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ABSTRACT

The congruence of expectations of industrial managers concerning the preparation of college graduates and what university professional schools are attempting to provide was explored. The focus was the aerospace and banking industries. Interviews were conducted with 24 senior executives from 13 corporations to determine what industry requires of graduate students and their expectations of the professional school. Deans, faculty, and placement office staff of four professional schools in two southern California universities were also interviewed. Four categories of competence were used to determine what industry considers complete preparation for employment: knowledge of field, job skills, interpersonal skills, and work attitudes. It was found that job requirements of both industries were more complex than traditionally thought and that these requirements were more exacting than ever. In engineering, knowledge of field was most important, while in business management job skills were what counted. Schools were found to be addressing only one of the four competencies. The engineering profession had established a stronger and more viable school/industry connection than business management. (Author/SW)

HIGHER EDUCATION'S EFFECTIVENESS IN PREPARING STUDENTS FOR PROFESSIONAL PRACTICE: Perspectives from the Aerospace and Banking Industries

ABSTRACT

R. Hansen

This study explores an important facet of the relation between higher education and industry. It seeks to provide some further insight into the congruence between what management experts in the preparation of certain classes of professionals think is necessary and what university professional schools are attempting to provide. The fields explored were the aerospace and banking industries. Intensive interviews were carried out with twenty-four senior executives from thirteen corporations. They were interviewed to determine what industry requires of today's graduate students and expects of the professional school. The deans, faculty, and placement office staff of four professional schools in two Southern California universities provide the educators' "response" to industry's identified needs and requirements. Four categories or elements of competence were utilized to determine more clearly what industry considers a complete preparation for employment and, more accurately, what contribution the university makes to that preparation: knowledge of field, job skills, interpersonal skills, and work attitude.

The analysis reveals that the job requirements of both industries examined are more complex than traditionally thought and that these requirements are more exacting than ever. In

engineering, knowledge of field is of paramount importance while in business management job skills are what count. Schools were found to be addressing only one of the four competencies identified. While industry's requirements vary from field to field, the engineering profession has established a stronger and more viable school/industry connection than business management. The expectations both industries hold for professional schools have also changed. The university is expected to recruit talent and provide a general preparation. Industry has given up trying to influence the university curriculum and has accepted greater responsibility for the necessary ongoing professional development of its employees. A complete preparation for employment, because of this change, now becomes a legitimate two-stage process with a unique and natural division of labor.

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INTRODUCTION

This paper explores an important facet of the relation between higher education and industry. It seeks to provide some further insight into the congruence between what industry expects and higher education provides in terms of professional preparation. What preparation does the graduate and/or professional school student receive? What are the benefits, to the employer, of hiring professional school graduates? From the higher education perspective, how well are we preparing our graduates for professional practice?

As educators and as professionals our instincts don't direct us to questions of program effectiveness often enough. Perhaps busy schedules don't permit such discretionary time. From the perspective of educator and analyst combined it is stimulating to examine one aspect of the cycle by which progress is either advanced or retarded, in this case within professional education programs.

Two questions underlie the program evaluation process. Are we doing what we do well? And, are we offering the right courses, and/or teaching the right subject matter? The research reported in this paper focuses on the latter question. Whether or not the professoriate does its job well is problematic. The autonomy earned and enjoyed is not open to much scrutiny. The question of

whether or not we offer the appropriate curricula in a particular program is quite different: Have we identified the need (in this case the needs of business and industry) and set out a curriculum to meet that need?

To determine the effectiveness of professional business management and engineering education programs (the two selected in this study) as preparation for professional practice, employers themselves rather than recent graduates were questioned. Individual graduates, while they presumably gain from increased enlightenment in subject areas which interest them, were overlooked as a definitive source of information for questions which ultimately involve matters of competence, performance and effectiveness. The assumption taken was that policy and operation level executives e.g. senior executives, personnel directors, training and development specialists, responsible for managing and directing the human resources of an organization, would have more experience on which to form opinions about what separates well prepared from inadequately prepared university graduates. If the object is to determine how well our programs prepare students for initial and continued practice in the workplace, why not ask the people who employ so many of our graduates and compare that information with the educators view.

The (demand/response) research design for the study utilized a model in which the requirements and expectations of business and industry (in this case the banking and aerospace industries) were contrasted with university dean, faculty, and placement office staff opinion. The two professional education fields chosen were

business management to correspond with the banking industry, and engineering to correspond with the aerospace industry. Comparing the industry view of how well a professional education prepared students for professional practice to that of the professional school itself, seemed a challenging if not manageable task.

