

CAREER PLANNING AND MOTIVATION THROUGH AN IMAGINARY COMPANY FORMAT*

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CAREER PLANNING HAS recently become a very popular topic for technical sessions at conferences [1], for workshops [2] and for books [3] [4] [5]. At the same time, we continue to have graduating students who are unaware of career opportunities and who do not appreciate how they can apply the fundamental knowledge to real problems. To provide some career planning and to motivate seniors by showing them how they will be using their knowledge to solve problems, we introduced the imaginary company format in a senior required course on process engineering. The objectives of the process engineering course have been described elsewhere [6]. In this paper we focus on the imaginary companies, the career planning components, the types of problems we use, and an evaluation.

Many have used an imaginary company approach for laboratories [7] [8] [9] and for design projects [9] [10].

What is unique about our effort is the use of career planning as a method for distributing the students among the companies and the extent and methods used by which we try to add realism to the company problems.

THE COMPANIES

WE HAVE ARBITRARILY selected the ten theme companies listed in Table 1. For each there is a job advertisement, an annual report, and a slide-

tape show that provides an imaginary plant tour. At any one time only five companies are run simultaneously. Sufficient details are provided in each of these so that students see typical, real job advertisements for each industry, an annual report typical for the industry which describes the company produce line and, through the slide-tape show, photographs of typical processing equip-

TABLE 1
The Companies

THEME	IMAGINARY NAME	PRODUCTS
Petrochemicals	Petrostar	ethanol feedstock with acetaldehyde, acetic acid, acetic anhydride, acetone, vinyl acetates
Refinery Products	Big R	typical refinery
Polymers, Synthetic Fibers	Petropoly	PVC via suspension and emulsion polymerization, polystyrene, styrene, EDC
Foods	Fine and Fancy Foods	edible vegetable oils, lecithin, margarine, soy and peanut products
Inorganics	Inorganics Unlimited	chlorine, caustic soda, soda ash, cement, sulfuric acid, Claus sulfur plant
Pharmaceuticals	Canadian Drug	Aspirins, mycin, enzymes, baker's yeast, streptomycin, penicillin and bacitracin
Pulp and Paper	Spruce Mills	Kraft sulfite pulping, paper products and vanillin
Ceramic	Big C	Brick and tiles
Mineral Processing	Big Rock Mineral	Copper beneficiation, phosphate fertilizer, SO ₂ abatement
Environmental	Enviroserv	Stretford process, impact of a sintering plant, flue gas desulfurization, amine scrubbing
Consulting	Technical Service Consultants	sulfuric acid production, tar processing . . . any current problem of interest

*Paper presented at the AIChE Free Forum on Undergraduate Education San Francisco, November 1979.

ment used by that industry.

Special letterhead paper has been prepared for each company; this must be used by the students for the covering letter that accompanies each assignment they hand in. Figure 1 shows a typical set of company information. Each company hires the course instructor to be its training officer. Thus, all correspondence and discussion with the students is between the instructor and them, with the imaginary third party (the company with its unique problems) providing realism for the problems. We elected to use the training-officer route because this is the day-to-day real life relationship between the instructor and the students.

THE CAREER PLANNING COMPONENTS

THE FIRST ELEMENT IN the career planning activities is self assessment [11]. We developed a 14-page self assessment instrument centered around Gaymer's book [5] and including ideas from Bolles [3] [4]. This instrument is sent to the students to be completed prior to entering the first term of their senior year. The assessment is personal; it is not shown to the instructor nor is it handed in to be marked. During the first week of term, the students spend about three hours in

a tutorial run by the career counsellors during which time their answers to the self assessment are discussed and the implications described. Specially prepared materials are available [12] [13]. Topics discussed include how to extract from an experience the skills you developed, how to check for consistency in self assessment, what the unique skills imply as far as career development and plans are concerned, and how to integrate a set of separate skills into a career preference, plan and path. These counsellors are also available in the following weeks for private counselling. Our experience has been that more than two thirds of the students spend an additional hour in private guidance.

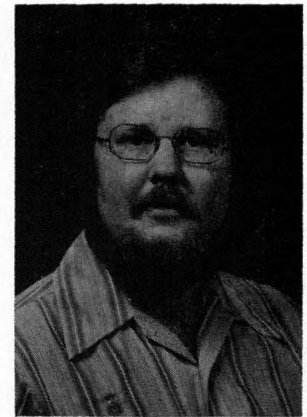
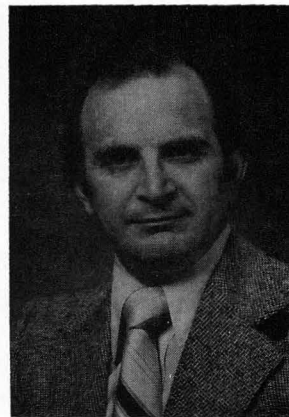
Once the unique skills and a career path have been identified, the students must be able to project their assessment through the "job" application (and eventually through the interview). Hints on how to apply and how to complete an application are given by all of us, although this is done primarily in a one-hour discussion led by Ron Romeo [14] [15].

The students are then given all the information about the ten companies: the advertisements, the annual reports, the slide-tape show and a "job"



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Carol Goodrow's previous experience in library science and university liaison is useful in her work as Career Counsellor with McMaster University students. She contributes to the development of career and job search programs and makes presentations to academic classes and professional associations. As Chairperson of the Career Information Resource Advisory Group, she is involved in evaluating and developing Canadian career publications. Ms. Goodrow received her Bachelor of Arts degree from Acadia University in 1967.



