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ABSTRACT

Life-long education, in which the learning process is continuous and unbroken, for the professional is discussed from the standpoint of obsolescence, its symptoms and causes, and present efforts to cope with it. The concept of half-life is used to describe a professional's competence, and it is stated that the two factors that are most prominent in hastening professional obsolescence are the rate of change and the addition of new data and knowledge. Two examples of coping with teacher obsolescence, in Japan and Great Britain, are briefly described. It is believed that psychologists possess specific skills by which they can contribute to continuing education and, at the same time, they may benefit by new employment opportunities in this field. These skills relate to: motivation, adult learning, measuring and assessing professional competence, the development and use of educational technology, counseling adults (mid-career change and interpersonal competence, external degree programs, and post-graduate residential programs for professionals), research in continuing education (learning, adult development, communications, and organizational behavior), innovative human service programs, group behavior and laboratory practice in group leadership, individual behavior, the psychology of learning, and learning theory. Four major national priorities for continuing education to which psychologists can make significant contributions are: program planning, leadership development, research development and high-priority items (child development, disadvantaged minorities, urban development, population explosion, alcohol and drug abuse, delinquency, violence, improved delivery of human services, and worker training). (DB)

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OBSOLESCENCE OR LIFELONG EDUCATION:

A CHOICE FOR THE PROFESSIONAL

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When setting out to write about obsolescence, one is vulnerable to the obvious criticism that he may himself be obsolete, a victim of the process which besets all living organisms — growing old. The author wishes to disarm his critics at once by admitting no immunity to the inexorable process of aging. One needs only to be required to use glasses for reading fine print or to miss a few soft spoken words of a conversation to be forced to admit that his sensory processes are going into a decline. However, having made this admission and this disclaimer, we can proceed on hopefully to resist or modify the debilities brought on by the passage of time.

The problem of professional obsolescence is in dire need of attention from psychologists. During the working years of a professional man or woman — roughly between the ages of 30 and 65 — a critical issue is whether or not a high level of competence and creative productivity can be maintained against the eroding effects of time. A highly trained person must constantly renew his knowledge. The goal is not merely to keep knowledge already acquired during the period of formal education. Much more than this — for past knowledge may become outdated — the aim is constantly to recharge the batteries which motivate and trigger self-renewal by keeping abreast of new knowledge that is constantly being added by research and publication.

The decline of competence in professional persons which often accompanies the passing of years is not inevitable or necessary except in the

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presence of ill health or other extreme debilitating factors. Obsolescence is a normal though decremental process that nevertheless responds favorably to updating efforts. What is needed for middle-aged persons is a new image of education — life-long education in which the learning process is continuous and unbroken. In familiar terms, this is continuing education but with a new and dynamic meaning. The range of educational activities for updating should cover a whole spectrum which essentially comprises a self-education program: reading, working on projects that stretch one's capacity to the limits, conversation, discussion and argumentation with colleagues, meetings, seminars, and courses in formal classes, studying by correspondence or television or by other media.

To date, psychologists have shown minimal interest in continuing education. The field lacked luster, and funds for research have been in short supply. Yet it would seem that time and money have been expended wastefully in educating children and youth if this valuable investment is permitted thereafter to decline and deterioriate in the middle years. There is need for psychologists to correct this obvious imbalance — the neglect of education for mature professionals. Psychologists can contribute much in the areas of motivation, adult learning theory, measurement of professional competence, adult counseling, mid-career change, evaluation of continuing education programs and educational technology.

First, it may be necessary to demonstrate the extent of obsolescence in the professional, including that of psychology. We shall try to do this through the half-life concept. Following this, we shall review briefly what we mean by obsolescence, its symptoms and causes, and present efforts at coping with it. By then it may become apparent that the psychologist has a number of special skills which are uniquely appropriate for application to the problem of professional obsolescence.

Professional Obsolescence

The Half-Life of a Professional

A useful measure for estimating the extent of obsolescence in various professions is the concept of half-life, a term taken from nuclear physics. The half-life of a professional's competence can be described as the time after completion of professional training when, because of new developments, practicing professionals have become roughly half as competent as they were upon graduation to meet the demands of their profession. Dr. Edward C. Rosenow, Jr. (1970), Vice-President of the Americal College of Physicians, recently estimated the half-life of medical knowledge to be five years. Professor J. Lukasiewicz (1971), of Carleton University in Ottawa, has stated that while the half-life of a 1940 engineering graduate was twelve years, it has shrunk to five years for today's graduate.

Estimates of the half-life of the psychologist, based on interviews conducted by the author on a small sample of psychologists, averaged about ten to twelve years with a range between five and twenty years. The durability and up-to-dateness of competence is dependent upon numerous factors such as achievement motivation, organizational climate, or work conditions, to name a few. The psychologist may be teaching or doing research that requires him to keep up-to-date constantly, or he may work in an industry, hospital, or service organization where opportunities for keeping abreast are minimal.

The factor which figures most prominently in hastening professional obsolescence today is the rate of change and the addition of new data and knowledge. One measure of the rate at which psychological information and knowledge are changing can be made from the number of abstracts published each year. Table 1 shows a three-fold increase in published abstracts

from 7,353 to 21,722 in a ten-year period. The number of psychological journals, while varying during the 10-year period, has not increased significantly enough to account for the increase in published abstracts.

