How the data processing industry has failed education

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Many attribute the greatness of the United States as an industrial nation to the system of private and public education which has evolved in our country. Those of us in education like to point with pride to the fact that our system of education is designed to provide each individual in our society with the opportunity to make maximum use of his abilities and to actively pursue the career of his choice whether on the semi-skilled, technical, or professional level.

It is indeed unfortunate that the business data processing industry has historically failed to recognize that formalized education can contribute to the success of their own operations within the data processing department, and, because of the importance of the data processing function within most organizations, the success of the company itself. When I speak of formalized education, I am speaking, not of manufacturer's training courses, P.I. courses, video tape courses or other types of multi-media courses offered as a part of in-house training, but formal educational programs of instruction in the form of well defined curriculums taught at our colleges and universities throughout the nation.

Almost each day one can read of the criticisms of the data processing departments of typical companies such as "Computers unproductive 48 percent of the time" or "Management becomes disenchanted with the computer," etc. Studies then point out that the failure of the computer installation is that top management did not get involved and similar excuses and explanations, but one seldom reads that the failure of computer installations is directly attributable to the lack of education at the programmer, systems analyst and data processing management level. When is the business data processing industry going to recognize that education, or the lack of education is severely handicapping the industry from progressing to the status which it deserves within the structure of the business organization?

Prior to 1971 a great deal of education within the computer industry took place at manufacturer training schools where an employee of a typical company could take a three to five day course in programming in a given language in which the instruction set was explained, and would then return to his company to program and perhaps even design a system! In recent years, in spite of the increased complexity of computer systems there has been an even greater deterioration of this vital function of education. In my own experience I have been acquainted with individuals who have completed a P.I. course in a programming language and have then been turned "loose" with no other supervision to reprogram existing applications. I have known other entire installations that have received their programming education via a video tape course and then set about to program their company's applications with their newly discovered skill in a new programming language. Certainly, if we can learn to program by means of a P.I. course, or by means of a video tape course of a few hours in length, and can indeed do an effective job, then programmers must be vastly overpaid!

At the other extreme we have the companies that insist that individuals entering the data processing profession, particularly as programmers, have a bachelor's degree. It makes no difference what area, but the person must have a bachelor's degree. I am sure that many of you are acquainted with the data processing manager that openly boasts of the fact that the newly hired programmer with the bachelor's degree in music is one of the best programmers on the staff —that is, after that individual had completed the company's six month training program and spent another year on the job. I am constantly amazed that the business data processing industry does not apparently recognize the tremendous direct cost associated with in-house training, and does not recognize that the business data processing industry should be able to recruit individuals trained in data processing at our colleges and universities rather than seeking individuals with majors in music or math but who have an aptitude for computer programming.

When discussing the extensive in-house training in data processing with training directors of several large corporations and those in management positions in data processing common replies have included, "but data processing is different than other areas—the field moves too rapidly", or "people must go through our training program to learn our system", etc.. When an inquiry is made as to whether they give P.I. courses or video tape courses in basic areas to their newly hired accountants, or electronic technicians, or their engineers, or chemists, the answer is almost universally "No, we hire these people from our colleges."

As one analyzes the fact that public education trains personnel successfully in many areas and disciplines why has education not been successful in meeting the needs of the business data processing industry as evidenced by the

extensive in-house training in all phases of data processing? Although industry may chide those in education for not offering the courses that are needed, an equal responsibility must rest with industry for their lack of interest in formal education offered through our colleges. In the past fifteen years there has been virtually no leadership from the data processing industry through its related professional associations relative to curriculum development in career education in such areas as business applications programming, data processing management, etc.

In the meantime our colleges and universities continue to train computer scientists who can write compilers, but who are not making a substantial contribution to the day-to-day needs of the vast business data processing community that so desperately needs the programmer that can write an efficient COBOL program that will assist in getting the payroll out on time.

Certainly, the efforts of A.C.M. in the development and recommendation of a curriculum in information analysis and systems design is to be commended; however, "The program is intended for the education of individuals who will develop complex informations systems for organizations."* What about the training for business application programmers? According to a recent AFIPS report there were some 210,000 programmers employed in 1970 with a projected average need of 23,000 additional programmers per year through 1980. Are these individuals to be trained via P. I. courses?