Adding a second dimension to that comparison, engineering education could be contrasted to business management education. Comparisons would also be possible between the two industries chosen for study. In both of these cases the contrasts found, broaden one's understanding of professional preparedness issues.

OBJECTIVES AND APPROACH

Studying Preparedness for Professional Practice

The question of how well the university prepares students for professional practice is a complex one. Assuming it is possible to reach agreement on and delineate what industry considers an adequate preparation, there is still the problem of how to measure whether or not a particular school is providing or facilitating that preparation. What are the indicators of preparedness?

In this research effort, thanks in part to the work of Pierson [1], Squires [2], Lusterman [3], Bisconti [4], the authors of the Goals Committee Report [5] and the more recent Engineering Education and Practice in the United States report[6], elements of competence were developed and used to ascertain and establish parameters for employment preparedness. If a student is

properly prepared for a profession, competence and effectiveness should follow. Competence was defined for purposes of this study as the state or quality of being capable of adequate performance. Competence is present, according to Trivett [7], when an individual can demonstrate skills, knowledge, values and attitudes, that are specified in some manner (Trivett, 1975, p. 10). A subtle but key word in this definition is demonstration. Competency implies a continuum between acquisition and demonstration of skills. Take the education profession, for example. It is one thing to design and complete a research project, it is quite another to influence policy and decision making.

A comprehensive list of competencies was refined before the investigation and pilot tested with industry executives in a series of working meetings. The result was the establishment of four categories or elements of competence: knowledge of field, job skills, interpersonal skills, and work attitude. Knowledge of field was perhaps the most easily defined category. It includes the basic and emerging knowledge in a field, e.g. accounting, computer science. The job skills category is more complex. Job skills can be divided into general and specific. General skills include leadership, adaptability, assertiveness and critical thinking. Specific skills include administrative, analytical and supervisory. Interpersonal skills include ability to communicate orally and in writing, understanding oneself and others, ability to project a point of view, and image management. Work attitude is more than just the work ethic. It includes moral qualities of

honesty, tolerance, work habits, industry knowledge, and job interest.

As variables, these competencies (knowledge of field, job skills, interpersonal skills, work attitudes) were ranked for importance as contributors to effectiveness on the job in an employer's view or in a faculty's view and used (along with a Likert scale) to solicit industry or professional school opinion about the degree of success that a professional education achieves in the development of these competencies. Quantifying such opinion, as you will see in several upcoming figures, enhanced and complemented ethnographic information. It also helped determine what constituted preparedness for professional practice, at least in the two industries chosen, and how effective the professional schools in question were at providing that preparation.

Two other indicators of preparedness were examined in the study but are not elaborated on in this paper. One less direct but no less important indicator of whether or not the university prepares its students well for employment is the nature and magnitude of additional training that industry itself makes provision for. Corporate sponsored training is increasing in magnitude across North America, according to Lusterman's research. What exactly does this expanding corporate initiative tell us? Probing this area revealed, among other things, another rich area for study. For example, what potential does education in non-school settings have for maintaining and improving professional competence?

The question of why the university prepares students well or poorly for employment could also find explanation in the practices of industry. How effective is industry at utilizing the skills and talents of university graduates? Are students properly matched to jobs? This tack, while not reported on here, also proved helpful in gaining insight and perspective on preparation issues.

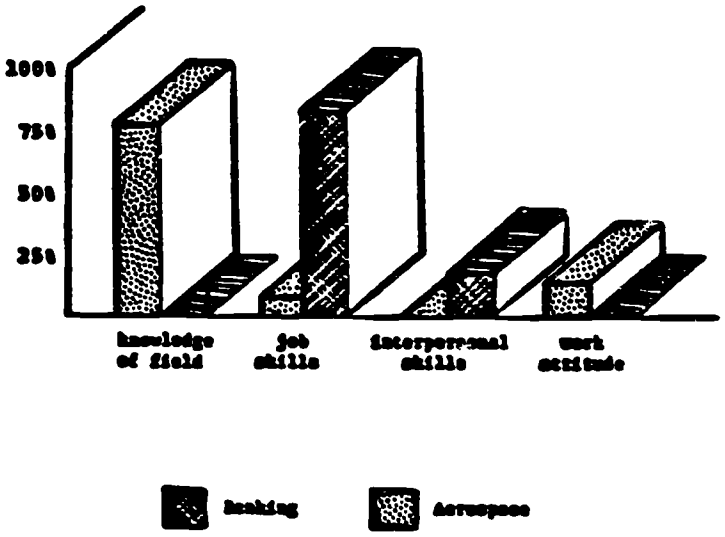
Two caveats require mention before sharing the results. First, a good part of what makes one individual more effective than another in an organization has to do with innate personal characteristics, e.g. motivation level, disposition, ability to influence others, loyalty to an employer, consistency, that are beyond the scope or sphere of a university's influence over students. Innate personal characteristics were consciously and purposely excluded from the elements of competence described earlier. Second, this study excluded an analysis of the struggle that has persisted between the university and the professional schools. A great deal of literature is available on this subject and a number of questions addressed. How have the professional schools evolved? What tensions exist between the university and the professional school? Is this tension a factor which hampers the professional school in meeting the manpower preparation needs of business and industry? Whether such an analysis adds to or detracts from the research questions raised in this study was considered problematic.