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Insert Table 1 about here

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Is the percentage of increase and change similar for all areas of psychology? A comparison was made of the number of abstracts in the eleven specific areas published in the Psychological Abstracts during the five-year period between 1967 and 1971 inclusive (Table 2). The number of abstracts in seven areas increased, in two areas the number remained the same, and in two other areas there was a decline. Ranked by number of published abstracts, the gains were: educational (100%), developmental (90%), physiological (59%), social (54%), clinical (49%), personnel and industrial (25%) and personality (10%). The data suggest that the rate of change is considerably greater in educational and developmental psychology than in personality. One can hypothesize, then, that the half-life in developmental psychology is shorter than in personality psychology.

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Insert Table 2 about here

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One may inquire whether the number of abstracts published is related to the number of members in the various divisions of the APA. Any estimate of a relationship must take into account the overlapping of membership in two or more divisions. According to the 1970 APA Biographical Directory, the largest divisions were personality and social with 4,637 members, clinical psychology with 3,662, and educational psychology with 3,421. As

apparent in Table 2, the largest number of abstracts were published in educational psychology. Developmental psychology has only 953 members but ranked second in number of abstracts produced. Physiological and comparative psychology had 585 members but ranked third in number of abstracts.

This outpouring of publications creates an obsolescence situation of staggering proportions. Furthermore, more research is going on among psychologists than appears in published form. Therefore, the number of journal articles published is not a complete index of the output of psychologists. The Summary Report of Journal Operations published in the American Psychologist, December 1971, shows that for 13 journals, one-third of the submitted articles are published and two-thirds rejected.

In order to keep abreast of new publications, according to George and Dubin (1971), 20% of a professional's working time should be devoted to updating. Chapanis (1971) estimated that a compulsive, well-versed engineering psychologist would have to read 30 or 40 articles, books, theses, and technical reports every day of the year merely to keep abreast of the current literature. If the psychologist has difficulty in keeping up within his field, consider the lot of the biologist or the physical scientist in which new information is added to the field in vastly greater amounts. For instance, the number of entries in Biological Abstracts rose from 40,000 in 1957 to about 110,000 in 1967, and Chemical Abstracts published about 244,000 in 1967 (Glass, 1970a).

What Does Obsolescence Mean?

At the present time, only descriptive and operational definitions of obsolescence have been advanced. Comparatively little experimental work has been done. Most of the inquiry and literature to date has come from engineering, medicine and management. Psychologists generally have not yet

taken a very active interest in this problem. However, several investigators have focused on factors underlying obsolescence. Burack and Pati (1970), Mahler (1965), and Shumaker (1963) have defined obsolescence in terms of a reduction of efficiencies of performance over time. Burack and Pati found that obsolescence exists when there is a discrepancy between job needs and managerial or professional capabilities as a result of innovation; or when the knowledge and skills of a manager are not sufficient to accomplish his job. Mahler described managerial obsolescence as the failure of the once capable manager to achieve results that are currently expected of him. According to Shumaker, obsolescence is a reduction in technical effectiveness resulting from a lack of knowledge of the new techniques and of entirely new technologies that have developed since the acquisition of the individual's education.

In the field of engineering, Zelikoff (1969), Mali (1969), and Siefert (1963) use the word obsolescence to mean the erosion of the applicability of knowledge. Zelikoff analyzed catalogue course offerings for five engineering colleges from 1935 to 1965 at five-year intervals. By identifying courses that were dropped and courses that were added, he developed engineering erosion curves for five areas of engineering. Figure 1 shows the potential obsolescence of knowledge in electrical engineering as measured by the number of course additions and deletions in the curriculum. The steeper curves in later years represent the rapid increase in technological advancement. For example, for the class of 1935, the percentage of applicable knowledge is about 5%, for the class of 1960 it is about 55%. As psychology approaches the degree of technical complexity of engineering, similar erosion curves can be expected.

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Insert Figure 1 about here

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Another approach to the definition of obsolescence has been advanced by Mali in the form of an obsolescence index (OI):

$$OI = \frac{\text{current knowledge understood by engineers}}{\text{current knowledge in the field}}$$

This equation is based on the rate of change versus time. A high rate of technological obsolescence is related to a high rate of growth. The growth curve expresses the exponential rate of technological obsolescence. Siefert defined obsolescence for engineers as the measurement at some point of time of the difference between the knowledge and skills possessed by a new graduate of a modern engineering curriculum and the knowledge and skills actually possessed by the practicing engineer who may have completed his formal education a number of years ago.

Ferdinand (1966), Norgren (1965), and Mahler (1965) found several types of obsolescence for the purpose of identifying the nature and causes of obsolescence among engineers and scientists. Ferdinand described three types: professional, areal, and ex-officio. In his opinion, remedial programs could be more effectively implemented once the type of obsolescence was determined. Norgren classified the major types of skill obsolescence as technology-based and product-based. Mahler had numerous categories of obsolescence, the most important of which were those of ability and attitude.

It is apparent from the foregoing review of attempts to describe obsolescence that a behavioral definition is still to be developed. There is a critical need here for experimental work by psychologists.

