

A MACHINE-AIDED SYSTEM FOR EXPLORATION OF OCCUPATIONS BY  
UNDERGRADUATES

by

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## SUMMARY

The thesis follows the development and installation of a computer-aided guidance system for students in Higher Education. Two main theories of occupational choice are reviewed with their implications for the activities of graduate careers advisory services.

The advantages of computer-aided guidance are outlined and a number of existing computer-aided guidance systems described. These systems were designed for other groups of users: either school leavers or groups in the U.S.A. Various reasons why none of these alternative systems would be suitable for use with under-graduates in the U.K. are listed and a proposal for an entirely new system put forward.

The aim was to produce a working system based upon an overall consideration of the problems of occupational choice, to use the system and to improve it as experience proved necessary.

The finished system consists of four main components: occupational information, student questionnaire, computer match algorithm and computer results. The occupational information is based upon careers adviser opinion collected as 1 to 5 ratings and relies upon there being agreement between careers advisers. A method was devised to demonstrate satisfactory agreement and to allocate suitable ratings for each item of occupational information. The considerations affecting the design of the other components are discussed. Emphasis was placed upon showing students how the computer reaches its list of suggestions, so that they are able to better understand the process of decision-making as well as receiving lists of possible occupations. The problems of evaluating the effects of careers advice are discussed.

Trials of the completed computerized system showed that the questionnaire and system are regarded as helpful by the majority of students and careers advisers.

A revised system has been installed for all students in Higher Education. Careers advisers say the system is helpful for interview discussion, career decision making and promotes use of information room facilities.

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Key words: CAREERS-GUIDANCE, COMPUTER-APPLICATIONS, GRADUATES



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## PREFACE

The work described in this thesis resulted in a computer-aided system for the exploration of occupations by undergraduates which is used throughout the UK under the name of Gradscope. Since April 1979, over 13,000 student profiles have been processed by the central computer program and the results have helped them (and their careers advisers) to consider future occupational choice.

Gradscope has been accepted as a supplement to existing careers advisory facilities by almost all UK university and polytechnic careers services; it is also used by universities in the Republic of Ireland. The majority of careers services use Gradscope via a central batch processing service established by the thesis writer as a result of the project. The central program is operated by the University of Liverpool Computer Laboratory and the administration is carried out at CSU (the Central Services Unit for Careers and Appointments Services) based in the University of Manchester. Ten careers services now use Gradscope on their own local computer facilities and versions for micro-computers should follow in the near future.

The thesis reports the design, development, operation and evaluation of Gradscope, the most widely used computer-aided careers guidance system in the UK Higher Education Sector.

September, 1980.

### Special Note

At the beginning of the project, the Sponsors, AGCAS (the Association of Graduate Careers Advisory Services), were still known as SCUAS (the Standing Conference of University Appointments Services). SCUAS therefore appears at some points of the text.

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## Chapter One

### INTRODUCTION

#### Origin of the Project

All universities and polytechnics in the U.K. have careers advisory services whose function is to provide counselling and practical help to undergraduates in making career choices and finding jobs.

The careers advisory services in all universities and most polytechnics are separate from Government and Local Authority provision and run by the institutions themselves. AGCAS is the professional body to which these services and the individual advisers belong.

Its stated aims are:-

1. To encourage and facilitate the exchange of views between services and with employers.
2. To foster and co-ordinate investigation and experiment and to promote improvements in affiliated services.
3. To encourage training in the skills and techniques appropriate to the work of its members.
4. To express a collective viewpoint.

AGCAS sponsored this particular project to further aim "2".

Early ideas for an exploratory probe into the area of computer aids



for careers guidance began in late 1973. Mr P J Deary of the University of Liverpool Appointments Board had been aware of new developments in the field for some time and discussed his ideas with Dr A J Cochran of the University of Aston's Interdisciplinary Higher Degrees (IHD) Office and himself an ex-university careers adviser.

Early in the next year, March 1974, the AGCAS Development Committee identified the general topic "technological aids" as one to be investigated in that year and set up a working party with Mr P J Deary as Chairman to do this. After a year of discussion and research the Working Party were able to report to the Development Committee on their findings. Although there had been some division of opinion, two main areas were identified where action might yield useful results. These were a long term approach which would involve reviewing the whole structure and function of Careers Services in the light of the computerised methods becoming available. This would need extensive relevant research for each proposal. As will be explained in a later chapter, careers advice consists of a number of different functions all leading to the final placement of the student in a job or further training or whatever else is his aim.

The other was a medium term approach where the aim would be the development of a computerised system to aid students and/or advisers in the matter of occupational choice but operating within the existing service structure. At that time the IBM/Cheshire project (see later chapter) was of great interest and universities and polytechnics were already using a computer assisted placement service (CAPS) in some of their institutions. The two processes of occupational guidance and placement (occupational exploration or choice and job finding from the student view point) are separate stages in careers advice but both



fall within the scope of university and polytechnic careers services.

Placement activities had been extended by the use of CAPS which had been designed to select suitable vacancies for student users from the bank of projected and actual vacancies entered in the bank by employers. The jobs were described in relatively straightforward terms but, for the data search to take place, the system required the student to commit himself to a preferred "type of work" or occupation, and in many cases this was something not yet decided upon. CAPS highlighted the need for a system to aid in the earlier stage of vocational or occupational choice.

Later that year, 1975, a Science Research Council (SRC) studentship was arranged in the IHD Scheme at the University of Aston with Dr A J Cochran as co-ordinating supervisor and Mr P J Deary as AGCAS (sponsor's) supervisor with support from Mr T Snow of Oxford University and Mr D C Ward of East Anglia University Careers Services. Additional financial support came from AGCAS central funds and extra money raised from firms in the Standing Conference of Employers of Graduates (SCOEG).

The writer of the present thesis was appointed from September 1975 and was fully involved in the development of the ideas, aims and development work described in this and the following chapters from that time.

#### Initial Aims for the Proposed System

It was intended to base the proposed system upon existing knowledge



and theory of people and occupational classification. There is a great deal of disagreement on what constitutes useful description of people and of occupations for the purpose of comparing the two, and even when the descriptive criteria are agreed upon there are still considerable difficulties in obtaining the information necessary to complete the classification. It was felt, however, that enough agreement and broadly reliable information could be found to build up a set of data for a computer system. In the event, the final system classification (or data) was new but based upon established principles. It was to be suitable for adaptation and extension as new evidence and research findings became available. The system was to aim to structure occupations as far as practicable in the light of student "chooser" requirements of work rather than from the angle of occupational description and employer requirements, and it was to be based on variables that really influence graduate choice (these may be different from those affecting other choosers). It was hoped to give first priority in the design to those with least idea of what type of work they are interested in or equipped to pursue. The system was to be ready to use by the end of the project and it was to be inexpensive to install, update and maintain. It was anticipated that a system meeting at least some of these requirements would meet the overall aim, that is, the improvement of careers advice through the installation of a mechanised aid.

It was hoped that the system could be designed and presented in such a way that students would not receive the impression that the computer could or would produce the answer for them without further effort on their part. It is not known how willing students in general are to accept computer suggestions without questioning them. There may well be plenty of healthy scepticism.



At a very early stage it was also thought politically apposite to aim to design a system that would work as an adjunct to careers advisers rather than serve as a replacement and to make this aim explicit and known to other members of AGCAS if the final system were to have any chance of adoption. Good public relations and the absence of any sense of threat meant that careers advisers were willing to give help when it was required. Gaining AGCAS support and active collaboration always received high priority.

An early move was to change the original title of the project which had been: "To improve Careers Advice in Higher Education by establishing an effective man/job matching procedure which is economically feasible to install and maintain".

"Matching" was thought to suggest both computer infallibility and threats of careers adviser replacement. The concepts of search and exploration were more evident in the new title: "A machine-aided system for the exploration of occupations by undergraduates".

#### Recapitulation: Initial Aims for the Proposed System

The overall aim was:-

1. Improving careers advice in some way.

The contributory aims were:-

2. Building upon existing knowledge and theory.
3. Designing for easy adaptation and extension.
4. Giving priority to graduate chooser needs in the occupational data structure.

5. Helping those with relatively unformed occupational ideas.
6. Preparing a working system within three years.
7. Producing an inexpensive system to install, update and maintain.
8. Avoiding ideas of computer suggestions being definitive recommendations.
9. Stressing exploration rather than matching as the system philosophy.
10. Avoiding fears of the system replacing careers advisers; it must fit in with existing facilities.
11. Keeping members of AGCAS fully informed of progress and intentions.

#### Proposed Course of the Project

The plan for the preliminary stages of the project was drawn up by both the supervisory team and thesis writer after the project started. In September 1975 it was not certain whether the project would continue for the full three years or for only two years. The three year period would make it possible to spend longer developing and evaluating the system but whatever the time available it was hoped to be able to produce a working occupational exploration procedure before the finish. Important stages on the way to that end would include:-

1. A study of the aims, functions and methods of university and polytechnic careers services.



This would involve visiting a number of contrasting AGCAS careers services and discussing the work with practising careers advisers as well as consulting the literature. It was hoped to identify areas where a machine aid would be of assistance to careers advisers.

(Covered in Chapter Two.)

2. A review of operating man/occupation matching systems.

A variety of types of man/occupation matching systems had already been developed and several had been in use for some time. It was hoped to visit some of these and to read about others in order to study the effects they have had upon careers advice. It would be necessary to investigate what classifications of people and occupations and other theoretical bases they were founded upon and how they might apply to students in Higher Education. This could lead to some modification of the views formed during the study of careers advisory service aims, functions and methods.

(Covered in Chapter Three.)

3. A comparison between existing systems and AGCAS requirements.

It will be crucial to decide whether it would be better to adapt an existing system or to construct a new system to meet as closely as possible to specific needs of AGCAS. Costs and administrative details will then become relevant.

(Covered in Chapter Four.)

4. The development and construction of a system to meet the initial aims.

(Covered in Chapters Five, Six, Seven and Eight.)

5. An evaluation of the finished system in order to demonstrate its approximation to the original aims and any unexpected outcomes.

(Covered in Chapters Nine and Ten.)

6. The development of an improved or mark two version of the initial system should there be sufficient time.

It was hoped that it would be possible to give recommendations to guide the use of the system and to indicate further useful future developments.

(Covered in Chapter Eleven and Chapter Twelve.)



## Chapter Two

### CAREERS ADVISORY SERVICES IN UNIVERSITIES AND POLYTECHNICS

#### The Need for Careers Advice

Increasing numbers of advice services are a symptom of accelerating change in society - the need for advice on occupational choice and job finding is no exception. Some idea of the size of the problem may be gained by looking at examples from occupational classification. The British "Classification of Occupations and Dictionary of Occupational Titles" (CODOT), first published by the Department of Employment in 1972, lists over 3,500 different occupations but is not comprehensive. The American "Dictionary of Occupational Titles" (DOT) lists 21,741 different occupations (under 35,550 titles as some occupations are known by more than one name) in the 1965 edition, and there have been supplements since then. (1) When DOT was first published in 1939 there were 17,452 occupations and 29,744 different titles. The large number of occupations and the rapid changes in employment mean that it is not possible for a student, entering work for the first time, to be aware of very many of the opportunities open to him and of their implications. Formal education lasts a long time and is normally remote from the world of work so, when the time comes to choose an occupation, the student lacks the necessary information and experience.

(1) The latest edition of DOT (1977) describes 20,000 occupations. 2,100 new definitions have been added and 3,500 obsolete titles and descriptions have been deleted.



Careers advice aims to link occupations with people. Occupations are different, make different demands upon the people who undertake them and offer a variety of rewards in exchange. People are diverse in their talents, abilities and their willingness to bring these attributes to their work. They differ, too, in their expectations of the personal benefits to be derived from work. Careers advisers help in the process of finding the individual a suitable occupation.

Good careers advice, resulting in people choosing appropriate occupations, can bring benefit not just to the individual but to employers and the community as a whole. First, there are the advantages to the individual himself. Skilled guidance and advice can increase his chances of personal satisfaction and pleasure in his work (or at least minimise his dissatisfaction) and increase his potential for adjustment overall. Advice also gives him the opportunity to feel "informed" and in a position to make his own decisions. Second, employers stand to gain from an advised population. Recruitment and selection should be more straightforward if more of those applying for vacancies have considered their own suitability realistically beforehand. If 'suitable' people are selected, training programmes could be less wasteful and costly - in that 'suitable' trainees are probably less likely to leave and should learn better during training. In a similar way, the performance of trained workers would be expected to be better with less labour turnover, absenteeism and accidents. (2) Third, for the community, good careers advice could mean improved use of labour resources, better manpower planning and an improved economic performance.

(2) Wallis (1978) discusses some of the effects of inadequate careers guidance provision.



## Discussion

The process of careers advice is a very difficult one to define satisfactorily. The least controversial definitions tend to be those that avoid specific reference to theories of occupational choice. Two examples of general definition follow. In 1918, Brewer gave one of the earliest definitions of careers advice or vocational guidance as:

"a systematic effort, based on knowledge of the occupations and an acquaintance with and study of the individual, to inform, advise or co-operate with him in choosing, preparing for, entering upon or making progress in his occupation."

A later definition, referred to by Wallis (1978) and attributed to the American National Vocational Guidance Association in 1937, states that vocational guidance is:

"the process of assisting the individual to choose an occupation, prepare for it, enter upon it, and progress in it."

Both definitions stress that the concern of careers advice is primarily helping the individual client. The other aims mentioned earlier in this chapter, aiding employers and the community, are not irrelevant but in this society it is not normal policy to specifically direct people into occupations to satisfy state and/or employer demands.

## The Problems of Occupational Choice for the Student

Towards the end of his Higher Education a student is faced with a new set of problems. Instead of pursuing academic study, the typical student has to choose and commit himself to something relatively per-

manent from the little known world of full-time employment. He will be expected by any number of people - parents, academic department, careers service, other students and society in general - to choose a useful occupation and to take up a job or training soon after he graduates. For some this may present the minimum of difficulty but for others the problems may well seem insurmountable.

The whole process of decision making and planning may have to be learned before a student is able to consider the alternatives available to him and make a wise choice. When he has made a commitment he will still need to look for vacancies, to make suitable applications and to handle interviews successfully. These again are skills he may well have to learn in a very short space of time.

#### Some Problems for the Student

The order given shows a progression from general to particular problems.

1. Need to talk to someone in order to define the problem which may or may not be occupational.
2. Need to find direction from a low level of self-awareness and knowledge of occupations.
3. Need to discuss possible career paths.
4. Need to talk to an independent person in the face of pressures from elsewhere.
5. Need to confirm own plan.
6. Need for specific information:
  - (a) on self, occupations and employers,
  - (b) decision making,
  - (c) job vacancies,



- (d) job applications,
- (e) job interviews.

It is expected that all students' problems with respect to career choice will resolve themselves into a need for information on specific occupations. Careers advice is sought with a view to eventually taking up a job - however deferred by further education and training the event may be. The advice is required so that students can learn what they want to know in order to make their plans and feel reasonably certain that they are acting wisely.

### Occupational Choice

Basically, there are three components leading to an occupational decision; these are:-

- (1) Assessment of the individual.
- (2) Information on occupations.
- (3) A comparison or 'match' hypothesis to link (1) and (2)

This leads to the actual 'choice'.

What (1) and (2) comprise depends very much on the nature of (3), the comparison hypothesis, and currently there are two main divisions of theory regarding the nature of the match or comparison hypothesis. The two models have very different implications for the practice of careers advice but what happens within careers advisory services is shaped by more pressing concerns than those of mere theory as will be discussed later.

## Models for Occupational Choice

1. Matching/differentialist model.
2. Developmental/self concept model.

1. Matching/Differentialist Model

This is the very early traditional view of careers advice and is probably what most of the general public would expect of careers advisory services. Holland (1973) gives an up to date view of this model as does Lancashire (1971). They explain that information about the relevant characteristics of individuals can be directly related to corresponding information on occupations that will be suitable for the individuals. The principal problem is thus one of identifying the relevant characteristics and measuring them in individuals and occupations. This is a model that has relied very much on psychological tests amongst its methods and at its extreme has been regarded as a once and for always process applied to the individual at the point of leaving education and entering work. A more moderate application of the model suggests that individuals can be directed towards sets of broadly similar occupations that will suit their characteristics and "warned off" those occupations which are obviously unsuitable. Wallis (1978) lists what he considers to be essential personal data and the equivalent occupational information for the process of 'matching'. See Figure 2.1 below.



Figure 2.1

Essential Data for Vocational Guidance Matching

<u>Personal Data</u>	<u>Occupational Data</u>
1. Occupational interests and preferences	1. Generalised task requirements
2. Educational qualifications	2. Educational requirements
3. Abilities and skills	3. Training requirements
4. Personal qualities	4. Social features
5. Attitudes to employment	5. Career prospects
6. Economic circumstances	6. Economic rewards
7. Mobility	7. Availability/locations

Rodger's (1952) Seven Point Plan referred to in Singleton (1973) covers the same kind of characteristics and has long been widely used as the basis of careers guidance (and job selection) interviews. See Figure 2.2.

Figure 2.2

The Seven Point Plan

1. Physical Make-up  
Has he any defects of health or physique that may be of occupational importance? How agreeable are his appearance, his bearing and his speech?
2. Attainments  
What type of education has he had? How well has he done educationally? What occupational training and experience has he had already? How well has he done occupationally?
3. General Intelligence  
How much general intelligence can he display? How much general intelligence does he ordinarily display?

Figure 2.2 (continued)

4. Special Aptitudes

Has he any marked mechanical aptitude? manual dexterity? facility in the use of words? or figures? talent for drawing? or music?

5. Interests

To what extent are his interests intellectual? practical - constructional? physically active? social? artistic?

6. Disposition

How acceptable does he make himself to other people? Does he influence others? Is he steady and dependable? Is he self-reliant?

7. Circumstances

What are his domestic circumstances? What do the other members of the family do for a living? Are there any special openings available for him?

The emphasis is on what the occupation will demand of the individual and what the individual has to offer as measured in, as far as possible, objective terms. The careers adviser acts as an expert 'measuring' the individual and directing him in the right path.

2. Developmental/Self Concept Model

This is a much more recent approach to the process of career choice and derives from the theories of Ginzberg (1951) and Super (1957). The developmental model considers occupational choice to be a continuing process related to stages in personal growth and development. Super (1957) says:

"In choosing an occupation one is, in effect, choosing a means of implementing a self-concept."

Thus the individual cannot be expected to make a decision just before leaving school that will be satisfactory for the rest of



his working life. He will need to keep taking stock of himself and over the different stages in his personal growth he may regard a variety of occupations as suitable. The process of choice may well be life long. The emphasis is upon the individual as a whole relating himself to an occupation that will fit in with his perceived self and life-style. The careers adviser acts as an agent in facilitating the individual's awareness of self rather than recommending particular occupations to him. An occupational decision is a matter for the individual but can be discussed with the careers adviser in terms of its relation to the self-concept.

Wallis (1978) has usefully contrasted the two models as shown in Figure 2.3 below.

Figure 2.3

Two Models of Occupation Choice

<u>Matching/Differentialist Model</u>	<u>Developmental/Self Concept Model</u>
<u>Reliance on:</u>	<u>Reliance on:</u>
1. Traits/abilities theory.	1. Developmental theories of personality.
2. Measured individual differences.	2. Notion of irreversible stages of growth.
3. Occupational classification by type and/or level.	3. Self-concept.
4. Use of tests and assessment norms.	4. Non-directive counselling techniques.
<u>Tendency towards:</u>	<u>Tendency towards:</u>
1. Once only 'crisis' counselling.	1. Non-involvement in decision making.
2. Adviser as occupational expert.	2. Neglect of economic and sociological influences upon occupational choice.
3. Influencing clients (benevolently).	



The two models appear to have different implications for careers adviser activity. Super's views have certain implications for: first, the type of information required by the client and, second, the information made available on occupations. Data based upon self-awareness and individual motivation is required. The comparison/match hypothesis, the third aspect, is a matter for the individual's own insights and perceptions and is not based upon a set of 'match' rules. The careers adviser acts as a facilitator in discussing the client's own ideas; he does not tend to initiate standard ideas as would often be the case in matching model careers advice.

The strength of the developmental model is in providing a theoretical framework that can explain student difficulties with decision and the many changes of mind that take place. It underlines the need for careers education beginning long before the point of leaving the educational system and taking up employment or training. It is not, as a model, so successful at explaining how the eventual, inevitable linking of self with an occupation can be made. Here the matching model is able to offer a framework for action, given the appropriate data. However, that data can include aspects of self-concept as derived from the developmental model. A more complete and convincing picture of the process of careers advice is obtained by drawing upon features of both models for the description. This view is strengthened by the fact that the differences in careers advisory practices that one might expect to find as a result of the two models are not apparent (to be discussed in the next section). There are variations between careers advisory services but observation has led the thesis writer to the opinion that practices are dictated by the resources available and



the need of the clients to find jobs (and, if not jobs, further training or other chosen activities) rather than by theoretical considerations.

The two models are essentially describing the same phenomenon: the developmental model explains the early stages in choice; the matching model explains the outcome of the process, the occupational decision.

### University and Polytechnic Careers Advisory Services

Careers advice takes place within careers advisory services, but the process is a complicated one and by no means all of careers advice consists of the one-to-one careers adviser/client interview and neither are careers advisers the only experts involved with a careers advisory service.

For ease of description, the process has been divided into three main functions:-

1. Information.
2. Guidance.
3. Placement.

The details which follow of careers advisory services are the result of visiting, at an early stage in the project, eight contrasting AGCAS services at the Universities of Aston, City, East Anglia, Keele, Liverpool, London and Oxford and at the Polytechnic of Central London.

The visits brought about the view expressed earlier that overall the

the services are more similar than dissimilar, but there are variations. Stated aims varied from placing students in suitable jobs to helping students understand their full potential and goals in life, but other demands have an effect. These demands are not just the students' needs and expectations - although those may be the most important - but also the requirements and beliefs of the university or polytechnic, the claims of employers of graduates as well as the skills and outlook of the careers advisory service staff. Another major factor is the amount of resources made available for the work, which varies in different institutions. In the face of financial and other limitations, only the most pressing and important functions can be continued.

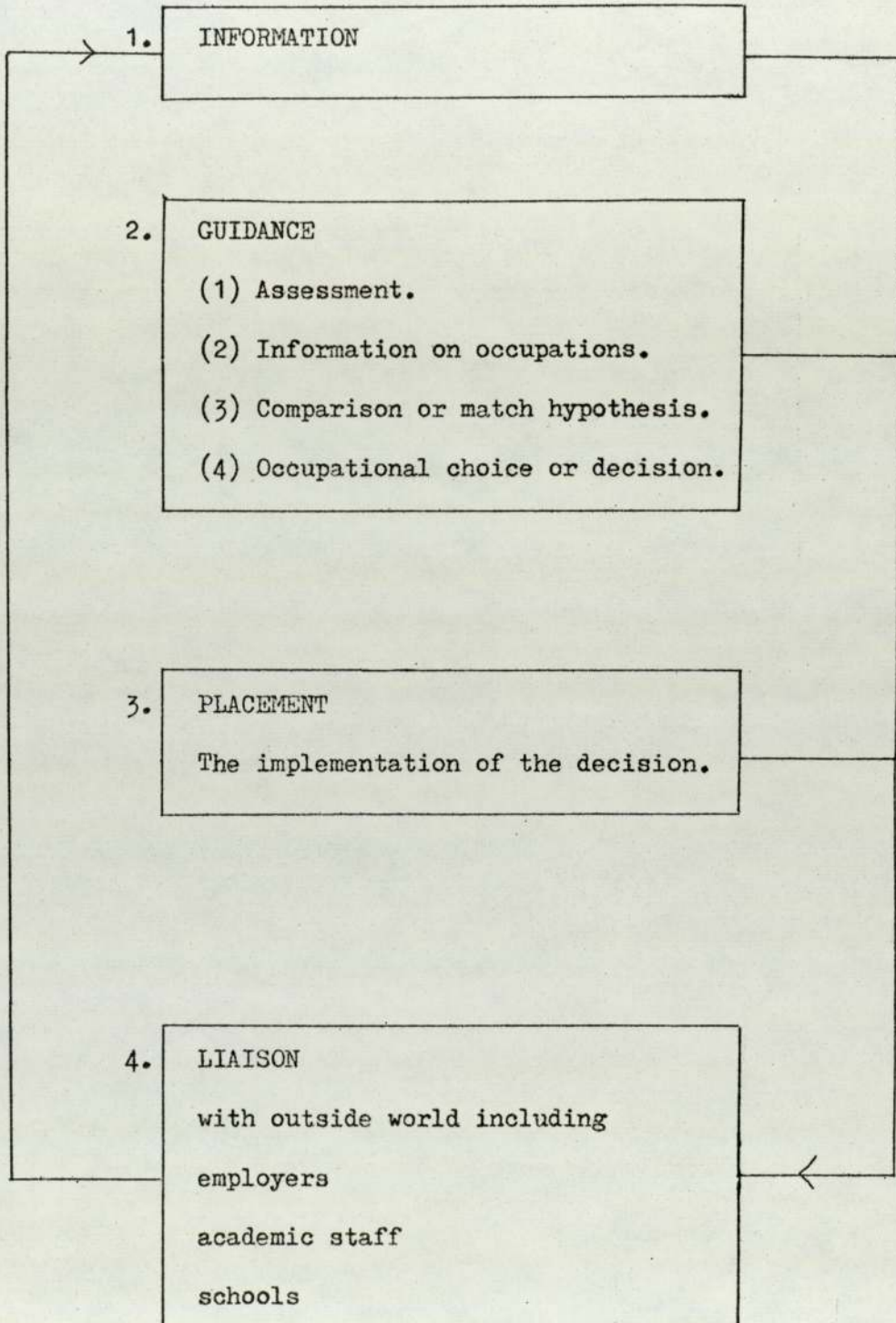
#### Functions of a Careers Advisory Service

Figure 2.4 shows the relationship between the various functions of a careers advisory service. The contents of each section will vary depending upon the particular careers service. The arrows show the direction of flow of information.



Figure 2.4

Functions of an AGCAS Careers Service



## Main Functions

### 1. Information

Information is at the centre of a careers service's activities. Students need information on all aspects of choosing an occupation, a course of further training and on finding a job. Services therefore dispense information as a matter of course and keep the information as up to date and relevant as possible. Many services employ an information officer to update the information facilities, to organise the information room and to help students with their difficulties and enquiries.

Careers advisers themselves need to keep in touch with the latest employment news and research and theory regarding careers advice as well as attending relevant courses on techniques and equipment. AGCAS organises training sessions and members co-operate in the distribution and collection of information and news.

### 2. Guidance

Guidance functions are those activities aimed at helping a student decide what he wants to do after graduation. Guidance activities could cover a wide range of possibilities, but this project is concerned with those students who are interested in eventual gainful employment, so "guidance" here is helping students to choose an occupation from among the many options open to them.

Earlier sections in this chapter ("Occupational Choice" and "Models for Occupational Choice") have dealt with the stages in the process of occupational choice. These were:-



- (1) Student assessment.
- (2) Gaining relevant information on a range of likely occupations.
- (3) Comparing student with the occupations in order to produce a list of possibilities. (This is a 'match' and implies a system of relating people to occupations however informal or unformulated.)
- (4) Deciding on an occupation. (This is entirely the concern of the student, the careers adviser can only supply the necessary information and ideas.)

Guidance is the area of careers advisers' particular expertise and where a careers adviser would expect to be of most help to students.

### 3. Placement

Placement activities become relevant when the student knows what occupation he wishes to follow; they enable him to implement his occupational choice by helping him to find a suitable job. This involves notifying students of available vacancies, which is normally part of the routine of a careers advisory service office staff, but it can involve careers advisers in teaching students the right techniques for application form submission and interview self-presentation.

### 4. Liaison

Liaison will be considered as a minor function for this project. Careers advisers do, however, keep in touch with academic departments, employers of graduates, schools and other outside professional bodies in the course of their work. They are able to gain information of use in their services and to pass on information to these

bodies that could further the interests of present (and future) students and foster mutual understanding.

## Services Available in a Careers Advisory Service

### 1. Information

#### Literature

Almost all AGCAS careers services have an information room where printed information is freely available for students to consult. Some of the material is for reference only but some items can be taken away. The written information available includes:

Information Sheets. About 80 titles covering specific occupations and opportunities available for particular subjects of degree prepared by careers advisers for students to take away.

Occupational Information. Further background information on occupations and training courses. Post-graduate study information.

Employers' Information. Employers' own recruitment literature and possibly newspaper cuttings, other information on particular employers and application forms.

Reference Books on work overseas, grants, vacation work and courses, yearbooks, directories and general reading on careers choice.

Commercial Directories of employers distributed by



commercial concerns to universities and polytechnics.

### Video Tapes

Many careers services use video cassette tapes to supplement the careers literature. Some tapes deal with having an interview, others deal with particular occupations and some with particular employers. There are now (1980) about 50 different tapes available.

### Careers Sessions, Seminars and Group Sessions

Topics covered include choosing an occupation, completing application forms, having an interview, sessions on particular occupations, employer presentations and opportunities to talk with professional contacts and other people working in various occupations.

### ROGET (not available in 1975/6)

ROGET is a directory produced by AGCAS careers services that gives information on the recruitment and training policies of most recruiters of graduates. It was introduced in 1977.

## 2. Guidance

### Interviews with Careers Advisers

Students in their final (and penultimate) year of study can arrange an interview with a careers adviser through staff in the information room of the careers service. Careers advisers tend to specialise in particular degree areas, so it is usual to see the appropriate adviser. Interviews can last up to an hour.

and give the individual student the chance to talk over his problems and plans on a one-to-one basis. He can try out his ideas and perhaps realise some new ways of looking at his position. He should at the end of the exercise, theoretically at least, be nearer to an eventual decision although there may still be some way to go and more interview sessions required.

### Psychometric Tests

Many services offer on request a number of psychological tests that can serve as a useful starting point for guidance interviews.

### Gradscope

Gradscope, the result of the present thesis, has been available to students since April, 1979.

## 3. Placement

### Vacancy Notification

CSU - the Central Services Unit for Careers and Appointments Services - produces fortnightly lists of graduate vacancies (and further lists of projected vacancies to be taken up after graduation). These are distributed to all AGCAS careers services. Some services produce their own additional lists of vacancies.

### Employers' Recruitment Visits ("Milk Round")

Most careers services are visited on site by employers interested in interviewing and selecting students hoping to graduate that year. The visits take place in the Lent term before examinations, and are a convenient method of recruitment for both students and employers. Careers services devote substantial resources to arr-



anging and staging the recruitment visits.

### Summer Fairs

After "finals", usually in July, employers visit certain careers services for 'Recruitment Fairs' which give graduates still seeking employment the chance to meet employers (and vice versa). The central co-ordination of the Fairs is through CSU.

### Central Resources

Central resources enable careers services to undertake more than might otherwise be possible when working on their own.

CSU - the Central Services Unit for Careers and Appointments Services - provides a number of important aids for careers services in AGCAS. CSU activities include a weekly mailing service to all subscribers; printing and distribution of about 500,000 information sheets each year; lists of current and projected employer vacancies and the compilation and distribution of central statistics and other useful information. (Gradscope will be run by CSU.)

AGCAS, by pooling its resources, is able to write information sheets, run training courses and undertake investigations into areas of current concern and interest.