THE REQUIREMENTS AND EXPECTATIONS OF INDUSTRY

The first and perhaps most dramatic finding was that knowledge of field is of paramount importance in the field of engineering whereas job skills are what count in business management. Figure I demonstrates how important the four categories of competence are from the business and industry viewpoint.

FIGURE I

Competencies Considered Important by Industry
(percentage of people who ranked each competence first)



Within the aerospace industry, the career field chosen from within the engineering profession, job skills, interpersonal skills, and work attitude categories were considered virtually irrelevant in the view of the chief engineers interviewed. "Knowledge is the necessary base" proclaimed one engineering executive after another. Recognition for the other competencies

existed but without the passion for knowledge of field. In response to probing about job skills a consensus of opinion emerged. "If a person has the right attitude and can communicate, he/she will pick up the job skills."

The opinions of banking executives differed considerably. The competence felt to be of great importance in this industry was "job skills." Not one interviewee referred to "knowledge of field" when asked to rank which category of competence was most important. "The emphasis in banking is now on sales" repeated several people. "The field is changing so quickly the name "bank" may be dropped in the near future" asserted a College Relations representative from First Interstate Bank. And remember this is the career field which consistently hires the greatest percentage of M.B.A.'s out of university schools of business management. The only other competence category receiving attention or concern was "interpersonal skills." One official from the Crocker Bank listed the necessary skills today as follows: "There is more emphasis today on interpersonal, analytical, creative and leadership skills. We have shifted from "work" to "people" being the center of focus." Questions about the relative importance of these competence areas fifteen years ago compared to today revealed little change, confirming a significant contrast between these two professions.

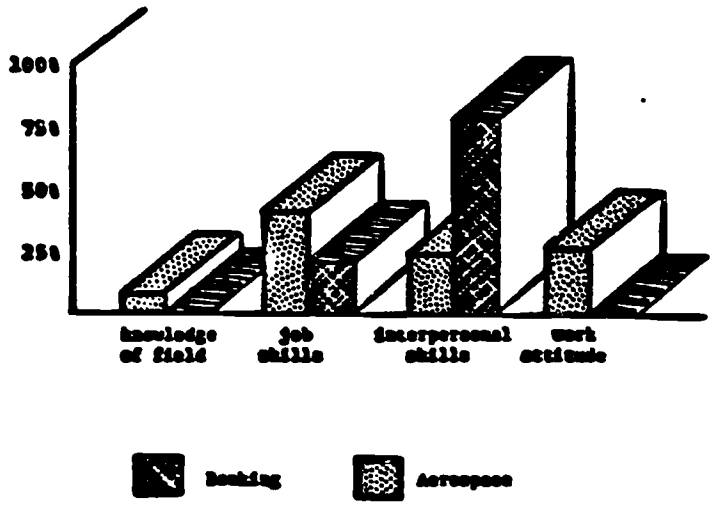
When asked what the professional schools accomplish most effectively, over 90% of aerospace interviewees ranked knowledge of field first. In banking only 60% felt the same. The other 40% chose job skills as the category in which professional business

management programs were most effective. Despite the small sample of banking interviewees, this information provided the first sign of discord between what business and industry expects and what professional business management/schools are providing.

