take courses offered only during the day. Staff members may rearrange their work schedules up to a maximum of 8 hours a week, including part-time study leave. The maximum reimbursement of 18 credits at regionally accredited institutions is allowed per year. Remission or partial or total prepayment of tuition is also available for students attending credit courses through the various divisions of The Johns Hopkins University. Senior and Principal Professional Staff members receive prepayment of up to the cost of two courses; all other staff members receive partial remission, a maximum of one-half the cost of one course. In all cases, continued support is based on satisfactory performance on the job and in school. Normally, the maximum academic load for a full-time staff member is six credits per semester.

The Staff Capabilities Enrichment Survey conducted in early 1988 identified the Part-Time Study Program as an important way to combat technological obsolescence. Innovative technologies in education (such as satellite downlinking) may offer new options for continuing formal education. The Education and Training Group is following developments in these new training technologies to determine whether they should be integrated into the future Part-Time Study Program.

APL PERSONAL COMPUTER TRAINING

Personal computer training is focused on helping staff members make the best use of computers in their work. The Laboratory's computer training effort began in 1982 with a series of lectures demonstrating the uses of Visicalc (a precursor of Lotus 1-2-3), Visidex, and Visifile (early attempts at database management systems). The lectures also demonstrated the use of personal computers for scientific calculations and showed how they were already

being used as embedded systems in some groups at APL. The demand for more information about personal computers was so strong that the lectures had to be repeated. Personal computer training continued to evolve as external and internal personal computer experts began to present regularly scheduled series of one-day software demonstrations.

As the marketplace changed, the variety, versatility, and power of personal computer application software increased. The number of personal computers in the Laboratory also grew dramatically and mandated that we modify and expand the scope of the personal computer training program. The rapid spread of word processing, spreadsheets, and database software packages enlarged the user base at APL. The increased availability of faster, more powerful, and less expensive hardware increased the demand for personal computer systems throughout the Laboratory, and the Education and Training Group revised the personal computer training classes. Internal experts and external consultants used an instructional systems design model to develop a new series of personal computer training classes.

Instructional systems design is a systematic approach to the analysis, design, and development of training. Specialists first conduct a systematic assessment of needs to determine a population's level of knowledge about a given topic and to ascertain what the population needs to know about it. The instructional designers then work with experts on the subject to organize the scope and sequence of the new training. Training specialists work with the subject experts to develop an instructional plan, determine measurable objectives for each course, and prepare objective-based evaluation documents. All of these design elements are rooted in the results of the needs assessment. When the course design and content have been determined, the subject experts, under the guidance of the instructional designers, prepare the course materials. The course materials, the sequence of objectives, and the overall instructional plan are tested in pilot classes, which are evaluated for necessary refinements. All of this is done before the courses are offered to the general Laboratory staff.

In the early years of personal computing, there was virtually no computer training industry, and qualified computer trainers were scarce. The Education and Training Group resolved this problem by identifying one primary vendor who provided most of the training. Using this approach, we met the challenge of training large numbers of inexperienced users in a great variety of software.

By 1987, the customer base for personal computer training had changed dramatically. Software had become more user-friendly and more powerful, and software companies had greatly improved the quality of their documentation. Perhaps the most important response to these changes was the Laboratory's establishment of an in-house computer support service, the User Services Group.

As needs changed and an internal source of expertise was defined and formally established, the Education and Training Group again used an integrated systems design

approach to modify APL's personal computer training program. The Education and Training Group and the User Services Group assessed the need for personal computer training. Course evaluations were analyzed, and User Services examined their log of calls for help. Education and Training conducted post-course interviews of participants and analyzed course attendance data. The assessment demonstrated some of the changes in the personal computer marketplace. The assertion that software was becoming easier to use was reflected in the high rate of cancellations for our intermediate and advanced courses. Because more people were trained in the various software packages, APL staff members had developed informal user support groups and were helping each other solve computing problems. In addition, the User Services Group had established itself as the central Laboratory resource for personal computer support.

Those factors enabled us to significantly change the way personal computer training classes were designed. The content of each course was now determined in conjunction with the Laboratory's own subject experts in the User Services Group, allowing personal computer training to be specifically tailored to the unique, known needs of the APL staff. To define the contents of each course, the subject experts used their service call records, their knowledge of the software packages, and their understanding of the computing needs of the staff. The Education and Training Group worked with the experts to determine performance-based objectives for each course and to redefine the program's structure; then they worked with an expanded group of training vendors and APL computer experts to prepare the course materials.