### Timing of Careers Advisory Service Activities

The services offered to students through their careers advisory services

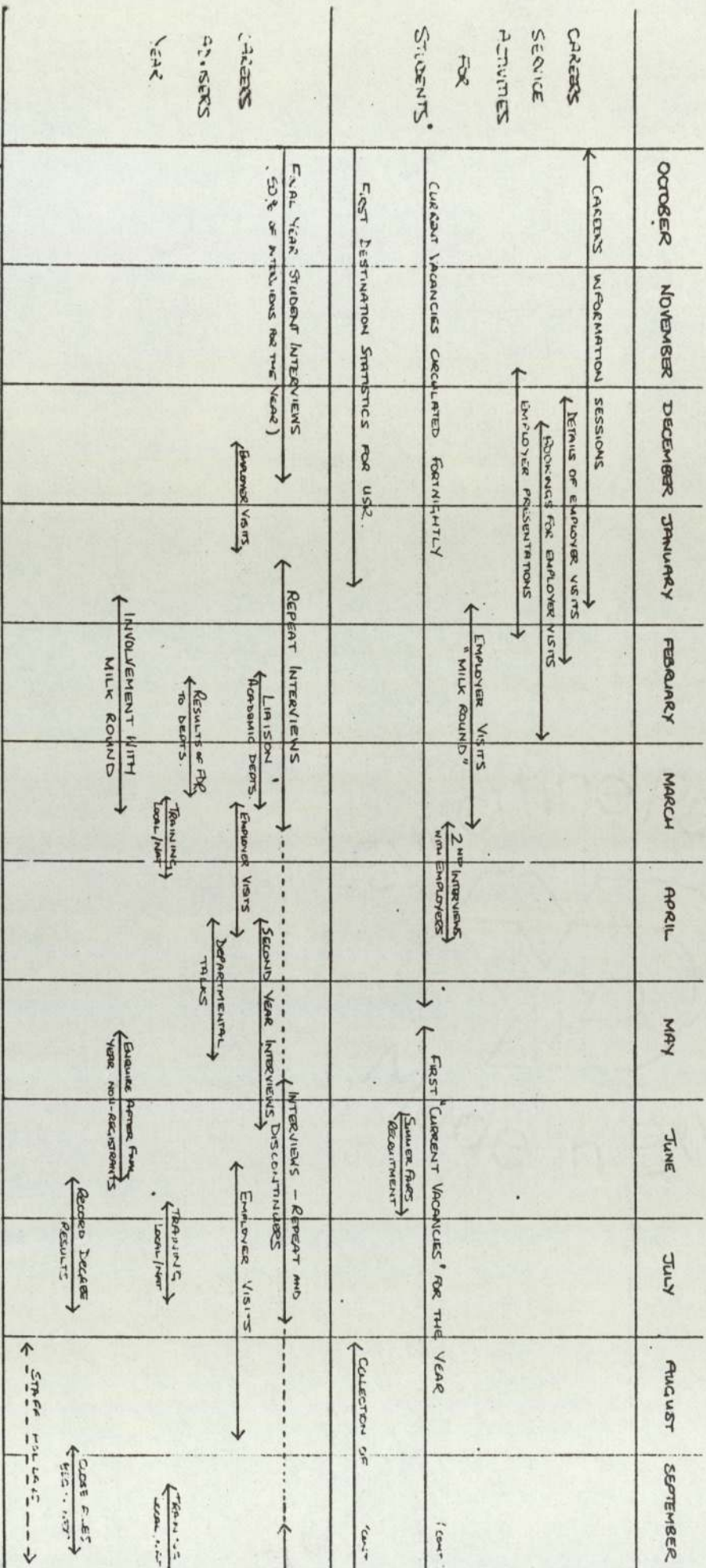


Figure 2.5 Careers Advisory Service Year



tend to be cyclical in nature; the main cycle being the academic year. This has implications for the design of computer aid, for at least how it will be fitted in with existing facilities and also for the timing of any request for help made to AGCAS members.

Figure 2.5, Careers Advisory Service Year, shows the yearly cycle of activities.

### Implications for the Present Project

The present project is by definition to be concerned with the guidance and explorative aspects of careers advice (rather than information or placement aspects). It will therefore be useful to look in greater detail and more critically at the guidance activities carried out in careers services with a view to identifying areas where a computer aid may be able to contribute.

### Interviews with Careers Advisers

The one-to-one interview with students is probably regarded as the most important part of careers adviser duties. While it is true that, in the interview, the individual's needs can be dealt with as they arise, there are problems. Interviews are time-consuming and open to the misinterpretation and error which have been shown by psychologists to exist in many situations involving the interaction of people. In the process of 'guiding' a client, there are several areas where misunderstanding may occur.

Smith (1978) divides the process of vocational guidance into three stages.

1. Eliciting and storing information about a client.
2. Weighing information to arrive at estimates of suitability for various occupations.
3. Communicating the results.

Smith discusses a variety of evidence that calls into question human, that is careers adviser, efficiency in performing some of the tasks of guidance. Interviewers seldom seek information in a systematic way and both bias and stereotyping can easily be established early on in the proceedings. A further problem with human advisers is that they are not particularly good at storing and using many separate pieces of information about a student - even if the information itself is reliable. Thirty or forty pieces of information may be elicited during the course of an interview and there is little likelihood that all of these will be co-ordinated and used to their full potential by a careers adviser before he passes comment to the student.

Figure 2.2, The Seven Point Plan, (earlier in the text) shows some of the items that can be raised at interviews, either for jobs or for guidance, for the purpose of making an assessment of the client.

When a careers adviser has made his assessment of the client and his needs, there still remains the problem of communicating his ideas and views to the client (whether these be occupational suggestions, counselling or other advice). Unless this stage of the interview is performed successfully, the student may be unable to understand or make full use of the outcome of his advisory interview.



## Psychometric Tests

Any aid, such as psychometric tests, that can be used to structure the information-gathering for an interview and/or measure the information gathered against a standard promises to be of help to careers advisers. Tests are sometimes given to form a basis for an interview. They may be given before the first interview or after the first interview to provide new ideas for a later interview if the first proved difficult. Tests do provide a more objective and systematic way of assessing a client. Also test results, or even test participation, may assist clients to learn about or assess themselves against a number of factors that may be relevant to their occupational choice. Very few tests have been shown to relate directly to occupations, most are only related to occupations through the interpretive expertise of the test designer or the 'common sense' of the careers adviser and client at the interview. When test validities are available, they cannot be expected to correlate completely with the objective standard taken as reference and caution must therefore be exercised when basing any recommendations on the results. To place too much reliance on an instrument that may misgroup two in ten people tested would be contrary to the aims of careers advice because of the injustice likely to particular individuals.

The two types of test available are normative and ipsative tests.

### 1. Normative Tests

Normative tests aid the careers adviser and client in the assessment of that individual's qualities as compared with the rest of the population. They are used to measure the more objective qualities that differentiate people. In careers advice they could be tests of Intelligence Quotient (I.Q.) and tests of specialised abilities like

spatial perception and manual dexterity. For some types of occupation such tests may be an aid in allocating clients appropriately; however normative tests are a tool of the matching/differentialist approach where the adviser is an expert directing the client as he sees fit.

Graduates are already a highly selected group and few available tests can differentiate usefully between them. Many graduate-entered occupations are not effected by the qualities such tests measure, for example, manual dexterity. One possible exception could be the tests used to measure potential for computer programming.

#### References:-

IBM (1964) Aptitude Test for Programmer Personnel.

## 2. Ipsative Tests

Ipsative tests aid the careers adviser and client in assessing how certain qualities are arranged within the individual. They are more often used as a basis for discussion in a careers adviser interview. The A.P.U. Occupational Interests Guide produced by Closs (1975) is of this category. By asking the client to make a choice between pairs of work related items, an ordering of strength of preference between eight different occupational interests can be obtained. The client is able to gain some idea of what an occupational interest is considered to be and one way that such interests can be assessed. There has been no objective relating of specific occupations to each



interest but this can be done informally by the careers adviser and client working from their own hypotheses. An attempt was made in July 1976 to allocate occupations to each interest by the North West Training Group of AGCAS. The aim was to take a set of the occupations graduates enter and for each one to order the interests, one to eight, depending on their significance to the occupation. The participants found that the interest definitions had to be interpreted more flexibly if the task was to be possible at all and that many graduate type occupations tended to rate high on persuasive and literary interest categories. The group's work indicates that A.P.U. Interest Guide categories will tend not to separate the occupations that graduates enter sufficiently to be useful. The Guide's main role seems to be in giving clients insight into some of their own characteristics.

References:-

Closs (1975) The APU Occupational Interests Guide.

Conclusion

There is room for improvement in existing careers service facilities and there are means of providing guidance other than through careers advisers. One alternative is the computer.

## Chapter Three

### COMPUTER-AIDED GUIDANCE SYSTEMS

#### Introduction

At a very early stage in the project it became apparent that the proposed system could be computer based as had always been hoped. The computer offered certain advantages which will be outlined below, but in 1974 computer use had been thought too expensive to be definitely stipulated. Early enquiries did, however, show that costs were not prohibitive.

Most universities and polytechnics either have their own main frame computer on site or access to one at a nearby institution. It was therefore likely that most careers services would be able to make arrangements for computing facilities at acceptable cost and convenience. A central computing service was also an alternative possibility. It could be run by a university, polytechnic or commercial bureau (at one time the Post Office Data Processing Service was considered) for the benefit of all institutions wanting to participate. Another important factor was the rapidly decreasing cost of microprocessors; by the end of the project, or soon after, computer hardware could be cheap enough to be within the budgets of careers services.



## Advantages and Disadvantages of the Computer

The great advantage of computers is their capacity to store very large quantities of information and to process that information rapidly, accurately and consistently. The process of careers advice depends a great deal on the effective use of large quantities of information. Human beings are less good at dealing with information and therefore careers advice should benefit from the introduction and proper use of suitable computer aids.

Figure 3.1 compares the performance of a hypothetical computer system with that of a careers adviser.

### Discussion

Some of the features in figure 3.1 may be both advantage and disadvantage depending upon the student, the careers adviser and the circumstances. Despite the undisputed and considerable computer advantage in information handling capacity, speed and accuracy, some students may still prefer to talk to a careers adviser. Sometimes the subjective element of an interview (for instance, the benefit of another's judgment and/or criticism) may be necessary. A careers adviser should be able to show a more flexible approach to problems and situations that do not fit the usual pattern and will often be aware of exceptions and recent changes in the general information.

The contrasting impartiality of the machine may attract students at the beginning of the career decision process when students are undecided and uncertain. It may be easier to reveal feelings to a computer rather than a person who might judge them harshly or unsympathetically. The computer can also make it easier for students to survey the field and

Figure 3.1

The Computer Compared with a Careers Adviser

Computer

Careers Adviser

- |   |  |
|---|--|
| 1. Stores large amounts of information.       | 1. Memory capacity variable (but less than computer).          |
| 2. Recalls rapidly accurately consistently.   | 2. Recalls more slowly frequently inaccurately inconsistently. |
| 3. Objective, impartial impersonal unbiassed. | 3. Subjective, given to judgements shows personal bias.        |
| 4. Restricted to program logic.               | 4. Flexible.   |
| 5. Enables central information updating.      | 5. Dispersed individual updating of information.               |



gain some ideas before attending an interview. They may then feel at less of a disadvantage and able to make better use of the interview time.

Program logic is unlikely to be able to reflect all the shades of human decision making because of the complexity of the process. The simplification required for the computer could help students to understand some of the elements of the occupational decisions required of them. The criteria of success for a computer system need not be that it provides the right answers, only that it shows how to reach an answer.

#### Applications for the Computer in Careers Advice

The success or not of computer aids in careers advisory services will depend very much upon the proper allocation of functions between careers advisers and computer. The aim is to enhance the facilities offered by careers services, not merely to make use of computer aids because they are available and at present receiving much attention.

A computer can be programmed to perform most of the tasks undertaken by careers advisers including interviewing (see details of AUTOCOUN later in the chapter). What is important is to spend time deciding which functions are better performed by careers advisers and which are better performed by computer before proceeding with a design. The computer is not intended to be a replacement for careers advisers or an imitation of any other facility but to complement the present arrangements in some way.

If the three main functions in careers advice are considered, there

will be computer contributions possible in each.

### 1. Information

The storage and retrieval capacity of a computer could aid students and careers advisers in dispensing some of the routine and repetitive information.

### 2. Guidance

A computer system could assist in a number of different ways. Thomas and Griffiths (1975) give four levels of computer-aided guidance. See Figure 3.2.

The levels correspond with the four aspects of guidance outlined in Chapter Two:

- (1) Assessment.
- (2) Information on occupations.
- (3) Comparison or match hypothesis.
- (4) Occupational choice or decision.

### 3. Placement

The computer could be used to compare a student and his chosen occupation against notified vacancies and produce lists for employers and/or students. This has already been tried for students in higher education by the CAPS system (Computer Assisted Placement Service). At present (1980) this system is not being used, although there are plans to re-introduce a similar service.

By definition, the present project is to be concerned with the



Figure 3.2 Four Levels of Computer-Aided Guidance

LEVEL	NEED	ACTION			
1	Knowledge of client's interests and aptitudes.	Counsellor sends questionnaire completed by client to computer centre.	Computer marks answer sheet.	Computer centre sends score back to counsellor.	Counsellor uses score as source of information to help client.
2	Information about a particular occupation.	Counsellor interrogates computer.	Computer produces required information.	If 'off-line', computer centre sends back required information. If 'on-line', information produced by terminal either as print-out or on TV-type screen.	Counsellor passes on information to client.
3	Job suggestions.	Counsellor collects relevant information about client and sends to computer.	Computer matches client profile against job profile and produces list of best matches.	As above.	Counsellor uses information to help client.
4	Education of client on how to make occupational choices.	Counsellor organises careers education, part of which involves direct interrogation of computer by client.	Computer produces information as required by client.	Information is presented to client (on-line) on a TV-type screen.	Counsellor monitors client-computer dialogue and discusses with client when appropriate.

Diagram from Thomas and Griffiths (1975)

guidance aspects of careers advice. It will help at this stage to look at some existing systems that have been designed to serve guidance functions.

### Existing Computer Systems

There are already a few computer-aided careers guidance systems in the U.K. and rather more in the U.S.A. Many have yet to be tested in practice but they are of interest because they have been designed to serve various groups of people and to fulfil varying aims and theoretical models of guidance. It is of relevance to see how theory is put into effect and whether any existing system would meet the requirements of the present project.

### General Plan

It is difficult to appreciate the full potential and application of a computer aided careers guidance system from the written descriptions available and from a brief visit to the installation. The systems examined below are described and appraised as they were in late 1975 as that is the date at which the survey and decisions as to the project system were undertaken, and it is fairer to present the evidence that was available at that time. Some systems have been changed quite dramatically since that time and in ways that support many of the decisions taken regarding the present (1980) project system design; so later versions of the systems discussed in this section will be presented in the evaluation section of the thesis. The implications of some design features were only fully realised as the project system gradually took



shape and this sort of detail will be included in the appraisals. Some of the most interesting features of systems are the ones that cannot be 'seen', such as details of the program design and data manipulation and the arrangement of the data itself. In most cases they were not available for inspection and so it inevitably means that it is not possible to say exactly how the system works. The overt features of a system do not necessarily convey all that takes place between input and output.

In order to compare and appraise each system a framework will be used to present the relevant information. The headings will be:-

1. Background

Reasons for development in the first place.

Designer.

Theoretical model it is based upon.

2. Occupations

Those included.

Source of titles.

3. Factors

Used to differentiate or classify the occupations.

Source of factors.

4. Data Bank

How the occupational profiles were obtained.

## 5. Match Algorithm

Logic used to produce data for student.

## 6. Features

Includes input mode, means of producing student profile, output mode and design, any extra functions.

## 7. Evaluation

Reference to existence of evaluation trials of the system and outline of main findings. More details will be included in the Evaluation section of the thesis.

## 8. Discussion

Strengths and weaknesses of the system and relevance to the project aims.

## Particular Systems

Only systems that have been designed to serve 'guidance' functions will be described. Those in sections A and B in Figure 3.3 are the systems that will be appraised in the following text. The other systems, listed in section C, complete a listing of the notable systems designed and used both here and in the U.S.A. Where named systems do not serve guidance needs their purpose will be given.

The six systems, that were looked at before the project system was



Figure 3.3

Computer Aided Vocational Guidance Systems (1975-1976)

A. Matching Systems

CASCAID (Careers Advisory Service Computer Aid) developed by Leicestershire County Council.

JIIG (Job Ideas and Information Generator) developed by Dr Closs at the University of Edinburgh.

CACVG (Computer Assisted Career and Vocational Guidance) at Kelsterton College of Technology.

JOBSPY at the Hatfield Polytechnic.

GIS (Guidance Information System) developed in the U.S.A. by Times Share Corporation. Now in use in Birmingham.

B. Vocational Development Systems

ICGS (Interactive Careers Guidance System) developed by IBM and Cheshire County Council.

SIGI (System of Interactive Guidance and Information) developed in the U.S.A. by Educational Testing Services.

C. Other Systems

AUTOCOUN

CVIS

ISVD

ECES

CIS

DISCOVER

OCIPS

} See text.

decided upon, fall into two groups that correspond with the matching and developmental approaches to careers advice:-

1. Matching

These systems aim to match a student's qualities against occupations in order to select those that fit either exactly or very closely.

2. Developmental

These systems aim to teach students the concepts and information they will need for careers choice and planning.

In most cases some sort of match takes place.

As will be seen, in use there may be rather less distinction between the models when it comes to the actual effects upon the user. (Note - conclusions in "Theories of occupational choice" section of Chapter Two.)

A. Matching Systems

I. CASCAID (Careers Advisory Service Computer Aid)

1. Background

Development of CASCAID began in 1969, initiated by two careers officers with Leicestershire Careers Service : J. F. Witherspoon and C. P. Roberts. They felt that there was a need to system-



atise the material used by school careers officers to reduce their memory load. CASCAID was originally designed to be a computerised version of the Careers Officers' Handbook (Department of Employment). In December 1975, the system in use was an extended version of the 1969 system with various extra factors and functions added when use showed them to be needed. It is a practical system (designed to help the careers officer) not based on any guidance or educational theories. Since 1975 CASCAID has been extensively altered and the version currently in use (June 1978) is CASCAID III. The changes will be described later in the evaluation section. Many of the improvements would seem to support several decisions taken during the design stages of the present project. In 1978, CASCAID is the only British system in widespread use.

## 2. Occupations

CASCAID I includes about 500 of the more usual occupations entered by school leavers as shown by the County Careers Service records.

## 3. Factors

The occupations are described by factors which relate to school leavers and are "discernible". Thus factors which can be assessed factually and clearly or factors which can be measured by means of psychometric tests are used. Other factors were of concern to the designers but there were no classifications to relate such factors to the occupations. Occupational interests measured by the A.P.U. guide are the only psychological factors used and for these a classification had to be derived specially

and was based on "a consensus of opinion of experienced senior careers officers trained to the use of the A.P.U. guide". Roberts and Witherspoon (1978).

The factors are:

1. Sex - this was before legislation prohibiting discrimination on grounds of sex.
2. Physical characteristics and health.
3. Academic attainment and potential.
4. Occupational interests.

#### 4. Data Bank

Each of the (approximately) 500 occupations are analysed in terms of the factors so that each has a profile describing it in terms of:-

1. Any restriction or limitation on entry by sex.
2. Any physical disability or health problem which will disqualify a student's entry.
3. Minimum academic qualifications for entry.
4. Relevant occupational interest categories, that is the eight A.P.U. interests, in terms of whether to be liked or not disliked by a would-be entrant.

Data for the fourth area is based on senior careers officer opinion as stated previously. The source of data for the other factors is not given.

#### 5. Match Algorithm

The computer eliminates all occupations that are disqualified by sex; that do not correspond with the student's abilities;



that would be closed because of physical or health problems; that do not correspond with highest scoring or rated A.P.U. categories or that do correspond with lowest A.P.U. scores or ratings.

A list of remaining occupations is produced with a weighting for each occupation to indicate the extent with which it accords with the student profile. This list forms a basis for discussion at interview with student and careers officer.

## 6. Features

CASCAID is primarily an off-line batch system. Students can fill in their profile forms (a simple questionnaire) in class; some extra information is available using health and school records, and, at a later date, when they see their careers officer, the printout produced is with the student's records. From information that becomes available at interview it is also possible for the careers officer to submit an alternative student profile as there is an interactive version of the program available that can be accessed by means of portable terminals. There is also a set of "override" factors which can be used by the careers officer at interview. These can work individually or in combination but they select the occupations from the total data bank that have the qualities specified. This is an information retrieval function.

The override factors are:-

Outdoor/office-based

Work on own/in group

Importance of appearance

Jobs requiring discipline

Mobile jobs  
Outdoor/active  
Social/managerial  
Musical

These are based on questions commonly asked by students.

#### 7. Evaluation

As far as is known, no formal evaluation has taken place. The changes that have been made (described later) are based upon the recommendations of careers officers who, by now, have used CASCAID with large numbers of students.

#### 8. Discussion

This system is ideal for indicating which occupations a student is eligible for. It is less good at showing students which occupations they might want to do. However, this is in the nature of a design which is as an aid for the careers officer in his work with students of school-leaving age.

The design of the system is simple but flexible, especially with regard to the override factors. These can be added to and altered as the need arises and are the strength of a system that would otherwise be limited to a few straightforward factors, valuable though these may be as an aid to careers officer memory. The system is also relatively cheap and easy to update, extend and administer.



## II. JIIG (Job Ideas and Information Generator)

### 1. Background

The JIIG system was designed between 1972 - 1975 by Dr S J Closs, a psychologist at the University of Edinburgh. It is based on similar factors to CASCAID and incorporates his own already developed A.P.U. Interests Guide. JIIG aims to reduce occupational ideas to a number that can be dealt with at an interview. It is a tool for the careers officer rather than the student. Closs himself describes it as a "sieve" to narrow the range of options. JIIG has been tried by the Edinburgh Occupational Guidance Unit but is not at present widely used.

### 2. Occupations

JIIG is based on about 550 occupations derived from the most common fathers' occupation and occupational preferences named in a survey carried out by Closs.

### 3. Factors

The occupations are described by a number of factors. These are:-

#### A. Student attributes.

1. Interests (measured) likes
2. " " dislikes
3. Sex (before legislation)
4. Qualifications (actual)
5. Physical characteristics

B. Student preferences.

1. Interests (self-assessed) likes
2. " " dislikes
4. Qualifications (anticipated)
6. Routes prepared to follow(qualifications)
7. Regional availability
8. Shiftworking

N.B. Three of the factors, i.e., 1, 2 and 4, appear both as student attributes and student preferences. For greater detail see Appendix 2.

4. Data Bank

Each of the occupations is coded in terms of the factors by means of information "derived mainly from the Careers Officers' Handbook and from Closs's own judgement - aided by a student for a while". (Watts, 1976)

5. Match Algorithm

Any or all of the factors may be used when making a search of the data bank. Each factor may be given an optional weighting on a 5-point scale according to the importance attached to it by the student. No details are given of how the 'match' uses these weightings (or will use them) as in 1975 the weighting facility had not been programmed into the match. From later descriptions it seems that the weightings have been abandoned. The user may search for occupations at specified qualification levels or the whole data bank. Occupations which match the student profile are listed by qualification level. If the suggestions are unappealing or too great in number then the input profile can be modified accordingly.



## 6. Features

JIIIG is designed to run in either batch or conversational mode. In both cases it seems that the student input has to be supplied, or at least interpreted, by the careers officer as it is coded. The conversational mode and simple factors enable the system to be used from the start by the careers officer and student at an interview when needed. Output also features coded items although the occupations are given explicit titles; so again extra help is needed to decode the additional information. The conversational visual display unit (VDU) content can be converted to a printout for the student if required.

## 7. Evaluation

JIIIG has been tested in schools but without formal evaluation. The Employment Service Agency have tested the system in the Edinburgh Occupational Guidance Unit and, with Closs, carried out a formal evaluation. Full discussions of the findings will come later but the evidence did point to the usefulness of such a form of computer-aided guidance.

## 8. Discussion

JIIIG is a flexible system, as the user, normally the student in consultation with his careers officer, may use the factors that really concern him. In practice, students tend to use all the factors for their first input profile and to drop some at a second run. It is tedious to change the input profile in the conversational mode as the whole profile has to be resubmitted and there is no diagnostic facility to indicate which

factors have led to the unsatisfactory output in the first place.

The search of the data bank seems to be for exact matches to the person's profile. In view of the aim to reduce occupational possibilities to a reasonable number that are actually possible for the student, and using only eight objectively based factors, this is a reasonable procedure to follow.

The batch mode is relatively cheap in operation. Closs quoted 25p per case (1975). The interactive costs are rather more: in the evaluation tests costs varied between £3.48 and £1.17 per case, although many of the overheads would be reduced in an actual installation.

### III. CACVG (Computer Assisted Careers and Vocational Guidance)

#### 1. Background

CACVG has been developed from 1973 at Kelsterton College of Technology in North Wales. It was originally designed by J. Deeley, a lecturer in computer studies, as a means of extending the range and availability of occupational information in schools. The college computer is linked to 110 centres, mostly schools, but including 14 colleges of further education in North Wales, Cheshire and Lancashire.

#### 2. Occupations

Work is at an early stage. So far the system is based on only 25 occupations.



### 3. Factors

The occupations are described in terms of:-

#### A. Student attributes

1. Actual (expected) examination results.
2. Sex (before legislation).
3. Physical handicaps.

#### B. Student preferences

4. Interests (A.P.U. categories).
5. Willingness to live away from home.

### 4. Data Bank

Watts (1976) states that the data base is "derived from standard sources and from advice of local careers officers".

### 5. Match Algorithm

The system, according to Watts (1976), lists occupations that have not been excluded on the basis of the student profile.

### 6. Features

The occupational matching system is one of a suite of five programs that make up CACVG. As yet, only three of the programs have been written. The five are:-

Program A: Talent Identification Program as described above.

Program B: Forecast of Future Occupational Trends - not yet written.

Program C: Careers Investigation Program - which is an information retrieval system providing a range of details on selected occupations.

Program D: Various Routes to Chosen Career.

Program E: Help!!! (not yet written) which is to help those with no ideas at all on their future.

The programs run only in an interactive mode.

#### 7. Evaluation

The system is not complete for evaluation.

#### 8. Discussion

There is much development still to be done. The mode of presentation to students is interesting. All interrogation and initiation of action takes place at the terminal. Students can use the system on their own because of the simple, explanatory nature of the interactive program. The system is limited in having only five factors, but the other programs in the suite do supply extra information to the student. Cost is minimal as existing equipment and facilities are used.

### IV. JOBSPY

#### 1. Background

JOBSPY has been developed from 1974 at Hatfield Polytechnic under the direction of A. D. Crowley, a lecturer in vocational counselling. It was begun as a research exercise for students on the course to undertake. The aim was to produce a system to generate occupational ideas for exploration, rather than a "best fit".



## 2. Occupations

JOBSPY is based on 500 occupations drawn mainly from "standard lists" (Watts, 1976).

## 3. Factors

The occupations are described by three factors which relate to student attributes and preferences and break down to give 26 key aspects. These are:-

1. Health - 4 key aspects.
2. Entry qualifications - 7 key aspects.
3. Interests - 15 key aspects.

These items were chosen as they describe areas that can be defined with some accuracy. Items relating to values and implementation of self-concept theory were discarded as they could not be defined.

## 4. Data Bank

The occupations are coded yes/no for each of the key aspects. The coding was done by Crowley from "standard sources" and his own judgement.

## 5. Match Algorithm

The occupations presented to the student are those "compatible with his search profile" (Crowley, 1975). Another source, Watts (1976), suggests that the list is of "non-excluded occupations".

## 6. Features

The system operates in either interactive or batch mode. The factor questions can be presented on paper or via a terminal. In either operating mode the student receives a printed copy of suggested occupations to retain for reference. Students can use the 26 key aspects individually or in combinations, and try several different input profiles.

Some 15-20 of the occupations have been described in detail with references to other sources and form the basis of an information retrieval facility yet to be completed.

No details of student inputs are kept by the computer.

## 7. Evaluation

There has been no formal evaluation. Watts (1976) says that Crowley claims that students who have used the system at Hatfield Polytechnic have all gone away with a new job idea.

## 8. Discussion

JOBSPY has application as an ideas generator. It does not aim to find the "best fit" and has the additional facility of information retrieval.

Students could use the system on their own with the minimum of instruction in interactive mode because of the program design.

There would seem to be some problems still to be corrected in the data base (Watts, 1976).

The interactive use tends to be expensive.



## V. GIS (Guidance Information System)

### 1. Background

GIS is a system produced by a commercial concern, Time Share Corporation, in the U.S.A. where the system has been in use for some years. In late 1975, the Local Authority Careers Service in Birmingham acquired a copy of the program, and data which has to be adapted for use in their services and schools.

### 2. Occupations

There are 1,300 occupations in the occupational data file. This number may reduce when the data is adapted for the U.K. as British occupations do not appear to be as subdivided as American ones. (CODOT lists 3,500 occupations, DOT lists 21,741.)

### 3. Factors

The occupations are described by four main groups of "selector" and each selector consists of a number of alternatives or categories. The selectors are:-

1. Industries - 15 categories
2. Occupations within industries - 9 categories
- 3a. Personal characteristics; interests - 5 pairs
- 3b. Personal characteristics; aptitudes - 11 categories
4. Educational characteristics - 3 divisions
  - (i) Levels of formal education usually preferred or required by the employer - 14 categories
  - (ii) Special vocational training time usually required - 15 categories

- (iii) Training other than formal education as preparation for the occupation - 9 categories

For greater details of categories see Appendix 3.

#### 4. Data Bank

A large part of the information is taken from the American Dictionary of Occupational Titles (DOT).

#### 5. Match Algorithm

The system is designed to work on-line. The student enters his choice(s) for each selector which can be "would like", "would not like" or "no choice", meaning all are acceptable. Several choices can be entered from each selector. Exceptions are specified where they apply (in the users' handbook) and the matching withdraws occupations from the 1,300 in the data bank if they are not compatible with student choices. As each selector is entered the number of occupations still remaining is shown on the VDU and when there are 25 or less remaining, the student can request to see what they are. It is not necessary always to enter all the selections in order to reach the 25 or less state.

#### 6. Features

There are sets of occupational features called descriptors which are in many ways parallel to the selectors, but these codes can be used with an indicated occupation to produce further information.



Displayed occupations are supplied with references indicating materials in the standard careers library (as in the U.S.A.).

The system also includes files on two-year and four-year colleges which can be searched in much the same way as the occupation file.

## 7. Evaluation

There has been no evaluation in Britain as the system is not yet converted to British data and operational. It has been in regular use in the U.S.A. for several years in a large number of schools.

## 8. Discussion

GIS is a matching system with information retrieval facilities. It is at present based on American data which is to be changed by careers officers and staff of Birmingham Careers Service with help from the Open University Computing Centre. It is unlikely that the American occupations will translate directly into British ones. The whole data base will have to be rebuilt upon a set of relevant occupations. The British version will probably have less than 1,300 occupations (see point 2: Occupations).

GIS is quick to use. It is said that the occupational search may take only about five minutes even allowing for some removing or changing of selectors. Printed copies of the suggestions are available. Instructions for using GIS (in the users' handbook) are not straightforward; many school students would have difficulty in entering the appropriate codes at the terminal. The separate written instructions do make terminal time shorter

and GIS may be intended for use through the careers officer anyway.

GIS has the potential to be a valuable, rapid and therefore a relatively cheap tool for searching the data bank and selecting appropriate occupations. A batch mode may be developed to further reduce cost, although the interactive mode gives the advantage of immediate feedback for a reasonable cost.

## B. Vocational Development Systems

### I. ICGS (Interactive Careers Guidance System)

#### 1. Background

ICGS was the result of collaboration between careers officers from Cheshire County Council and IBM UK Scientific Centre. A.M. Butler (Cheshire) and M. W. Dowsey (IBM) set out to demonstrate the contribution the computer can make to a developmental model of careers guidance. Dowsey and Butler (1974) state that other systems aim to offer "completely undirected browsing for students or information retrieval based on simple selection criteria for counsellors and students".

ICGS was designed to aid both students and careers officers or counsellors-Dowsey and Butler (1975)-as follows:-

1. Understand himself better, not just his capabilities, but also his needs and values.



2. Ask the right questions about careers.
3. Obtain detailed information on careers.
4. Provide decision-making exercises for use in the careers education curriculum.

Work began in September 1973 and the system was ready for installation and testing in two schools by April 1974.

## 2. Occupations

The occupations in ICGS were chosen to cover all careers that students at school are likely to enter within ten years of completing full-time education and also to cater for as wide an ability range as possible. See Appendix 4.