A question about what professional schools need to emphasize more revealed, both professional schools did an adequate job at disseminating knowledge of field. Needing emphasis were interpersonal skills and job skills, especially in the business management field. (see Figure II)

FIGURE II

Competencies Needing Emphasis
(percentage of people who ranked each competence first)

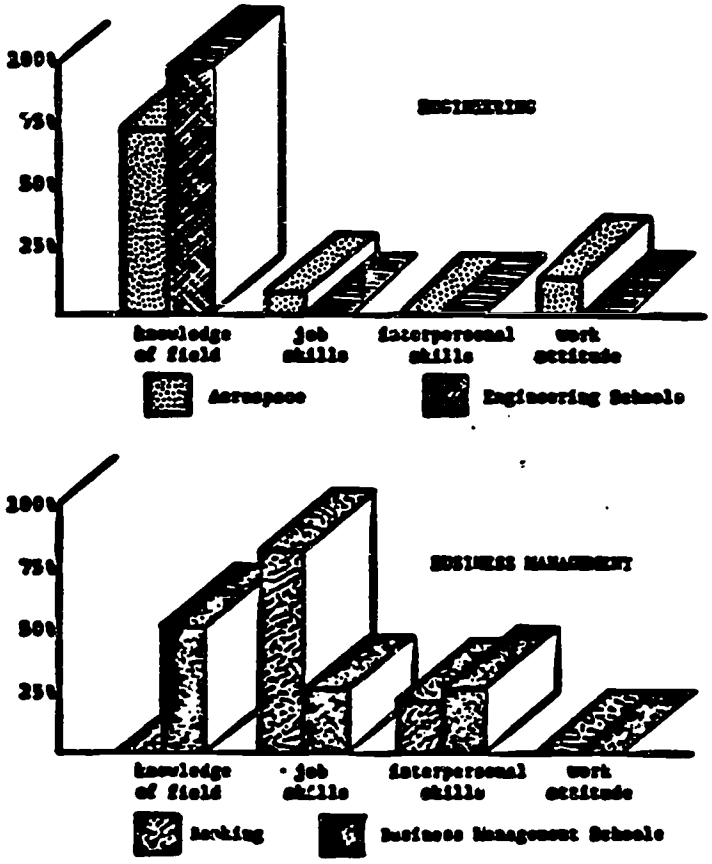


The faculty interviewed in this study, from both professions, had no illusions about what competencies the professional school imparts. Summarizing briefly, engineering as a profession requires that a certain body of knowledge be imparted by the university to the aspiring practitioner. Business management's requirements are less clear. If there is a central subject matter or knowledge base to be imparted, there is less consensus on what that knowledge base should be. Engineering executives expect the university to provide the knowledge base and little else. Business management executives think it is equally important to teach subject matter and the application of it in business settings. The professional schools are quite effective if the criteria for effectiveness is knowledge of field by itself. When the broader concept of competence is applied, the professional schools leave themselves open to criticism. In defense of the professional school, some business and industry executives do feel that the workplace rather than the university, is a better place to learn job skills, interpersonal skills and work attitudes.

In terms of congruence between the university professional school and the business and industry it serves the following chart relays the story very clearly (see Figure IV).

FIGURE IV

Competencies Considered Most Important
(Comparison of industry to professional school for each field-% of 1st choices)



Looking first at the field of engineering, this table shows industry (77% of 1st choices) and professional schools (100% of 1st choices) agree that knowledge of field is the most important competence required for employee effectiveness. In the area of job skills, agreement also exists. Eight percent of industry respondents and zero percent of professional school respondents

felt job skills were of importance in the field of aerospace engineering. The same sentiment was shared for competence in interpersonal skills. Modest importance was expressed for work attitude (15% of 1st choices by industry and 0% of 1st choices by professional schools). In short, knowledge of field is of paramount importance in the field of engineering, so much so that job skills, interpersonal skills, and work attitude are considered to be of little concern.

The situation in business management is a dramatic reversal in two ways. First, job skills rather than knowledge of field were ranked by industry as the most important competence area (80% of 1st choices). Second, professional school respondents disagreed with their industry friends. Only 25% of professional school interviewees felt job skills was the most important category. As might be expected, the category felt to be most important by professional school interviewees was knowledge of field (50% of 1st choices). No one from the banking industry considered knowledge of field to be a most important area of competence. The remaining 25% of professional school and 20% of banking industry interviewees chose interpersonal skills as being the most important category.

The story, graphically at least, is clear. Knowledge of field in engineering is clearly a requirement for employee effectiveness whereas in business management job skills are more important. Also some agreement exists between the opinion of those in

professional engineering schools and the aerospace industry, while a major difference of opinion exists between professional business management schools and the banking industry, about whether knowledge of field or job skills is more crucial to employee effectiveness on the job.