Because the capabilities of the training industry had grown with the marketplace, many qualified vendors were now available, allowing the Education and Training Group to select a number of different vendors to conduct computer training. Consequently, we now have maximum flexibility in scheduling classes, and our ability to respond to the specialized or unique training requirements of individual Laboratory groups has increased. In addition, all of APL's computer training is conducted as "hands-on" training. Again, with the advice and assistance of the User Services Group, we have assembled an internal facility for computer education that consists of 10 student machines, printers, and additional monitors that display the screen on an instructor's system. These systems are also on-line with the Laboratory's central computing facility to enable us to conduct hands-on mainframe training. Figure 2 is a photograph of the computer training facility.

Although different vendors are conducting the training, they are teaching courses designed and developed by the Laboratory. As in the past, we review the content with the vendors, and they supply competent trainers. Evaluations ensure that up-to-date content is taught and that appropriate instructional methods are used. Finally, by coordinating training efforts with the User Services Group, we are able to assess, continually, whether the courses are meeting the needs of the participants.

Today, each personal computer training course has been redesigned to last 2½ days, on the assumption that



Figure 2—The APL computer training facility.

skills are best acquired through practice. Because the courses focus primarily on skills development, trainers are required to present a basic skill or concept and to provide several hands-on opportunities for participants to practice the skill. The formal courses last 2 days, and members of the User Services Group conduct half-day follow-up sessions about one week later. The follow-up sessions allow the participant to use the software, develop some application problems, and get help in the form of additional training and learning reinforcement. User Services also offers advanced skill-building workshops that demonstrate advanced software applications.

As computing technology continues to expand, so does the demand for training. The APL staff has responded very favorably to the new 2½-day course format. There are few empty seats in any of these courses, and waiting lists are common for most. In the 12-month period from April 1988 (when training began under the revised format) through March 1989, 698 people participated in computer training using our IBM-based training facility. Figure 3 shows the registrations for these courses by software package. Included under "Others" are training in specialized software packages as well as mainframe software training. In addition, we have arranged two month-long training efforts to support the needs of the growing number of Macintosh users at APL. Those efforts have reached 280 users. Figure 4 shows the breakdown of the registration for this training by course.

The Education and Training Group has prepared two evaluation documents to ensure that the personal computer training program continues to serve the staff's needs. The first assesses the training and the trainer at the time of instruction, and the second, about one month later, asks whether the skills taught in the course are the ones needed for the job.

The personal computer marketplace will continue to change. We believe we have established a training system that allows us to monitor the training constantly, determine when courses need revision, and suggest when new courses need to be planned. As a result, the Laboratory is well positioned to accommodate and take ad-

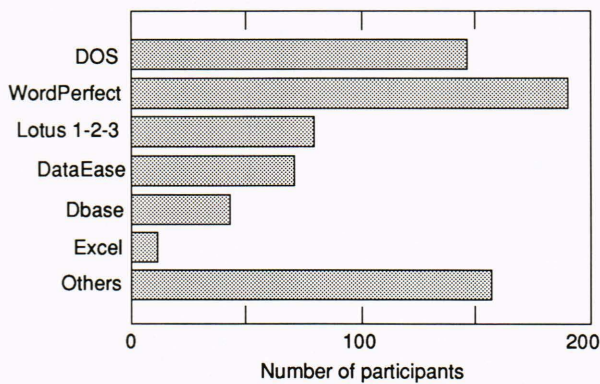


Figure 3—APL computer training, excluding Macintosh computers, April 1988 through March 1989.

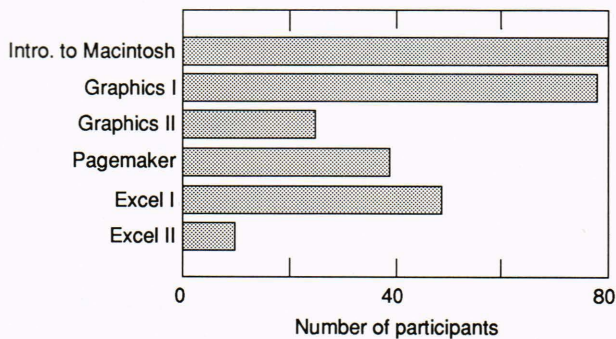


Figure 4—Training on the Macintosh computers, July 1988 through March 1989.

vantage of the inevitable changes in the world of personal computing.