## 3. Factors

The occupations are described on several dimensions or factors and each is subdivided into component factors (see Appendix 5 for the component factors). The main factors are:-

1. Physical characteristics.
2. Qualifications: those the student already has; those he may expect.
3. Abilities.
4. Interests.
5. School subject interests.
6. Self estimate of level of responsibility.
7. Values and satisfactions - based on SPEEDCOP, Hopson and Hough (1973).

## 4. Data Bank

Information on the objective aspects of occupations was taken

from various sources. Level of responsibility, as it relates to training and ability, was adapted from Roe's (1957) two-dimensional classification. The interests categories were taken from 'Signposts', Department of Employment (1974). Economic and training information came from the Careers Officers' Handbook and Signposts. Information on the psychosocial aspects of work, that is the social surroundings within which work is done and the human characteristics of workers, was collected by questionnaires which were sent to members of the Institute of Careers Officers; about ten views, less in some cases, per occupation were returned.

#### 5. Match Algorithm

Each type of factor (1 to 7 above) has its own particular matching logic. Students do not have to use all of their profile sections in the match, they need only use one if that is all that concerns them. The search is for exact matches to the parts of the student's profile under consideration.

#### 6. Features

ICGS is designed to be used only in the interactive mode. The terminal is a Visual Display Unit (VDU) with an optional printer and a light pen for students to indicate their choices from the alternatives displayed for them on the screen. This was felt to be easier for them than a type-writer keyboard. The student is able to manipulate his own data and the information from the system in a number of ways which make ICGS far more sophisticated than any of the other systems in the U.K.



Some of the system commands are indicated below:-

ENTER allows the student to enter a total profile, skipping sections as he wishes.

UPDATE allows him to change a particular section.

LOAD transfers information from a previous profile to the current one.

CLEAR removes any information from store when the student wishes.

RANK concentrates on satisfactions and values and enables them to be placed in order of priority.

PROFILE gives a report on the information stored about him.

HIGHLIGHT displays the last 17 occupations the student said he liked.

CAREER gives information about a specific occupation.

CONTRAST - two occupations are compared side by side.

SEARCH is the primary system command and compares the student with the data base.

There are various other commands available.

Each student is allowed two profiles during one session. One is a base profile and is himself as he is now. The other is an exploration profile and can represent the student as he might be later on. The two profiles from each of the previous three sessions are also stored so that student and counsellor can monitor the changes in thinking that have taken place.

ICGS also stores other details on student activity at the terminal to help students, counsellors and systems designers with relevant information.

Students may request printed copies of any of the information on the screen.

## 7. Evaluation

ICGS is unusual in having been the object of three separate evaluations, two by Cheshire themselves and one independently. The findings will be discussed in detail later on; however, the overall results were as follows:-

Students said of ICGS that it:-

1. suggested occupations which they had not thought about,
2. provided new information on occupations already previously identified,
3. suggested new factors to be taken into account,
4. made them aware of the consequences of important decisions,
5. gave useful and specific references to the careers library,
6. admitted frankly when it did not know the answer.

Careers advisers said that it:-

7. gave faster and more accurate recall of information,
8. kept more detailed records of individual counselling sessions,
9. had cut down information giving during interviews - in some cases by as much as from 50% to 20%,
10. showed how students' views changed over a period of time,



11. provided a tool to generate simulation exercises to supplement the careers education programme.

Parents:

12. were able to be involved through the printouts their children received and expressed enthusiasm.

## 8. Discussion

ICGS is sophisticated in its structure and has been designed to carry out some of the developmental practices of guidance.

It includes more psycho-social aspects of work than other systems - although matching on these is not yet fully satisfactory according to A. M. Butler.

ICGS is expensive to run as it can only be on-line or interactive and students required at least 22 minutes per session, and some as much as 1 hour 13 minutes in evaluation tests. Most students would need to use the system more than once.

In its early stages ICGS was prone to breakdowns and excessive delays between program "frames". This led to frustration and boredom at the terminal. These difficulties are now sorted out but ICGS has never been widely adapted.

## II. SIGI (System of Interactive Guidance and Information)

### 1. Background

SIGI has been developed under the direction of M. R. Katz

of the American organisation, Educational Testing Service (ETS). It has been based on a clear theoretical position emphasising individual values and career decision-making stages. It is designed for students at two and four year colleges. In the ETS brochure, SIGI is claimed to be a "clearly defined structure of decision-making for all students, but responds flexibly to individual needs and circumstances".

SIGI has been used in several American colleges from late 1974 in an experimental way and design has taken place over a number of years with a project team of nine ETS staff.

## 2. Occupations

The number and source of the occupations in SIGI is not known. (In 1980 a listing of 176 occupations was obtained. See Appendix 6.)

## 3. Factors

Occupations are defined in terms of 10 values. These are:-

1. High income
2. Prestige
3. Independence
4. Helping others
5. Security
6. Variety
7. Leadership
8. Interest field
9. Leisure
10. Early entry



#### 4. Data Bank

It is not known how the values are related to the occupations but it is stated that the occupational information in SIGI comes from "many sources". These include national sources such as the Bureau of Labor Statistics, professional organisations, labour unions, occupational briefs and from state agencies and sociological and psychological studies as well as specialists in the occupations. SIGI occupational information specialists researched carefully into any discrepancies between sources. The whole data bank is continually brought up to date.

#### 5. Match Algorithm

Students are allowed to enter five values (see 'Factors') at a time for LOCATE (see below), having already distributed 40 weighting points between the ten values.

#### 6. Features

SIGI consists of six inter-related subsystems, of which LOCATE is only one. These are:-

Subsystem 1: VALUES is a game in which the student examines the ten occupational values and decides on their importance to him. This takes place via a visual display unit and is very much an interactive process as inconsistencies in responses are highlighted as the game progresses.

Subsystem 2: LOCATE allows the values already weighted to be used to select occupations.



- Subsystem 3: COMPARE allows the student to ask for specific information about occupations that interest him.
- Subsystem 4: PREDICTION helps him to judge his chances of success in various college courses.
- Subsystem 5: PLANNING helps the student to see how he can achieve entry into any of the occupations in SIGI from his present time and situation.
- Subsystem 6: STRATEGY examines the desirability of an occupation for the student and the probability of success upon entering the occupation. It aids appreciation of the concepts of reward and risk.

## 7. Evaluation

It is claimed that SIGI "does not, however, pretend to ensure the "right" choice for every student - except insofar as the right choice is defined as an informed and rational choice. In short, SIGI aims to help students master strategies for rational behaviour in the face of uncertainty". SIGI would seem to meet these requirements and to be much appreciated by the students who are reported to enjoy using it as stated in the preliminary reports available in 1975. The above definition of "right choice" is a valuable one; no system can possibly produce more than an informed and rational suggestion.

## 8. Discussion

SIGI is a complete process meant to complement the work of careers advisers and to fit into American college guidance programmes.



Students seem to want to spend three to four hours at the terminal, not in one session, and the computer installation itself is expensive. Development work must have been prohibitively expensive in terms of staff salaries alone. It is a concept that cannot be met for the present project.

C. Other Systems

The other systems listed here are all American. Some were not operating as early as 1975, some were not relevant to the present project (too expensive in time and resources) and few details were available on the others.

1. AUTOCOUN (Loughary, Friesen and Hurst, 1966)

AUTOCOUN was designed before 1965 to simulate counsellor behaviour with regard to pupil appraisal and course selection. In AUTOCOUN the computer is imparting the same information and asking the same questions as a human might. The computer and counsellors "agreed" markedly, but such simulation is not the most efficient use of computer resources.

2. CVIS (Computerised Vocational Information Service)

CVIS was developed for schools by Harris et al (1968). The system began as an information retrieval program. Self-exploration procedures and matching were added later.

3. ISVD (Information System for Vocational Decisions)

ISVD was designed by Tiedeman and others at Harvard. It has been discontinued as, although admired, it was considered "too futuristic to be immediately viable", Watts (1973).

4. ECES (Educational and Career Exploration System)

Minor, Myers and Super (1969). ECES was designed for secondary schools. It is an interactive exploration system.

5. CIS (Career Information System)

Based at the University of Oregon (1975), CIS is an information system and not an interactive computer aided guidance system. The computer retrieves information on occupations and needle-sort cards are used for the match.

6. DISCOVER

DISCOVER was designed by Harris — Bowsby and tested in 1976.

It is based on theories of vocational development and helps students to understand life stages and exploratory behaviour. See Appendix 7 for the list of occupations in 1980.

7. OCIPS (Officers Career Information and Planning System)

Designed by Myers and others for army officers. It is still to be completed.



## Chapter Four

### CHOOSING THE COMPUTER-AIDED GUIDANCE SYSTEM

#### Introduction

The previous chapter ended with descriptions of a number of the more notable computer-aided guidance systems in Britain and the U.S.A. Differences between the systems were seen to reflect the needs of the people for whom they were intended and variations in guidance philosophy. A system is therefore unlikely to transfer directly from one group of users to another but, in theory, with appropriate modifications any one of the systems described in Chapter Three could meet the needs of students in higher education. The modifications considered desirable will be discussed in the following sections.

#### Occupations

As nearly all of the systems have been designed for school populations, many of the occupations they are based upon are not relevant for an undergraduate population. (See Appendix 4 for a list of the occupations in the Cheshire/IBM Interactive Careers Guidance System.) School systems list occupations that school leavers might realistically consider, that is, those entered straight from school and open to school leavers

with a wide range of academic qualifications (from none to G.C.E. 'A' levels) and occupations they will be able to enter in the future after further training. Undergraduates have already discounted many of the former type of occupation and are finishing the training required for some of the latter. They will want to look into new opportunities and to further discriminate within some of the categories that were sufficient at the school-leaving stage, for instance, the terms 'psychologist', 'chemist', 'engineer' and 'accountant' are no longer specific enough. An undergraduate system cannot be based only on the occupations in a school leaving system.

The set of occupations for an undergraduate system is likely to be shorter (SIGI contains about 170 occupations); will contain few occupations that relate to minimum qualifications and will show greater division among occupations that require a degree. SIGI is a system intended for college students but is based on American occupations which are named and defined differently (see Appendix 6 for a list of the occupations in SIGI) so some adaptation is still necessary. It is of interest in this context that the City of Birmingham Careers Service have been changing the occupations in the American schools system, GIS, to British equivalents since 1976.

### Factors

The occupational factors used in school systems are likely to prove unsuitable for distinguishing between occupations requiring a degree as entry. For school leavers, level and area of attainment and physical health are prime indicators of eligibility for occupations. Accordingly, in school systems questions relating to qualifications and health are



among the main matching criteria. Undergraduates will not be distinguished in the same way by their level of qualification; they will all have (or hope to have) a degree, although subject of degree may well have some relevance. Physical health is unlikely to be of much importance in the majority of cases as graduates are generally recruited to exercise their cognitive strengths.

In order to interest and serve undergraduate purposes, the system will have to include factors that help them to choose between graduate occupations. The undergraduate's problem is not so much objective eligibility as subjective preference for and commitment to an occupation. Factors relating to personal likes and dislikes and motivation will be critical if the system is to select occupations that students will be interested in. SIGI, the American college system, bases its occupational search upon ten values the student has weighted. ICGS is the only school system to include a full section of questions on values and satisfactions (see Appendix 5).

#### Data Bank

If the proposed system is to emphasise the subjective aspects of occupational choice, it will have to include more subjective psychosocial factors than is usual and probably more factors overall to allow for differences in individual outlooks. For the other systems, the information required on objective factors was available from standard sources such as the Careers Officers' Handbook, CODOT, careers literature and careers officer or designer knowledge. Data for psychosocial factors is more difficult to obtain; for the values and satisfactions section



of ICGS, the information was sought by questionnaire from members of the Institute of Careers Officers. Approximately ten views for each item were obtained and final decisions made by the 'designer' group for the system data bank. However, the values and satisfactions part of ICGS was never considered completely satisfactory, partly because of the method of obtaining the data and partly because of the way the section was used in the match logic.

The thesis writer will not be able to base occupational data upon her own knowledge. The view of AGCAS members, collected by questionnaire and analysed systematically could, however, provide an acceptable, relevant source of data. Students already receive the benefit of careers advisers' knowledge and views at interview and the early involvement of AGCAS members with the system could foster their interest in a finished product that reflects their own views.

#### Matching Algorithm

School leaver systems, as is compatible with their bias towards objective factors, produce a list of occupations for the user by either eliminating those that have been judged incompatible with particular points of student information or searching for an exact match with student data. The proposed system is required to promote undergraduate awareness of occupational possibilities. It would, therefore, be misleading to allow occupations to be lost to students merely because they 'fail' on one or two items. This would be particularly unfortunate if the items were psychosocial in nature and not in any respect immutable evidence of suitability for an occupation. If the system includes a large



number of factors, elimination and exact match algorithms will frequently fail to find any occupations at all (which has happened with CASCAID on occasion). A match for undergraduates will need to be more flexible if, in the interests of promoting an awareness of self and the process of compromise, a wide range of occupational possibilities is to be presented.

### Features

The cost of introducing and running the proposed system is one of the main constraints. In the interests of economy the finished system is most likely to be a batch processed service, at least to begin with. It is important that the system be simple but flexible enough to be altered readily when experience in use or the funds available indicate the need. The proposed system is likely to become the first stage in the computerisation of a number of careers service activities. Modification may be necessary as the future pattern unfolds and further systems are developed.

In the future, computer hardware will be much less expensive so full interactive use of the system via a careers service based micro-computer is a real possibility and should be allowed for in the design.

Figure 4.1 compares computer-aided guidance systems as they were in 1975 on the criteria discussed in the chapter.

### Discussion

Any of the systems discussed could, in theory, be used by AGCAS and

Figure 4.1

Comparison of Computer-Aided Guidance Systems in 1975

	CASCAID	JJIG	CACVG	JOBSPY	GIS	ICGS	SIGI	Proposed System
<u>Use</u>								
For Careers Adviser	x	x			x	x	x	x
For Student			x	x	x	x	x	x
Careers Education Programme						x	x	x
<u>Occupations</u>								
School Leaver	x	x	x	x	x	x		
Graduate							x	x
British-based	x	x	x	x		x		x
<u>Factors</u>								
Mainly objective	x	x	x	x	x	x		
Mainly subjective						x	x	x
<u>Data Bank Source</u>								
Reference literature	x	x	x	x	x	x	x	x
Careers Advisers	x	x	x			x	x	x
Designers	x	x		x		x	x	
<u>Matching Algorithm</u>								
Elimination	x	x	x	?	x			
Exact match	x	?		?		x	?	
Other							?	x
<u>Features</u>								
On-line, interactive	x	x	x	x	x	x	x	?
Batch processed	x	x		x				x



would meet at least some of the original aims, but without modification, certain failings would be obvious. In all the systems the set of occupations is not totally suitable; in most the occupational factors used are mainly inappropriate and the matching logic too restricted. All of the shortcomings could be remedied: it would seem more expedient to adapt and develop an already working system as even the simpler systems have absorbed the efforts of a number of people and/or taken several years to reach their present form. SIGI, a very sophisticated system, is reputed to have cost two million dollars and took eight years to develop. It is not certain though that adaptations do take less time or cost less. The City of Birmingham Careers Service are still engaged in converting GIS to British occupations after four years' work. The difficulties to be encountered are not always predictable (at the outset) as the finer points of design are not obvious without deeper involvement. The costs of running the systems described in Chapter Three are not known in sufficient detail. ICGS, with its on-line design appears too expensive, JIIG or CASCAID may well be appropriately priced.

However, the costs of collaboration-political and other-may be too great. AGCAS would probably prefer to exercise full control over any systems used in universities and polytechnics and their future development. AGCAS did not, at the time, show any enthusiasm for collaboration with another system. Later events have, so far, still not led AGCAS into any serious moves towards such a liaison.

### Conclusion

Having taken into account the problems inherent in the modification of existing systems, it was decided that the project time would be best

spent in designing a new and simple system to meet the special needs of Higher Education. After a time of closely monitored use, the system would be evaluated and adjusted accordingly. The need to produce a working system before the end of the project assumed paramount importance.

From this point on, the thesis will describe the design and development of an entirely new system, GRADSCOPE. (Graduate Search by Computer after Personal Evaluation), for use in AGCAS Careers Advisory Services and also the steps taken to gain AGCAS co-operation and acceptance of the finished system.



## Chapter Five

### THE OCCUPATIONS FOR THE SYSTEM

The first four chapters have furnished the background to the decision to develop an entirely new computer-aided guidance system for students in Higher Education. This and later chapters of the thesis describe the evolution of the new system (GRADSCOPE) and parallel the framework proposed in Chapter Three for outlining and comparing the other computer systems.

Figure 5.1 shows the structure of the thesis compared with the framework from Chapter Three.

Figure 5.1

<u>Framework Section</u>	<u>Thesis Chapter</u>
(i) Background	1, 2, 3 and 4
(ii) Occupations	5
(iii) Factors	6
(iv) Data Bank	7
(v) Match Algorithm	8
(vi) Features	8
(vii) Evaluation	9
(viii) Discussion	10, 11 and 12

## Outline for the Proposed System

Before the system will be ready to be used and evaluated, the following elements must be assembled:-

1. A set of occupations that apply to graduates.
2. A set of occupational factors that will be a means whereby students will be stimulated to think about themselves and occupations when they provide the information necessary for the system. This will also involve a questionnaire to the students to pose the factors to them as questions to elicit the data for a 'profile' for the computer system to work from.
3. A data bank linking occupations to factors and based upon the views of careers advisers.
4. A computer match logic to highlight a strategy or plan for decision making and to provide a useful list of occupational suggestions. This will involve a computer printout listing the occupations designed to give information to encourage students to learn from the process even though there will be a time delay introduced by the need to adopt batch processing to reduce cost.

## The Development Plan

Chapters Five, Six, Seven and Eight will describe the work that resulted in GRADSCOPE Mark One.

Figure 5.2 shows the main tasks involved in the development.



Figure 5.2

Plan of the Development Phase of GRADSCOPE

<u>Date Begun</u>	<u>Task</u>
January 1976	Set of occupations
January 1976	Set of occupational factors
May 1976	Data Bank
May 1976	Student questionnaire
May 1976	Match algorithm
April 1977	Printout design
September 1977	Computer program

The development is shown as a sequence of tasks but as "Date Begun" shows, the tasks were actually proceeding (in most cases) at the same time. The need to produce a working system within three years (one of the more important aims for the project) meant that it would not be possible to test each system component separately before working on the next. But apart from constraints of time, the reductionist approach is still further inappropriate as the system components will not exist in isolation from each other. Design decisions taken regarding one component will influence the design options for the other components.

Hence, a fairly specific (but flexible) plan for the whole finished system was considered carefully before the development work began. The aim was to achieve the working system as soon as possible, adjusting and adding to the original plan whenever necessary with the intention of testing the completed system in AGCAS careers services. If reasonable care is taken in the original design, experience gained in use should

justify the earlier decisions and indicate the areas where improvements can be made.

At the end of the thesis, folded inside the cover, is a more detailed "Plan of GRADSCOPE Development". Reference to the plan will help the reader to follow the text more easily and to appreciate the significance of each of the many different questionnaires involved.

### Classification of Occupations

Each computer-aided guidance system consists of occupations relevant to the proposed users and a set of occupational factors considered of assistance in occupational choice. The factors are used to describe or define the occupations and the whole forms the 'data bank' for the system. When occupational information is not part of a computer system it is more usually referred to as an occupational classification. A good (relevant) classification is required as a basis for GRADSCOPE.

Occupational classification is intended to reduce the confusing complexity of the occupational world by making it possible to group occupations. The occupations are grouped by the category they fall into for a particular occupational factor. The factors and categories are arbitrary in that they may be selected to suit the purposes of the classifier. It is important to appreciate that there is little likelihood of there ever being a classification that will suit all user needs so fresh classifications continue to be produced to meet fresh user requirements.

Figure 5.3 gives an example of one classification from DOT (1965), the American Dictionary of Occupational Titles. The factor is "Areas of Work" and this is divided into 22 categories.



Figure 5.3

Areas of Work from DOT

Art	Law and law enforcement
Business relations	Machine work
Clerical work	Managerial and supervisory work
Counselling, guidance and social work	Mathematics and science
Crafts	Medicine and health
Education and training	Merchandising
Elemental work	Music
Engineering	Personal service
Entertainment	Photography and communications
Farming, fishing and forestry	Transportation
Investigating, inspecting and testing	Writing

Morgan (1972) reviews the variations in occupational classification. He points out that a classification may consist of any number of axes or dimensions (the factors discussed above) of occupational description, but if the classification is to be easily represented on paper no more than two or three factors with as few categories in each as possible should be included.

Figure 5.4 shows an example of a simple two-dimensional (or two factor) classification. The two factors are "educational attainment" and "work interest" which are divided into four and five categories respectively. Occupations can be placed in the appropriate cell of the resulting matrix.

Figure 5.4

A Simple Two-Factor Classification

	Abstract	Practical	Social	Physically Active
Higher Education	Chartered Accountant			P E Teacher
'A' Levels			Nursing	
'O' Levels				
C.S.E.		Craft Apprentice		
Other				Building Labourer

When such a classification is used in a guidance context, the client in effect places himself in the appropriate cell and considers the occupations that 'fit' into the same cell.

If large numbers of factors and categories and numerous ways of combining the factors and categories are required, then a computer may become the only convenient way to manipulate the classification contents and make the information accessible to clients.

Morgan also separates classifications into two types:-

1. A nominal classification is one in which the categories used for a factor are discrete. Occupations must fall (or be made to fall) within separate categories; there are no degrees of belonging to a



category. This form of classification can only be descriptive, but it is straightforward and easy to understand. Examples of nominal classifying would be the "work interest" categories in Figure 5.4, "areas of work" from DOT in Figure 5.3 and "work performed" divided into eighteen major groups or categories in the British-based CODOT, Classification of Occupations and Dictionary of Occupational Titles, shown below in Figure 5.5.

Figure 5.5

CODOT "Work Performed" Classification

Managerial occupations (general management).  
Professional and related occupations supporting management and administration.  
Professional and related occupations in education, welfare and health.  
Literary, artistic and sports occupations.  
Professional and related occupations in science, engineering, technology and similar fields.  
Managerial occupations (excluding general occupations).  
Clerical and related occupations.  
Selling occupations.  
Security and protective service occupations.  
Catering, cleaning, hairdressing and other personal service occupations.  
Farming, fishing and related occupations.  
Materials processing occupations (excluding metal).  
Making and repairing occupations (excluding metal and electrical).  
Processing, making, repairing and related occupations (metal and electrical).  
Painting, repetitive assembling, product inspecting, packaging and related occupations.  
Construction, mining and related occupations.  
Transport operating, materials moving and storing and related occupations.  
Miscellaneous occupations.

Figure 5.5 makes an interesting comparison with Areas of Work from DOT shown in Figure 5.3. Both classifications cover the same ground but the categories derived are quite different, reflecting differences in the views or requirements of their originators.

2. A relational classification permits degrees of similarity between occupations to be described because the factors are continua along which the occupations are ordered. Such a classification is explanatory and not merely descriptive. It is more difficult to derive than a nominal classification but is potentially more useful. In DOT, the Data, People, Things hierarchies are relational classifications.

Figure 5.6

Data, People, Things Hierarchies from DOT

<u>Data</u>	<u>People</u>	<u>Things</u>
0 Synthesizing	0 Mentoring	0 Setting-up
1 Co-ordinating	1 Negotiating	1 Precision working
2 Analyzing	2 Instructing	2 Operating-controlling
3 Compiling	3 Supervising	3 Driving-operating
4 Computing	4 Diverting	4 Manipulating
5 Copying	5 Persuading	5 Tending
6 Comparing	6 Speaking-signalling	6 Feeding-offbearing
7 No significant relationship	7 Serving	7 Handling
8 No significant relationship	8 No significant relationship	8 No significant relationship

The factor is "task performed" which is subdivided into data, people and things which are further categorised into nine levels each.



The theory is that levels zero to eight are in descending order of difficulty and that if a worker is capable of functioning at a given level on one of the hierarchies he can also cope with all levels below. Every occupation in DOT is described by the level on each hierarchy it demands of its incumbents - for example:-

CATALOGER (library)	100. <u>388</u>
PHYSICIST, THEORETICAL	023. <u>088</u>
HIGH CLIMBER (logging)	949. <u>781</u>

Both ways of classifying may be combined in one overall classification; DOT is a good example of a 'mixed' classification. If necessary, a computer-aided guidance system could combine the two types of classification in its data bank.

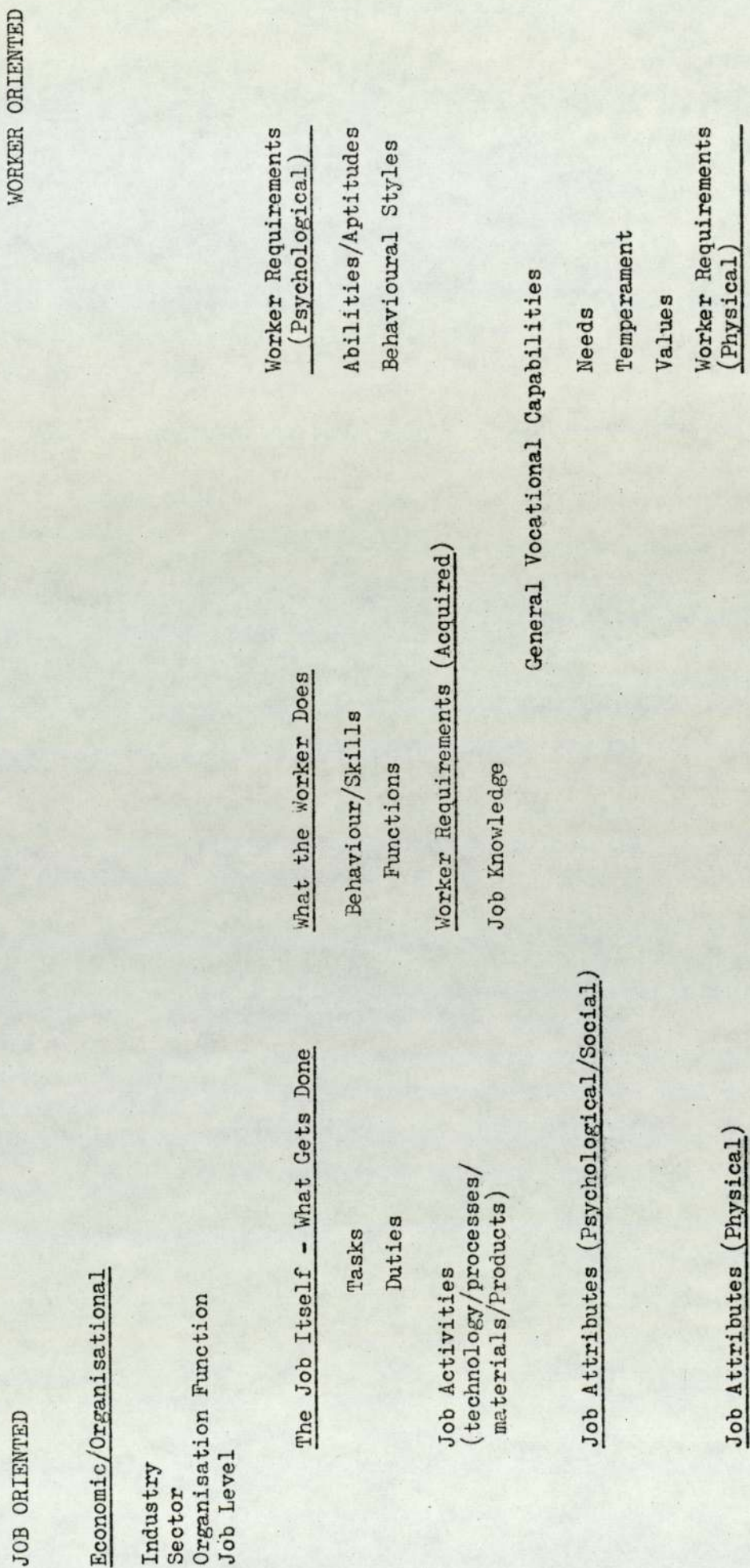
#### A Classification for the Present Project System

Occupational variables have frequently been separated into two types, those that are "job" oriented and those that are "worker" oriented. Gordon and McCormick (1962) found that people can readily distinguish between the two types. Figure 5.7 gives some indication of the differences between the job and worker oriented factors.

As can be seen, job oriented factors will be best used in classifications where the aim is to describe occupations for statistical purposes and perhaps for selection procedures. Worker oriented factors are more likely to help a would-be worker choose between occupations and will be used in classifications intended for use by careers advisers and/or their clients and for recruitment. GRADSCOPE is intended to structure

Figure 5.7

Factors for Describing Occupations





occupations from the choosers' point of view and so will need to include worker-oriented factors.

The system classification will consist of as many factors as are felt to be useful. Considerations of number need not be a deterrent in the sense that all manipulation of the data will be computer-aided; thus any factors that are likely to interest students and aid in their awareness of self and work can be included as long as the resulting questionnaire to students does not become dauntingly lengthy.

A classification cannot be produced without information on occupations. It is more usual to take existing information in the form of occupational descriptions and to devise a classification from it, but it is also possible to decide upon a set of factors and then to set out to collect the information necessary to complete the classification. The latter is the approach to be adopted for the present project and resulted in a classification that is based upon existing knowledge but which is new in that it brings together for the first time diverse information from diverse sources.

### The Development Work for GRADSCOPE

#### The Set of Occupations

A system for undergraduates should be based on the set of occupations that graduates actually enter. The set is extensive and, because of the time constraint placed upon the project, it was decided to concentrate on a particular section of occupations and to design the system in such a way that those omitted can be added at a later date. One of



the aims for the system is that it should help those with least idea of occupational choice. Their difficulty in choosing could, in some cases, stem from the fact that their degree discipline will not lead to any specific occupational areas or that they wish to move away from the areas of their degree. A good starting set of occupations for GRADSCOPE would therefore be a set of those occupations open to graduates with any degree subject (the any discipline occupations).

The Universities Statistical Record (USR) contains data on students at university and those who have recently left. Some of the data concerns the employment (or other activity) that graduates take up on leaving university. The USR require "first destination" information on all graduates each year and that information is usually collected and coded for computer analysis by the careers advisory services who use coding instructions provided by USR for the purpose. The instructions include a list of "types of work" which is the set of occupations that apply to graduates. See Appendix 8 for the full 1975 USR "Type of Work" index.

Occupations that qualified for the description "any discipline entry" were extracted from the index with the help of careers advisers at the University of Liverpool. Figure 5.8 is the resulting list.