Comments about the way in which university, work, and life experiences contribute to employee effectiveness revealed some insight into the congruency question. "An effective employee has to be a whole person" proclaimed the Director of Training and Development for AeroSpace Corporation commenting on the value of life experience. "Life experience cumulatively contributes to personal development" added AeroSpace's Director of Placement and Career Planning. "University provides introductory knowledge and skills only. Work experience is the basis for effectiveness, contribution, and state-of-the-art understanding" declared the Director of Management and Professional Development for the same corporation.

In summary, engineering executives and engineering educators were in agreement about what competence was important and where it was best learned. In the business management field, there was considerable disagreement about which elements of competence were most important, except for interpersonal skills. Contrasting the university and industry sectors, it was evident that ideas and scholarship are the key to effectiveness for professional educators while understanding through application is the touchstone for industry executives. Most interviewees felt work

experience became of increasing importance over time. In other words, the deep differences that were expected to be found between industry and the university didn't materialize. What proved more interesting was the differences found between the two professions.

The making of a competent professional is a story of progress but with compromise. The intimate one-to-one communication that must have been possible between a successful professional and an apprentice 50 short years ago has been replaced by a system of universities and professional schools that try, with varying degrees of success, to simulate workplace conditions and problems in order to train aspiring professionals. In engineering, this is done with modern laboratories. In business management, case studies are used extensively. How effective can a process be when so removed from everyday practice? Quite effective in some respects but not in others. What has evolved with this institutionalization is a different kind of preparation for employment. Work attitudes and "how to" job skills, once passed on directly from practitioner to trainee, have become almost extinct elements in the employment preparation process within universities.

Development and dissemination of knowledge, in contrast, has become a hallmark of university education. It is hard to imagine an institution better suited to research and teaching than the university. Like any social process, learning in a group setting also provides opportunity for interpersonal skill development whether structured or not. A complete preparation for employment,

because of this change, now becomes a more legitimate two-stage process with a unique and natural division of labor. The university has already become a recruitment center for talent and provider of a general preparation for professional practice. Industry is quickly becoming a facilitor of ongoing employee professional development initiatives and a "finishing school" for work related competencies. Industry, to varying degrees and in different ways, is taking on the training that educational institutions should never have been expected to provide.

What does this apparent industry/education conciliation mean for educators? If, as I suggest, the preparation process is becoming a legitimate two stage process, cooperative education might seem to have fulfilled its purpose. The two giants have reached agreement on respective roles, responsibilities and expectations; educational institutions can continue to focus on the academic subject matter necessary to broaden perspectives, etc., and industry will provide the specific occupation related skills so critical to employee effectiveness. Unfortunately, such an analysis is far too simple. A more realistic explanation is that cooperation and collaboration is more important than ever. For one thing educators and industry training specialists may wish to share their respective andragogical expertise. For another, faculty will still need to understand industry's requirements for competent professionals and to tailor curricula accordingly. Industry requirements are continually changing. Finally, a new agenda for research on the preparation process across different

professions and occupations is needed - an agenda that focuses on the relationship among knowledge, competence and performance.

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Appendix A

List of Competencies

COMPETENCE CATEGORIES

KNOWLEDGE OF FIELD

Basic and emerging knowledge in a field eg. accounting, computer science.

JOB SKILLS

General

- Leadership-capacity to influence, direct.
- Adaptability-willingness to accept change, to continue learning.
- Assertiveness-ability to work independently.
- Critical Thinking-ability to evaluate facts and ideas.

Specific

- Administrative Skills-decision making eg. policy formulation; planning eg. setting objectives, implementing programs, measuring results; problem solving eg. information gathering, weighing evidence.
- Analytical Skills-numerical skills/tools of analysis, ability to reason and to think clearly eg. logic, scientific inquiry.
- Supervisory Skills-allocating work, monitoring performance.

WORK ATTITUDES

Work Ethic-sense of responsibility, commitment to hard work, loyalty.
Moral Qualities-honesty, tolerance.
Work Habits-organization, discipline, neatness, promptness.
Industry Knowledge -understanding workplace realities eg. beginning rates of pay, speed of advancement, standards of behavior.
Interest-in field or type of work.

INTERPERSONAL SKILLS

Communication Skills-ability to speak and write clearly eg. clarity and expression of thought, simplifying a concept or idea eg. use of analogies.
Understanding Oneself-eg. knowing strengths and weaknesses, getting along with others.
Understanding Others-eg. ethnic practices.
Ability to Project a Point of View-eg. framing, fragmenting, playing it both ways.
Image Management-having a contribution recognized and valued.