Ron Romeo has a bachelor's degree in Economics and Philosophy from the University of Western Ontario (1967) in London, Ontario. For the past twelve years, he has been an employee of the federal government's Canada Manpower Centre in Hamilton, Ontario, and for the last eight years, he has been a placement officer at the McMaster University Student Placement Office, which is staffed by the Federal government. In his position at McMaster, Ron has concentrated on preparing Engineering and Science students in job search strategies directed towards full-time employment.

David Lawson is a counsellor in the Student Counselling Service at McMaster University, Hamilton, Ontario. His particular area of interest is career planning and development. Prior to joining the counselling service in 1976, Mr. Lawson received a B.A. and Master's degree in Sociology from McMaster University.

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application form. They apply for one of the positions; their applications are evaluated and they are sent an appropriate letter of acceptance or rejection. Those rated "A" receive a bonus salary and those "B" or "C", a standard salary determined from a telephone poll of local industries. Those with late but acceptable applications are offered positions in isolated communities with no salary increase as compensation. Those with less than "C" are given rejection letters by their first choice company and must choose from among the other companies. To keep the work for the instructor reasonable, only five companies are run at a time. This is handled by running five each of two successive terms, with five companies accepting the applicant but delaying the appointment for one term. In the meantime, they choose one of those companies that is being run during the first term. The mechanics may sound complicated but it is actually simple to run. Standard letters have been prepared for each company so that annually we just fill in the student's name and salary.

In this way, students receive immediate feedback on both their self assessment and their ability to present themselves. As the term progresses, we hope that the students can assess, to some extent, their career choice through the types of problems they are asked to solve in that career path.

TYPES OF PROBLEMS

The problems are chosen from the context of the course on process engineering which considers the analysis of the structure of chemical processes, an analysis of the function of process equipment in different processing contexts, equipment design and selection, safety, time and project management, ethical and legal considerations, financial aspects of a corporation, engineering economics, financial attractiveness criteria, capital and operating cost estimation, economic balances, optimization, developing rules of thumb, and case studies to illustrate the application of these ideas in process operation, improvement, design and research and development. These include the use of trouble shooting problems and the development

of problem solving and decision making skills [6] [16] [17] [18]. This context provides a rich environment in which to cast the imaginary company problems. The problems can be created or used directly from a text but cast into the context of the company. Small problems from local industry or from consulting are used for some of the problems. Some illustrative example problems are given in Table 2 (Details are available from Donald R. Woods).

EVALUATION

STUDENTS ARE UNANIMOUS in their praise of the career planning components. Indeed, they encourage us to introduce this earlier in the curriculum instead of in its present location as the first semester of the senior year. The feedback from company interviewers has been extremely complimentary about the student's self awareness, the ability to communicate their skills, and the mutual understanding of each other's potential opportunities.

The actual week-by-week operation of the companies presents an initial faculty load in preparation of the context. It also provides further incentive to bring new practical problems into the course; problems from a variety of industries that one normally does not follow up. For example, we are currently trying to improve the problems which illustrate applications in the ceramics and mineral processing industry. Most companies are very helpful.

The student's response to the problems has been mixed, partly because we are still developing

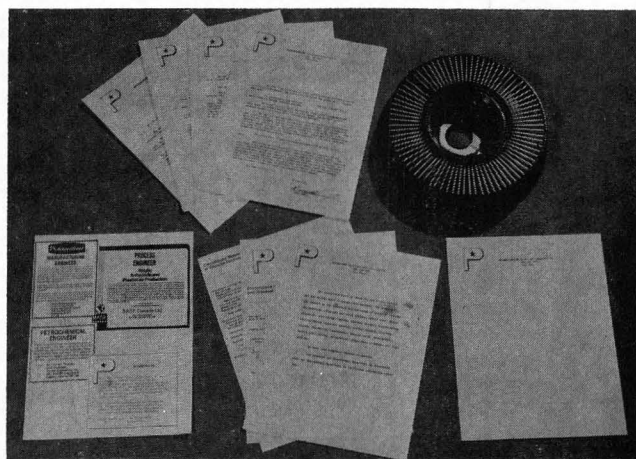


FIGURE 1. Information pertinent to the imaginary company.

TABLE 2
Typical correspondence—assignments

1. Letter of Offer	
2. Analysis of Financial Report (participation in stock option)	Related to Ch. 3 of Text
3. Flowsheet development for the products	From the literature
4. Analysis of Structure of a Section of the Process	Application of ideas from class
5. Financial Attractiveness Criteria	Problems from Text in company context
6. Capital Cost Correlations	How to use different correlations
7. Plant Capital Cost	Integrating the data into complete plant costs
8. Production Cost Estimation	
9. Safety analysis	
10. Trouble Shooting Problems	

the problems and smoothing out the mechanical details. Nevertheless, the students enjoy seeing what types of problems characterize different career opportunities and how the same fundamental ideas can be applied in a wide variety of contexts.

SUMMARY

TO HELP STUDENTS DEVELOP career plans and to motivate senior students, we provide opportunities for self assessment into an application for one of ten imaginary companies. Basic information is given for each company. During the term the students solve problems written in the context of the company for which they are working.

ACKNOWLEDGMENT

We are pleased to acknowledge the assistance of those who have helped us develop these problems by collecting the photographs and details of the different processes and supplying short problems we could use in class: L. W. Shemilt, McMaster University, F. H. Gallinger, McMaster University, Fred Bishop, Natco Brick Co. Ltd., Peter Barnes, W. R. Barnes and Co. Ltd. and John Currie of Currie Products Ltd.

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