The list of titles was further adjusted in consultation with the careers advisers as follows:-

1. In some cases, essentially the same occupation appeared under different titles. The most commonly used title was retained. As examples, consumer research and market research were represented by market research; shorthand typing, typing and personal assistant became secretarial work.
2. Some titles were too broad and covered more than one occupation as far as a 'chooser' would be concerned. The lack of differentiation



Figure 5.8

ANY DISCIPLINE ENTRY OCCUPATIONS TAKEN FROM THE USR TYPE OF WORK INDEX

General Traineeships

General Trainee

Non-Specialist Management and Administration

Civil Service - Admin Trainee  
 Civil Service - Executive Class  
 Civil Service - Immigration Officer  
 Diplomatic Service  
 Local Government Administration  
 University Administration  
 Hospital Services Administration  
 Public Sector Administration  
 (nat'lised industry research council)  
 Commissions in H.M. Forces  
 British Council Administration  
 Political Agent  
 Theatrical Agent

Environmental Planning

Town & Country Planning  
 Landscape Architecture /Design  
 Research Assts - Planning Depts  
 Ordnance Survey Work  
 Land Surveying  
 Quantity Surveying  
 Building Surveying  
 Valuer

Scientific Analysis & Investigation

Public Health Inspector  
 Weights & Measures Inspector

Production Operation & Maintenance

Air Traffic Controller  
 Factory Management  
 Housing Management  
 Hotel Management  
 Estate Management

Buying, Marketing & Selling

Advertising Agency Work  
 Marketing  
 Brand Management  
 Market Research  
 Public Relations & Promotional Work  
 Sales Advisory Work  
 Sales Administration  
 Sales in Retail Stores  
 Sales Representative  
 Export Sales  
 Merchandising  
 Purchasing - Industrial  
 Purchasing - Valuer  
 Estate Agent  
 Home Service Advisor - Gas Council  
 Shipbroking  
 Antique Dealing  
 Auctioneering  
 Commodity Broking  
 Book Selling  
 Commercial Art Gallery Work

Services to Management

Management Services Trainee  
 Management Consulting  
 Method Study/Work Study/  
 Organisation & Methods  
 Computer Programming  
 Systems Analysis  
 Computer Operation/Management

Financial Work

Accountancy Articles  
 Industrial/Commercial Accountancy  
 Public Finance Accountancy  
 Actuarial  
 Auditing



Figure 5.8 (Cont'd)

Financial Work (continued)

Banking

Insurance Broking

Insurance Inspector

Stockbroking

Stockjobbing

Tax Inspector

Lloyds Underwriting/Broking

Legal Work

Banking Trustee Work

Solicitors Articles

Company Secretary

Creative & Entertainment Work

Advertising Art Work

Copywriting

BBC Film Trainee

BBC News Trainee

BBC Programme Operations Assistant

Broadcasting Production Work

TV Production

Artist

Commercial Artist

Commercial Photography

Acting

Stage Management

Theatrical Production

Stage Design

Film Work

Film Editing

Dancing

Journalism

Publishing Editorial Work

Scriptwriting

Graphic Design

Musician

Sportsman

Library, Information, Art  
Gallery, Museum & Archive Work

Archive Work

Art Galleries, Public Curatorship

Museums, Public Curatorship

Librarianship

Abstracting

Personnel

Careers Advisory Work

Industrial Relations

Recruitment & Selection

Training

Safety Work

Factory Inspector

Health & Social Welfare

Church Lay Work

Church Ministry

Social Work - Field

Social Work - Residential

Youth Organiser/Leader

Community Development Work

Probation Service

Police Constable

Prison Governor

Nursing

Radiographer

Speech Therapy

Occupational Therapy

Teaching & Lecturing

School Teaching (Primary)

School Teaching (Mentally Handicapped)

School Teaching (Phys. Handicapped)

Community School Teaching

British Council teaching Eng. abroad

HM Forces Educn/Instructor Branch

Secretarial & Clerical

Secretarial & Clerical Work



could also lead to difficulties during the later description of the occupations for the data bank, for example, housing/estate management for a local authority and for a private concern were included separately as it was felt that these did involve different work.

Banking was divided into clearing and merchant banking.

3. For some occupations too few vacancies are normally available for it to be realistic to include them in a system meant to help in the choice between real alternatives. Action here was tempered by the fact that students would expect some occupations to be in the data bank. Hence various BBC traineeships were included but commercial photography and local authority research were not.
4. Occupations that depend upon a particular talent that a student will know himself to possess (or not) were excluded. Thus actor, sportsman, musician, commercial artist and dancer were omitted.
5. The system was to be based on occupations that students can enter or begin to train for straight after graduating. Therefore any occupation that is unlikely to be a real option within the first ten years after graduating because of training and experience requirements was excluded. Management consultancy was eventually removed on this count.
6. Some occupations were titled in a way that does not relate to conditions of entry. Child care, family case work, medical social work and mental welfare work are branches of social work in which an entrant will be trained but which he cannot select to specialise in prior to entry. In the system these are represented by four variations of social work: residential or field, for local authority or private concern.

The eventual set of occupations numbered 120 after further discussion at the University of Liverpool and with the steering committee. Figure

5.9 lists the 120 occupations. Note that the titles are, in most instances, the name of the work, but the name of the worker is sometimes given where this is the more usual term.



Figure 5.9

List of 120 Any Discipline Entry Occupations

*Abstracting: non-technical	Fire Service
Accountancy: certified	HM Factory Inspector
Accountancy: chartered	HM Forces: Commission
Accountancy: cost and management	HM Forces: Educn/Inspector
Accountancy: public finance	Branch
Actuary	HM Tax Inspector
Administration: Building Society	Hotel Management
Administration: Hospital Services	Housing/Estate Management
Administration: Local Government	(Local Authority)
Administration: Public Sector	Housing/Estate Management
(nationalised industry, etc)	(Private owners & Estate agents)
Administration: Universities	Information Science/Information
Admin Trainee: Civil Service	Work
Admin Trainee: Diplomatic Service	Insurance Broking
Adult Education	Insurance Inspector
Advertising Account Executive	*Insurance Manager
Air Pilot (nat. and private airlines	Insurance Underwriter
incl. helicopters RAF & RN)	
Air Traffic Controller (nat. and	Journalism
private airfields UK & abroad	
<u>not</u> HM Forces)	Landscape Architecture/Design
Antique Dealing	Librarian
Archive Work	
Auctioneering	
	*Management Consultancy
Banking: clearing bank	Management: retail stores
Banking: merchant bank	Marketing
Barrister	Market Research: analyst
BBC Film Trainee	Market Research: interviewer
BBC News Trainee	Method Study/Work Study/O & M
BBC Programme Operations Asst	Museum or Art Gallery Curator
Bookselling	(public)
	Nursing
Careers Advisory Work	
Church Ministry	Occupational Therapy
Clerical Work	Operational Research
Commercial Art Gallery Work	
Commodity Broking	Personnel: Industrial relations
Community Development Work	Personnel: recruitment & selection
Company Secretary	*Personnel: safety work
Computer Programmer	Personnel: training
Consumer Advisory Officer	Physiotherapy
Consumer Protection Officer	*Political Party Agent
(Trading Standards)	Police Force
Copywriting	Prison Governor: assistant
	Probation Service
Environmental Health Inspector	Production Management: industry
Executive Officer: Civil Service	Production planning: industry
Executive Officer: Diplomatic Service	
Export Sales	

\* Occupations which were later removed from the list. See Chapter Seven.



Figure 5.9 (Cont'd)

Public Relations	Speech Therapy
Publishing: editorial	Stockbroking/Jobbing
Publishing: sub editing	Systems analysis
*Publishing: production	Teaching: primary school
Purchasing: industrial	Teaching: secondary school
Purchasing: retail stores (buying)	Teaching: mentally and physically handicapped
Radiographer	Teaching: College of Further Education - Liberal Studies
Research Asst: planning depts L.A.	Teaching: English as a foreign language
Research Officer: Civil Service	Theatre and Cinema Management
Research Officer: Diplomatic Service	Town and Country Planning
Sales Administration	Traffic Manager: distribution of commodities
Sales Respresentative	Traffic Manager: transport fleets (nationalised and private transport)
*Scriptwriting	*Travel Tour Operating
Secretarial Work	TV Production
Shipbroking	Valuer: Inland Revenue
Social Work: field: Local Authority	Valuer: Industrial assets
Social Work: field: private organ.	Valuer: property - estate agent
Social Work: residential: Local Authority	Valuer: private assets, art, antiques, etc.
Social Work: residential: private organisations	Youth organiser/leader
Social Work on a voluntary basis	
Solicitor	
Sound Broadcasting Production Work	



## Chapter Six

### THE FACTORS FOR THE SYSTEM

#### Selecting the Set of Factors

The system will require a set of factors that can actually discriminate between the occupations included; that will appear relevant and interesting to students who are exploring occupations before making a choice and that will also, if possible, help them to a greater awareness of the aspects of work that could be of importance to them in their final decision. It was intended to draw upon careers adviser experience and ideas of student needs in building up a large set of factors for the new system. If, in use, some of the factors prove to be of limited value, they could be removed (far more easily than extra factors could be added). It was also felt that a system based upon a large number of factors would have sufficient advantages to outweigh the disadvantages.

#### Advantages of a Large Number of Factors

1. It was hypothesized that a decision or career choice, where choice indicated preference for rather than only eligibility for an occupation, would be the result of optimisation over a number of different work factors. A large number of factors will ensure that there are some of interest and importance to most students.

2. A larger number of factors meant that each student would be able to describe himself in more individual terms by means of the greater number of possible factor combinations available. This should lead to more variation in results and, incidentally, make student prediction or influencing of the outcome more unlikely.
3. If there were more factors, each one need only be concerned with small, discrete and identifiable areas of work which would make definition and categorisation for the computer more straightforward.
4. A student would be able to show the extent and strength of his attitudes by the number and type of factors he selected for his profile. Even though each of the factors only covers limited areas of work, an ambitious student interested in working for maximum personal benefit could select all of the following:

High pay immediately

High pay medium term

High pay long term

Rapid promotion

Responsibility

Authority

Travel abroad

In a system with fewer factors, "scope for ambition" could be the only choice open to the student. With more factors, more shades of interest can be indicated and the personal profile becomes, in itself, an indicator of occupational attitudes.

5. The finely differentiated factor areas meant that experts supplying the occupational information for the data bank would be less able to reflect commonly held stereotypes as they are asked to react to a large number of separated, specific items.



6. It had been decided that the system would be computer-aided, so that the computer facility for dealing with large amounts of information should be made full use of.

#### Disadvantages of a Large Number of Factors

There were certain disadvantages in large numbers of factors to be set against the advantages.

1. It would be difficult to adjust the factors to a representative mix. Different individual preferences should have an equal chance of expression through the personal profile. For example, an interest in helping others should be as easily and strongly indicated as an interest in personal advancement. However, the problem of balance may only be resolved through trial and error in use.
2. Use may show some factors to be superfluous in that they may fail to discriminate one occupation from another, although they had appeared relevant before. (As mentioned earlier, it is easier to remove than to add factors.)
3. Profile changes might fail to have any great effect upon the results. Whether or not this was so would show when the system is tried.
4. The system questionnaire to the student might be too long.

#### The Factor Questionnaire (QA on the Plan of Gradscope Development)

It was decided to ask careers advisers in AGCAS what questions students most often ask when they attend one-to-one interviews with careers advisers. Difficulties were foreseen in eliciting the information direct from students without unduly influencing their responses and project time was too short to allow for open-ended interview sessions with



students. The practicable alternative seemed to be a questionnaire to AGCAS careers advisers, who knew why the information was required and had an overview of the problems of student choice. It was best not to ask busy careers advisers what factors they would like to see in an AGCAS computer system as an open-ended exercise, because it seemed unlikely that many returns would be received. It was decided to supply certain guidelines and to ask for ideas and suggestions within these parameters but with scope for any new ideas being permitted.

There is a variety of literature, survey material and the other computer systems covering the factors that should or do affect choice of occupation: Bisconti (1975), Gribbons and Lohnes (1968), Hayes (1971), Daws (1965), Holland (1973), Bennett (1971) and Figler (1974). For computer factors see Chapter Three and Appendices 2, 3 and 5.

A questionnaire (QA) was drawn up under a number of headings that would, it was hoped, elicit more new and useful ideas than merely offering a checklist which it was felt would not lead to any new ideas. The first version (QA) was piloted at the University of Liverpool Careers and Appointments Board and the redraft sent out to all 277 AGCAS careers advisers in 79 AGCAS careers services in February 1976 via C.S.U.

Figure 6.1 is the letter that accompanied the questionnaire (QA) and Figure 6.2 is Factor Questionnaire QA.

### Analysis of Replies

By the end of March 1976, one hundred and twenty-eight replies had been received. Some careers advisers wrote to say that they were unable to respond, most often because of the vagueness of the task. It is probably true that responses could have been more helpful if careers advisers



Figure 6.1

Letter to Careers Advisers to Accompany Factor Questionnaire QA



FROM THE APPOINTMENTS BOARD

Secretary: S.R. WHIPPLE, D.F.C., B.A.  
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ASHTON BUILDING BROWNLOW HILL P.O. BOX 147 LIVERPOOL L69 3BX

TEL: 051 - 709 - 6022

The University of Liverpool

Dear Colleague,

SCUAS sponsored research project - IHD scheme  
University of Aston.

You will remember that Mrs. Linda Wilson was selected as the research student to work on the above, and that SCUAS has to find more money than the S.R.C. provides, to finance the project (so far only with a donation from I.B.M. of £2,000), for 2 years as the basis for an M.Phil. We hope to extend it for a third year as a basis for a Ph.D. I was asked by SCUAS to act as one of the project supervisors.

The aim is to establish an economically feasible man/occupation procedure to improve careers guidance in higher education". To do this it is necessary to

- (i) establish a list of factors considered by students when making a choice,
- (ii) establish a list of occupations. (Initially we intend to use "any discipline" ones only).
- (iii) relate the list of factors to each occupation, and
- (iv) set up a suitable procedure to store the information and to enable it to be accessed when required, using choices made by individual students. (This may well involve the use of a computer).

Linda will need the help of appointments officers to do items (i) and (iii) above, since the collective 'wisdom' of us all provides the only means of achieving a usable scheme within the foreseeable future.

I enclose a questionnaire which Linda has prepared to enlist your help with part (i) above. When she has used the results, she will write again later in the year about part (iii).

Time isn't on our side in such a big undertaking and although I realise that this is the worst time of the year to ask, I do hope you will be able to make a contribution to what could eventually be a most valuable aid to our work. To keep to her programme, Linda asks for the replies by March 15th. Obviously the more people who reply, the more valuable the information will be.

Yours sincerely,

*Peter Deary*

P.J. Deary.



Figure 6.2

Factor Questionnaire QA

SCUAS - I.H.D. RESEARCH PROJECT 1976

Students often mention factors which they intend to take into account in choosing an occupation, for example "I want to work with people". Such factors can be grouped into categories, twelve of which are listed below. Space has been left at the end for you to add other categories if you wish.

Please could you list, under the category headings, the factors students actually quote to you in interviews. You may need to interpret the factors so that they are defined and meaningful. A student may say "I want to work with people" but prove to mean "I want to help sick people" or "I want to organise and direct people" and so on. Factors such as these will then be used to differentiate between occupations.

Against each factor please indicate, in the column on the right, how often you encounter each, using the following scale: 1 = very often, 2 = often, 3 = sometimes, 4 = seldom, 5 = very seldom. If you find the space too restricted please use a separate sheet.

Please return completed questionnaires by 15th March, 1976 to Mrs. L.M. Wilson, The Appointments Board, University of Liverpool, Ashton Building, Brownlow Hill, P.O. Box 147, Liverpool L69 3BX.

Thank you very much for your assistance.

Linda M Wilson, Feb '76

		How often encountered
1.	<u>Geographical location:</u> An example would be: Away from a large conurbation.	
	a) .....	.....
	b) .....	.....
	c) .....	.....
2.	<u>Subject of degree:</u>	
	a) .....	.....
	b) .....	.....
	c) .....	.....
3.	<u>Level of degree:</u>	
	a) .....	.....
	b) .....	.....
	c) .....	.....
4.	<u>Physical requirements:</u>	
	a) .....	.....
	b) .....	.....
	c) .....	.....
5.	<u>Type of employer:</u>	
	a) .....	.....
	b) .....	.....
	c) .....	.....
6.	<u>Future prospects:</u>	
	a) .....	.....
	b) .....	.....
	c) .....	.....
7.	<u>Effects on outside life:</u>	
	a) .....	.....
	b) .....	.....
	c) .....	.....
	d) .....	.....



Figure 6.2 (Cont'd)

- 2 -

	How often encountered.
8. <u>Training/further study:</u>	
a) .....	.....
b) .....	.....
c) .....	.....
d) .....	.....
9. <u>Type of relationship with people:</u>	
a) .....	.....
b) .....	.....
c) .....	.....
d) .....	.....
10. <u>Content of the work:</u>	
a) .....	.....
b) .....	.....
c) .....	.....
11. <u>Level of responsibility:</u>	
a) .....	.....
b) .....	.....
c) .....	.....
12. <u>Ease of return after a break in mid-career:</u>	
a) .....	.....
b) .....	.....
c) .....	.....
13. - - - - -	
a) .....	.....
b) .....	.....
c) .....	.....
14. - - - - -	
a) .....	.....
b) .....	.....
c) .....	.....

OTHER COMMENTS:

Name ..... Univ/ ..... Date .....  
Poly .....

had understood exactly why their response was required, but without their knowledge of an actual computer system as a reference, it was difficult to convey the significance of factor design. When the finished system has been tried, further factor suggestions may be made.

Suggestions made were listed under the twelve headings from Factor Questionnaire QA and a further heading, "special skills", identified. The resulting lists were modified to remove duplication and certain initial judgements were made (further refinements will be necessary later) to remove factors that were:

1. difficult to express clearly and non-ambiguously, for example, 'variety' of work;
2. not likely to differentiate between occupations very usefully, for example, physical health and height;
3. mostly concerned with matters not easily identified in occupations although of relevance to the student in his decision, for example, work in London or not, or work in the country (rural setting) against work in a city;
4. related to particular jobs and not to occupations in general, for example, activity of employer fell into this category.

Figure 6.3 shows the factors, non-defined, remaining after duplications had been removed but before the application of points one to four as above. Definition and further refinements are described in Chapter Seven.



Figure 6.3

Factors Taken from Factor Questionnaire

1. Location

Available in many locations in U.K.

London area

City/rural

Abroad - immediately without experience  
after gaining experience in U.K.

Likely to involve spells abroad (up to 9 months at a time)  
after experience

2. Degree Subject

All discipline occupations e.g. teaching

Any discipline occupations e.g. police

Discipline related occupations

3. Degree Level

Minimum entry level

Extra qualifications/training required

Degree level affects pay or advancement

4. Physical Requirements

Age - maximum/minimum

Health

Conformity in dress and appearance

Physically demanding in terms of strength, stamina

5. Employer

Type of organisation

Private/nationalised or public body/Government/  
Partnership

Large/small

Profit orientation

Self employment

Activity of employer

Central Government                      Industry

Local Government                        Commerce

Education                                 Entertainment

Hospital                                     University/Poly/College

School                                        Service Industry

6. Prospects

Pay - starting salary  
career grade (60% reach it)  
potential for top 10%  
payment by results  
rate of progression

Promotion - with same employer  
need to change employer

Mobility - likely to get moved frequently  
every three years or less

Transferability of skills acquired - from one employer to another  
to another function with same  
employer

Security

Ease of finding a job - ratio of applicants to jobs  
total number of jobs available each year

7. Effects on Person

Hours

Pressure

Behaviour restrictions

Emotional involvement

Colleagues like/unlike

8. Further Study/Training

Required/not required

Academic/vocational

Type - day release  
full-time  
on the job, etc

Financing

Professional qualifications

Duration of training

9. Relationship with People

Persuade

Investigate

Help disadvantaged

Instruct

Supervise

Inspect

Provide expert service

Work in team/alone

Meet a variety of new people each day (frequency of contact  
with new people)



Figure 6.3 (Cont'd)

10. The Work

People/pencil and paper/tools & instruments

Indoor/outdoor

Active

Variety, mental and physical

Travel - around a local area

1-3 nights away from home per month

End product: long-term/short-term results

11. Responsibility/Authority to Take Decisions

Level

Type of - for people, decisions, money, machinery, etc

12. Return to Employment after Break

Resumption after 1-5 year break

Ease of transfer around country

Possibility of working from home after acquiring skills

13. Special Skills

Numeracy

Ability to communicate clearly - paper/verbal

Divergent/Convergent thinking

Languages

## Chapter Seven

### THE DATA BANK FOR THE SYSTEM

Development work so far carried out has resulted in a set of occupations and a set of occupational factors potentially suitable for students in Higher Education. In order to progress towards a working system, a rationale for relating the factors to the occupations (in effect a definition and categories for each factor) must be established. It had earlier been decided that the actual occupational information would be based upon careers adviser views and that the information-gathering operation would be conducted by means of questionnaire. First, however, appropriate factor definitions and categories had to be devised and built into a suitable questionnaire (QB on the Plan of Gradscope Development).

As many of the factors to be used were psychosocial, non-objective aspects of work, a set of rules for showing the agreement between careers adviser opinions and for settling upon 'values' for the data bank would be necessary.

A set of rules would mean that the data could be seen to have been collected systematically and checked thoroughly, which is essential if users are to have confidence in the system and to ensure that the system has every chance of working usefully.

Therefore, before the data bank could be ready for incorporation into a system, three stages of preparation were envisaged:-



1. Factor definition and categorisation leading to the data collection questionnaire. (QB)
2. Collecting the occupational information.
3. Checking the occupational information and establishing agreement and factor values.

Factor Definition and Categorisation leading to the Data Collection Questionnaire (QB on the Plan of Gradscope Development)

Various preliminary investigations were necessary before the best forms of definition and categorisation for the system purpose were reached. The generally worded definitions drawn up from the factor questionnaire, QA, were set against a few of the occupations from the set of 120 as a grid (see Figures 7.1 and 7.2) and possible categories or descriptions placed in the squares. Careers advisers at Liverpool and on the Steering Committee helped with the exercise as did reference to the replies received to factor questionnaire QA.

Figure 7.1 shows a set of factors taken from the list given at the end of Chapter Five with possible categories for each.

Figure 7.2 shows the same factors against seven occupations, but with the appropriate factor category to describe the occupation placed in the matrix. The final classification for the data bank will be on the same principle but larger.

Three distinct ways of categorising the factors began to emerge as the work proceeded. Some factors could be categorised in more than one way but most were better suited by one of the alternatives. The simplest

Figure 7.1

An Early Categorisation of Some of the Factors

<u>Factor</u>		<u>Category</u>
Degree Level	:	Good Honours, Any
Discipline of Degree	:	Any, Specify
Physical Factors	:	Specify
Classification of Work	:	Manual (Things), Desk, People (place in order of predominance)
Scope for Ambition	:	High, Medium, Low
Scope for Pay	:	High, Medium, Low
Scope for Power	:	High, Medium, Low
Social Pressures (Conflict)	:	High, Medium, Low
Time Demands in Job	:	9-5, Shift, Perpetual, Overtime
Interests (A.P.U.)	:	Scientific, Social Service, Persuasive, Literary, Artistic, Computational, Practical, Natural
Security	:	High, Medium, Low
Transferability of Job	:	Yes, No
Return to Job Possible	:	Yes, No



Figure 7.2 An Early Version of Occupational Classification Based on Seven Occupations and Eleven Factors.

Job	Degree Level	Discipline of Degree	Physical Factors	Classific'n of Work	Scope For Ambition Pay Power	Social Pressures (Conflict) in Job	Time Demands in Job	Interests (A.P.U.)	Secure Possible	Transfer Possible To	Returned To
Mkt Research Executive	Good Hons	Any	-	Desk People	Med Low	Low	9-5	Computational Scientific	Low	No	No
Air Traffic Control	Any	Any	Fit Clear Voice	Manual Desk	Low Med	Low	Shift	Scientific	High	No	No
Computer Programmer	Any	Any	-	Desk Manual	Med Low	Low	9-5 (some overtime)	Computational	Med	Yes	Yes
Admin Trainee Civil Service	Good Hons	Any	-	Desk People	High High	Med	9-5	Persuasive Computational	High	No	No
Probation Officer	Any	Any	-	People Desk	Med Med	High	Perpetual	Social Service	High	Yes	Yes
Housing Manager	Any	Any	-	Desk People	Med Med	High	9-5	Computational Social Service	High	Yes	No
Pub Health Inspector	Any	Science	-	Desk People	Med High	Med	9-5	Social Service Scientific	High	Yes	No

categorisation involved factors that divided into clear cut categories and more often than not dealt with the objective areas of work, for instance, "time demands in job" as categorised in Figure 7.1. Some of the factors could not be described in terms of clear and separate alternatives but led more readily to the high, medium and low categories seen in Figure 7.1. These factors could be used to form the basis of a relational classification at least for the subjective factors in the system. Other factors were almost the same as the first described, but dealt with work activities, the actual tasks performed in the occupation, as in "classification of work" in Figure 7.1. It was felt that the factor categories describing the work undertaken were of particular relevance in choice of occupation and could be usefully expanded. Occupations would probably require more than one category each as description.

After more discussion and trials of different questionnaires with careers advisers at the University of Liverpool, a satisfactory form of questionnaire was reached. The questionnaire was piloted at the University of Manchester Careers Advisory Service and from their comments a final version of data collection questionnaire QB, see Figure 7.3, was prepared.

The first factors described above became Section 1 of the questionnaire, consisting of six questions with appropriate categories listed for each.

The second variety of factors became Section 2, the bulk of the questionnaire, with thirty-nine factor questions. As many factors as possible had been adapted to a one to five relational scale which would fit with the flexible matching algorithm intended for the system. Section 2 factors in particular required the expertise of careers advisers in supplying the information. The 1 to 5 scale is intended to produce



Figure 7.3

Data Collection Questionnaire QB

SCUAS/IHD PROJECT

PROCEDURE.

Attached please find a set of questions divided into Sections 1, 2 and 3 and an answer sheet listing the 10 occupations allocated to you. There is also a list, (on yellow paper), of all the occupations which are included in the exercise throughout SCUAS. This list is just for information so that you can see where the 10 occupations allocated to you fit into the overall picture.

The questions in each of the sections 1, 2 & 3 require different forms of answer. Appropriate instructions head each section.

Each of the 10 occupations on your answer sheet should be considered against each of the questions. Please consider your answers with reference to the average graduate and within the first 10 years after graduation, and record them in the spaces provided together with any comments you may care to make. Please enter your name and institution before returning your answers to me so that I can contact you if necessary to query any particular answers.

To enable me to keep to my rather tight time schedule, could you please return your answer by January 10th 1977, to Mrs. L.M. Wilson, University of Liverpool Appointments Board, P.O. Box 147, Liverpool L69 3BX.

\*\*\*\*\*

Figure 7.3 (Cont'd)

QUESTIONNAIRE

SECTION 1.

These are questions requiring either/or answers to each of the definitions given.

1. Maximum age limit that applies (either by regulation or in your judgement) in entering the occupation.  
Enter the age or nil.
2. Is further full-time study or training necessary before entering paid employment.  
A Yes  
B No  
Enter A or B.
3. Duration of the full-time study or training if it is necessary.  
A 1 year  
B 2 years  
C 3 years  
D Longer.  
Enter A, B, C or D.
4. Degree class necessary to enter the occupation (because of regulations).  
A Good Honours  
B Degree class immaterial  
Enter A or B.
5. Type of employer.  
A Public services, central, regional or local government.  
B Educational institutions  
C Nationalised industries, public corporations.  
D Private industries, trade and commerce.  
E Private professional  
F Charitable organisations  
G All  
Indicate which apply - maybe more than 1 category.
6. Is there a professional and recognised qualification for the occupation which is necessary for long term prospects. (students feel this may add to security and status).  
A Yes  
B No  
Enter A or B



Figure 7.3 (Cont'd)

- 2 -

SECTION 2.

Each question has been defined to indicate as clearly as possible the intended interpretation. Each is to be considered on a 1 to 5 scale where 1 and 5 are the opposite extremes of a factor as encountered among occupations, 2 and 4 are less extreme and 3 is average.

Examples are given for the 1 and 5 extremes.

- |     |  |                               |  |
|-----|--|-------------------------------|--|
| 7.  | Likely income for the first year after taking Bachelors (first) degree: (includes those training and on a grant, those training but with an employer, and those entering paid employment immediately). | 5      4      3      2      1 | very low<br>Solicitor                              |
|     | Cost and Management Accountancy  |                               |  |
| 8.  | Expected earnings - including commission and any fringe benefits - 10 years after taking Bachelors degree.   |                               | (1) very low<br>Church Ministry                    |
|     | Very High (5)<br>Chartered Accountancy   |                               |  |
| 9.  | Eventual possible earnings (commission and fringe benefits) for the very ambitious and successful.   |                               | (1) very low<br>Secretarial work                   |
|     | Very High (5)<br>Stockbroking  |                               |  |
| 10. | Likely rate of promotion to position of power or authority   |                               | (1) Very low<br>Occupational Therapy.              |
|     | Very rapid (5)<br>Merchant Banking   |                               |  |
| 11. | An occupation where there are jobs in most parts of the U.K. (5)<br>An occupation where jobs are highly localised (1)  |                               | (1) Localised<br>Admin. trainee<br>Civil Service   |
|     | Widespread (5)<br>Teaching   |                               |  |
| 12. | Occupation that gives opportunity to work abroad for short terms as part of job.   |                               | (1) Highly improbable<br>Librarian                 |
|     | Highly probable (5)<br>Export Sales  |                               |  |
| 13. | Occupation that could lead to longer term employment abroad.   |                               | (1) Highly improbable<br>Assistant Prison Governor |
|     | Highly probable (5)<br>Nursing   |                               |  |
| 14. | An occupation in which it is likely that the work will be mainly out of doors. (i.e. as opposed to one indoor location).   |                               | (1) Very unlikely<br>Copywriting                   |
|     | Very likely (5)<br>Police constable  |                               |  |





Figure 7.3 (Cont'd)

- 4 -

24. Occupations where conformity in appearance, style of dress and manner will be important.  
 Extremely so (5) Stockbroking (1) not at all. T.V. production
25. Occupation associated with regular hours, that is 9-5 or other standard daytime hours (shift work considered irregular as it could interfere with social life and leisure hours).  
 Very regular (5) Clearing Banking (1) very irregular Youth Organiser
26. Probability that in such an occupation movement of home will be required by an employer.  
 Very High (5) Management in retail stores (1) very low Insurance underwriter
27. Probability that in such an occupation movement of home will be necessary for career advancement and promotion.  
 Very High (5) Accountancy: Public Finance (1) very low Actuary
28. Occupation where the work will be at high pressure with demanding time deadlines that may lead to high stress levels.  
 Very much so (5) Journalism (1) minimally so Archive Work
29. Contact for large part of work day with people of similar educational backgrounds.  
 Very likely (5) Admin. Civil Service (1) very unlikely Traffic Manager - transport fleets
30. Restrictions on behaviour in outside life.  
 Very likely (5) Police (1) Very unlikely Computer Programmer
31. Likelihood of frequently being away from home at night in the occupation.  
 Very High (5) Export Sales Rep. (1) Very low Primary School teaching
32. Likelihood that the occupation will lead to a high level of emotional involvement. (ie. concern for other people's feelings)  
 Very likely (5) Social Work (1) very unlikely Shipbroking

Figure 7.3 (Cont'd)

- 5 -

- |     |  |  |
|-----|--|--|
| 33. | Likelihood of being able to work at own home after necessary training and experience in the occupation.<br>Very High (5)<br>Abstracting                              | (1) Very low<br>Air Traffic controller             |
| 34. | Relative ease of taking up occupation again after a period away.<br>Very High (5)<br>Nursing   | (1) Very low<br>Commission - H.M.<br>Forces        |
| 35. | Ability required in the occupation to communicate clearly and effectively in speech.<br>Very high (5)<br>Diplomatic Service  | (1) Minimal<br>Computer Programmer                 |
| 36. | Ability required in the occupation to communicate clearly and effectively in writing.<br>Very high (5)<br>Journalism   | (1) minimal<br>Radiographer                        |
| 37. | Ability required in manipulation, interpretation and presentation of numerical data. (that is numeracy required).<br>Very High (5)<br>Accountancy: Cost & Management | (1) minimal<br>Speech Therapy                      |
| 38. | Ability required to apply knowledge and skills in new ways.<br>Very high (5)<br>Management Consultancy   | (1) Minimal<br>Building society<br>Administration. |
| 39. | Ability required to take an extremely logical approach.<br>Very high (5)<br>Systems analysis   | (1) Minimal<br>Church Ministry                     |
| 40. | Ability required to take an extremely methodical approach<br>Very high (5)<br>Librarian  | (1) Minimal<br>Copywriting                         |
| 41. | Ability required in the occupation to make frequent and rapid decisions<br>Very high (5)<br>Production Manager   | (1) minimal<br>Civil Service:<br>Research Officer. |
| 42. | Ability required to establish rapport (good relationships) with strangers.<br>Very high (5)<br>Social Work   | (1) Minimal<br>Actuary                             |



Figure 7.3 (Cont'd)

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SECTION 3.

Work Content Factors.

Consider that there are 3 main categories with which an occupation can be concerned.

These are:-

- A. People: dealing on a face to face basis with a person or group requiring a service of some kind.
- B. Data: dealing with information, knowledge and concepts obtained from instrument readings, people, investigation books, records, statistics and any other source.
- C. Things: dealing directly with materials, substances, machines, tools, apparatus, equipment, processes or other products.

An occupation will be concerned with one, two or all three of the above. The extent to which each is present in an occupation can be indicated on the 1-5 scale used previously where 5 will mean that there is a high content of the factor in the occupation and 1 will mean that there is little or none of the factor - (that is relative to other occupations as before).

