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## Continuing Education in Technical Information Services\*

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Several educational choices available to literature chemists are discussed.

In recent years we have all read and heard a lot about what has come to be known as continuing education. This concept has been developed to combat technical obsolescence of the individual scientist. For the chemist, continuation of his education offers a challenging opportunity to acquire significant and substantive information, especially that with broad implications. In this paper, I will examine several of the major continuing education choices open to the chemist working in a technical information services department in industry.

At least one good review of continuing education in chemistry has been published (1). This source estimates that: "The 'half-life' of a scientist or engineer is very close to 10 years—half of what the scientist and engineer has learned will be obsolete in a decade, and half of what he will need to know 10 years hence is not now available to him. Now more than ever before, greater pressure is brought to bear on the technical man to keep up-to-date—to make his work more effective by continuing his education."

According to another source (2), "The senior manager with 10-15 years to serve can no longer count on exploiting his present knowledge and skills comfortably until he retires. The younger man just beginning his career... must prepare for peak responsibilities two or three decades hence in a world whose characteristics he... can only dimly foresee." This same paper suggests that for many the need is to survive today, not to prepare for tomorrow; this kind of situation is one which needs to be surmounted.

### THE PROFESSIONAL SOCIETY and CONTINUING EDUCATION

The role of the professional society is important (1). The American Chemical Society now offers, on a regular

basis, short courses, both at national meetings and elsewhere. Interestingly, one of the courses scheduled for the September 1966 National Meeting relates to Information Retrieval.

The first ACS short courses were presented in April 1965, at the national meeting in Detroit, where 263 registrants participated in three courses. Dr. Moses Passer, ACS Educational Secretary, scheduled five courses for the Fall 1965 meeting in Atlantic City; some 600 registrants attended the five courses offered. This series has been continued at subsequent meetings. The second phase of the ACS program in continuing education—traveling short courses—began in the fall of 1965. These courses are aimed at serving a greater number of ACS members, many of whom are seldom able to attend a national ACS meeting.

It has been reported (1) that the ACS is also considering approaches such as courses on tape complete with supplementary materials. Tapes and accessories would then be made available to any local section or topical group. In addition, exploratory studies are reportedly in progress for producing some pilot TV films appropriate to the ACS continuing education program.

Local ACS sections are also active in continuing education. In 1964, 11 sections gave a total of 18 courses to their members. These courses were generally not available at local colleges and universities.

Another well-known program is that of the American Institute of Chemists. This program, which began in 1964, has been characterized by two main features. The first of these is the "AIChemLecs" program (3). These lectures have been designed to develop new techniques for continuing education. The program was inaugurated by a lecture on the subject, "Statistical Theory of Polymer Structure," by Dr. Richard Stein of the University of Massachusetts. Dr. Stein spoke to groups of chemists in two different geographic locations simultaneously. He used telephone microphones and amplifiers in conjunction with an Electrowriter instrument as a "blackboard."

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A second facet of the AIC program is the accreditation of chemists. One of the major purposes of this program is to encourage chemists to keep their tools sharp and workable. Accreditation is done on a local chapter basis operating under broad standards (4). Each chapter establishes its own more specific standards and conducts its own examinations. An individual who completes the examination successfully is designated as a "Professional Chemist-Accredited." Certificates of accreditation are renewable every five years subject to successful completion of another examination. As one of those accredited, I can personally testify to the value of the program.

The American Institute of Chemical Engineers has established an "Awareness Program to Combat Technical Obsolescence" (1). Included in this program is a library of taped lectures, many of which are illustrated with slides. The AIChE also maintains a library of educational motion pictures which may be rented or purchased. At each national meeting of AIChE, a full day lecture on some phase of chemical engineering is offered. The Institute also holds workshops for local sections to acquaint them with chemical engineering programs and how to present them.

#### THE CHEMICAL INDUSTRY AND CONTINUING EDUCATION

Chemical companies have become more active and more formalized in their continuing education programs. For example, in a recent issue of *Chemical & Engineering News* (5), there is an advertisement for a "Coordinator of Continuing Technical Education." It is well-known that for some time, a number of companies have offered on-site courses. Many companies also offer tuition refund programs, wherein technical employees are reimbursed for a high percentage of the cost of approved college-level courses.

There has been particular interest in computer training. According to one source (1), almost every company of any real size in the U.S. today offers its technical people courses in computers.

#### RESPONSIBILITY FOR CONTINUING EDUCATION

There is not complete agreement as to whether responsibility for continuing education is with the individual or with his employer. It has been noted that "It is the belief of the Professional Engineers in Industry Committee on Continuing Education that the principal burden [for continuing education] lies with the employer..." (6). On the other hand, there are others who believe that it is the primary responsibility of the individual to further his continuing education (6). A recent survey of members of the National Society of Professional Engineers (7) states that "Better than 55 per cent of the engineers who participated in this survey have taken and completed some type of formally organized continuing education program during the five-year period 1960-1965. Most of the costs incurred were personal to the individual engineer, with the average out-of-pocket expenses totaling slightly over 60 per cent."