The business data processing community has failed "education" in several areas: (1) Industry has failed to define on a national level what it wants in trained personnel. What are the requirements for a programmer? Industry blindly says "Programmer wanted, degree in any area required," others say "Programmer wanted, some college desirable—must score high on aptitude test". Industry says "coders are out", yet current research tends to indicate that programming teams with a chief programmer, a diagnostic specialist and a coder utilizing structured programming techniques is extremely effective. Certainly if education is to train for industry there must be some guidelines set as to the requirements for the positions for which the training is to occur. (2) The field of education as related to business data processing has on a career education level, had little support from our professional associations relative to curriculum development. If industry wants business application programmers to have a baccalaureate degree why have not our major professional associations actively sought to develop, recommend and implement four year degree programs in business application programming. If a four year degree is not required why have our professional associations not stated this fact. If the educational requirements of the profession are not known why have not our professional associations undertaken research to determine the amount of education required to be successful within the industry. Historically, professional associations composed of a membership with a common bond of specialized knowledge have always been concerned about the education of its membership. Yet, little has been done within the business data processing industry to define the body of knowledge required to be successful within the profession.

Other professions such as law and medicine exercise great influence and control over the subjects taught in private schools and colleges related to their profession; however, business data processing seems uninterested or perhaps unwilling to let or even encourage our colleges and universities to enter this area of instruction. In an informal conversation with the director of education of one of the large professional associations related to data processing—an inquiry was made as to why there was not a greater interest in developing and recommending a program of training for its members and taking further steps to encourage colleges to implement the program of studies within their curriculum. The reply was "This is a controversial area." Certainly, if industry cannot define the educational requirements for its members or cannot define what individuals entering the profession must know then it is extremely difficult, if not impossible, for educational institutions to offer an effective program of instruction.

Many working within the data processing profession including programmers, systems analysts, and data processing managers like to consider themselves "professionals." One of the commonly applied standards to determine if a field is a "profession" is that a "profession requires a high degree of academic training". How does this definition apply to the current status of training within the industry? At a recent speech by the president of one of our leading professional associations the point was made that an effort was being conducted to assist the membership in reaching top corporate management. The effort of the association to assist its membership to reach the lofty levels of corporate management was to supply a video tape course on management to be shown at local meetings! It is almost unbelievable that this is the solution espoused by a leading professional association to prepare those needing education in management for top management positions. Is this association unaware or unable to recognize that top management positions in most corporations require a high degree of academic preparation, normally as evidenced by a baccalaureate degree or higher? Has it not occurred to this association that perhaps a recommendation of a college level curriculum in data processing management might not be a more realistic approach to reaching the levels to which it aspires for its membership? Again, I mention this instance only to re-emphasize the fact that the business data processing industry seems unaware of the function that public education through our colleges can perform in preparing individuals for employment within their profession.

As previously pointed out other professions exercise great control and direction over instructional programs at all levels related to their profession. Recently, the health/medical technologies field has undergone dramatic changes

* Computing Newsletter, April 1972, Center for Cybernetics Systems, Colorado Springs, Colorado.

under the direction and guidance of related professional associations. There are now available in some states one year programs for licensed vocational nurses (LVN), two year programs for registered nurses (RN) and four year programs for registered nurses for those desiging to move into supervisory positions. Certainly these developments did not come about at a single school or by a single individual attempting to define the needs of the medical/health field but were brought about by the recommendations of professional medical societies. Why won't the professional data processing associations support education by defining a curriculum for colleges at several levels and exercising influence and pressure on our schools to provide the type of education needed so that the industry can elevate itself to a truly professional level?

It is interesting to review the development of commonly recognized professions and relate these developments to business data processing. Some of the steps leading to professional status have been defined as follows:

1. There is a body of specialized knowledge which becomes apparent and leads to the formation of a "professional" society or association bringing together those with common interests.
2. There is a sharing of knowledge of the members of the association. At this stage learning frequently consists of sharing of experiences, problems, and techniques. Apprenticeship type training and on-the-job training is provided for new entrants into the field.
3. The profession begins to recognize the need for more formalized training or education and seeks to define and recommend a program of training for those desiring to enter the profession.
4. As the body of knowledge related to the profession becomes more complex and theoretical, the responsibility for education is placed in the hands of the universities where the information can be widely disseminated and research relative to the field undertaken.
5. Licensure and certification of members is likely to occur especially where public interest or public service is involved.
6. The final step in the evolution of professions commonly consists of an interest by the profession in ethical problems of society and social responsibility as related to the profession.

As one reviews the current status of those in business data processing it becomes apparent that the industry is still in the "apprenticeship" stage in the evolution of the profession with a sharing of knowledge and in-house and on-the-job type training common in most installations. Isn't it about time that the business data processing industry, through our professional associations, began that important step toward professionalization by defining a body of knowledge that should be taught at all levels of education so that formal education can contribute to the success and growth of this dynamic profession.