43. People - extent to which occupation is concerned with face to face contact with people (as above)  
Great amount (5) (1) very little/none.
44. Data - extent to which occupation is concerned with information and concepts (as above)  
Great amount (5) (1) very little/none
45. Things - extent to which occupation concerned with the material environment (as above)  
Great amount (5) (1) very little/none

The remaining questions involve a new procedure. Various aspects of each of the above three categories, people, data and things are listed below. On your answer sheet for each of the categories below please tick not more than two aspects that are pre-dominant and most important in the occupation. You may find a category(s) inappropriate to an occupation, especially a category that has received a rating of two or less for questions 43, 44 or 45, in which case omit.

CATEGORY A - PEOPLE - face to face.

Tick no more than 2 aspects 46-52.

46. Dealing with people by providing a service for particular sections of the (normal) population. This will involve advice or action of a professional kind regarding a clients problem/requirements.
47. Dealing with people by exchanging ideas, information and opinions or negotiating with others in order to formulate policies and to arrive at decisions or solutions - management functions.
48. Dealing with people by teaching and instructing them in order to extend their knowledge and improve their skills. Informing and communicating with others on the basis of special knowledge and skills.

Figure 7.3 (Cont'd)

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49. Dealing with people by "helping" the disadvantaged, that is those who are handicapped, sick or deprived in some way.
50. Dealing with people by organising their work procedures and standards - supervising them by direct control.
51. Dealing with people by gathering information from them or by investigating their actions in relation to standards or regulations or laws - inspection.
52. Dealing with people by persuading or influencing them in favour of a product, service or point of view.

CATEGORY B - D.M.T.A.

Tick no more than 2 from aspects 53-56.

53. Innovation - integrating analyses of data to discover new facts and develop new knowledge and concepts.
54. Co-ordinating information and data to determine and arrange the appropriate actions - any decision relating to people, data or the function of things.
55. Compiling - gathering, collating or classifying information about data, people or things. (more of a prescribed task than 54).
56. Computing - arithmetic and the carrying out of other routine data operations.

CATEGORY C - THINGS.

57. Innovation - the design and testing of machines, substances, apparatus etc., to meet a specified purpose.
58. Using machinery, tools, substances, apparatus etc., to within very close and demanding specifications and tolerances - includes some fault diagnosis repair, maintenance.
59. Using machinery, tools, substances, apparatus etc., in routine; non-exacting way to a specified purpose - some simple repairs and maintenance operations.
60. Routine manual/physical work.



comparative data and only careers advisers (rather than occupation "practitioner" experts) were felt to be sufficiently neutral to undertake the task. Careers adviser participation also ensured AGCAS interest in the system and means that the data bank is the collective wisdom of AGCAS.

The third type of factor became Section 3 of the questionnaire, divided into 'people', 'data' and 'things' as for the DOT hierarchies (see Figure 5.6). The activities under each 'hierarchy' were based on the higher levels of the DOT classification as these apply to graduate level occupations more than the lower levels and on suggestions put forward in the factor questionnaire QA. Careers advisers were asked to select up to two activities in each hierarchy that are important in the occupation under consideration.

A pilot version of the data collection questionnaire QB was sent to six hitherto uninvolved careers advisers at the University of Manchester together with an answer sheet, ten occupations each, and a letter explaining the purpose of the occupational rating exercise. A follow-up discussion some weeks afterwards brought about the modifications to the questionnaire QB that resulted in Figure 7.3, the final version, and improvements to the answer sheet. Ten occupations to rate appeared to be a reasonable demand to make upon careers advisers and comparison of all six sets of ratings demonstrated acceptable agreement between raters (see later section on "checking the occupational information" for an explanation of acceptable agreement).

After further discussion with the Steering Committee, it was decided to go ahead with the data collection and to send out questionnaire QB, ten occupations and a covering letter from the AGCAS project supervisor to all AGCAS members.



## Collecting the Occupational Information

There were, at the time, 278 careers advisers in AGCAS careers services. It was planned that no two careers advisers should receive the same ten occupations to rate. From the 120 occupations, twenty-four randomly produced lists of five occupations each were drawn up to give 276 different ways of combining two lists of five. It was thought fairer to allocate occupations randomly to careers advisers rather than to attempt to allocate by special occupational area as careers advisers normally dealing with technical occupations and degree subjects were being asked to participate. It was hoped that 'raters' would look up details or consult colleagues if in difficulty. As far as possible lists were not repeated within careers services. Thus each careers adviser received:-

1. The data collection questionnaire QB shown in Figure 7.3.
2. An answer sheet, Figure 7.4, with two lists of five occupations.
3. An individually addressed and personally signed letter explaining the purpose of the exercise, from the thesis writer, Figure 7.5.
4. A letter from the AGCAS project supervisor, Figure 7.6.

Each head of careers service received a memorandum asking for his cooperation in distributing the questionnaire packages to his staff, Figure 7.7.

As each list of five occupations is represented 23 times, a 50% return, as for the previous questionnaire QA, should ensure the required minimum of ten opinions per occupation.

The questionnaires were sent out from CSU in late November 1976, with a return date of 10th January 1977. It was hoped that six weeks, ending in a vacation, would promote response. Reminders circulated in mid-January extended the closing date to 21st February 1977.







Figure 7.5

Letter to Careers Advisers from the Thesis Writer to Accompany QB



FROM THE APPOINTMENTS BOARD

Secretary: S.R. WHIPPLE, D.F.C., B.A.  
Deputy Secretary: P.J. DEARY, B.SC.  
Assistant Secretaries: J.L. HANDLEY, B.A.  
MISS B.S. JOHNSTON, B.SC.(ECON.)  
R.J.B. KENNA, M.SC., C.ENG., F.G.S.  
D. MOLYNEUX, B.SC.ENG., C.ENG.  
A.D. WILSON, B.SC.TECH., M.INST.P.

ASHTON BUILDING BROWNLOW HILL P.O. BOX 147 LIVERPOOL L69 3BX

TEL: 051 - 709 - 6022

The University of Liverpool

From: Linda Wilson IHD Project.

November, 1976

Dear

SCUAS/IHD PROJECT

The first task in this project was the compilation of a list of factors which influence students in their choice of occupations. This has now been done firstly by examining systems, secondly by extensive reference to relevant literature; but most productively of all by analysing the replies received from 130 careers and appointments officers in universities and polytechnics to the questionnaire circulated earlier in the year. If you are one of those who so kindly and thoughtfully completed that questionnaire, please accept my thanks. Unfortunately I could not reply personally to everyone, but I was very encouraged by the interesting and helpful answers which I received from SCUAS members.

I am now asking you to help again by giving your opinion about each of the 60 factors I hope to use to describe graduate occupations. The list of 100 occupations has been drawn up from the U.S.R. coding instructions and has been confined initially to those open to graduates in "any discipline". I am asking each appointments officer to deal with 10 occupations and different groupings have been sent to each officer. I need independent opinions from a minimum of 10 people for each factor against each occupation in order to establish which are consistent and reliable. The ultimate reliability and credibility of the data will depend on the number of replies I receive. Therefore I am asking you to do your best to find time to help; every answer is important.

The questionnaire has already been tried out and modified several times with the help of different careers and appointments officers. However, because of the subjective nature of some of the factors and the varying interpretations which may arise, I am expecting some inconsistencies to show in the answers. Only acceptably consistent scores will be used for the data bank and all other factors and occupations will be discarded for the present. Therefore, I hope that even if you have doubts and reservations about the project as a whole you will try to give an answer to all the factors for all the occupations allocated to you; consult as many colleagues and reference books as you wish. Space has been provided for any comments you may need to make.

continued overleaf /.....



I hope to be able to report upon the results of this collection of data, on the form of student input data and the comparison of the two at the Hull Conference in 1977. At the same time I hope to outline plans for testing the value of the system on a substantial number of students in the session 1977/8 which have been made possible by the recent decision of Plenary Committee to provide finance if required to enable the project to continue for a third year and to form the basis of a Ph.D thesis. If the system proves useful it should be available to SCUAS careers and appointments officers from October 1978.

Please accept my thanks for your help and continued support.

Yours sincerely,

*Linda Wilson*

Linda Wilson.

Figure 7.6

Letter to Careers Advisers from the AGCAS Project Supervisor to  
Accompany QB



FROM THE APPOINTMENTS BOARD

Secretary S.R. WHIPPLE, D.F.C. B.A.  
Assistant Secretaries P.J. DEARY, B.Sc.  
J.L. HANDLEY, B.A.  
MISS B.S. JOHNSTON, B.Sc. (ECON.)  
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ASHTON BUILDING, BROWNLOW HILL, P.O. BOX 147, LIVERPOOL L69 3BX

TEL. 051 - 709 - 6022

The University of Liverpool

PJD/H.

22nd November 1976.

Dear Colleague,

SCUAS Sponsored IHD Project

You will remember a letter from Tom Snow, David Ward and me in early November describing how this project had progressed. Factors have been selected (which it is hoped are the ones used by students when choosing an occupation) and the next task is to assess these factors against occupations. The only practicable way this can be done is by obtaining the best judgement of as large a number of SCUAS Courses and Appointments Officers as possible.

Since the whole future of the project and its long term value to students depends entirely on your help at this critical junctive, I do hope that you will be able to find the time to help.

Yours sincerely,

P. J. DEARY



Figure 7.7

Memorandum to Heads of AGCAS Careers Services

FROM: P. J. DEARY, UNIVERSITY OF LIVERPOOL, APPOINTMENTS BOARD, ASHTON  
BUILDING, P.O. BOX 147, LIVERPOOL L69 3BX.

TO: HEADS OF SCUAS CAREERS AND APPOINTMENTS SERVICES.

---

SCUAS Sponsored IHD Project

I hope you will feel able to support this project and distribute one of each of the attached questionnaires (and associated documents) to each Appointments Officer on your staff. Obviously every reply is important to improve the value of the data bank.

Thank you.

Checking the Occupational Information and Establishing Agreement and Factor Values

Analysis of Returns

By the end of February, 188 replies (a 67.6% return) had been received. A record was kept of returns for each of the 24 lists.

Figure 7.8

Lists of Occupations Rated and Returned

List Number	1	2	3	4	5	6	7	8	9	10	11	12
Number of Returns	15	18	13	16	15	15	15	8	14	14	16	15
List Number	13	14	15	16	17	18	19	20	21	22	23	24
Number of Returns	19	17	14	16	16	19	18	18	17	14	16	18

List eight only had eight returns and did not, therefore, meet the minimum requirement of ten opinions. After consultation with supervisor and Steering Committee, it was decided to accept the data. In the event, one occupation from list eight was eventually deleted (too few job openings); the other four showed high levels of agreement.

In order to analyse later agreement of opinion, each careers adviser's ratings for each factor were collated by occupation. Figure 7.9 shows the collation of ratings received for information science work.



A computer punch card was prepared for each set of ratings per occupation (a 'column' in Figure 7.9 was represented on one card). The information coded on each card was as follows:-

Occupation

Rater

Questions 1 - 6 (appropriate category)

Questions 7 - 46 (appropriate rating)

Questions 47 - 60 (1 = ticked, 0 = not ticked)

Section 1, questions 1 to 6, dealt with objective aspects of work and so agreement was expected. There were, however, quite wide variations in view but usually differences could be traced to misinformation or ambiguity (except in question 1, maximum age limit, which varied depending upon employer policy and so seldom could be agreed) in the factor question. Comments on the answer sheets helped.

Section 3, questions 46 to 60 (dealt with here out of turn because the discussion regarding Section 2 is crucial to the next step in development and is far lengthier and involved) was also supposed to be relatively straightforward. For people, data and things, the two questions in each most often ticked were intended to be taken as the activities most typical of the occupation. In many instances, no real pattern was apparent. Eventually, the data from Section 3 was modified, the action taken and the reasons for it will be discussed in Chapter Eight.

Section 2, questions 7 to 45, required first that the data (1 to 5 ratings) collected from careers advisers be shown to be reliable. If insufficient agreement were found between raters, there would be no possibility because of the philosophy and method adopted, of settling upon a value for each factor. The method proposed required that agreement be demonstrated and factor values established by following a set



of rules and not by the exercise of subjective personal judgements. The resulting data bank would then be the representative views of careers advisers in AGCAS.

### Examining the Ratings for Agreement

The distributions of ratings were tabulated for questions 7 to 45 for the first 30 occupations, one quarter of those rated. See Figure 7.9. It was not expected that complete agreement would show very often, but it was anticipated that there would be a majority view or peak of agreement at one rating value or over two adjacent rating values. For the majority of factors, such proved to be the case but there were instances where there was no one peak of agreement. Disagreement was of two types:

1. There were two separated peaks of opinion as seen for factor question 33, "possibility of being able to work at own home after necessary training and experience", in Figure 7.9. The distribution of ratings was:-

Rating value	1	2	3	4	5
Number of ratings	7	1	6	1	-

2. There was an almost flat distribution of opinion as for factor question 20, "level of responsibility (trust or charge for which one is answerable) assumed at work", in Figure 7.9.

The distribution of ratings was:-

Rating value	1	2	3	4	5
Number of ratings	-	4	4	4	3

At this stage, it was thought appropriate to look at the standard deviations (SD) for the factors. Accordingly, the SD (and means) for factor questions 7 to 45 for all 120 occupations were calculated by a computer statistical package, using the data cards mentioned earlier. The





results were added to the tabulations of occupation ratings. See Figure 7.9.

For the 30 occupations under consideration, factor questions 7 - 45 were divided into cases showing agreement and cases showing disagreement and tabulated against their SD; 1170 (30 x 39) factors were thus considered to give the results shown in Figure 7.10.

Figure 7.10

Cases of Agreement and Disagreement between Factor Ratings compared by their Standard Deviation

	Standard Deviation						Total
	1.0 and below	1.1	1.2	1.3	1.4	1.5 and above	
Cases of Agreement	962	90	34	18	7	3	1114
Cases of Disagreement	0	10	12	12	8	14	56
% of Agreement	100	90	74	60	47	21	95.2

As can be seen, when SD was 1.0 or less, 100% agreement was observed.

For the remaining 90 occupations rated by careers advisers, all factors with an SD of 1.0 or less (over 80% of factors) were taken as showing agreement. Distributions of ratings were tabulated and examined for the other 20% of factors to determine which were the 4.8% expected to show disagreement and therefore requiring further consideration. Thus a simple rule for examining the ratings given by careers advisers was established and the last 90 occupations were processed more rapidly.

The cases of disagreement did not, as might have been expected, appear to relate strongly to particular factors or occupations. In most cases, comments made by the raters showed where the difficulties had occurred.



Some factors are not relevant to all occupations: the factor, "away from home at night", question number 31, leads to confusion in the case of residential social work. Question number 7, "likely income for first year after taking degree", was interpreted by some raters as income upon taking up employment, which may be after postgraduate training rather than income during training, employment, or whatever happens in the year immediately after graduation. Question 15, "size of working group" and question 45, "Things - extent to which occupation concerned with the material environment", led to most unacceptability. Size of group depends as much on the employer as on the occupation followed in many instances. Few occupations of "any discipline" entry selected for the trial system have any definite relationship with things. (The question was included to allow for later extensions of the data bank.) Other factors like "work at home" and "self-employment possibilities" depend upon the individual concerned as well as the occupation. Some of the occupational examples given in the questionnaire led to conflict for several raters as they could not agree that occupations given did illustrate the extreme (1 or 5) point for which they had been chosen.

Some occupations were thought by raters to be inadequately separated for rating purposes. As an example, H.M. Forces: Commission could have been divided into administrative and operational functions; without the division, factors were ambiguous.

#### Allocating Values to the Factors

Factors that had shown agreement were given a value 1, 2, 3, 4 or 5 that accorded with their mean value from the computer analysis (see Figure 7.9). Certain corrections were made to ensure proper representation of each factor value. Without the adjustment, 1 and 5 have less chance of appearing



because of both the tendency for raters not to choose the extreme ends of a scale and because, on taking an 'average', 1 and 5 can only occur where there has been complete agreement. The correction applied was as shown below:-

Value Allocated	1	2	3	4	5	
Mean	1.0	1.8	2.6	3.4	4.2	5.0

Each value was allocated over a range of 0.8 of the 'mean' values. See Figure 7.9.

The 4.5% of factors that had shown disagreement and which could not therefore be allocated values were discussed at a special meeting of project supervisor and Steering Committee in May, 1977. Wherever possible occupations had already been rated again by careers advisers with special knowledge, that is the information sheet writers and liaison officers for the occupation. The 'expert' ratings were consulted throughout the meeting.

Each case of disagreement was thoroughly discussed individually and in every instance it proved possible to assign an acceptable factor value. After the meeting, a further check was made upon the factor values by preparing a computer listing of occupations under each value for each factor (see the latter part of Appendix 9 for a similar listing of the Mark 2 version of Gradscope data bank). The Steering Committee studied the listing and found it acceptable after eight minor adjustments to contradictory items - mostly concerning pay in the first year after graduation. At the earlier meeting, the decision was taken to remove eight of the occupations but for reasons other than rating inconsistencies. The eight occupations were:-



Non technical abstracting	-	not definable
Insurance manager	}	not normally entered immediately
Management consultancy		
Personnel safety work		
Political party agent	-	very rare
Publishing production	-	not any discipline
Scriptwriting	-	rare
Travel tour operating	-	several occupations subsumed in the title

At this stage, the data bank consisted of 112 "any discipline" entry occupations open to graduates, described by 39 relational factors, fifteen work content factors and with information available on six factual items. All items were intended to be of relevance and interest to students in Higher Education when considering their future choice of occupation. Together, they constitute a new occupational classification in that the Gradscope data bank is the first time all the particular factors have been associated.

## Chapter Eight

### THE MATCH ALGORITHM AND SYSTEM FEATURES

For the user, the finished system will consist of three main components. The same is true for the other systems described in Chapter Three. The three components are:-

1. A questionnaire to the student which will elicit from him the data necessary for the computer part of the system.
2. A computer operation, the match algorithm, which will compare the student data with the bank of occupational data available to the computer.
3. A list of occupations that can be presented to the student as a result of the computer operation, together with any other information considered relevant.

The work so far described has resulted in an occupational classification for the data bank of the proposed system. In this chapter, the work necessary to produce a usable system will be outlined, that is, the design of a student questionnaire, match algorithm and a results computer printout. The design of each depended very much on design intentions for the other components and upon the data bank already assembled. It is intended to show their interdependence in the following sections.



## The Student Questionnaire

### The Trial Student Questionnaire (QC on the Plan of Gradscope Development)

The data collection questionnaire, QB, was divided into three different types of factor question. The division depended upon the nature of and objectivity of the occupational information available on the factor. It was intended to use the different types of factor in different ways in the computer match algorithm.

1. Section 1, questions 1 to 6 from questionnaire QB (Figure 7.3) were factual items which were not intended for use in the match algorithm, but rather as additional information that could be presented with the computer generated suggestions.
2. Section 2, questions 7 to 45, (the main body of occupational data) were less objective psychosocial items concerning occupations and were intended to provide a flexible aspect for the match algorithm.
3. Section 3, questions 46 to 60, dealt with work activities and were divided into separate tasks concerned with people, data and things. The activities were intended to serve as GO/NOGO selectors for the match.

Figure 8.1 is the first trial student questionnaire, QC. The questionnaire was based upon 54 questions from QB - section 1 questions were omitted. The first 39 questions are the psychosocial factors, rated 1 to 5 for the data bank, adapted from section 2 of QB. Questions 40 - 54 were taken from section 3 of QB.

The form of question was aimed at eliciting appropriate information for the match algorithm but also at stimulating students to think more about themselves and occupations. The 39 psychosocial factors were presented



as neutrally and unambiguously as possible and in a form similar to that used for the data collection questionnaire QB.

For example:-

For Data Collection Questionnaire QB - Likely rate of promotion to position of power or authority for the majority.

For Trial Student Questionnaire QC - Rate of promotion to position of power or authority.

Each statement was to be considered in two different ways:-

1. The student was asked to assess his strength of feeling towards the factor, that is, how much that factor was likely to influence his eventual choice of occupation. Three alternatives were offered:

A = no influence

B = some influence

C = great influence

2. The student was asked, if B or C had been his choice for the first decision, to indicate the level or amount of the factor he desired in an occupation. The scale given was 1 to 5 as for the data collection questionnaire.

At this stage, the precise use of the eleven options offered to the student, A, B (1 to 5) and C (1 to 5), in a match algorithm was uncertain. It was important initially to establish what form of questionnaire would be acceptable to students. However, it was thought that instances of choice A - no influence, would remove those particular factors from any match algorithm calculations and that for the factors remaining either or both of the scales could form the basis for a match.

The remaining fifteen questions, section 3 from QB were presented in the



Figure 8.1

Trial Student Questionnaire QC

UNIVERSITY OF LIVERPOOL APPOINTMENTS BOARD

THE QUESTIONNAIRE

Below are 54 factors which may influence your choice of occupation. You are asked to consider each statement in two ways and record the one or two resulting answers as follows:-

(i) Decide what influence the factor will exert on your choice of occupation.

No influence	tick	<input type="checkbox"/>	A	Please put your answers on the attached answer sheet.
Some influence	"	<input type="checkbox"/>	B	
Great influence	"	<input type="checkbox"/>	C	

If you tick A you can proceed directly to the next statement.  
If you indicate B or C then

(ii) Decide what aspect and level of the factor you would prefer on the appropriate 1 - 5 scale. 1 and 5 will be the opposite (relative) extremes of the factor and 3 will be an intermediate or average value with 2 and 4 above and below average respectively.

Example. Working abroad for short periods when required to by employer.

(i) Indicate the influence this will have on your choice.

A                      B                      or                      C.

(ii) Indicate whether you want short terms abroad to be very probable or very improbable (or something in between).

---

1. Income during first year after graduation.

(i) Indicate:- No influence A, some influence B, great influence C.

(ii) for B or C indicate:-

Very high (paid employment) 1, 2, 3, 4, 5, Very low (student grant)

2. Competition for vacant jobs.

(i) Indicate:-                      A   B   C

(ii) For B or C indicate:- Very high 1, 2, 3, 4, 5 Very low.

3. Expected earnings 10 years after taking degree.

(i) Indicate:-                      A   B   C

(ii) For B or C indicate:- Very high 1, 2, 3, 4, 5 Very low.

4. Geographical spread of jobs (in all/few parts of U.K.) for the occupation.

(i) Indicate:-                      A   B   C

(ii) For B or C indicate:- Widespread 1, 2, 3, 4, 5, Very localised.

Figure 8.1 (Cont'd)

- 2 -

5. Rate of promotion to position of power of authority.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very rapid 1, 2, 3, 4, 5, Very slow.
6. Working abroad for short periods when required to by employer.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very probable 1, 2, 3, 4, 5, Very improbable.
7. Permanent employment abroad if wanted.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very probable 1, 2, 3, 4, 5, Very improbable.
8. Prospects for eventual self employment if wanted
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very good 1, 2, 3, 4, 5, Very poor.
9. Degree to which one will be supervised i.e. instructed; inspected.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very closely 1, 2, 3, 4, 5, Not very closely.
10. Level of responsibility assumed, i.e. degree to which one is answerable.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very high 1, 2, 3, 4, 5, Minimum.
11. Eventual possible earnings for the very ambitious and successful.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very high 1, 2, 3, 4, 5, Very low.
12. Job security.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very high 1, 2, 3, 4, 5, Very low.
13. Ease of using experience gained in transferring to different fields of work.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very easy 1, 2, 3, 4, 5, Very difficult.
14. Moving home when required to by employer.
  - (i) Indicate:- A B C
  - (ii) For B or C indicate:- Very probable 1, 2, 3, 4, 5, Very improbable.



Figure 8.1 (Cont'd)

- 3 -

15. Moving job and home necessary for career advancement and promotion
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very probable, 1,2,3,4,5, Very improbable.
16. Nights away from home because of travel(not shift work.)
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very frequent, 1, 2, 3, 4, 5, Very infrequent
17. Work at own home after necessary training and experience if wanted
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very probable, 1, 2, 3, 4, 5, Very improbable.
18. Taking up occupation after a period away.
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very easy, 1,2,3, 4, 5, Very difficult
19. Time spent working out of doors.
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Mostly, 1, 2, 3, 4, 5, Very little if any.
20. Likely size of closest working group.
- (i) Indicate No influence A, some influence B, great influence C.
- (ii) For B or C indicate:- (25 or more) 1, (10-25) 2, (3-10) 3, (1-3)4, (on own) 5,
21. Likely size of overall employing organisation.
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very large, 1, 2, 3, 4, 5, Very small.
22. Physical demands of the work.
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very demanding, 1, 2, 3, 4, 5, Not at all demanding.
23. Conformity in appearance, style of dress and manner.
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very necessary, 1, 2, 3, 4, 5, None at all.
24. Regular hours i.e. 9-5 or other standard day time hours that do not interfere with social life and leisure.
- (i) Indicate:- A B C
- (ii) For B or C indicate:- Very regular, 1, 2, 3, 4, 5, Very irregular.

Figure 8.1 (Cont'd)

- 4 -

25. Pressure of work.

(i) Indicate:- A B C

(ii) For B or C indicate:-  
Very demanding, time deadlines, High stress- 1 2 3 4 5 minimum stress.

26. Contact with people of similar educational background.

(i) Indicate:- A B C

(ii) For B or C indicate:- large part of working day, 1, 2, 3, 4, 5, minimal.

27. Effects on behaviour in outside life

(i) Indicate:- A B C

(ii) For B or C indicate:- likely to be restrictions, 1, 2, 3, 4, 5, unlikely to be restrictions.

28. Emotional involvement - concern with other people's feelings.

(i) Indicate:- A B C

(ii) For B or C indicate:- Very likely, 1, 2, 3, 4, 5, Very unlikely.

29. Requirement to communicate clearly and effectively in speech.

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

30. Requirement to write clearly and effectively.

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

31. Requirement to manipulate, interpret and present numerical data (numeracy).

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

32. Requirement to apply knowledge and skills in new ways

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

33. Requirement to take an extremely logical approach.

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.



Figure 8.1 (Cont'd)

- 5 -

34. Requirement to take an extremely methodical approach.

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

35. Requirement to make frequent and rapid decisions.

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

36. Requirement to establish good relationships (rapport) with strangers.

(i) Indicate:- A B C

(ii) For B or C indicate:- High 1, 2, 3, 4, 5, low.

37. Frequency of face to face contact with people either as individuals or groups.

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

38. Frequency of dealing with data that is information knowledge and concepts derived from instrument readings, people, books, statistics etc.,

(i) Indicate:- no influence A, some influence B, great influence C.

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

39. Frequency of dealing with things, that is, substances, machines, tools, apparatus, processes and other materials

(i) Indicate:- A B C

(ii) For B or C indicate:- High, 1, 2, 3, 4, 5, low.

You have now finished all the factors of this type - the next factors are in a different format and require a different form of response.

From each of the 3 groups choose the 2 descriptions that most closely conform with what you would like in an occupation and tick those chosen on the answer form.

GROUP 1 - PEOPLE

Tick no more than 2 from aspects 40 - 46.

40. Dealing with people by providing a service for particular sections of the (normal) population. This will involve advice or action of a professional kind regarding a clients problem/requirements.

41. Dealing with people by exchanging ideas, information and opinions or negotiating with others in order to formulate policies and to arrive at decisions or solutions management functions

42. Dealing with people by teaching and instructing them in order to extend their knowledge and improve their skills. Informing and communicating with others on the basis of special knowledge and skills.

Figure 8.1 (Cont'd)

- 6 -

43. Dealing with people by "helping" the disadvantaged, that is those who are handicapped, sick or deprived in some way.
44. Dealing with people by organising their work procedures and standards - supervising them by direct control.
45. Dealing with people by gathering information from them or by investigating their actions in relation to standards or regulations or laws - inspection.
46. Dealing with people by persuading or influencing them in favour of a product, service or point of view.

GROUP 2 - DATA

Tick no more than 2 from aspects 47 - 50.

47. Innovation - integrating analyses of data to discover new facts and develop new knowledge and concepts.
48. Co-ordinating information and data to determine and arrange the appropriate actions - any decision relating to people, data or the function of things.
49. Compiling - gathering, collating or classifying information about data, people or things. (more of a prescribed task than 48).
50. Computing - arithmetic and the carrying out of other routine data operations.

GROUP 3 - THINGS

Tick no more than 2 from aspects 51- 54.

51. Innovation - the design and testing of machines, substances, apparatus etc., to meet a specified purpose.
52. Using machinery, tools, substances, apparatus etc., to within very close and demanding specifications and tolerances - includes some fault diagnosis repair, maintenance.
53. Using machinery, tools, substances, apparatus etc., in routine; non-exacting way to a specified purpose - some simple repairs and machine operations.
54. Routine manual/physical work.



same way (neutrally, unambiguously and in the form they had taken in QB) but the activities were divided up into three groups relating to people, data and things, from each of which students were asked to select no more than two activities. Thus students were able to indicate up to six different work activities that would interest them. It was thought that the work activity choices the students made might be used as GO/NO GO selectors for the occupations in the data bank before the effects of the other psychosocial factor choices were taken into consideration. This accorded with the view that the activities that an occupation will consist of are of greater significance than other features. (The view was later to be modified.) Answers to the questionnaire were to be placed on a separate answer sheet, Figure 8.2, from which the data could be transferred to the computer.

It was thought that the questions would give rise to some variation in interpretation or even deliberate misrepresentation on the part of students but this was not felt to be crucial as the aim for the system is not to present a definitive set of occupations (the "answer"), but to stimulate thinking and discussion. Students can be expected to be aware of their own thoughts when completing the questionnaire and can discuss the resulting suggestions in terms of those previous thoughts.

#### Field Test of Student Questionnaire QC

Questionnaire QC was tried out on a sample of 40 second year students at the University of Liverpool in March 1977. They were asked to help in the development of the system via a letter, Figure 8.3, that accompanied a questionnaire, answer sheet and a further follow-up question sheet (QD on the Plan of Gradscope Development and included in the text as Figure 8.4). Question sheet QD asked about the questionnaire QC and for comments on the exercise as a whole.



Figure 8.2

Answer Sheet to Questionnaire QC

ANSWER SHEET

NAME:

1. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	21. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Group 1.
2. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	22. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	40. <input type="checkbox"/>
3. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	23. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	41. <input type="checkbox"/>
4. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	24. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	42. <input type="checkbox"/>
5. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	25. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	43. <input type="checkbox"/>
6. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	26. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	44. <input type="checkbox"/>
7. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	27. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	45. <input type="checkbox"/>
8. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	28. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	46. <input type="checkbox"/>
9. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	29. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Group 2.
10. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	30. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	47. <input type="checkbox"/>
11. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	31. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	48. <input type="checkbox"/>
12. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	32. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	49. <input type="checkbox"/>
13. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	33. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	50. <input type="checkbox"/>
14. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	34. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Group 3.
15. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	35. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	51. <input type="checkbox"/>
16. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	36. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	52. <input type="checkbox"/>
17. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	37. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	53. <input type="checkbox"/>
18. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	38. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	54. <input type="checkbox"/>
19. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	39. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
20. A <input type="checkbox"/>	B C <input type="checkbox"/> <input type="checkbox"/>	1 2 3 4 5 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>				



Letter to Students to Accompany Questionnaire QC



FROM THE APPOINTMENTS BOARD

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ASHTON BUILDING BROWNLOW HILL P.O. BOX 147 LIVERPOOL L69 3BX

TEL: 051 - 709 - 6022

The University of Liverpool

March 1977.

Dear Colleagues,

I am researching into a system for producing a list of occupations which might best suit a student after graduation. You are one of a group of 40 whom I hope can help me in this work which is centred at Liverpool and will benefit students in British Universities and Polytechnics in about three years' time.

I would appreciate it if you could:

1. Read the prototype questionnaire and then mark the accompanying answer sheet as if you were submitting it for comparison with the data banks.
2. Complete the follow-up question sheet.
3. On the actual questionnaire please write comments or indicate difficulties as you meet them.

Your reactions to this prototype will be used in the design of the final questionnaire.

Thank you for your help.