Symptoms and Causes of Obsolescence

The causes of professional obsolescence are many, and a number of interacting factors appear to be involved. Several authors have pointed out that certain attitudes, behaviors and motivational patterns are symptomatic of obsolescence and hence provide guidelines for detecting it.

Malmros (1963) described five signs of obsolescence in the engineer: 1) he became less and less inclined to apply rigorous mathematical techniques to obtain solutions to his problems; 2) he encountered increasing difficulty in reading new technical papers and felt frustrated because he could not follow the mathematics; 3) new technical concepts were confusing to him; 4) new tasks and assignments began to look too difficult to be practical; and 5) contemporaries did not seek his advice. Burack and Pati pointed out to managers some danger signals which should alert them of creeping obsolescence in themselves. They identified a number of conditions conducive to managerial obsolescence: lack of awareness of change; lack of aptitude to learn; out-dated education; lack of motivation for self-education because of age and low level of aspiration; heavy family obligations; desire to maintain status quo; lack of broader education for the development of conceptual skills; and failure to perceive potential future change.

Some professionals are made obsolete by the organizations in which they work. They are kept obsolete by the limited demands and rigid controls which prevent them from enlarging their scope. A man may be required to overspecialize to the point where he operates on a low level of use of his professional knowledge. Or it may be the individual himself who chooses a specialization which is so narrow he becomes unaware of new developments in the rest of his profession. Further, the mutual expectancies between the individual and the organization can create or combat obsolescence. This is what Levinson (1971) calls the psychological contract. "What the person expects from the organization, his experiences in dealing with the organization, and how much he trusts the organization for need fulfillment influences his updating."

Present Efforts Towards Coping with Obsolescence

Already several professions have made various approaches to monitoring the competence of their members. In the medical profession, periodic recertification is being considered by a number of medical specialty boards. For example, the Long Range Committee of the American Board of Internal Medicine has accepted the recommendation that periodic recertification of its diplomates should be undertaken. They acknowledge that competence is a perishable commodity and plan to administer examinations dealing with significant new knowledge in internal medicine and subspecialties at 10-year intervals (Hickam, 1970). Rosenow (1971) suggested the use of objective tests taken periodically, to detect educational deficiencies. At least two state medical societies have required their members to take a stipulated number of hours of continuing education every three years. As evidence of the intention to maintain continuing education standards, the Oregon Medical Association suspended eleven members from the association who failed to keep up with educational requirements (New York Times, Jan. 9, 1972). The newly established American Board of Family Practice requires recertification every six years. The President's Commission on Health Manpower recommended relicensure to compel physicians to keep up with new knowledge (Carmichael, 1970).

In engineering, a projective study of attitudes toward continuing education indicated that active participation (MS degree or taking seven courses versus taking one course) was perceived by supervisors as making the engineer less obsolete, clearer thinking, growing, active, and more up-to-date. Participation in continuing education was perceived as the activity of a well-qualified professional, with ambition, higher initiative, more enthusiasm, and higher management potential than a nonparticipating

engineer (Rubin and Morgan, 1967). Kaufman's (1972) longitudinal study of engineers indicated that the degree of technical challenge experienced by engineers early in their career was positively correlated with their professional competence as well as job performance during subsequent periods. It appeared that if the engineer's early work used his knowledge and skills to the full, he was stimulated to good performance and competence throughout his career. Organizations could capitalize on this by initiating changes in the engineer's job design to use the intrinsic motivational affects of the work itself as a means of stimulating good performance and professional development. Similar findings on motivating managers were described by Hall (1971).

A study of training needs which R & D personnel considered of key importance in handling work five years in the future was carried out by Barrett, Bass and Miller (1971). They concluded that skills and knowledge required of future professionals would be different from those considered sufficient today, and that the great majority of today's professionals would require continuous training or substantial retraining if they were to survive in the rapidly changing world of work.

The updating panel is proposed as another method of coping with obsolescence. This is a technique of determining, in a systematic way, the educational needs of professional or non-professional persons working in an organization. For example, what are the updating needs of a manager who has been out of school for 10-15 years. Certainly his own perceptions can provide useful guidelines on subject areas he needs to improve or maintain his competence. But many managers are not aware of the new developments in their field. A more constructive approach would be to initiate a panel consisting of selected persons such as management professors the organization's own management development staff, psychologists,

economists, and others. The composition of the group would vary for each occupational area. Such a group could explore the changes, both theoretical and practical, to be expected within the next five years. Recommended areas of instruction could emerge from these discussions for current and long-range organizational developments.

Two of the best examples of coping with teacher obsolescence come from Japan and Great Britain. Teacher updating in Japan was described by Glass (1970b) after he visited six of their Science Education Centers. These centers were first established in 1960 to remedy the poor training and reduce the educational obsolescence of the science teachers in the schools. By 1965 the results were so extraordinary that 33 centers had been built and the scope of the centers had been broadened to include mathematics, social studies, languages and other disciplines. Bailey (1971) described teacher's centers in Great Britain where self-improvement programs are organized and run by teachers themselves for purposes of upgrading educational performance. Their primary function was to make possible a review of existing curricula and other educational practices by groups of teachers and to encourage teacher attempts to bring about changes.