APL MANAGEMENT AND SUPERVISORY EDUCATION

Many technical organizations must face the problem of turning their most talented technical leaders into effective managers and supervisors, who can exercise leadership as well as supervise teams of other technical professionals. The organizations, therefore, frequently make significant technical accomplishment the first criterion for identifying and promoting supervisors.

This is a sensible practice. Technically knowledgeable supervisors help assure product quality and reliability. People are often enthusiastic about working for others whose expertise they respect, and supervisors who are technical experts can promote *esprit de corps* more rapidly within a work team.

Technical supervisors must understand the work of the people who report to them, but contemporary supervision demands much more than strong technical ability. The supervisors must direct assignments, plan work strategies, answer questions, resolve conflicts, and, of course, communicate with sponsors and with their own superiors. They also must confront many of the problems facing our larger society—drug abuse, AIDS, ethics or fraud issues, sexual harassment, and discrimination

on the job. They must understand their organization's affirmative action policy and work toward its implementation. They must work effectively with their subordinates and help them to grow and develop within the organization and within their profession. They must control budgets, evaluate performances, and recommend salary actions, reclassifications, and promotions. They must understand and interpret organizational policy and procedures. They must interview candidates for employment. Occasionally, they may even need to discharge a subordinate. Most supervisors acknowledge that very little, if any, of their training or experience ever prepared them to assume those responsibilities.

Recognizing that technical supervisors and managers must be trained to meet their nontechnical responsibilities, APL has established and is continuing to expand a management education effort. Begun in 1981, it has grown rapidly. The first management education activity at APL was Supervisors Management Seminars, where the goals were to inform supervisors about the administrative responsibilities of their positions and to describe the workings of organizational support systems available to them. Over several months, most professional staff supervisors—from first-line supervisors through department managers—participated. The seminars provided essential information and underscored the need for broadening APL's management education effort. They also peaked supervisors' interest in continued management education.

During the second half of 1981, the management training needs of APL supervisors were further detailed and quantified. The components of a complete, integrated management education program were described, the program's critical elements were outlined, and the sequence of course development was determined. Training courses were aligned with the plans of APL's management and with the specific goals of the technical and administrative departments.

The first course developed as a result of this phase was the Coaching Seminar, the core course of the entire program, first offered in early 1985. All other management education courses, including those being planned, are required to merge well with this course and must be in harmony with its theoretical foundations. Figure 5 shows the current courses and courses to be developed in the management education program. The 5-day course is presented at the Woods Resort and Conference Center in West Virginia. Over 200 people have participated in this seminar, which is offered five times a year to groups of 16 people.

The Coaching Seminar focuses on the day-to-day supervisory needs and responsibilities of line managers. It presents a model for understanding interpersonal communications in general and helps supervisors and managers apply that model to their work as leaders of people. It also introduces the concept of development discussions (informal, periodic discussions of performance between a supervisor and individual subordinates), and, of course, it offers opportunities for participants to apply the learned skills and concepts to case studies as well as to their own supervisory situations.

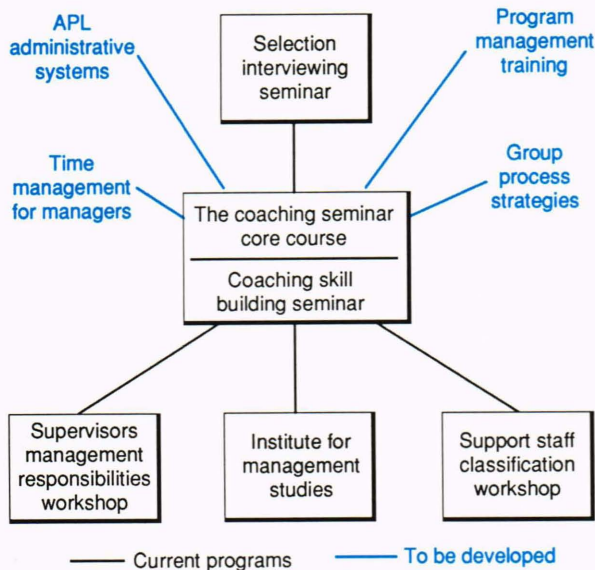


Figure 5—Structure of the APL management and supervisory education program.