*Linda Wilson*

Linda Wilson

N.B. Please remember to bring your completed questionnaires with you when you attend your interview at the Appointments Board.

Figure 8.4

Follow-Up Question Sheet QD

1. Did the questionnaire help you to structure your occupational preferences?

Yes \_\_\_ No \_\_\_

If No, please indicate why not in the space below.

2. Were enough occupational factors covered?

Yes \_\_\_ No \_\_\_

If No, please indicate what you would have liked to have been included.

3. Did you find the questionnaire too long?

Yes \_\_\_ No \_\_\_

If Yes, please indicate what factors could be excluded.

4. You will have noticed that questions on factors were in two parts:

(i) Importance of factor to you - A, B or C

(ii) Level of factor preferred - 1, 2, 3, 4 or 5

Which part(s) did you find more useful in expressing your preferences (for most questions)?

(i) \_\_\_ ; (ii) \_\_\_ ; Both (i) and (ii) \_\_\_ ; Neither (i) or (ii) \_\_\_

If Neither, please indicate why and what you would like.

Please use overleaf for further comments and ideas.



As a result, thirty-three completed questionnaires, QC and QD, were brought along to the Appointments Board. Analysis of the responses to the follow-up question sheet, the comments and the student questionnaire itself produced the following:-

1 Follow-up Question Sheet QD

Question 1	Yes	52%	No	48%				
Question 2	Yes	84%	No	16%				
Question 3.	Yes	15%	No	85%				
Question 4	(i)	25%	(ii)	41%	(iii)	28%	(iv)	6%

2 Comments

Several suggestions were made, including ideas for better ways of wording the questionnaire and possible extra occupational factors (very few that were practicable in terms of the original specifications given in Chapter Six; a favourite new factor was length of holidays!). Other comments underlined the fact that the system for answering the questions was too complicated. Most were encouraging about the general approach, several said that they had found the questionnaire interesting and that it had given them new ideas and more to think about regarding themselves and occupations.

3 Student Questionnaire QC

Each subject's responses to the questionnaire were tabulated so that the overall pattern of response could be determined.

<u>Importance of Factor</u>		<u>% Choosing</u>
No influence	A	20
Some influence	B	50
Great influence	C	30

<u>Level of Factor</u>		<u>% Choosing</u>
High	1	19
	2	28
	3	30
	4	13
Low	5	10

Overall response - summed over all questions and all subjects - was as would be expected. There was a tendency to choose the middle point of the scale and to opt for the presence rather than the absence of factors. Individual students showed the variation in the way they responded to the questionnaire that had been hoped for. Generally, the eleven different options offered for each question made it difficult to detect any patterns or to be sure exactly what students intended to express through their choices.

Revised Student Questionnaire (QE on the Plan of Gradscope Development)

The evidence and ideas gained from the field test of student questionnaire QC were the basis of revisions which led to the development of an improved student questionnaire, QE. See Figure 8.5.

The 54 questions were presented in three groups:-



1. Conditions of work. (28 questions)
2. Particular requirements made by the work (8 questions)
3. Work activities. (18 questions)

The questions in groups 1 and 2, questions 1 to 36, were defined as they had been for the earlier questionnaire, but students were asked to consider their choice differently. The example given earlier became:-

Q4. Rate of promotion to position of power or authority (PROMOTION)

If it is important that this should be relatively rapid, tick box A.

If it is important that this should be relatively slow, tick box B.

Otherwise, if this is not important to you or you are looking for an average level, do not answer.

Explanations were given when it was felt they would be of help. For example:-

Q 18. Conformity required in appearance, style of dress and manner (CONFORM)

In some occupations, it may be necessary to adopt for work an accepted style of conforming, an extreme example would be the armed services.

Only if you would find it impossible to modify your style to any extent to suit an employer - tick box B.

Otherwise, do not answer.

As can be seen, in some instances one of the alternatives was not made available if it was thought to be an implausible choice in order to give the system credibility.

Reference to Figure 8.6, the Profile Form, will show which questions were



Figure 8.5

Student Questionnaire QE

GRADSCOPE.

This system is to help you sort through a data bank of 112 occupations which are open to graduates in any discipline. Your answer to a number of questions will be compared with the data bank and 10 occupations suggested which come nearest to your specification. This does not mean that they are even particularly close, they will certainly not in any sense be a perfect match but they will be worth further consideration.

The list of questions is divided into 3 main groups. First, conditions of work such as 'time away from home', 'responsibility', 'pay' and 'prospects'. Your answers in this group should relate to the first 10 years of your working life only. The next group relates to demands that can be made upon you and abilities you require in the course of work, for example 'numeracy', and 'communicating clearly'. You should consider whether you have the abilities and whether you want to use them at work. The last group covers relationships and dealings with people, data and things.

Please read each statement and consider whether it is going to affect your choice of occupation. If it is not, pass on to the next statement. If it is important to you, decide whether you prefer the high or low condition specified in each statement. Then tick the appropriate box on the profile form. When you have completed the questions you may tick up to 6 in the column at the side of the question number that are of most importance to you.

---

GROUP 1 - CONDITIONS OF WORK

1. Earnings during first year after graduation. (PAY 1)  
If it is important that these are relatively high tick box A.  
Otherwise do not answer.
2. Expected earnings 10 years after graduation. (PAY 2)  
If it is important that these are very high tick box A.  
Otherwise do not answer.
3. Eventual possible earnings for the very ambitious and successful - (PAY 3)  
say at the age of 50.  
(this is the exception to the first 10 years rule)  
If it is important that there be the potential for very high earnings tick box A.  
Otherwise do not answer.
4. Rate of promotion to position of power or authority. (PROMOTION)  
If it is important that this should be relatively rapid tick box A.  
If it is important that this should be relatively slow tick box B.  
Otherwise if this is not important to you or you are looking for an average level do not answer.
5. Geographical availability of jobs. (LOCALE)  
If it is important that the occupation is available widely throughout the U.K. - for example if your spouse is liable to be moved in his/her job - tick box A.  
Otherwise do not answer.
6. Opportunity to work abroad for short terms. (ABRDSE)  
If you would definitely want this opportunity as part of your job tick box A.  
Otherwise do not answer.



Figure 8.5 (Cont'd)

7. More permanent employment abroad. (ABRDLG)  
If you definitely want an occupation with this possibility tick box A.  
Otherwise do not answer.
8. Likelihood of work out of doors. (OUTDR)  
If you definitely want to work mainly out of doors tick box A.  
If you definitely do not want to work out of doors - for example, you may suffer from hay fever - tick box B.  
Otherwise do not answer.
9. Size of closest working group. (GPSIZE)  
If it is important that this consists of more than 10 people tick box A.  
If it is important that this be less than 10 people tick box B.  
Otherwise do not answer.
10. Size of overall employing organisation. (ORGSIZE)  
If it is important that this is most likely to be large tick box A.  
If it is important that this is most likely to be small tick box B.  
Otherwise do not answer.
11. Eventual self employment. (SELFEMP)  
If you definitely want this to be possible tick box A.  
Otherwise do not answer.
12. Physical demands made by the work. (PHYSICAL)  
If it is important to you that these be at a high level tick box A.  
If it is important to you that these be of a low level tick box B.  
Otherwise do not answer.
13. Degree to which one will be supervised i.e. instructed, inspected at work (SUPERVIS)  
If it is important to you that it is relatively high tick box A.  
If it is important that it is relatively low tick box B.  
Otherwise do not answer.
14. Level of responsibility (trust or charge for which one is answerable) assumed at work. (RESPONS)  
If it is important to you that this is high tick box A.  
If it is important that it is relatively low tick box B.  
Otherwise do not answer.
15. Level of competition for available vacancies (COMPETN)  
If it is important to you that this is low tick box B.  
Otherwise do not answer.
16. Likely job security. (SECURITY)  
If it is important to you that your occupation is associated with high job security tick box A.  
Otherwise do not answer.

Figure 8.5 (Cont'd)

- (TRANSFER)
17. Flexibility of the skills acquired, that is ease of use of experience gained for transferring to different field of work (with same or other employer).  
If it is important to you that this is high i.e. easy tick box A.  
Otherwise do not answer.
18. Conformity required in appearance, style of dress and manner. (CONFORM)  
In some occupations it may be necessary to adopt for work an accepted style of conforming, an extreme example would be the armed forces.  
Only if you would find it impossible to modify your style to any extent to suit an employer - tick box B.  
Otherwise do not answer.
19. Hours of work - interference with normal social life and leisure. (HOURS)  
If it is important to you that these be regular - that is 9 - 5 or other standard day time hours - tick box A.  
If it is important to you that these be less regular, that is shift work and extra hours tick box B.  
Otherwise do not answer.
20. Moving of home required by an employer. (EMPMOVE)  
If it is important to you that this is most unlikely tick box B.  
Otherwise do not answer.
21. Moving home for career advancement and promotion at your own choice. (SELFMOVE)  
If you definitely want work where this will probably not be necessary tick box B.  
Otherwise do not answer.
22. Pressure of work. (PRESS)  
If you definitely want work where there will be demanding time deadlines and standards - that some may consider stressful but which others could see as stimulating, tick box A.  
If you definitely do not want high pressure of work, tick box B.  
Otherwise do not answer.
23. Contact with people of a similar educational background. (SIMILAR)  
If it is important to you that you are likely to spend a large part of each working day with this tick box A.  
Otherwise do not answer.
24. Restrictions on behaviour in outside life. (BEHAV)  
Some work may impose restrictions upon life outside; for instance teachers are expected to observe certain rules, local government officers cannot stand for elections and so on.  
If you are definitely not prepared to accept such conditions tick box B.  
If some necessary restrictions would not bother you do not answer.
25. Absence from home at night because of travel (not because of shift work (AWAY) this is covered elsewhere).  
If you definitely want work where this is likely to be high tick box A.  
If you definitely want work where this is at a minimum tick box B.  
Otherwise do not answer.



Figure 8.5 (Cont'd)

26. Emotional involvement - concern for other people's feelings. (EMOTN)  
If you definitely want a job where this is high tick box A.  
If you definitely want a job where this is low tick box B.  
Otherwise do not answer.
27. Possibility of being able to work at own home after necessary training and experience. (WKHOME)  
If it is important to you that this should be relatively likely tick box A.  
Otherwise do not answer.
28. Ease of taking up occupation again after a period away. (RETURN)  
If it is important to you that you should be able to do this - for example a woman who would prefer to take some years away from work to raise her family but who would wish afterwards to return to her previous occupation, tick box A.  
Otherwise do not answer.
- GROUP 2 - PARTICULAR REQUIREMENTS MADE BY THE WORK
29. Communicating clearly and effectively in speech. (COMSPCH)  
If you feel you can do this and want work where there is a need for it tick box A.  
If you definitely don't want or would not manage work involving this - tick box B.  
Otherwise do not answer.
30. Communicating clearly and effectively in writing. (COMWRT)  
If you can do this and definitely want work where it is needed tick box A.  
If you definitely cannot manage and would not want work involving this tick box B.  
Otherwise do not answer.
31. Manipulating, interpreting and presenting numerical data. (NUMBERS)  
If you can do this and definitely want work involving it (i.e. numeracy) tick box A.  
If you definitely cannot manage and would not want work involving this tick box B.  
Otherwise do not answer.
32. Applying knowledge and skills in new ways. (CREAT)  
If you can do this and definitely want work involving it tick box A.  
If you definitely cannot manage and would not want work involving this tick box B.  
Otherwise do not answer.
33. Taking an extremely logical approach. (LOGIC)  
If you can do this and definitely want work involving this tick box A.  
If you cannot manage and would not want work involving this tick box B.  
Otherwise do not answer.

Figure 8.5 (Cont'd)

34. Taking an extremely methodical approach. (METHOD)  
If you can do this and definitely want work involving this tick box A.  
If you cannot manage and would not want work that involves this tick box B.  
Otherwise do not answer.
35. Making frequent and rapid decisions. (DECSN)  
If you can do this and definitely want work that involves it tick box A.  
If you cannot manage this and would not want work that involves this tick box B.  
Otherwise do not answer.
36. Establishing rapport (good relationships) with strangers. (RAPPT)  
If you can do this and definitely want work that involves it tick box A.  
If you cannot manage this and would not want to work with this tick box B.  
Otherwise do not answer.

GROUP 3 - WORK ACTIVITIES

37. Dealing on a face to face basis with a person or group. (PEOPLE)  
If you definitely want work where there will be a lot of this tick box A.  
If you definitely want work where there will be little of this tick box B.  
Otherwise do not answer.
38. Dealing with people by providing a service for particular sections (ADVICE) of the (normal) population. This will involve advice or action of a professional kind regarding clients problems/requirements.  
If you definitely want work involving this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
39. Dealing with people by exchanging ideas, information and opinions (NEGOTIATE) or negotiating with others in order to formulate policies and to arrive at decisions or solutions - management functions.  
If you definitely want work involving this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
40. Dealing with people by teaching and instructing them in order to (TEACH) extend their knowledge and improve their skills. Informing and communicating with others on the basis of special knowledge and skills.  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
41. Dealing with people by "helping" the disadvantaged, that is those who (HELP) are handicapped, sick or deprived in some way.  
If you are definitely wanting work that involves this tick box A.  
If you do not want work that involves this tick box B.  
Otherwise do not answer.



Figure 8.5 (Cont'd)

42. Dealing with people by organising their work procedures and standards - supervising them by direct control. (SUPERVISE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
43. Dealing with people by gathering information from them or by investigating their actions in relation to standards or regulations or laws - inspection. (INSPECT)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
44. Dealing with people by persuading or influencing them in favour of a product, service or point of view. (PERSUADE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
45. Dealing with information, knowledge and concepts derived from people, books, statistics, instrument readings and so on. (DATA)  
If you definitely want work where there will be a lot of this tick box A.  
If you definitely want work where there will be little of this tick box B.  
Otherwise do not answer.
46. Innovation - integrating analyses of data to discover new facts and develop new knowledge and concepts. (INNOVATE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
47. Co-ordinating information and data to determine and arrange the appropriate actions - any decision relating to people, data or the function of things. (CO-ORDINATE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise if you have no strong preferences or a moderate amount would satisfy you do not answer.
48. Compiling - gathering, collating or classifying information about data, people or things. (more of a prescribed task than 47). (COMPILE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
49. Computing - arithmetic and the carrying out of other routine data operations. (COMPUTE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.

Figure 8.5 (Cont'd)

50. Concern for and dealings with material things - machines, tools, processes, materials and so on. (THINGS)  
If you definitely want work where there will be a lot of this tick box A.  
If you definitely want work where there will be little of this tick box B.  
Otherwise do not answer.
51. Innovation - the design and testing of machines, substances, apparatus etc., to meet a specified purpose. (INVENT)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
52. Using machinery, tools, substances, apparatus etc., to within very close and demanding specifications and tolerances - includes some fault diagnosis repair, maintenance. (SETUP)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
53. Using machinery, tools, substances, apparatus etc., in routine; non-exacting way to a specified purpose - some simple repairs and machine operations. (OPERATE)  
If you definitely want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.
54. Routine manual/physical work. (MANUAL)  
If you definitely do want work that involves this tick box A.  
If you definitely do not want work that involves this tick box B.  
Otherwise do not answer.







restricted. (N.B. After student trials of the finished system had taken place, the policy of restricting certain options was found to be unnecessary and undesirable.)

The new form of question and instruction offered the students a three-point scale which incorporated both the strength of feeling and level of factor scales from questionnaire QC. If neither A or B (see Profile Form Figure 8.6) are ticked, the student has indicated that the factor will not influence his choice. Choice of A or B indicated preference for the high or low state of the factor.

Group 3 questions, work activities, were presented in the same way as all others. This necessitated modification of the data bank, but simplified the questionnaire and match algorithm as it resulted in uniformity of question and match logic. It would also mean that students could decide for themselves whether work activity factors were more important in choice of occupation than others, the system would make no assumptions on their behalf. Students were also allowed to weight up to six questions if they were of particular significance in their choice.

#### Modification of Work Activity Data to 1 to 5 Scales

There was insufficient time to undertake a further 1 to 5 rating exercise among careers advisers for the work activity factor questions. In order to complete and test a working version of the system, it was decided to modify the existing data. If the system proved useful, the work activity factors could be re-rated when a mark 2 version of Gradscope is introduced. (This was in fact undertaken in 1978.)

The modification depended upon the ratings for the earlier general questions (43, 44 and 45) relating to people, data and things. When the general question had been rated '5' or more, that is, average or above



for the occupation, questions in the appropriate group that had been ticked by more than 50% of raters were allocated '4', those that had been ticked by 75% or raters were allocated '5', in all other instances the factor was allocated '3'. It was not possible to give less than average values, '1' or '2' from the data available. See Figure 7.9.

### The Match Algorithm

It had always been intended that the finished computer system, Gradscope, should widen the outlook and promote thinking and self-awareness in its users rather than aim to produce a definitive list of occupations. It has been shown already that the questionnaire alone helps many students to think about themselves and occupational choice.

### Considerations Affecting the Design of the Match Algorithm

1. One of the dangers associated with the use of a computer for careers advice is that the machine will impart an air of 'over-believability' to the answers it produces. One would expect that there will always be students who approach either computers, tests or careers advisers wanting to be supplied with "the answers". It would be an advantage if those students could be encouraged towards the necessary active thought and research into their own future alternatives. One way to avoid passive acceptance of the machine answers would be to develop a matching logic that illustrates the process of making a decision as well as providing possible solutions.

The other computer systems described in Chapter Three do not make



explicit to the user the basis upon which the occupations listed have been produced. Students will be aware that the output is related to their own personal input but they will not know exactly how. Thus they may be obliged to accept the computer's solutions because there are no obvious grounds for rejection or, should they feel sceptical, there will be no evidence to argue with.

The aim for Gradscope will be a decision strategy made explicit so that users can see exactly what has happened and judge for themselves whether they agree with the process or not and whether they can accept the answers or not. Full responsibility for further thought and research after receipt of the computer verdict is left with the student and he can actively develop his own sense of commitment to a particular occupation(s).

Gradscope must produce plausible solutions, to do otherwise might lead to immediate rejection of the whole system, but more important, the way to the solutions must be clearly shown.

2. Reaching any decision involves compromise as certain disadvantages may be overwhelmed by a number of advantages. It is important to encourage users to reconsider feelings towards what may prove to be prejudices and stereotypes.

Gradscope will aim not to rule out occupations on the basis of unsuitability on one or very few factors. This approach will also promote the appearance of occupations not normally brought out in human logic and reasoning because it will not work to the usual patterns and stereotypes.

GO/NOGO logic was discounted as a possibility in Chapter Four because of its inflexibility and unsuitability when there are large numbers



of factors.

3. At this early stage in Gradscope development, it will be important to ensure that the ways of using the system are as flexible as possible. The system must be capable of being seen as an aid for the careers adviser, the student or both, and to be usable and valuable whether used on-line or off-line, with or without external advice.
4. It is important that the match logic chosen should illustrate a decision-making process (as discussed in point 1) but also that the process decided upon be flexible in emphasis so that it can change as the student gains in understanding and familiarity with the system. In other words, the system will be programmed to one decision-making logic, but it will be a logic such that the user can vary its emphasis.

There are 54 questions in the system and the user will be free to select or ignore these as he chooses; he can decide to select occupations on factors he feels positively towards or he can select on on items he wishes to avoid. The avoidance choice option is considered important (as well as adding flexibility) as this is a method some people adopt in making their decisions. In many respects, the person who wishes only to avoid certain features is less difficult to please than one who definitely must have a number of qualities. It is unfortunate that some careers advisers regard a decision based on avoidance impulses as less desirable than one based on positive feelings. Individuals show a wide variety of decision-making strategies. Gradscope will be able to deal with both approaches and a number of other variations.

## The Chosen Match Algorithm

The match algorithm to be described was adopted because it seemed capable of fitting in with the considerations outlined previously. It seemed to be a way of treating all occupations and factors in the same way and of assessing the relative pros and cons within each occupation with a view to selecting those occupations offering the most 'pros'.

The occupations have been rated on 1 to 5 scales so 3 was subtracted from each rating to give a range of -2 to +2. Students are offered low, high or neutral choices. These are assigned -1, +1 and 0 respectively. Students are also allowed to weight up to six factors, which will be assigned twice the contribution of unweighted factors and this will also give a range of -2 to +2 for student choice.

Each factor in each occupation in the data bank is multiplied by the appropriate student choice to give a string of 54 products for each occupation. The possible products are shown in Figure 8.7.

Figure 8.7

### Possible Match Algorithm Products

		Occupational Rating					adjusted
		5	4	3	2	1	
		2	1	0	-1	-2	
Student Choice	Weighted 2	4	2	0	-2	-4	
	High 1	2	1	0	-1	-2	
	Neutral 0	0	0	0	0	0	
	Low -1	-2	-1	0	1	2	
	Weighted -2	-4	-2	0	2	4	



The products are summed for each separate occupation to give a total. Thus for each factor a value ranging from +4 to -4 can be added to each occupation's total or overall value. Where student choice concurs exactly with the occupational data and is weighted, the value is +4. Both  $+2 \times +2$  and  $-2 \times -2 = +4$ . When choice and data are diametrically opposed and weighted, the value is at its lowest, -4, and there are values in between. For factors the student feels neutral about, the value will be 0 and, in effect, those factors are not taken into consideration. Where occupational factors are rated average, the value will always be 0 on the basis that such factors will not influence the student either way. Gradscope selects on strong feelings for or against a factor that are satisfied by the occupation. Those occupations with most but not necessarily all strong feelings, exactly met or met in "direction" will score highest and should be the most attractive.

#### An Alternative Match Algorithm

It would have been possible to use a match algorithm based upon a subtraction logic, that is, establishing the difference between the occupation and student choice for each factor and then suggesting those occupations with the least overall difference from the student profile. The student data required for a subtraction logic would be his view of how much of each factor he would prefer in an occupation - expressed on a 1 to 5 scale, rather than the two-pronged approach taken in questionnaire QE which demands an assessment of strength of feeling and an indication of the direction of preferred level.

An amount of factor choice would require a different questionnaire wording and a match algorithm that would show the difference between the student's choice and the occupation's rating for each factor. If the 54 differences thus obtained were summed, the occupations with the lowest totals should be the most attractive as they would be least different



from specification. However, a subtraction logic demands (and implies) a far greater degree of accuracy than the method of data collection and the nature of the data can possibly provide, although there may be applications where a subtraction algorithm would be the more appropriate. The data bank ratings only provide an imprecise, relative guide to the amount of factor in the occupations as they compare with each other, there is no comparison against an outside standard to give a reliable measure of amount of factor, neither are students able to gauge the amount of factor they might prefer. Thus a strength of feeling scale would seem the better option. Students decide whether the factor is important or not and in what way and the multiplication algorithm is able to select occupations that meet his preferences as far as the direction of feeling is concerned. To venture further would be misleading.

### The Computer Results

It was decided to list the ten occupations from the full 112 with the highest totals. Ten seemed to be sufficient to provide some new ideas without being so many that students are confused. The number can easily be changed after a trial period. Results will be made available in two different formats to add flexibility to the ways of using the system.

One set of results will be given direct to the student for use without any careers adviser intervention and the other set will be available only to the careers adviser for use in interviews, or for the student to consult in conjunction with a careers adviser.

N.B. The computer program itself is described in Chapter Ten. This chapter deals with the design requirements that led to the program.



## The Computer Printouts

### Student Version

See Figure 8.8. The student printout listed the ten occupations with the highest totals. The choice of ten was arbitrary, but was considered the right number to ensure several suggestions that could interest the student. The totals that had led to the listing of the ten were not given as they might impart a feeling of 'exactness' of fit (and perhaps alienate those not impressed by numbers?).

The original questionnaire responses were also listed as a reminder and for checking. Against each occupation the factors contributing most to the total (+4) were given (as the code words used on student questionnaire QE at the right of each question). The information collected for factual questions 1 to 6 on the data collection questionnaire QB was also presented via a numbered 'key'.

The information given was intended to help students find out more about the occupations, decide whether they were interested in any of them and/or understand how they might alter their original profile in order to produce a more appropriate alternative set of suggestions.

### Careers Adviser Version

See Figure 8.9. This other printout was intended to be made available to students only through their careers adviser (it was intended to leave the decisions on how to use the other student printout up to careers services themselves, but it was felt to be suitable for issue to students without any supervision if that was preferred).

The printout gave each of the products that had contributed to the total







(also included) that had led to the occupations being listed as suggestions. The printout could therefore be used as the basis of an interview discussion. The products illustrate the pattern of logic (strategy) the computer has followed and show how the occupations listed differ from each other on each factor. The contrasts could help the student to understand, develop or defend his own views and strategies. The data bank contents themselves are indirectly available by working backwards from the products and student choice information. These may lead to a re-definition of a particular occupation or factor. (The data bank is now (1980) issued as a separate booklet by CSU, see Appendix 9 )

It is intended that students will be helped to focus on their priorities in life and possible ways of fulfilling them. Further profiles may be processed as their original views are modified; an on-line version of Gradscope would make this aspect more immediately obvious.

It was also possible (and the only extra match feature) for students to select an occupation(s) that was already of interest to them and receive its rank number within the set of 112 occupations.

Chapter Ten will describe the experiments and trials undertaken to show the applicability of the developed and working system to the original aims and the intentions put forward in later chapters.



## Chapter Nine

### EVALUATION

#### Evaluation of GRADSCOPE

The principal aim of the present project was not an evaluation of the resultant system but rather the production of the system itself. However, as part of the overall exercise it will be necessary to show some evidence that the system is effective and to point out directions for future development.

There will be some difficulty in establishing suitable criteria to demonstrate the system's effectiveness. Similar problems arise when attempting to show the usefulness of careers guidance as will be seen later in the chapter.

For GRADSCOPE it will be necessary to indicate that the system:

1. Meets its original aims.
2. Compares with traditional careers advice.
3. Adds something to the process of careers advice.

#### 1. Original Aims

From the beginning of the project the system was designed specifically around the aims listed in Chapter One. Aim 1, "to improve careers advice in some way", is covered by points 2 and 3 above.

## 2. Comparison with Traditional Careers Advice

A measure of the effectiveness of traditional careers advice will be required in order to judge how well GRADSCOPE compares. A straight comparison of a computer-aided system with other careers guidance technique would be unfair to both. One would not expect computer aids to provide exactly the same service as careers advisers, the rationale for developing computer-aided careers being that they can offer certain advantages (whilst suffering from certain obvious disadvantages). If it should appear that a computer system differs widely from the careers adviser, it does not follow that the system is invalid. The order and nature of the differences have to be considered.

## 3. Extra Dimension to the Process of Careers Advice

In order to determine whether a computer system does contribute an extra dimension to careers guidance, it will be necessary to select suitable criteria by which to measure traditional careers advice (perhaps several aspects of careers advice will need separate evaluation) and a computer-aided system. As certain differences are to be expected it will also be important that a "value" be allocated to the various criteria in order to reach a decision as to what style of careers advice is "better".

There are very many problems to be overcome if a computer system is to be adequately compared with other forms of careers guidance. Some of the difficulties encountered in several evaluations of careers advice itself will be outlined below and the conclusion reached that a strict comparison with other types of careers advice is not essential in the process of demonstrating the value of a computer aid.



## Evaluation of Careers Advice

Evaluation of careers advice implies an appreciation of the aims of the process. Divergence of opinion and practice among practitioners causes some of the apparent variations in the objectives of careers guidance. Some of the difficulties of establishing the precise purpose of careers guidance were discussed in Chapter Two. However, the over-riding all-purpose aim of careers advisers appears to be "help the client" but the ways of helping will depend upon the type of guidance being offered or sought.

Choice of criteria to illustrate the "help" received from careers guidance is also important. Certain criteria will only be relevant to a particular kind of careers guidance; for instance, measures of learning are relevant to developmental methods but not to diagnostic. It is also likely that different criteria will not always relate to each other.

Evaluation is further complicated by the number of different activities undertaken in careers services, some may be useful in certain cases and others less so. If it is assumed as discussed earlier in Chapter Two that most clients are interested in taking up employment eventually the measure of success for careers services could be the number of clients enabled to find the jobs or courses of further training they wanted.

However, a purely quantitative outlook misses some of the more subtle, qualitative aspects of careers advice. For example, is the client successful or satisfied with his employment, is his employer satisfied? There are also the individual client's feelings about the advice he received from his careers service, was it what he wanted? This issue may be confused by unrealistic expectations of guidance on the part of clients. Students may not always recognise what effects, if any, their



experience of guidance may have had.

The remaining problem is then the design of studies which will show the effects of careers guidance.

To sum up, there are at least three stages in the evaluation of a careers guidance "package":-

1. Definition of aims and objectives.
2. Selection of relevant criteria.
3. Design of a study.

Data is available from two contrasting sources:-

- a) As subjective evidence gathered from clients after their careers advice; included are reports of satisfaction with their jobs as well as features of greatest help in the guidance given and so on.
- b) As objective evidence which depends on collecting measures relating to the criteria thought to be relevant.

Evidence of both kinds has been used in evaluative studies aiming to show the outcomes of careers guidance.

Watts and Kidd (1977) review and discuss three different groups of evaluative studies all concerned with determining the overall effectiveness of a careers guidance programme (not including studies dealing only with clients' reported satisfaction with guidance received).

The three groups are:-

1. Studies of diagnostic accuracy.
2. Studies of the effectiveness of diagnostic guidance interventions.
3. Studies of the effectiveness of developmental guidance interventions.



## 1. Studies of Diagnostic Accuracy

Studies of this kind are among the earliest undertaken. They are simple in concept and seek to correlate various measured criteria (e.g., satisfaction with an occupation) with the extent to which the occupation entered is concordant or discordant with careers advice received. Burt et al (1926), Macrae (1932, 1933), Jennings and Stott (1936) and Handyside and Stott (1958) carried out broadly similar studies. In general, those who entered concordant occupations were more likely to consider themselves to be satisfied with their work, pay and prospects and less likely to be in lower paid jobs and less likely to have changed jobs frequently.

The Handyside and Stott (1958) study showed that those who had entered concordant occupations were more likely to report being satisfied but not more likely to report themselves as successful in their occupations.

Fariduddin (1971) followed up a small group 30 years after their original careers guidance and was unable to find any significant relationships between self ratings of competence and enjoyment and client or researcher ratings of concordance with the original advice. This suggests that predictive validity tends to operate over a relatively short period of time (the other studies' follow-ups ranged from six months to three and a half years) and that over time many other variables exert their effects. Possibly these findings imply that it could be unwise to attach too much importance to the predictive properties of careers guidance.

A study by Cherry (1974) followed up a large number of school leavers. She found that those who entered discordant occupations were more likely to leave within the first six months. Cherry also examined possible explanations for the observed differences. She sought



evidence for three alternative hypotheses:-

- a) that some personality factor led to rejection of guidance and failure in the first occupation,
- b) that careers advisers were unwilling to recommend entry to "undesirable" occupations (particularly unskilled work), thus those who implemented a recommendation might be more likely to enter pleasant work and so have a lower "failure" rate,
- c) that following careers advice led to clients starting work in a better "fitted" job (regarding match between ability and skill level and between occupational interest and field of work).

No evidence was found to support hypotheses a) and b), but hypothesis c) was supported.

Studies of diagnostic accuracy do not demonstrate the effects of careers guidance upon the client. They examine the validity of a careers adviser's judgement. However, it is possible that those clients that appear to follow advice would have entered the same concordant occupations without the benefit of guidance. It is interesting that Thomas and Wetherell (1974) report that in most careers interviews, discussion is focussed on ideas put forward by the client himself. In order to judge whether careers guidance makes any difference, a different kind of evaluation study is required.

## 2. Studies of the Effectiveness of Diagnostic Guidance Intervention

Studies of this kind require that a group receiving careers guidance (the experimental group) be compared with a group without the



benefit of the careers guidance (the control group) in order that the effects that can be attributed to the careers advice be identified.

There are a number of studies of this type, Earle (1931), Rodgers (1937), Allen and Smith (1932), Hunt and Smith (1944).