What is the profession of psychology doing on this matter? The March 1969 Policies and Procedures Manual of the American Board of Professional Examiners (ABPE) contains the statement that one of the requirements for the diplomate examination is evidence that the psychologist is continually keeping abreast of scientific and scholarly ideas.

It is the purpose of this part of the examination, therefore, to ascertain whether in fact this is the case: that the examinee can present and can discuss critically the implications and applications of contemporary psychological knowledge in his specialty.

The above applies only to those who apply for the diplomate, however, and not to the thousands of psychologists who belong to the APA.

The Psychologist in Continuing Education[2]

Clearly, the process of updating requires radical changes in educational and professional thinking, not the least of which is the recognition that lifelong education for updating must become an integrated part of professional practice. The traditional concept of education which is essentially terminal education — that is, the completion of a formal program in a prescribed number of years as adequate preparation for a lifetime of work — must give way to a concept of lifelong education as a requisite ingredient in a professional career. The half-life of the practicing professional can rarely be extended by a casual attempt on the part of the individual to keep up with new developments; the constant process of rejuvenation requires a systematic approach. Psychologists possess specific skills by which they can contribute to continuing education and at the same time they themselves may be benefited by new employment opportunities in this field.

Motivation for Professional Updating

One area of psychological expertise which is particularly applicable to continuing education is motivation. And one of the toughest problems in combatting professional obsolescence is motivation; a professional person must be highly motivated in order to maintain competence throughout his career. This is a job for the psychologist.

An effort in this direction has been made by Dubin (1972) and Dubin and Cohen (1970). Their model described the motivation to update as a multi-dimensional process comprising psychological and environmental variables such as achievement motivation, supervisory behavior that encourages professional growth, organizational climate that nurtures creativity, challenging work projects that promote on-the-job problem solving, peer and group interaction that allow for interchange and seeking of

A symposium was recently devoted to the subject of motivation for professional updating (Liège, Belgium, 1971). At this meeting Porter (1971) advanced a theoretical approach for understanding motivation in professional updating by the use of expectancy theory. How the professional evaluates different kinds of potential rewards is significant.

The important point is, that each professional would select that combination of rewards which is most appealing to him. From the motivational theory standpoint, this would utilize high valences of outcomes to help increase each individual's overall motivation to exert effort in this particular direction - engaged in updating activities.

Porter's presentation included a number of provocative hypotheses that need to be tested. At the same symposium, Hinrichs (1971) reported the results of the application of two theoretical models of motivation — content and process — to the problem of skills updating in a large technology-based organization. He found that higher-order content needs based on Maslow's need hierarchy model were not substantiated. He concluded that the expectancy process model seemed more effective. "The reward system of the organization is the individual's perception of the outcomes that will accrue to him for updating behavior. This is significantly related to the effort which he devotes to updating."

An excellent report on the motivation of R & D scientists in maintaining their scientific competence along with the views of top management on continuing education was recently published by Renck, Kahn and Gardner (1969). In another study, Margulies and Raia (1967) interviewed scientists and engineers in advanced R & D technology laboratories and found that the two activities which best motivated their professional growth were on-the-job problem solving (42%), and the interaction with colleagues (20%). At a conference on professional obsolescence in Cambridge, England, Dill (1972) emphasized the importance of personal initiative in coping with obsolescence.

Dill, Crowston and Elton (1965) suggested a self-education program based on a three-step process: 1) establishing a learning agenda, 2) planning a strategy for learning, and 3) evaluating the chances of success. They found that well-stated learning agendas were rare among their interviewees. Further, Dill et al suggested:

It is more important to provide as positive models, leaders and senior professionals who demonstrate in visible ways that taking time to explore, to question, to learn, and to make mistakes as we learn are approved priority behavior. Those who follow the models or who strike out on their own need feedback and enforcement that acknowledge and reward the acts of trying to learn as much as it does the results.

Studies on the motivational process at the adult and professional level are still comparatively few. Stern (1971) considers this topic one of the major underdeveloped areas in continuing education.

Adult Learning

Another area which needs systematic study by psychologists is adult learning. There is a thirty-five year information gap in our understanding of learning by adults; learning which occurs between the ages of 30 and 65. Much learning theory is based on early childhood, and young adults and populations beyond the age of 65; comparatively little knowledge has been accumulated from the study of middle-aged adults. Yet this period of life covers the longest span.

What differences exist, if any, between child and adult learning? A few of the more helpful studies to date have been done by Bandura (1971), Hebb (1966), and Ausubel (1968). Bandura believes that the child's modeling of teachers, parents and peer groups is responsible for many of the responses acquired. In adult education the learner does not need an adult in a mediational role between himself and the subject matter. An adult develops

ability. The implication for the teacher of adult education is primarily one of cueing the students. The teacher should be a source of guidance and direction rather than simply a dispenser of knowledge. Another major difference in child and adult learning is that adults possess a reservoir of experiences accumulated over the years. Hebb pointed out that childhood learning is characterized by busily developing cell assemblies, whereas the adult is busy integrating the cell assemblies into phase sequences. The implication of Hebb's work for continuing education is that the multitude of previous experiences which the adult has at his disposal should be capitalized on when new tasks are taught. Teaching for transfer is the aim of adult education. According to Ausubel, cognitive structures are different for adults and children. Real discovery learning is primarily applicable to young children. The utilization of discovery methods by older individuals might be temporarily helpful but beyond the elementary and high school, verbal reception learning is the most effective method of learning.

