DEVELOPING PROFESSIONAL SKILLS IN CHEMISTRY

- AN INITIAL STUDY

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INTRODUCTION

In 1978 the Chemistry Department at the University of Waikato introduced an industry-orientated degree, the Bachelor of Science (Technology). This 4-year degree includes the components of a normal Bachelor of Science degree integrated with additional vocationally-related courses and twelve months of industrial experience. It was set up "to meet the needs of students who have an interest in an industry/applied career in chemistry and to meet the demands of employers for graduates with some working experience in such courses" (Anon, 1980).

To extend our awareness of the employer's perspective, the pilot study reported here was undertaken to investigate the needs and expectations of industrial employers. The main aim was to identify the professional skills and attributes employers look for in new chemistry graduates. It was intended that this information could then be used to design a wider investigation of the skills required by professional chemists and of the role of university degree courses in developing these.

This report contains the main outcomes of this pilot study.

PROCEDURE

A "naturalistic" approach involving detailed interviews with a limited number of subjects (Cohen and Marion, 1980) was adopted for this project. Selected industrial plants and laboratories were visited and audiotaped discussions were held with appropriate personnel (Chief Chemists, Technical Managers, etc.) on a range of issues relating to tertiary chemistry courses and the needs of the workplace. Background material was supplied well in advance of these interviews. Emphasis was placed on how well prepared (first degree) graduates were to meet "chemistry in the real world" and, in particular, on identifying skills or knowledge areas in which graduates seemed to be inadequately prepared. Interviews occupied approximately 40 minutes.
The industries chosen for these discussions represented a cross-section of the New Zealand chemistry scene. All employed chemistry graduates. Thirteen sites were visited and 21 in-depth interviews were carried out. It should be noted that the term "industry" is used here to denote any area outside of the educational sector from Government research laboratories to privately owned companies.

ANALYSIS OF DATA

Analysis and presentation of the information obtained was carried out by transcribing the audiotapes, analysing for the main issues raised, then grouping these issues into general areas.

The professional qualities thus identified by the employers as being desirable for graduates to possess upon entering the chemistry-based workplace can be presented in 5 broad categories. A summary of the major issues within each category is given below with a brief commentary. It has to be recognised that in a study of this kind, the views expressed result from a wide diversity of backgrounds and experiences and inevitably reflect a range of often conflicting opinions. Since the context in which individuals saw issues adds an important reality and richness to the views expressed, extensive use has been made elsewhere (Kirk, 1987) of direct quotations (in italics) to present viewpoints in their true perspective. Only a few examples are included here.

I. Issues Associated with Analytical Chemistry and Quality of Results

Summary

The major issues identified were the need for improved:
- analytical skills
- understanding of analytical methodology
- data handling and interpretative skills
- awareness of the implication of quality assurance for analytical methods/results.

Comment

Disappointment at the level of manipulative analytical skills, from the very basic (use of a pipette was a favourite) through to maximising instrument performance, brought considerable comment. It appears that, after 3 years of tertiary chemistry, many graduates are not able to perform basic laboratory techniques adequately.

"...often have very poor practical skills like how to use a pipette. We really have to take them though a basic laboratory skills programme for the first few weeks."