The experimental groups receive scientific guidance of a variety of kinds including interview, teachers' reports, medical examinations, home visits and the use of various psychological tests. The control group received standard school advice. Criteria taken to gauge differences include entry to concordant occupations, length of stay in the occupation, satisfaction and satisfactoriness. The experimental group tend to receive higher ratings but it also appears that some forms of guidance intervention are more effective than others - particularly those employing the use of certain psychological tests when the aim is to diagnose the individual's characteristics and to make recommendations.

### 3. Studies of the Effectiveness of Developmental Guidance Interventions

These studies aim to show the value of an alternative form of careers guidance, that of helping clients to make decisions for themselves rather than prescribing for them. The difference of aim requires a different choice of criteria with which to compare experimental and control groups.

A study by Jahoda and Chalmers (1963) compared a group of school leavers who had received a careers adviser interview with a group who had not. Measures were taken before and after interview. The experimental group did not improve on any of the three criteria - knowledge of local job opportunities, range of factors taken into



account in forming job preferences and the realism of the knowledge regarding wages.

Hopson (1970) and Butler (1971) looked at self concepts in relation to the use of tests. In both cases the experimental groups were found to have moved towards greater realism in their self-ratings on relevant attributes some time after they had been given the results of their tests.

Pumfrey and Warm (1972) investigated the effects of work visits with discussions and questionnaires and used the results of the Crites Vocational Development Inventory (a measure of vocational maturity) and the contents of "starting work" essays as criteria for comparison purposes. The guidance programme did lead to increased scores for the experimental group.

Thus "learning" criteria seem to show that developmental guidance programmes do have an effect. Hopson (1970) has taken the research a stage further in that he looked into whether the learning experience resulted in greater satisfaction with the occupation chosen. He found that the experimental group were not more satisfied in their work after 18 months but they had entered occupations more congruent with their measured interests and had made fewer but more constructive (more congruent with their first job choice) job changes. They also said that school had been more helpful in preparing them for work than did the control group.

In general there is no evidence that the developmental approach is any better than the more traditional diagnostic approach.

### Implications

All of the studies described involved school leavers or at least non-



graduates. However, there is no reason to believe that the situation for graduates is a great deal different, even if they may rely upon different criteria to differentiate occupations. Judging the value of computer-aided guidance will involve the same sorts of problems too. There is a need to decide what the results of the aid are expected to be and to select suitable criteria to sample and measure to show the effects of the system. As with traditional careers advice it will be difficult to decide which are relevant criteria and to devise ways of measuring them accurately. Studies, e.g. Heron (1954), show that different criteria measures do not necessarily correlate very markedly. It may not always be possible to find measures sensitive enough to illustrate change.

It would seem that the success or otherwise of a computer system must be judged over as many criteria as possible:-

- a) because of the need to show effects in some of the criteria chosen,
- b) because the nature of adjustment to, satisfaction with, and success at work is in itself multi-dimensional,
- c) because clients will vary in the way they interpret satisfaction,
- d) because careers advisers differ in their guidance objectives and practices.

A sampling of a wide number of possible outcome measures of careers guidance may be the best policy when wishing to ascertain its effects. At present concentrating on defining and identifying wider benefits from guidance programmes may be more rewarding than only attempting to produce measures and statistical evidence to prove one way or another that guidance is useful. If such an approach were accepted it would be quite in order to take as evidence clients' reported views on the helpfulness of the guidance they have received and to question them or



ask them to describe the ways in which it has helped them. It may then be possible to say that careers talks achieve x, individual interviews y and computer systems z. Individual client and careers adviser variables may also be identifiable.

### Evaluations of Existing Computer Systems

Two of the British systems have been subjected to evaluation. These are JIIG and ICGS. In both cases the evaluations were carried out primarily to aid future developments and system improvements rather than to demonstrate their overall effectiveness in careers guidance. Thus the studies adopted the approach of sampling individual views and eliciting comments as outlined in the previous section. All the studies to be described involved very few subjects, included their reported views and did not concentrate on gathering data to compare the system with other forms of careers guidance - that presumably would come at a later stage in the design and development.

### Field Trial of JIIG

#### Introduction and Aims

In August 1975, Closs and Thomas wrote a report on the operation of JIIG. For three months from March to June 1975 the JIIG system was used in the Edinburgh Occupational Guidance Unit. The three Occupational Guidance Officers (OGO's) and the Team Leader at the Unit used the system on-line as an extra aid in their normal casework. The aim of the exercise was to obtain certain useful information.



## Procedure

### Method

The information was gathered in three ways:-

1. The OGO's were interviewed individually at intervals before and during the trial.
2. Questionnaires were completed both by the OGO's and the clients in computer-aided cases.
3. All participants in the project, OGO's and researchers, took part in a discussion towards the end of the project.

### Subjects

The OGO's used JIIG whenever the client expressed a willingness to use the system. The information gathered was based on use with 39 clients: 20 male and 19 female. As no significant sex-based differences were identified results were presented for the whole group.

### Materials

1. Record sheet to be completed by OGO after each computer-aided interview.
2. Record sheet to be completed by client after each computer-aided interview.
3. Information to be gathered through discussion with OGO's.

### Results

Only those of the results relevant and OGO and client reactions to the system "contents" will be included - results relating to the reliability of the terminal, for instance, have been omitted here as they are particular to JIIG and not computer systems in general.

OGO Views

a) Attributes Used for Searching the JOBFIL

Attribute	Number of times used by individuals (% in brackets)			
	First Search (N=39)		Second Search (N=22)	
Interests	39	(100)	18	(81.8)
Dislikes	38	(97.4)	18	(81.8)
Sex	34	(87.2)	19	(86.4)
Phys. Char.	8	(20.5)	3	(13.6)
City/Rural	10	(25.7)	4	(18.2)
Region	4	(10.3)	0	( 0.0)
Quals	37	(94.9)	13	(59.1)
Routes	34	(87.2)	13	(59.1)
Health	9	(23.1)	1	( 4.6)
Shift	9	(23.1)	1	( 4.6)

It is interesting that Interests and Dislikes were among the most used search attributes.

b) Use Made of the Program with Clients

The researchers identified three possible uses of JIIG in the interview situation:

1. Information retrieval - information about particular occupations presented to the client.
2. Generation of job ideas.
3. Education of client in aspects of occupational choice.

The table indicates the frequency with which OGO's saw JIIG serving these uses and the importance they attached to them in relation to the use of JIIG.



Guidance Objectives	Rank Order of Importance (% in brackets)			
	1	2	3	0
Information Retrieval	5 (12.82)	13 (33.3)	5 (12.8)	16 (41.0)
Generation of Ideas	26 (66.6)	8 (20.5)	0 (0.0)	5 (12.82)
Education	4 (10.26)	8 (20.5)	17 (43.6)	10 (25.65)

OGO's rated the extent to which an objective had been met in each particular client case. The "0" rating was used if it was felt JIIG had made no contribution on that objective.

c) Clients' Attitudes to the Use of JIIG

	Attitude (% in brackets)		
	Positive	Neutral	Negative
Total: 39	19 (48.7)	18 (46.2)	2 (5.1)

d) OGO's Tentative Ideas on the Use of JIIG

No. of times OGO's tentative ideas altered	No. of times OGO's tentative ideas confirmed by program
11                    28.2%*	32                    82.1%*

\*N=39

e) Perceived Utility of JIIG

	Perceived Utility (% in brackets)			
	Very Useful	Fairly Useful	Of Some Small Use	No Use
Total: 39	5 (12.9)	20 (51.3)	11 (28.2)	3 (7.7)

f) Relationship between Occupations agreed upon and Ideas generated by JIIG

Generated by JIIG    Influenced by JIIG    Shown by JIIG

Total: 39            16 (41.0)            16 (41.0)            29 (74.4)

Generated by JIIG = JIIG responsible.

JIIG influenced = not generated by JIIG but arose from a JIIG idea.

Shown by JIIG = OGO and JIIG produced same idea independently.

Client Views

Not all clients were able to complete questionnaires due to lack of time. Results are based on 32 subjects.

a) Utility of the System

Clients indicated the use JIIG had been to them on the same criteria used by the OGO's:-

i.e. a. provision of useful information.

b. suggestion of job ideas.

c. increased awareness of factors involved in choosing an occupation (educational).

	Useful Information	Job Ideas	Educational
Total: 32	26 (81.3%)	30 (93.8%)	15 (46.9%)

b) Particular Likes about Using JIIG

Nine clients (28.1%) had nothing to say.

Nine clients (28.1%) - impressed with the variety of job ideas generated.



Eight clients (25%) - impressed with the speed with which the system worked.

c) Dislikes and Suggestions for Improvements

Ten clients (31.2%) made no comment.

The largest group, four (12.5) mentioned lack of information on job content.

Other comments are not reported.

Field Trials of ICGS

First Field Trial and Pilot Study

Introduction and Aims

The main aim of the first trial was to gain information to shape further and future work. The overall system objectives were the promotion of vocational awareness and an appreciation of the short-term and long-term consequences of various decisions. Secondly, the system provided detailed information on occupations, and, thirdly, it aimed to release careers teachers and officers from non-counselling functions for their professional role of counselling. This first study carried out between April and June 1974 would be followed by a more formal evaluation.

Procedure

Method

The method was informal, records were kept of students using the system, the time spent connected to the computer, and the particular system commands used. Opinions were given informally by teachers, students and parents.

## Subjects

The subjects were third, fourth, fifth and sixth year students at two schools in Cheshire. Overall, 98 students used the system during the pilot study.

Third, fourth and fifth year students tended to have use of the system in groups with a careers teacher. Some fifth and sixth year students had individual use.

## Results

### a) Range of Functions carried out by the Counsellor

1. Provision of technical assistance and content clarification.
2. Discussion of the students' inputs.
3. Amplification and discussion of occupational information.
4. Help in interpretation of feedback or of integration into the students' decision-making and career planning. With teaching sessions beforehand and written instructions, the counsellor did not have to be constantly at the terminal - the system did not depend on the counsellor.

### b) Group and Individual Use

The advantages of group use appear to be:

1. When using simulation exercises in career planning and training in decision-making.
2. Less waste in terms of computer time and manpower.
3. In enabling students to understand themselves in relation to others.

Possible disadvantages may be:

1. Embarrassment when discussing self-perceptions in front of a



group.

2. Boredom if not actually using the terminal.

c) Usage

98 students used the system, 83 used the system for more than 20 minutes. Only average session times are given but it seems that most students used the system more than once and for sessions of between 20 minutes and just over one hour.

SEARCH was by far the most popular command, other commands being used less than had been anticipated.

For younger users, school subject preference was most often used during SEARCH. For older students "interests" and "qualifications" were the most popular. The "values" section was also used most by upper sixth years and progressively less further down the school.

d) Informal Feedback

Students who had used ICGS said that it:-

1. suggests occupations which they had not thought about before,
2. provides new information about occupations in which they were already interested,
3. suggests new factors to take into account when making career choices,
4. makes them aware of effects certain decisions might have,
5. gives quick and easy references to the careers library.

Counsellors said that ICGS:-

1. gives faster and more accurate recall of careers information,
2. keeps more detailed records of individual counselling sessions,
3. has cut down information-giving during interviews from 50% to 20%,
4. allows study of the changes in a student's vocational maturity

over several sessions,

5. gives an expanded careers education curriculum (i.e. provides a structure for careers education programmes).

Many students remarked on increasing involvement of their parents in school courses and careers choice. The printouts seem to have made this possible.

## Second Field Trial

### Introduction and Aims

The system was designed to complement careers education and to aid careers advisers so that they can work more effectively with clients when relieved of some of the more routine information-giving. The first field trial indicated that this objective was met. The aim of this second field trial was to demonstrate a change in the vocational maturity of clients with the use of ICGS and to compare the change in vocational maturity with changes experienced with other forms of careers advice.

### Procedure

#### Method

Three different groups of students were involved:-

1. those receiving normal careers guidance,
2. those receiving assistance with an off-line careers package (prepared by Cheshire Careers Service),
3. those receiving assistance with careers package and the computer on-line facilities.

The trial period was twelve weeks between January and March 1975. The method involved surveys of opinion.



- a) Each student and his parent answered questionnaires before and after the trial period.
- b) The careers officers and teachers involved in the trials also completed questionnaires before and after the trial.
- c) Discussions were also carried out with a selection of students, careers officers and teachers after the trial.

### Subjects

The subjects were 344 fourth to upper sixth year students at the same two schools in Cheshire as the first field trial.

### Materials

The questionnaires covered the following topics:-

#### a) Students

- (i) "Fantasy", "probable" and "possible" job choices.
- (ii) Plans made to obtain the "possible" job chosen.
- (iii) Thoughts on what school should do to help choose a career.
- (iv) Help given by school (and views about it).
- (v) Information requirement about jobs.
- (vi) Description of self.
- (vii) Views on computing.
- (viii) Views on ICGS (on-line students only).
- (ix) Views on careers guidance in general.

#### b) Parents

- (i) Knowledge of and thoughts about the form of careers guidance.
- (ii) Information needs about jobs.
- (iii) Discussions with children about careers.

- (iv) Wishes for their child's career.
  - (v) Socio-economic grouping of the head of the household.
- c) Careers Officers and Teachers
- (i) Agreement with statement about the objectives of careers guidance.
  - (ii) Views on computerisation related to careers guidance.

Discussions carried out after the trial aimed at pinpointing the advantages and disadvantages of the system, whether it achieved its objectives and development for the future.

"Before" and "after" responses were to be compared and each of the three groups.

### Results

Too few of the students completed their questionnaires for there to be enough data for a meaningful analysis.

The time period chosen, of less than three months, was rather short for any observable changes in thinking and attitude to be measurable. A year at least would seem advisable.

The questionnaire itself was probably not a suitable instrument for measuring "vocational maturity". A properly standardised test developed for the U.K. is required.

The computer system was also dogged by unreliability and slow response time throughout the period of the trials which reduced interest and observable results.

However, certain views on ICGS were gathered from students as part of the survey (as in the first trial) and showed the following:-



## 1. Student Views on the Contents of ICGS

Statement	Proportion who agreed or agreed strongly (%)
Details of job descriptions were good	60
Details of job requirements were good	78
Number of jobs described was good	82
Details of the scheme were about right	65
Facilities for group use were good	64
Facilities for individual use were good	30
Student profile descriptions were good	14

## 2. Student Views on the Objectives of ICGS

Statement	Proportion who agreed or agreed strongly (%)
My career ambitions have been affected by the system	8
Careers guidance is more interesting with the use of computers	54
The computer can help with careers guidance, given an efficient scheme	73
The computer can be useful in:	
building a picture of myself	43
comparing myself with a job	73
sorting through information	100

ICGS was generally liked by students, careers officers and teachers alike.

## Independent Review of ICGS

Watts of the Careers Research and Advisory Centre (CRAC), carried out an independent review of ICGS in the summer of 1974. (Watts, 1975). He visited the two schools where the field trials were conducted.

Watts' questioning of students, teachers and careers officers confirmed the findings of the first field trial - and the trial that was carried out afterwards. The system showed potential for the future; Watts was able to suggest a number of areas for improvement and to recommend a programme of carefully evaluated field trials lasting over a year, including less able students and group and industrial use.

## SIGI Field Test and Evaluation

### Introduction and Aims

Field tests were begun in December 1974 and the final report was published in 1977. SIGI is a career guidance and information system. The aim is to produce "an autonomous individual capable of making informed and rational decisions". The emphasis is not just on the content of decisions but upon the process of decision making.

### Procedure

#### Method

The following information was taken from a summary of the two volume main report. In some instances full details are not available.

Five Community Colleges and one university participated in the field trials. The institutions were widely varied in region, size, population, curriculum and careers guidance programme.

Evidence was collected:-

1. to improve the operation of SIGI (formative evaluation)
2. to assess the impact of SIGI as a careers guidance system (summative evaluation).



1. The Formative Evaluation Covered:-

- a) Problems of gaps found by students in the displays and contents.
- b) Whether all elements of the system were used.
- c) Whether the do-it-yourself manuals could be used efficiently.
- d) Validity of the "test-free prediction system".
- e) How SIGI could be integrated with the total careers guidance programme.

2. The Summative Evaluation covered Five Major Areas:-

- a) Hardware reliability and cost.
- b) Student reactions to SIGI.
- c) The effects of SIGI on student career decision making.
- d) The impact of SIGI on counselling activities and guidance problems.
- e) Summary data on student use of SIGI.

Subjects

The subjects were students, counsellors and other staff at five American community colleges and one university. Numbers are not stated in the summary.

Procedure

1. The Formative Evaluation

- a) Questionnaires were issued to counsellors and SIGI users, asking among other items for:-
  - (i) Views on the clarity of displays and comprehensiveness of information.
  - (ii) Details of problems in the operation and use of the system.

- b) The system itself kept records of individuals' interaction with the system.
- c) Small samples of students were interviewed.

## 2. The Summative Evaluation

- a) Records were kept over a three month period of problems affecting the operation of SIGI hardware.
- b) & c) Questionnaires were administered to two sets of students:-
  - (i) Random samples of SIGI users - the experimental group.
  - (ii) Random samples of students yet to use SIGI - the control group.

This was to show any differences between the groups that could be attributed to SIGI.

Also ten to seventeen students were interviewed at each institution.

- d) Questionnaires were administered to counsellors who worked with SIGI users or in the area of careers counselling.
- e) The computer collected descriptive data on the interaction of students with SIGI to show the extent and patterns of use.

## Results

Results taken from the field test summary will be given where they were thought to relate to the present project - e.g., details of hardware reliability were not considered relevant.



## Content and Presentation

Content and presentation were very highly thought of both by students and counsellors.

## Test-free Prediction System

Predictions of performance based on non-test prediction variables that included students' own self ratings of behaviour associated with good grades for a particular course and their own informed estimates of final grades were as 'valid' as predictions obtained from test scores.

Self ratings can be a good guide and also enable students to become active participants in the prediction process.

## The System

### Internal Consistency

Internal consistency was of a high order. Values most heavily weighted in the "Values" system were most frequently selected for retrieving occupations in the "Locate" system. Occupations most often retrieved in "Locate" were more frequently selected for examination in the "Compare" and "Strategy" systems.

### Sufficiency of Individual Subsystems

Each of the ten values and six interest fields were important to some students. The weights assigned to each value varied widely.

Each of the ten values was selected for use by at least some students in the "Locate" system.

Every occupation in SIGI was retrieved and used in the "Compare" system.

Thus there is seen to be a wide range of values and specifications used by students and a corresponding differentiation in the characteristics of occupations.

### Impact on Students

Interviews showed that through SIGI students seemed to:-

1. Acquire a vocabulary for communicating ideas relating to careers choice - e.g. the SIGI values.
2. Gain an awareness of structure in decision making.
3. Show purposive behaviour - they had reasons for liking or disliking an occupation and often took actions towards particular goals - for instance, changing course of study.
4. Move forward in the process of making a decision.

However it was not always felt that students completely understood the SIGI algorithm. (Note:the actual process of relating the retrieved occupations to the chosen values in the "Locate" system is not actually explicit to the user.)

### Differences between Experimental and Control Groups Shown in the Questionnaire Responses

Results at the different colleges were not always the same, but overall there were certain significant differences between the experimental and control groups.

SIGI users (Experimental Group):-

1. Displayed greater knowledge of the rewards and satisfactions they wanted from an occupation.
2. Had more career plans.
3. Thought they could predict their grades better.
4. Knew better which course to enrol in for their occupational goals.



5. Had greater confidence in their career decision making ability.
6. Used the reference library more frequently.
7. Talked with guidance counsellors more often.
8. Used career related audio-visual materials more frequently.
9. Rated themselves higher as decision-makers and in their knowledge of occupations.
10. Had more accurate knowledge of the occupation they might enter.
11. Were more willing to interact with a computer.
12. Were less inclined to follow the advice of parents and friends.
13. Were less likely to be confused by conflicting advice.
14. Were less likely to think knowledge of marriage plans crucial to career decision making.
15. Had a clearer knowledge of their values and goals.

#### Impact on Guidance Programmes - Careers Counsellor Views

##### Acceptance

Counsellors showed a high acceptance of computer-based guidance - and of SIGI in particular. They did not consider the use of computers a fad or a threat to them. Rather they felt that such systems would relieve them of routine duties and would help students with career decisions.

##### Use of the System

Almost all counsellors (56 out of 57) referred students to SIGI and all who observed student response to SIGI thought it favourable.

##### Impact on Problem Areas

Most of the areas identified as major or minor problems were aided by SIGI.

The serious problems of:-

- (i) getting students to read occupational information
- (ii) keeping information up to date

were thought by more careers counsellors to have been alleviated.

Fewer thought there had been an impact on some of the less serious areas.

#### Impact on Counselling Activities

SIGI is not seen as taking over the burden of careers counselling - rather it improves the quality of sessions. Students arrive with a better background, with better formulated goals, with more occupations in mind and with a more structured approach. Time spent giving basic information is cut down. The session is used for more important matters and the student can gain more from it.

#### Overall Perspective (Conclusions from the Summary of the Report)

SIGI seems sufficiently flexible to fit into a wide range of counselling practice and programmes and still be effective.

Students prefer a combination of SIGI and counsellors for help in their career choice whilst counsellors themselves prefer to play a part in student choice. SIGI and the human counsellor can and should complement and supplement each other.

SIGI's role would be that of providing:-

1. algorithms for decision making
2. vocabulary for communication
3. basic steps of values clarification.

The counsellor's role would be that of:-

1. interpreting and explaining
2. supplementing
3. helping with personal problems.



SIGI in conjunction with a course or group seminar also seems to be effective.

Counsellors, SIGI and information facilities need to be in accord.

SIGI should best be available to students to use as and when they choose.

A number of independent evaluations have confirmed the above findings. The fact that such studies have been undertaken is in itself a bonus in that thorough consideration of the objectives of careers guidance and planning of programmes will have been stimulated. SIGI has also shown itself to be a catalyst in the process of improving careers guidance.

#### Evaluation of Computer-Aided Guidance Systems - Conclusions

The studies and results outlined above show that computer-aided guidance is helpful and meets the aims set for it.

The computer approach has not been directly compared with traditional careers advice - there is no reason for expecting the two approaches to compare as explained earlier.

Computer aids in careers guidance are able to:-

1. produce new job ideas
2. retrieve information
3. enhance vocational awareness
4. release careers advisers from a significant part of routine information giving.

SIGI has been shown to contribute a great deal more.

So far only indirect, reported evidence is available. Time has been too short for more formal studies, or such studies have proved inconclusive. However, at this relatively early stage in the development of computer-aided advice it would seem best to collect the informal evidence readily available and to improve computer systems by working from the material and ideas so gained.

Scientific, fully objective studies of careers advice or computers in careers advice may well never be necessary in that careers guidance is a process that depends upon the feelings of clients as much as upon their behaviour. Objective studies may be necessary to justify expenditure on the activity of careers guidance. Objective studies of computer aids for careers guidance are irrelevant until the formal evidence available shows that the system is as complete as the human, practical and economic resources drawn upon will allow.

SIGI has not been tested in the fully scientific way outlined above, but the evidence described demonstrates that SIGI is useful. SIGI does improve careers counselling for students and counsellors alike.

#### Summary - The Problems of Evaluating Careers Advice

The points are not listed in the order discussed in the chapter.

1. Evaluation of careers advice whether given by careers advisers or computers is difficult and inconclusive.
2. Other computer systems have in most cases not been evaluated. What evaluation has taken place has mainly been concerned with collecting evidence to improve the system rather than to prove its objective value.



3. What evidence is available suggests that computer-aided guidance is useful.
4. In the absence of any conclusive measure of careers guidance effect, the best approach is to take as many separate measures as possible to illustrate the value of a system.
5. Despite the difficulties outlined above some evaluation of Gradscope is expected to show that it goes at least some way towards meeting its original aims and to gather data to shape future improvements.

## Chapter Ten

### SETTING UP AND TESTING THE SYSTEM

#### The Computer Program

Before the final form of match algorithm was confirmed for the system, a number of manual sortings of 50 occupations from the data bank had taken place using profiles from students, careers advisers and the thesis writer. The process was very slow and painstaking, but did show that different profiles lead to different lists of ten suggested occupations, that generally individuals were interested in their personal list and that a computer is necessary to deal speedily and efficiently with the data.

The multiplication match algorithm favoured for the system appeared, as far as can be certain without expending much time on testing, to be better than an alternative subtraction logic. The lists produced by multiplication logic tended to include more occupations of interest. Multiplication had been preferred for a number of theoretical reasons already discussed in Chapter Eight so it was decided to base the first working computer system upon a multiplication match algorithm.

Conducting relevant research exercises at each stage of system design into the many feasible alternatives does not guarantee a functioning system as an end product. Arriving at an integrated working computer system to be used in careers services and assessed by the people most directly



concerned has been an important aim for the project. At this point, it was decided to go ahead and write a computer program to link up with the system components already described. A final year student from a Computer Studies course at the University of Liverpool was hired for September 1977 to write a computer program to specifications supplied.

### Program Specifications

Student input data would be taken from the Profile Form shown in Chapter Eight as Figure 8.6 and consisted of: name, institution, date and the 54 responses to the Student Questionnaire (QE), including indication of weighted responses. Input would initially be via punched cards.

The system data bank consisted of 112 occupations, each with data covering the 54 factors. Extra information, as shown on the student printout, Figure 8.8, was stored for the computer printouts. The computer match algorithm followed the logic explained in Chapter Eight under the section, 'The Chosen Match Algorithm'.

The products for factor and student choice for each occupation were summed to give a total. The products and totals were saved to be added to the careers adviser printout and the ten occupations with the highest totals were to be listed on the printouts.

(A subsidiary program, required for a control experiment, listed all 112 occupations in descending order of total.)

The program could also indicate on the printouts the rank position, in the 112, of an occupation selected by the user beforehand and identified by the appropriate code number submitted as part of the input data.

The ten occupations were listed on two different printouts: one for the



student and one for his careers adviser. Both are shown in Chapter Eight as Figures 8.8 and 8.9 respectively and the reasons for the dual presentation given. The design and layout were also influenced by certain line-printer restrictions—each line was limited to 120 characters and a page of output to 60 lines.

The program was written in FORTRAN and installed at the University of Liverpool under the supervision of the thesis writer.

During the program writing, weighted factor choices were assigned a number of different contributions as alternatives to the doubling effect discussed in Chapter Eight. In most cases, even with weightings increased to a factor of nine, the listed occupations did not change very much. It seemed that the pattern of choices was as important as the contribution to the results made by each factor. Thus the doubling effect was retained for weightings in the experimental version of the system.

## Field Tests of the System

### Introduction and Aims

As the important aim of producing a complete working system had been achieved, an evaluation was the next step. In Chapter Nine, the problems of measuring the effects of careers advice were discussed. With both traditional careers adviser and computer-aided guidance there are difficulties in deciding upon overall aims and of selecting suitable criteria to test whether those aims are achieved.

For computer-aided guidance, information on at least three different as-



pects of system function is of relevance:-

1. Information concerning the system as a "package", including evidence to improve the design of the student questionnaire, profile form and the computer printouts as well as the instructions given with the system and the operational convenience of the whole.
2. Information concerning the "quality" of the occupational suggestions produced by the system so that efforts can be made to improve their relevance or sense as perceived by users.
3. Information to demonstrate the general usefulness of the system in areas other than the generation of occupations so that the benefits can be enhanced and added to wherever possible.

Information on all three aspects is also required to justify the allocation of resources to computer-aided guidance.

### Procedure

#### Method

Three different approaches were adopted for gathering information upon Gradscope in use:-

1. Questionnaire survey to gather views and information from students and careers advisers who had used the system.
  2. A control experiment to compare the system with an alternative.
  3. Collection and analysis of any available and relevant statistical information.
1. Questionnaire Survey (QF and QG on the Plan of Gradscope Development)

A questionnaire (QF) was given to subjects after they had used a

Figure 10.1

Survey Questionnaire QF

Please would you comment upon the questions you have just completed.  
Ring 'yes' or 'no' below and explain whenever possible.

---

1. Did you find the instructions clear and sufficient? YES/NO
2. Did you find the profile form straightforward to use? YES/NO
3. Did you like the form of the questions? YES/NO
4. Did you find the questions covered enough ground? YES/NO
5. Did you think some questions unnecessary? YES/NO
6. Were there any questions where you really wanted to choose the answer that is not allowed for? YES/NO
7. Have you found that answering the questions has helped you? YES/NO
8. Have the questions given you new ideas? YES/NO
9. Have the questions organised some existing ideas? YES/NO
10. Other? - specify.



Figure 10.2

Survey Questionnaire QG

DATE OF INTERVIEW \_\_\_\_\_

NAME \_\_\_\_\_

DEGREE SUBJECT \_\_\_\_\_

M / F

STUDENT VIEWS - to be recorded by C...

1. Are the 10 suggestions of interest to you?

Tick those that are ) Indicate against 1st block of  
Cross those that are not) 18 on your printout.

Give reasons where these are obvious.

2. Are there any occupations that you feel ought to have been suggested?  
(Indicate here).

3. Do you find the printout form layout easy to use? Yes / No

What do you like?

What could be improved? - how?

4. Has taking part in these trials been of help to you? Yes / No  
Explain

Careers Adviser Views

1. Is the student looking for occupations in the 'any discipline'  
area? Yes / No

2. Are the 10 suggestions relevant? (i.e. could you see this student  
in the occupation?)

Tick those that are ) against 2nd block of 18  
Cross those that are not)

Give reasons where possible.

3. Are these occupations that would have come up without the system?

Tick those that would ) against 3rd block of 18  
Cross those that would not)

PTO - use overleaf to expand answers

Figure 10.2 (Cont'd)

4. What other occupations would you have suggested?  
(Indicate here)
  
5. Was this student better prepared for interview than you might have expected because he / she had taken part in these trials? Yes / No  
In what way?
  
6. What factors from the Questionnaire did you discuss?

-----



student questionnaire (QE) and profile form but before their data was processed, to establish their reactions. See Figure 10.1.

A further questionnaire (QG) was completed by both student and careers adviser when the former received his occupational suggestions from the system at a careers advisory interview. See Figure 10.2.

Both questionnaires encouraged students and careers advisers to make their own comments in the hope of identifying areas for future investigation and explaining findings for the current evaluation.

## 2. Control Experiment

A small experiment was carried out to check that the system produced more suggestions of interest than might be expected by listing ten occupations at random for students to consider: in effect to demonstrate that Gradscope "works".

## 3. Statistical Survey

Records were kept of:-

- (i) Each system user's 54 responses to the questionnaire QE.
- (ii) The times each occupation appeared on a printout.
- (iii) The "first destinations" of a sub-set of the subjects when they graduated in summer 1978.

## Subjects

1. For the questionnaire survey, the subjects were 155 final year students from the following institutions:-

	Total	Sex	Degree Subject			
	Number	M/F	Arts	SES*	Sc	Eng
City University	31	25/6	0	9	13	9
U. of East Anglia	31	19/12	14	13	4	0
U. of Liverpool	56	28/28	18	7	31	0
U. of Aston	20	10/10	6	8	5	1
U. of Oxford	13	9/4	12	1	0	0
Lanchester Poly	4	1/3	1	3	0	0
	—	—	—	—	—	—
	155	92/63	51	41	53	10

2. For the control experiment, the subjects were 15 second year students from the University of Liverpool.
3. For the statistical survey, the subjects were:-
  - (i) and (ii) 222 students from the institutions listed previously including the 155 who also participated in the questionnaire survey.
  - (iii) 56 students from the University of Liverpool who also participated in the questionnaire survey.

### Materials

1. Introductory letter to subjects. Figure 10.3.
2. Student questionnaire QE. Figure 8.6.
3. Profile form. Figure 8.7.
4. Questionnaire QF. Figure 10.1.
5. Computer printouts:
  - (i) Student version. Figure 8.8.
  - (ii) Careers adviser version. Figure 8.9.

\* SES = Social and Environmental Sciences.



Introductory Letter to Subjects to Accompany QE and QF



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TEL: 051 - 709 - 6022

The University of Liverpool

SRW/EAN

February 1978

The Association of Graduate Careers Advisory Services is hoping to introduce a computer system for University and Polytechnic students to aid them in occupational choice by the academic year 1978-9. This present version is only a prototype but is fully operational. We need to check upon the quality of occupational suggestions made, so we would appreciate your help.

(Questionnaire design is being tested separately).