Two promising areas of exploration in adult learning have been suggested by Hultsch (1971). One is the impact of experimental learning conditions and their interaction on individual characteristics as personality, intellectual ability and life style. The second area is that of process differences rather than absolute differences in performance. For example, a more profitable approach to a memory experiment would be to focus on the strategies that went into the thinking on how the number of correct solutions was obtained rather than on the number of right answers. Additional topics of study suggested by the directors of continuing education were the identification of the psycho-social characteristics of the adult learner; methods of instruction that work best with adults, and motivation for learning in adults (Dellen, 1971; Drazek, 1971; Grabowski, 1971; and Ray, 1971). On the other hand, a dissenting voice is that of Wilson (1971) who commented that far too much emphasis is being placed on some assumed differences between

learning theories appropriate to adults and others and not enough on one of the more basic problems of motivation.

The area of adult learning is almost virgin territory for the psychologist. In a recent report the Carnegie Commission (1971) has pointed out that much greater attention will be given to the education of adults during the decade of the seventies. The psychologist may find it very profitable to explore facets of adult learning and put them to use in continuing education programs.

Measuring and Assessing Professional Competence

Measuring and assessing professional competence is a particularly knotty problem and one that has not yet been sufficiently explored. Psychologists can contribute their skills to this area by designing appropriate testing instruments.

One method of getting at an assessment of competence is by determining self-perceived needs of professionals who wish to keep up-to-date by questionnaires and interviews. Studies of this kind have been undertaken at The Pennsylvania State University and elsewhere with the following professional groups: engineers (Dubin and Marlow, 1965a), hospital supervisors (Dubin and Marlow, 1965b), managers (Dubin, Alderman and Marlow, 1967), municipal managers (Dubin, Alderman and Marlow, 1968), natural resource managers and scientists (George and Dubin, 1972), mental health workers (Katahn, 1968); and accountants (Roy and MacNeil, 1967). A survey of postdoctoral training needs of industrial psychologists (Lawler, 1967) found that 70% of the respondents were interested in postdoctoral training, while 60% thought that the professional association had a responsibility for sponsoring such programs. The study included questions about training experience taken within the past five years, the most valuable and least valuable past training, and the most needed areas of future training and

plans for satisfying those needs.

A second method of assessing obsolescence by measuring the up-to-dateness of specific knowledge with objective tests. Rosenow (1971) reported the results of a 700-item objective test of medical knowledge. Physicians out of school less than five years scored the highest; those between five and fifteen years scored slightly less than those out five years. Physicians who graduated before 1956 consistently received somewhat lower scores. Medical specialists, however, scored higher than non-specialists, irrespective of their date of graduation. As a consequence of this experiment, about ten medical societies have initiated self-assessment tests. The anticipated outcome of this self-assessment approach in medicine will probably be to reduce pressure for relicensure and recertification by federal agencies who intend in the very near future to require some indication of competency in order to participate in health and Medicare programs.

Another example of the self-assessment approach was an objective measure of psychiatric knowledge and skills reported by Carmichael (1970). In his opinion, the advantage of the self-assessment test is that it helps the prospective participants to want what they require, not telling them what they need to know; 2) it uses a model based on the way adults learn, a process model rather than a categorical content one; 3) it avoids overemphasis on practitioners needing more information and the undue clamour for better means of dealing with the flood of information.

An objective mathematics competence test for industrial engineers was developed at Penn State by Cohen and Dubin (1970). The results, based on a sample of forty engineers, showed that the year in which the degree was received made a significant difference on test scores. The more recent the degree, the higher the score. On the average, five out of seventy-one

questions were missed because the information was new or respondents had no previous training in these subjects. After the respondents were given the results of the test, 42% of the subjects said that they would take short courses in their weak areas.

The studies summarized above are only the beginnings of what can develop into more sophisticated approaches to the complex problem of determining knowledge deficiencies and assessing professional competence.

Educational Technology

New educational technology has great potential for keeping professionals abreast of new developments. For example, there is a recently developed experimental computer program that accurately diagnoses one type of heart disease on X-ray films of the chest (New York Times, Dec. 16, 1971). The computer's overall accuracy was 73% compared with 62% for the diagnoses made by ten X-ray specialists at a medical school hospital. This type of computer analysis program might eventually be used for recertification of licensure purposes as a means of checking the accuracy of a physician's ability to read X-rays.

The greatest promise of educational technology lies in the widened opportunities for learning through self-instruction and independent study. However, use of educational technology at the professional level requires an understanding of the learning and information-seeking processes of the user. Two continuing education learning models, a categorical content and process model, have been described for physicians by Miller (1967). He did not advocate the categorical model because it is built around teaching specific subject matter courses as cardiology, physiology, etc. The assumption underlying this model is that practitioners who take these courses will transform their knowledge into action. He pointed out that such translation does not necessarily occur, yet we talk of bringing more

his office or his home, of making the communication more appealing and more convenient. We talk of better informational sources, of primary publications and abstracts and bibliographies.