An important element of the Coaching Seminar's design is that it takes supervisors and managers away from the daily pressures of work for an extended period and places them in an environment that allows them to concentrate solely on supervisory concepts and issues. For many, this is the first time they have had an opportunity to analyze this aspect of their jobs. Participants learn that the problems they once thought were unique are often the same problems their peers face. They also discover that their peers are excellent resources for approaches and solutions to supervisory problems.

This intellectual exchange about supervisory issues has become a resource for APL's senior management. The participants spend the last evening of each Coaching Seminar applying what they learned during the week to issues of management and supervision at APL. The process has produced several valuable results: it gives central management access to another body of data regarding the issues and opportunities that Laboratory supervisors and managers face, it helps course participants crystallize some of their own thoughts about management issues, and it demonstrates how many of their concerns are shared by their colleagues. The seminar has been so valuable that it has led to the development of the Supervisors/Managers Issues Committees, committees formed with central management's review and approval to explore Laboratory-wide issues, make recommendations for addressing them, and report their findings to management. Five committees have dealt with such issues as streamlining administrative procedures, enhancing staff recognition, maintaining the staff's technical capability, improving travel procedures, and establishing alternative technical career paths.

As participants begin applying the supervisory skills learned at the seminar, they often discover that they need further training to refine their new skills. To assist former Coaching Seminar participants with problems, a

2-day follow-on seminar called the Coaching Skill-Building Seminar was arranged. This course uses a "contract learning" instructional format to extend the concepts and principles taught in the Coaching Seminar, and helps participants address a particular management skill or supervisory problem they face. Participants receive individual attention, and with the help of the instructor and their colleagues, they directly confront the problems. Supervisors typically do not attend the skill-building seminar until at least three months after the Coaching Seminar, and since it addresses specific supervisory or managerial problems, individuals may attend more than once. Because of the intensely practical nature of the Coaching Skill-Building Seminar, many participants consider it to be one of the most valuable courses in APL's management education program.

Another management education course with a practical skills orientation is the Selection Interviewing Seminar, which teaches an in-depth selection interviewing process to help supervisors gather the data needed to make informed hiring decisions. The seminar demonstrates techniques for screening and selecting the best candidates and for interviewing them about their work history and career interests. It helps supervisors develop a systematic approach to establishing job-relevant selection criteria. It meshes well with the management and supervision principles presented in the Coaching Seminar and, in fact, teaches supervisors how to use the data they collect during the in-depth interview process to develop coaching and career development plans for the new employees they hire.

One practical supervisory issue of great concern to most supervisors is knowing how to function effectively while facing diverse threats from an increasingly litigious society. In the summer of 1986, the Laboratory began to educate its supervisors on their roles in supporting and enforcing its equal employment opportunity and affirmative action policies and on the importance of functioning within the legal limits of supervisory practice. The Supervisors Personnel Management Responsibilities Workshop is a 1-day course that also examines proper procedures for employment and promotion interviewing and presents guidelines for handling problem employees, including, if necessary, dismissal. The clear connection between these policies and good supervisory practice makes it easy to relate this course to the underlying principles of the Coaching Seminar. Coaching staff members, working with them to match their personal development goals with organizational needs, and discussing their work-related problems—these are all interrelated tasks, part of positive management of staff by supervisors.

In addition to these courses, the Education and Training Group oversees APL's membership in the Institute for Management Studies, an international organization that sponsors monthly seminars on management topics in cities around the world, including Washington. The seminars offer an excellent way for APL's supervisors and managers to keep abreast of current developments in management practices and to exchange ideas with their peers in other organizations. In conjunction with the Em-

ployee Relations Group, the Education and Training Group developed a course that helps supervisors work with and understand the reasons for the Laboratory's Supporting Staff reclassification procedures. In the coming months, a program explaining the working of some

of APL's administrative support systems will be offered. Also planned is a course addressing techniques for program management. Other courses on topics such as time management and group process strategies are being discussed as offerings for the near future.

THE AUTHORS



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In 1986, Ms. Edelman joined APL, where her major responsibilities have included the coordination and administration of educational benefits programs, including the Part-Time Study Program and the Scholarship Program for Dependent Children. She has provided career development assistance to staff members seeking guidance regarding education and training activities; she was also responsible for coordinating the senior staff biographies. She has developed, coordinated, and administered several management training programs and has served as an in-house training consultant for several support staff activities.



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VINCENT C. MESSER's biography can be found on p. 111.