My own belief is that both the individual and his company must be partners in this venture. The individual must possess the desire to continue his education; the company can provide the opportunity to enable him to do so. But I think that the primary responsibility rests with the individual; it is a matter of self-education.

#### CONTINUING EDUCATION AND TECHNICAL INFORMATION SERVICES

In a technical information services operation we are in an excellent position to contribute to the continuing education of the chemists and engineers we serve. We can call to the attention of our clients significant new literature, meetings, and courses, as well as other opportunities. We can keep our facilities open around the clock to make it convenient for our clients to use them. In my own operations, we are presently considering an assigned reading program for all technical R and D people. Under this program, each individual would be assigned two or three journals to follow on a regular basis. This individual would also be expected to keep his colleagues informed if he notes articles which they might not ordinarily read.

But we also need to continue our own education. To put this another way, we need to maintain our own state of readiness. The concepts presented below reflect my own thinking on this matter. Others may have different but equally valid and useful ideas.

As I see it, our situation in technical information services is that we need to maintain our awareness both in chemistry and in the area broadly defined as the information sciences.

In the area of chemistry, many of us will probably first of all want to maintain a general awareness of what is going on throughout the chemical world. This can be done, for example, by reading media such as *Chemical & Engineering News* and by attending general technical society meetings. In addition, most of us will want to maintain our state of readiness in at least one specialized area of chemistry. This may depend in part on our own background and in part on the interests of the organization for which we work. In any event, we need to be selective, as no one can cover all branches of chemistry.

In the area of the information sciences, we have an equally important goal of looking to the future. For example, some of the areas which we could follow include: chemical patent practices; computer science and technology, foreign language capability, information retrieval techniques, and chemical nomenclature.

If a person in a technical information services department has managerial responsibilities, his goals may be different from those of his colleagues. Such an individual also needs to keep up-to-date with respect to management techniques and practices. Further, he must maintain not only his state of readiness, but he should help maintain the readiness of those individuals who work in his department by establishing the necessary climate. In the case of a manager, the emphasis in continuing education will probably be put more on breadth rather than depth of knowledge. He may want to participate at intervals in each of the technical functions performed in his depart-

ment to avoid the "filtered experience" noted by John W. Gardner (8). On the other hand, for the information scientist within the department, depth of knowledge in specific areas seems to be a more logical goal.

There are many specific techniques for continuing education in technical information services. Here are some examples:

1. Staff meetings within the technical information services department to exchange ideas and information.
2. Conversations at lunch with other laboratory personnel.
3. Reading of current literature.
4. Formal courses either at home, at one's place of employment, or in an approved college, depending on geographical location.
5. Job rotation.
6. Attending outside meetings and seminars.
7. Attending inhouse meetings and seminars.
8. Publishing worth-while papers (this in itself is continuing education).
9. Field trips to study advances made by others and to exchange ideas with colleagues.
10. Participating in short courses and other programs offered by professional societies.

To keep up-to-date requires a real effort on the part of some individuals. To help spur those people along, encouragement by management is needed. Some individuals may find it helpful to record in a notebook their goals and achievements. Accreditation programs can also help serve as a stimulus. But there are other individuals who don't need to make a conscious effort to learn. Their natural curiosity and interest keeps them abreast. Not everyone needs prodding.

Perspective is important in technical information services. There is a proliferation of new services, theories, and systems. Are these fads or will they have a lasting impact on our field? One needs to be highly critical and to test and experiment whenever possible.

## PLANNING AND EVALUATING CONTINUING EDUCATION

Before embarking on a continuing education program, it is wise for an individual to first assess his areas of strength and needs. He can then build a carefully planned, flexible agenda around these areas.

There can be no pat formula as to the amount of time to be spent on continuing education. This varies with the capacity of the individual, the opportunities open to him, and his initiative.

I would like to emphasize the importance of a flexible program. The chemist should feel free to alter his program to meet changing technical times. Heavy commitment to formal agenda may make such flexibility difficult. On the other hand, a completely informal program offers few standards against which to measure progress. An intermediate approach is probably best.

Can one evaluate what one has learned? There are formal examination programs such as those of AIC and the grades received from formal courses. Dill *et al.* (2) suggest that one can write and talk about what has been learned and some of the new skills acquired. Feedback from colleagues and experiments can be useful in planning future goals and in setting priorities. But the best measure may be the degree of success achieved in one's chosen field.

## CONCLUSION

Each individual is the best judge of what he can reasonably achieve successfully in continuing his education. Success depends to a great extent on one's personal situation and capabilities. There is no doubt that continuing education is a necessity. More ideas are needed to further develop this concept as applied to technical information services.

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