In Miller's opinion, the educational technology industry has done a great deal to improve information processing and transmission, but it knows very little about the human receiver of that information. The human receiver, the man who must learn and recall information transmitted by this sophisticated new equipment remains largely untouched.

The process model, on the other hand, requires the learner to identify problems and seek ways to solve them. It is based on the assumption that men learn what they want to learn. Continuing education means self education, not continuing instruction. If this desirable goal is to be accomplished, there must be movement away from the content model, which encourages dependence upon teachers, to a process model, which demands a significant measure of self-reliance — a shift away from preoccupation with courses and methods, towards an augmented concern for educational diagnosis and individualized therapy.

The potential contributions of psychologists in the development use of educational technology for professional groups are unlimited. Psychologists can assist in specifying learning objectives of instructional content and attempt to translate these into desired behaviors. Improved measurement and test design techniques are needed to assess learning performance. Comparatively little has been done in the development of situational or non-verbal tests (Greenhill 1971).

Counseling Adults, Mid-Career Change, and Interpersonal Competence

Counseling of adults was the skill most frequently mentioned as needed by directors of continuing education (Briscoe, 1971; Funk, 1971; Ray, 1971; Smith, 1971; Wilson, 1971). "One of the strongest emerging actions across the country is the development of trained counselors for adult students who can give advice on

educational and career goals" (Fischer 1971). Adult counseling, generally speaking, is far more complex and diverse than counseling for the average undergraduate or graduate student because of the greater age time span represented by adults as a total class, as well as the vastly greater variety of experiences, interests, and needs represented in that total class (Schram, 1971). According to Wilson (1971) adult education is either new learning or relearning and frequently involves an almost therapeutic process. Adult educational problems must be resolved through counseling and cannot be done through "administration, organization or planning, the basic three components to which adult educators unfortunately seem to devote most of their thinking and training."

The Extension Division of the University of California at Los Angeles utilizes counseling psychologists in two important ways: as full-time staff of the Counseling Center to provide educational and related life counseling; and in para-professional programs to train counseling specialists for adults, and in group counseling for women. Psychologists have been largely responsible for the planning, development and supervision of these programs. They go significantly beyond educational counseling to include general life and career counseling for persons at all ages of adult life (Frandson 1971). When the concept of life-long education becomes more nearly realized, there will be a growing need for competent counselors, especially as professional associations tighten up relicensing procedures (Strothers 1971).

Continuing education departments are also assuming some of the responsibility for retraining and reeducating individuals who want to change occupations in their middle years. This is an increasing occurrence among industrial, civil, and military personnel who retire early with many work years ahead of them (Briscoe, 1971 ; Stillwell, 1971; Worthington, 1971).

Mature women also can be classified in this occupation group, who after raising their families, wish to resume careers or begin new careers. Heistand (1971) reported that a significant number of successful men and women have made career changes. These people tend to be dynamic individuals, actively searching for new interests which they had not previously considered as career possibilities. Psychologists can assist such persons in making career changes by helping them to define their goals, ascertain their capabilities and explore their motivations as a basis for realistic career decision-making.

Teaching interpersonal competence can be a major contribution of the psychologist to a person's growth and development via continuing education. Dunnette and Campbell (1968) pointed out that there is widespread need for teaching business managers and other professionals to be more analytical, to be more aware of how they affect others, to develop better interpersonal skills and use constructive approaches for resolving conflicts. Some desirable behaviors which they believe can be taught include increased self-insight or self-awareness of one's own behavior and its meaning in a social context; increasing sensitivity to the behaviors of others by the ability to infer correctly what the other person is feeling; increased awareness and understanding of the types of processes that facilitate or inhibit group functioning and interactions between different groups; heightened diagnostic skills in social, interpersonal and intergroup situations which can be used to resolve interpersonal and intergroup conflict; increased action skills - the ability to intervene successfully in inter or intra-group situations in order to increase member satisfactions, effectiveness and productivity; and learning how to use one's ability to analyze continually his own interpersonal behavior as a means of helping himself and others achieve satisfactory and interpersonal relationships.

Periodic Readmission of Professional Persons for Post-Graduate Training and External Degree Programs

The National Committee on the Utilization of Scientific and Engineering Manpower (1964), recommended that highly trained personnel must undergo continuous self-renewal if they are to maintain their creative potential. To implement this recommendation they considered that it is necessary to institute a system whereby individuals can reenter professional schools at appropriate intervals to undertake studies. Carpenter (1971) offered a novel proposal, at the time the Hershey Medical School in Pennsylvania was established, that graduates be permitted to return at regular periods for updating purposes under a convenient prearranged financial agreement. Glass (1970) suggested that a month of every year or three months every third year might be an acceptable pattern of reeducation. Psychologists can assist in devising innovative educational systems.

The external degree program is one that enables adults to obtain a college degree who in the past have been unable to attend regular college classes. There is a growing trend in many states — New York, Pennsylvania, Massachusetts, New Jersey, for example — to make a college degree available to the broadest possible variety of students, especially to members of minority groups and working adults. A bachelor of arts degree can be earned through a combination of weekend seminars, independent study, tests, television classes, correspondence courses, and practical experience.

Two functions are proposed for the psychologist. First, he can provide counseling to adults. In the external degree, the need for educational and psychological counseling and advising will be much greater than ever before (Fischer, 1971). Regional advisory centers are recommended especially for adults to provide first hand information on college programs that are

new, different and experimental (New York Times. Aug. 8, 1971). A second major function is the construction of examinations. Careful psychometric skills will be needed in the development of tests that are reliable and valid.

Perloff (1971) proposed a method of reducing obsolescence in graduate training programs by improving counseling procedures, sharpening selection and classification systems in industry and government, and by relocating professional graduate training programs. Perloff and Koleda (1971) further proposed that graduate training programs be relocated out of the university; "on location," so to speak, in industry, government, and non-university research and service environments where most of the recipients of this training would find their ultimate professional employment.

Research and Evaluation

Research in continuing education is embarrassingly light, both in quantity and quality. The Department of Planning Studies, Continuing Education, The Pennsylvania State University, is one of the few existing units within a continuing education department, primarily engaged in survey, evaluation and motivational research on continuing education problems. The National University Extension Association survey (NUEA 1971) reported that 87 out of the 140 universities and colleges belonging to the National University Extension Association have some staff doing work on administrative problems, program evaluation and basic research. But eight out of ten institutions have less than the equivalent of one full-time employee engaged in these programs. Webster (1971) pointed out that psychologists are major contributors of research to continuing education. His priorities included such fields as learning, adult development, communications, and organizational behavior. In addition there is an urgent national need for applied research and evaluation of innovative human service programs.

The need for research in motivation for adult learning, for example, was noted by Schram (1971).

Considering the primary role of motivation in the learning process, it seems unfortunate that this consideration is not given greater attention in the earliest stages of the learning process. This being the case, continuing education is faced with a most difficult task because it seeks to develop the notion of lifelong learning after basic habit patterns have already been established.

On professionalization, Webster (1971) pointed out that significant research work is needed in studying mid-career change, changing colleague relations, growing pains for professional organizations and individuals, faculty development in professional schools, mushrooming knowledge and superspecialization in research. Continuing education, he pointed out, can improve the quality and impact of psychological research by fostering interdisciplinary and interorganizational continuing education work that reduces the isolation of experimental laboratories.

There are comparatively few on-going evaluation studies of continuing education programs on a conceptual, methodological or administrative basis. As budgets grow tighter at the university, state and federal levels, the measurement of educational outcome becomes increasingly important. The selling of the continuing education budget is coming more and more to depend on demonstrable results based on valid criteria (Strothers, 1971). Directors of continuing education who were consulted by the author were agreed that considerable energy and resources should go to the development of evaluation procedures to insure that programs are meeting their objectives (Drazek, 1971; Goerke, 1971; Smith, 1971). But unfortunately few evaluation studies exist at the present time. Murphy (1971) pointed out that the psychologist can contribute to continuing education through the following functions: planning, supervising, and evaluating learning activities in group behavior and especially laboratory practice in group

leadership. He can also function in the formulation of educational policies, objectives and programs by conducting systematic inquiries into the dynamics of individual behavior, the psychology of learning, and learning theory.

The absence of research and evaluation in continuing education departments across the country is painfully evident. With rising priorities toward adult learning, updating, external degree programs, adult motivation and the like, continuing education departments should consider the employment of psychologists to assist in doing this job for them.

Opportunities for Psychologists in Continuing Education

In concentrating on the problem of obsolescence, we should not overlook the fact that there are a host of other substantial issues with which continuing education is concerned. Webster (1971) identified four major national priorities for continuing education to which psychologists can make significant contributions. These are: program planning, leadership development, research development and high priority items. The high priority items include: child development, disadvantaged minorities, urban development, population explosion, alcohol and drug abuse, delinquency, violence, the improved delivery of human services, and the training and integration of new types of workers into the manpower pool and into the human services delivery system.

There is a wide range of opportunities (Stillwell, 1971; Wilson, 1971) for psychologists to work in one of these high priority areas in continuing education — continuing education viewed broadly "as an important instrument of adult learning and change, culture change and organizational change, as well as for advancing technological knowledge and skills." (Webster 1971)

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Footnotes

1. Requests for reprints should be sent to Samuel S. Dubin, Department of Planning Studies, 1 Shields Building, The Pennsylvania State University, University Park, Pennsylvania 16802.

2. Mr. Floyd B. Fischer, President of the National University Extension Association and Vice President, Continuing Education, The Pennsylvania State University, provided the author with a selected list of directors of continuing education from whom some of the opinions in the following section have been drawn. Morris Okun, graduate assistant, helped with the literature review.

Table 1

Number of Journals Reviewed and Abstracts

Published in Psychological Abstracts for 1961-70

Year	Number of Journals Reviewed	Number of Abstracts Published
1961	475	7,353
1962	437	7,713
1963	545	8,381
1964	560	10,500
1965	637	16,619
1966	525	13,622
1967	638	17,202
1968	554	19,586
1969	402	18,068
1970	500	21,722

APA 1971

Table 2

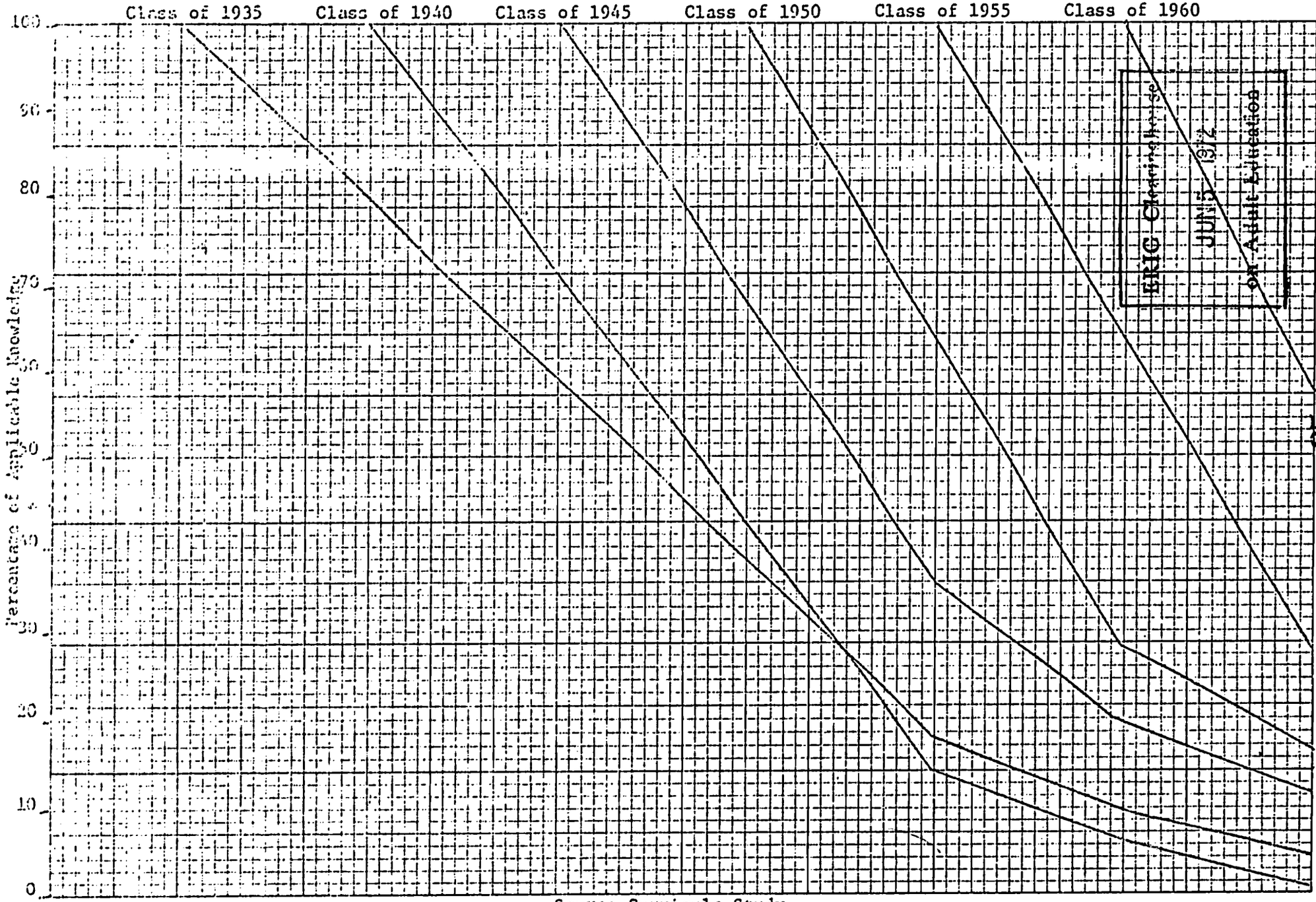
Number of Abstracts Published in Psychological Abstracts

By the Eleven Areas Between 1967-1971

Area	1967	1968	1969	1970	1971	% Increase or Decrease[a]
General	879	823	512	657	402	54% Decrease
Methodology and Research Technology	959	1,059	721	752	624	35% Decrease
Experimental Psychology	2,533	2,861	2,466	2,222	2,660	None
Physiological Psychology	1,887	2,413	2,477	2,872	2,788	59% Increase
Animal Psychology	1,200	1,176	1,182	1,163	1,186	None
Developmental Psychology	925	842	1,102	1,498	1,741	90% Increase
Social Psychology	1,474	1,687	1,655	2,025	2,266	54% Increase
Personality Psychology	784	778	868	880	864	10% Increase
Clinical Psychology	4,202	5,024	4,377	6,502	6,243	49% Increase
Educational Psychology	1,637	2,132	2,047	2,797	3,316	100% Increase
Personnel and Industrial Psychology	705	774	653	985	890	25% Increase
Totals	17,185	19,569	18,060	22,353	22,980	33% Increase

[a] % Increase or decrease calculated by ratio of 1967 to 1971.

Figure 1 Erosion Curves--Electrical Engineers--Selected Graduating Classes



Source Curricula Study

From Zelikoff, S. B. On the obsolescence and retraining of engineer personnel. Training and Development Journal, May 1969, 3-15.