Would you please fill in the profile form included and return the whole thing to the Appointments Board as soon as possible, your profile form will be compared with the data bank and the resulting suggestions given to you at your interview. (Please do not forget to put your name and date of interview at the top of your profile form).

Many thanks for your help.

S.R. Whipple.

6. Questionnaire QG. Figure 10.2.
7. Control Experiment Form. Figure 10.4.

## Procedure

### 1. Questionnaire Survey

The exercise required the co-operation of a number of careers advisers, who received the necessary instructions and explanations via the telephone and in writing (some were members of the project steering committee and so were familiar with the system). It was intended that subjects should be third year (or final year) students and, if possible, be interested in "any discipline" entry rather than degree related occupations but this was not always possible to control for.

Between October 1977 and February 1978, suitable students were approached when they booked careers advisory interviews, participation in the field trials being entirely voluntary. The subjects completed a Gradscope Profile Form and a questionnaire (QF) which were posted by their careers service to the University of Liverpool where the thesis writer transferred the profile information to the computer and posted the results back as soon as they were available. The subjects' careers advisory interviews were booked sufficiently ahead to allow processing time so that at a suitable point in the interview, the careers adviser and subject could look at and discuss the computer suggestions and, between them, complete questionnaire QG.

### 2. Control Experiment

The subjects completed profile forms and the data was transferred to the computer and processed by the program which listed all 112 occupations from the data bank in descending order of total. From the



Figure 10.4

Control Experiment Form

NAME :

DEGREE :

	OCCUPATION.	STUD- ENT	C.A.	COMMENTS.
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

Using appropriate column  if you would consider the occupation .  
 if you would not.  
 if you do not know.

Have you decided upon an occupation ? YES / NO  
 If yes what is it ?

listing the thesis writer produced a form (see Figure 10.4) presenting up to thirty occupations for each subject to consider. It consisted of their top ten and bottom ten as calculated by Gradscope and a random selection from among the 112 occupations in a scrambled order. Subjects were asked to indicate occupations that would interest them, those that would not and those they were uncertain about. Their careers adviser made parallel indications on the suitability of the occupations presented.

### 3. Statistical Survey

- (i) The subjects' input data punched cards were saved for later computer analysis.
- (ii) As each set of computer printouts were produced, the occupations that had been listed were ticked off on a checklist.
- (iii) In the Autumn Term of 1978, the required data was extracted from the first destination returns collected by the University of Liverpool Appointments Board and compared with the occupations that had been listed on their printouts.

## Results

### 1. Questionnaire Survey

Information from the questionnaires was coded on to punch cards for computer analysis - for codings see Appendix 10. All analyses were carried out by means of the Statistical Package for Social Sciences (SPSS) program.

Results were as follows:-



Figure 10.5

Reactions to the Student Questionnaire and Profile Form

Q1. Did you find the instructions clear and sufficient?

Yes 89.6% No 10.4%

(11 subjects did not respond.)

Q2. Did you find the profile form straightforward to use?

Yes 95.1% No 4.9%

(12 subjects did not respond.)

Q3. Did you like the form of the questions?

Yes 46.9% No 53.1%

(12 subjects did not respond.)

A number of subjects commented that the question form demanded too definite a commitment for or against; they would have preferred a 1 - 5 scale.

Q4. Did you find the questions covered enough ground?

Yes 75.9% No 24.1%

(14 subjects did not respond.)

Q7. Have you found that answering the questions has helped you?

Yes 52.5% No 47.5%

(14 subjects did not respond.)

Q8. Have the questions given you new ideas?

Yes 19.1% No 80.9%

(14 subjects did not respond.)

Q9. Have the questions organised some existing ideas?

Yes 59.2% No 40.8%

(13 subjects did not respond.)

Q5. Did you think some questions unnecessary? and

Q6. Were there any questions where you really wanted to choose the answer that is not allowed for? were not analysed as answered by so few, but comments and suggestions were noted.

Questionnaire QF - reactions to the Student Questionnaire QE and the Profile Form. The percentages given are of those who answered the question. An indication is given of the level of non-response. Subjects' comments and suggestions were noted. See Figure 10.5.

Questionnaire QG - reactions to the ten suggestions and the system as a whole. Results are shown in Figures 10.6, 10.7, 10.8, 10.9 and 10.10.

Student Views

Figure 10.6 Student Reactions to the Ten Occupational Suggestions

Q1. Are the 10 suggestions of interest to you?

	% Indicated		
	Yes	Perhaps	No
0	4.5	65.2	2.6
1	10.3	16.1	5.8
2	8.4	5.8	6.5
3	16.1	7.7	14.8
4	16.8	1.3	16.1
5	12.3	1.9	14.2
6	11.1	1.3	14.8
7	10.3	-	11.0
8	5.2	-	5.8
9	3.9	-	5.8
10	1.3	0.6	2.6
Mean	4.3	0.8	4.9
S.D.	2.4	1.5	2.3



Figure 10.7

Other Student Views of the System

Q2. Are there any occupations that you feel ought to have been suggested?

Yes 55.0%                      No 45.0%

(4 subjects did not answer the question.)

Q3. Do you find the printout form layout easy to use?

Yes 94.5%                      No 5.5%

(9 subjects did not answer the question.)

Q4. Has taking part in these trials been of help to you?

Yes 66.7%                      No 33.3%

(8 subjects did not answer the question.)

Careers Adviser Views

Figure 10.8 Careers Adviser Reaction to the Ten Occupational Suggestions

Q2. Are the 10 suggestions relevant? (i.e. could you see this student in the occupation?)

	% Indicated		
	Yes	Perhaps	No
0	5.2	64.5	8.4
1	7.7	14.2	11.6
2	7.1	10.3	13.5
3	9.7	3.9	10.3
4	10.3	1.9	9.7
5	14.8	1.3	10.3
6	10.3	0.6	8.4
7	14.2	-	9.0
8	8.4	-	5.8
9	4.5	-	7.1
10	5.2	0.6	3.2
Mean	5.0	0.7	4.3
S.D.	2.7	1.4	2.9

(In 4 cases this question was not answered.)

Figure 10.9 Occupations That Would Not Have Come Up Without the System

Q3. Are these occupations that would have come up without the system?

	% Indicated		
	Yes	Perhaps	No
0	12.9	71.6	5.2
1	9.7	11.6	9.0
2	11.0	3.9	6.5
3	7.7	0.6	11.0
4	13.5	1.9	11.6
5	12.3	0.6	9.7
6	11.0	0.6	10.3
7	7.1	0.6	8.4
8	5.2	0.6	9.7
9	6.5	0.6	7.7
10	-	3.9	7.7
Mean	4.0	0.9	5.1
S.D.	2.7	2.4	2.9

(In 5 cases this question was not answered.)

Figure 10.10 Other Careers Adviser Views of the System

Q1. Is the student looking for occupations in the 'any discipline' area?

Yes 80.6%                      No 19.4%

Q4. What other occupations would you have suggested?

One/Several 67.3      None 32.7

Q5. Was this student better prepared for interview than you might have expected because he/she had taken part in these trials?

Yes 26.9%                      No 73.1%

(In 21 cases the question was not answered.)

Q6. What factors from the questionnaire did you discuss?

Comments were noted.



Figure 10.11

Other Information Taken From Questionnaire QG

(i) Proportion of male/female subjects

Male 59.4%      Female 40.6%

(ii) Degree disciplines of subjects

Arts	32.9%
Social & Environmental Sciences	26.5%
Science	34.2%
Engineering	6.5%

(iii) Subjects who had already decided on an occupation

Yes 23.9%      No 76.1%

(iv) Occupations that would not have come up at interview compared with occupations of interest to students and careers advisers

70.1% of students were interested in at least one of the unexpected occupations.

61.0% of careers advisers thought at least one of the unexpected ideas of relevance.

(v) Totals for first occupation on each list

Range 2 - 44

Mean 24.1

S.D. 8.3

Connections Between Variables

A number of crosstabulations were carried out on the data coded from the comment forms by means of the statistical package. Chi-square figures were obtained. The cross-tabulations were as follows:-

Firstly, a number of variables were compared with the student views on

(a) whether the system had been of help (S HELP)

(b) whether the student questionnaire had been of help (Q HELP).

Results are shown in Figure 10.12.

Figure 10.12 Student Views on System and Questionnaire Helpfulness

(i) (a) Sex by S HELP and (b) Sex by Q HELP

No connection was observed.

(ii) (a) Degree subject by S HELP and (b) Degree subject by Q HELP

No connection was observed.

(iii) (a) Interest in any discipline occupations by S HELP

Interest in such occupations was positively related to positive views of the system helpfulness. ( $P = .001$ )

(b) Interest in any discipline occupations by Q HELP

No connection was observed.

(iv) (a) Already decided on occupation by S HELP

No connection was observed.

(Mostly the occupation decided upon came up on the printout.)

(b) Already decided on occupation by Q HELP

Those who had not decided on an occupation were slightly more likely to find the questionnaire of help. ( $P = 0.03$ )

Then other variables were compared with students view of system helpfulness only (S HELP). Results are shown in Figure 10.13.



Figure 10.13 Other Aspects of System Helpfulness

- (i) Total or score of top occupation on the printout by S HELP  
No connection was observed.
- (ii) Range or difference between top occupation and 10th occupation score or total by S HELP  
No connection was observed.
- (iii) Number of student 'yes' and 'perhaps' to occupations on printout by S HELP  
A greater number of liked occupations did tend to be related to a positive view of system helpfulness. (P = .0009)
- (iv) Number of careers adviser 'yes' and 'perhaps' to occupations on printout by S HELP  
A greater number of liked occupations did tend to be related to a positive view of system helpfulness. (P = .0014)
- (v) Occupations that would not have come up at interview and liked by student by S HELP  
No connection was observed.
- (vi) Occupations that would not have come up at interview and liked by careers adviser by S HELP  
Presence of such occupations was linked to student view of helpfulness.
- (vii) Student improved readiness for interview in the opinion of careers adviser related to Gradscope questionnaire by S HELP  
(In effect student views and careers adviser views.)  
The two views were positively related. (P = .001)

2. Control Experiment

For each subject, the occupations indicated "of interest", "uncertain"

Figure 10.14 Control Experiment - Student Views of Suggestions

Figure 10.15 Control Experiment - Careers Adviser Views of Suggestions

Subject Number	Indicated Interest								
	Gradscope Top 10			Random 10			Gradscope Bottom 10		
	Yes	?	No	Yes	?	No	Yes	?	No
1	6	2	2	2	1	7	1	4	5
2	6	2	2	1	6	3	0	10	0
3	7	2	1	3	3	4	0	3	7
4	6	2	2	2	1	7	1	3	6
5	7	3	0	3	3	4	1	0	9
6	7	2	1	3	5	2	1	1	8
7	2	2	6	2	4	4	0	4	6
8	7	0	3	3	2	5	1	3	6
9	3	4	3	3	3	4	3	2	5
10	6	4	0	4	1	5	2	2	6
11	7	0	3	3	6	1	0	1	9
12	5	0	5	0	4	6	0	2	8
13	4	6	0	5	3	2	2	0	8
14	6	2	2	2	2	6	0	2	8
15	Missing			Missing			Missing		
Totals	79	31	30	36	44	60	12	37	91

Subject Number	Indicated Interest								
	Gradscope Top 10			Random 10			Gradscope Bottom 10		
	Yes	?	No	Yes	?	No	Yes	?	No
1	7	0	3	0	1	9	0	0	10
2	4	2	4	2	2	6	0	0	10
3	8	2	0	0	4	6	0	0	10
4	6	3	1	4	2	4	0	4	6
5	8	0	2	3	4	3	0	2	8
6	6	3	1	4	1	5	0	0	10
7	1	1	8	1	4	5	0	0	10
8	5	1	4	4	2	4	1	1	8
9	6	1	3	4	0	6	0	4	6
10	4	3	3	1	1	8	1	2	7
11	5	1	4	2	1	7	0	0	10
12	7	3	0	0	3	7	0	0	10
13	Missing			Missing			Missing		
14	Missing			Missing			Missing		
15	1	1	8	4	2	4	0	1	9
Totals	68	21	41	29	27	74	2	14	114



and "not of interest" from each list: "Gradscope top 10", "Gradscope bottom 10" and a "random 10" were added up. The same process was carried out for the careers adviser views of relevance of occupations to the subject. This resulted in 18 totals for each subject, nine his own views and nine the views of his careers adviser. The views are tabulated in Figures 10.14 and 10.15.

### 3. Statistical Survey

#### (i) Responses to Questionnaire QE

The original punched data input cards were re-analysed to produce percentage responses to the options for each question. See Figure 10.16.

#### (ii) Relative Appearance of Occupations on Printouts

The list was prepared by hand; as subjects' printouts were produced, the occupations suggested were indicated on a check list.

Afterwards, the occupations were listed in order of number of appearances, those that appeared most often at the beginning. See Figure 10.17.

#### (iii) First Destination of University of Liverpool Subjects

In the autumn of 1978, the first destinations of the Liverpool subjects were checked. Of the original 56, 6 had not replied to the follow-up questionnaire, 6 were still seeking posts, 10 were taking a higher degree, 5 were in employment - but not any discipline entry - and 29 were in any discipline entry occupations.

The occupations of the 29 were compared with their original printouts to determine the level of similarity of their jobs to suggestions on their printout. Figure 10.18 shows the result.

Figure 10.16

Student Response to Each Question From Questionnaire QE

<u>GROUP 1 CONDITIONS OF WORK</u>					
<u>Question</u>	<u>Weighted (%)</u>	<u>Box B Against/Low (%)</u>	<u>No Influence Neutral (%)</u>	<u>Box A For/High (%)</u>	<u>Weighted (%)</u>
1	N/A	N/A	75.2	14.0	10.8
2	N/A	N/A	64.9	21.2	14.0
3	N/A	N/A	66.2	22.5	11.3
4	0.9	1.8	64.0	22.5	10.8
5	N/A	N/A	64.0	27.0	9.0
6	N/A	N/A	55.9	24.8	19.4
7	N/A	N/A	82.4	10.4	7.2
8	0.0	8.1	79.7	5.9	6.3
9	5.0	20.7	69.4	3.2	1.8
10	3.2	10.4	73.9	9.5	3.2
11	N/A	N/A	80.2	14.9	5.0
12	0.5	6.3	80.2	8.1	5.0
13	13.1	41.4	39.6	3.6	2.3
14	0.5	0.9	46.4	30.6	21.6
15	0.5	9.9	89.6	N/A	N/A
16	N/A	N/A	59.9	20.7	19.4
17	N/A	N/A	48.6	40.5	10.8
18	1.4	2.7	95.9	N/A	N/A
19	2.3	6.8	66.7	14.9	9.5
20	9.5	15.8	74.8	N/A	N/A
21	5.0	11.7	83.3	N/A	N/A
22	5.4	8.1	63.1	18.5	5.0
23	N/A	N/A	51.7	23.0	15.3
24	6.3	2.7	91.0	N/A	N/A
25	7.7	24.3	64.0	4.1	0.0
26	2.7	8.1	59.5	15.8	14.0
27	N/A	N/A	84.2	12.2	3.6
28	N/A	N/A	55.0	23.0	22.1
Total	64.0	179.7	1939.3	390.9	227.4
Mean	2.3	6.4	69.3	14.0	8.0



Figure 10.16 (Cont'd)

GROUP 2 PARTICULAR REQUIREMENTS MADE BY THE WORK

<u>Question</u>	<u>Weighted (%)</u>	<u>Against/Low (%)</u>	<u>Neutral (%)</u>	<u>For/High (%)</u>	<u>Weighted (%)</u>
29	0.5	3.6	40.5	38.3	17.1
30	1.4	0.5	50.9	32.4	14.9
31	3.2	17.6	60.8	13.5	5.0
32	0.0	0.5	48.2	31.5	19.8
33	0.9	3.2	65.8	24.8	5.4
34	0.0	4.1	72.1	18.5	5.4
35	1.8	5.4	63.1	26.6	3.2
36	0.0	2.3	48.2	32.9	16.7
Total	7.8	37.2	449.6	218.5	87.5
Mean	1.0	4.6	56.2	27.3	10.9

GROUP 3 WORK ACTIVITIES

People Subgroup

<u>Question</u>	<u>Weighted (%)</u>	<u>Against/Low (%)</u>	<u>Neutral (%)</u>	<u>For/High (%)</u>	<u>Weighted (%)</u>
37	0.5	2.7	37.8	29.7	29.3
38	0.5	3.2	52.3	27.5	16.7
39	0.5	7.2	43.2	29.7	19.4
40	3.2	11.3	53.2	18.9	13.5
41	6.8	25.7	54.1	7.2	6.3
42	1.8	11.3	70.3	14.9	1.8
43	3.6	17.6	67.6	9.9	1.4
44	5.9	21.2	53.6	12.6	6.8
Total	22.8	100.2	432.1	150.4	95.2
Mean	2.8	12.5	54.0	18.8	11.9

Figure 10.16 (Cont'd)

Data Subgroup

<u>Question</u>	<u>Weighted (%)</u>	<u>Against/Low (%)</u>	<u>Neutral (%)</u>	<u>For/High (%)</u>	<u>Weighted (%)</u>
45	0.5	11.7	50.9	25.2	11.7
46	0.5	15.3	50.9	27.9	5.4
47	0.0	5.4	60.4	24.8	9.5
48	0.0	17.1	58.6	20.7	3.6
49	5.0	37.8	53.2	3.2	0.9
Total	6.0	87.3	274.0	101.8	31.1
Mean	1.2	17.4	54.8	20.4	6.2

Things Subgroup

<u>Question</u>	<u>Weighted (%)</u>	<u>Against/Low (%)</u>	<u>Neutral (%)</u>	<u>For/High (%)</u>	<u>Weighted (%)</u>
50	1.8	41.0	47.7	7.2	2.3
51	3.6	44.6	42.8	6.3	2.7
52	9.5	50.0	37.4	2.7	0.5
53	7.2	41.4	48.2	3.2	0.0
54	7.2	41.4	46.8	2.3	2.3
Total	29.3	218.4	222.9	21.7	7.8
Mean	5.8	43.7	44.6	4.3	1.6

Overall Work Activities

Total	58.1	405.9	929.0	273.9	134.1
Mean	3.2	22.5	51.6	15.2	7.5



Figure 10.17

Relative Appearance of Occupations on Printouts

<u>Rank Position</u>	<u>Occupation</u>
1	Solicitor
2	Accountancy: Cost and Management
3	Merchant Banking
4	Barrister
5	Advertising Account Executive
6	Export Sales
7	Accountancy: Chartered
8	Operational Research
9	Marketing
10	Personnel Industrial Relations
	Admin Trainee Diplomatic Service
12	Accountancy: Certified
13	Company Secretary
14	Social Work field/private
	Social Work field/L.A.
16	Teaching: handicapped
17	Actuary
18	Probation Service
19	Sales Representative
20	Teaching: Secondary school
	Systems Analysis
22	Teaching: Primary school
	Speech Therapy
24	Careers Advisory Work
25	Nursing
26	H.M. Tax Inspector
27	Market Research Analyst
28	Social Work resident/private
29	TV Production
30	Insurance Broking.
	Air Pilot
32	Teaching: Liberal Studies in F.E.
	Admin Trainee Civil Service
	Public Relations
35	Physiotherapy
	Social Work as a volunteer
37	Church Ministry
	Social Work resident/L.A.
39	Accountancy: Public Finance
40	Research Officer Civil Service
	Production Management Industry
42	Insurance Underwriter
43	Community Development Work
	Purchasing Industrial
	Research Officer Diplomatic Service
	Journalism
	Hotel Management
	Teaching: EFL
49	BBC News Trainee
	Adult Education
	Stockbroking/Jobbing
	HM Forces Commission

Figure 10.17 (Cont'd)

53	Antique Dealing Valuer Private Assets, Art Commodity Broking
56	Admin Local Government Method Study/O & M
58	Research Assistant Planning L.A. Archive Work
60	Secretarial Work Executive Officer, Diplomatic Service Landscape Architect Youth Organiser
64	Valuer Industrial Assets Clearing Banking
66	HM Forces Education Branch Information Science Work Bookselling Valuer Property BBC Film Trainee
71	Housing/Estate Mgt L.A. Librarian Personnel Recruitment & Selection Occupational Therapy Clerical Work Executive Officer, Civil Service Auctioneering Copywriting
79	Commercial Art Gallery Work Management: Retail Stores Police Force Admin University Shipbroking Computer Programming Fire Service HM Factory Inspector
87	Traffic Manager Distribution
88	Production Planning industry Personnel Training Traffic Manager Transport fleets Market Research Interviewer Sales Administration Admin Nationalised Industries Sound Broadcast Production
95	Radiographer Prison Governor - assistant Environmental Health Inspector Air Traffic Controller Consumer Protection Officer Public Museum Curator Consumer Advisory Officer

The following eleven occupations did not appear at all:-

- Town & Country Planning
- Valuer Inland Revenue
- Publishing - sub-editing
- Admin Building Societies
- Theatre/Cinema Management
- Housing/Estate Management private
- Insurance Inspector
- Publishing - editorial
- BBC Trainee Studio Manager
- Purchasing Retail Buying
- Admin Hospital Services



Figure 10.18

Comparison of the Jobs of 29 Subjects when in Employment  
with their System-Produced Suggestions

Same	17	(59%)
Very Similar	4	(14%)
Same Field	3	(10%)
Completely Different	5	(17%)
	<hr/>	<hr/>
	29	(100)

Other Information

From comments added to questionnaire QG, it was possible to separate out subjects that had already decided upon an occupation and to compare their decisions with their printouts. Thirty-eight subjects had made their decision. Of these, 26 had decided on 'any discipline' occupations. 12 had not.

The printouts for the 26 were checked and showed the following:-

Chosen occupation on printout	20	(77%)
Chosen occupation not on printout	6	(23%)
	<hr/>	<hr/>
	26	100

Discussion

The results include some encouraging signs and have deliberately been presented in detail so that readers may speculate for themselves upon

their significance. Some of the more important points are discussed below under the earlier threefold division of aspects of system function.

1. The System as a "Package"

The instructions, profile form and printout were acceptable to almost all users. The three option choice for each question was not so popular: slightly over half of the subjects did not like the form of question, many commenting that a five-point scale would be easier to use. They felt forced to use the neutral option because their feelings were not so strong that 'Box A' or 'Box B' seemed appropriate. The questions were thought to cover enough ground although there were some constructive suggestions for extra factors put forward - some of which may be included in later modifications to the system as they could improve the 'balance' of questions as well as interest students.

No questions were generally thought to be unnecessary, but a few subjects made comments on particular questions.

Very few subjects answered question 6, but several commented that the policy of not allowing users to choose low pay and a number of other supposedly unlikely options was frustrating and unreasonable.

Study of Figure 10.16, detailing responses to each individual question, shows that, in almost all instances, 'neutral' is the most frequently chosen response. The exceptions are of interest and, together with the pattern of responses, reveal some aspects of student thinking. For instance, Q13, "degree to which one will be supervised" has an exceptionally low neutral response and a high response to the "against" option of 41.4% plus 13.1% of weighted "against" responses. The different groups of "conditions of work", "particular requirements made



by the work" and "work activities" show basically the same overall patterns: neutral and 'for' choices being the most favoured (except for the 'things' aspects of work activities).

All but eleven occupations have appeared from only 222 profiles. The eleven occupations were later demonstrated to be theoretically accessible.

## 2. The Occupational Suggestions

The majority (95%) of subjects received at least one suggestion that they liked; the average number of liked suggestions was four. Careers advisers consider an even higher average of five to be relevant. An average of 4.9 occupations for subjects and 4.3 for careers advisers are not liked. It would be interesting to make comparisons with other forms of careers advice - if it were possible.

The results of the control experiment show a similar effect and also that the system works better than a random listing of occupations. There is a greater tendency for occupations not to be liked than liked; possibly reflecting the individual's interest in a limited range of occupations rather than in the broad spectrum. Very few show enthusiasm for as many as ten occupations (Careers Adviser view). As many as 75% of the students in any discipline employment were in work similar to system suggestions - this is not likely to be as a result of using the system. Rather it shows that the system produces plausible suggestions.

## 3. General Usefulness of the System

The majority of subjects (66.7%) stated that using the system in the field test had helped them. Over half (52.5%) found the questionnaire alone helpful. In 26.9% of cases, careers advisers thought the subject

better prepared for interview because of his participation in the field tests - a worthwhile gain. Almost all subjects (94.8%) received at least one occupational suggestion that would not have come up at interview and over 70% of students were interested in the surprise suggestions.

Interesting connections were shown between certain variables. Fortunately, sex and subject of degree do not have any effect on the likelihood of users finding the questionnaire and system helpful. An interest in any discipline occupations pre-disposes the user to find the system useful, but any student might find the questionnaire helpful.

If students had already decided upon an occupation, they were no less likely than the others to find the system useful. In most cases those who had decided on an any discipline occupation actually found that occupation on their printout; it may be this that they found helpful. Decided students were less likely than the others to find the questionnaire helpful.

Students whom careers advisers regarded as more ready for interview were more likely themselves to regard the system helpful.

Top occupation total and range of totals had no effect on likelihood of finding the system helpful. Students who liked a larger number of occupations from the top 10 were more likely to regard the overall system as helpful. If "liked" occupations that would not have come up without Gradscope were present, this did not pre-dispose students to regard the system as helpful.



## Conclusion

The system and questionnaire helped many of the subjects. The occupations suggested are acceptably sensible and there are other promising features. A number of possible areas for improvement have been identified.

It was, therefore, decided to introduce certain of these improvements, launch the Mark Two version in university and polytechnic careers services and examine the revised system more thoroughly.

## Chapter Eleven

### COMPUTERS AND CAREERS GUIDANCE IN THE U.K. IN 1980

Since 1975-1976, the time at which the computer systems in Chapter Three were described, computers have become much more widely used and accepted in careers guidance. In the present chapter the current state and use of the systems outlined in Chapter Three and of Gradscope will be examined and discussed if there have been significant changes.

#### CASCAID

The Leicestershire Careers Advisory Service Computer Aid is the most widely used of all the computer-aided systems designed for the school population in the U.K. The version at present in use is mark four and is very different from the system of 1975.

#### Student Data Form

The student gives details on a number of factual items including several versions of academic qualifications which may be actual or hoped for and will be used in different runs and could lead to different outcomes. There are also approximately 70 questions on work activities that the student rates on a 1 to 5 scale from 'like very much' to 'dislike very much' with 'neutral' as the midpoint. Up to six of the 'like very much' categories may be 'keyed' or weighted and there are a number of items



mainly concerned with health which may act as disqualifiers. The student may also ask for his details to be compared for suitability with a number of occupations of his own choosing.

It is intended that this style of presentation and questionnaire will raise the level of self-awareness in the user.

### Occupations

The 400+ occupations in the data bank are taken from CODOT (Classification of Occupations and Directory of Occupational Titles). Occupations that have few openings or require experience are omitted unless they are likely to be expected by users, for example, occupations such as interpreter. The entry level required varies from 3 'A' levels down to 3 'O' levels. A different system altogether is considered necessary for students with fewer qualifications.

### The Match

Matching is effected on the items the student has 'keyed', on 'likes' and in some cases 'neutral' choices but never on 'dislikes'. The aim is to produce at least 10 occupations per student. Any occupation containing features to which the student has expressed aversion - that is a rating of less than neutral - are removed from consideration.

### Printouts

The results are intended for careers adviser use at interview and therefore some of the information given requires decoding. Student responses to the questionnaire are given in full. Occupations the student has considered appear together with the message 'data satisfactory' if the student and occupational data match. If the occupation seems unsuitable, reasons for the mismatch are given. Occupations that have matched with



the student data are next presented in order of suitability with symbols that indicate library classification, whether neutral responses have had to be accepted, which 'keyed' items have matched, whether the occupation is difficult to enter and, in some cases, institutions offering specialist training courses.

### Use

At present, the system is used almost entirely as a batch service by 60 local authorities, 30 of which have a version of the program on their own computer facilities. The other 30 authorities use the central batch service offered by Leicestershire's own computer department. Since April 1979, approximately 8,000 inputs have been processed. The level of local use is not known at present. The system is used mainly for lower 6th form students which is the group for which it was originally designed, but younger students do find it of benefit.

### Future

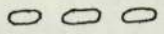
The system is due to be improved and changed for the 1980-81 academic year. It is also intended to introduce a version for Higher Education students within the next six to nine months for autumn, 1980.

### JIIIG - CAL

Job Ideas and Information Generator - Computer Assisted Learning is based upon the original JIIIG described in Chapter Three but has changed greatly since 1975-76. It has been developed jointly with the Borough of Havering to be used in conjunction with their CAL programs. The system is essentially an extension of the APU Occupational Interests Guide.



### Student Data

The system is designed to be a classroom tool rather than a careers interview aid as it is fitted into a careers education programme. A prior part of the programme is completion of APU Occupational Interest Guides and discussion of the scores. The scores form part of the profile information; other items are talents, hours worked, clothes worn, obstacles to cope with, risks involved, training period, place of work, conditions, exertions, work with people, leaving home and the study involved. The student indicates his likes and dislikes in lozenges  - in effect a three-point scale. First, he gives the information on a four page answer sheet, using an illustrated booklet to help him interpret the questions. The answers can then be transferred on to two 'mark sense' cards (or other data-read-in form).

### Occupations

The system is based on 300 occupations and is to be extended to 400. They are divided into six sections based upon academic qualifications required and further study and training involved. Students choose which sections to search, usually two adjacent ones rather than the whole data bank.

### The Match

Student information is compared with the corresponding occupation information for each of 108 characteristics. A grading of 'suitable' or 'unsuitable' is given after each comparison. The pattern and distribution of 'suitable' characteristics is assessed to give an overall points rating of 9 (highly suitable) to 0 (highly unsuitable) for each individual occupation. The occupations with the highest points ratings are those printed.

### Printouts

There are two formats of printout: one for the student and one for the

careers adviser or teacher. The student printout includes the following:-

1. Job titles and reference numbers.
2. Points rating (0 - 9) indicating level of suitability.
3. Brief description of the job.
4. Typical qualification requirements.
5. Skills and personal qualities which may be required or advantageous.
6. Any item to note.
7. Careers library classification codes.
8. References to publications relevant to the job.

The normal student printout will be about six lines per job and is presented in 'plain English'.

As well as the above normal printout there are alternatives:-

- (a) Miniprint which allows for more job titles but less information per job.
- (b) Maxiprint which gives complete details of each job.

A careers adviser printout is available giving a summary of student responses and showing the numbers of jobs giving positive and negative matches. It is not clear to the thesis writer whether it is possible to discover which jobs were positive or negative for each item.

#### Use

JIGG - CAL is at present used in two local authorities via their own computers as there is no central batch processing service. It is used at Havering with 30 schools and Lothian with 12 schools. The system is on trial at 18 other authorities and is used by 4th year students onwards.



## ICGS

The Cheshire/IBM Interactive Careers Guidance System is now used only at one school in Cheshire, Whitby Comprehensive School, Ellesmere Port. The program is essentially the same as it was in 1975-76 apart from a few minor updates.

There have been problems with the system because of excessive demands in both cost and time. As the program is on-line, it requires the acquisition of a VDU light pen, printer, etc. There is also the rent of a sophisticated program. Each user will probably require 45 minutes to one hour at the terminal in order to follow through the basic program; so costs per individual user are high. Also, a high degree of commitment is required from school staff using the system as part of their careers education programme.

Cheshire careers advisers seem to believe that in the present economic situation a batch service aimed at careers adviser interview use rather than a school-based system would seem to be the most cost-effective use of computer resources.

## DOORS (Data On Occupations Retrieval System)

DOORS is being developed by the Employment Service Division of the Manpower Services Commission. The project controller is Mr Len Gould, Principal Psychologist based in the MSC Head Office in Sheffield. The system will be made available to the public through Joblibraries which will run parallel to Jobcentres. It is intended to make the system more widely available to the Careers Service and other bodies after the development and experimental phases are completed.

DOORS will provide a multi-axial classification of occupations, thus enabling users to assess information either directly by job title or by inputting their requirements and allowing DOORS to determine the occupations which meet those requirements. The system will be used interactively with the facility to obtain a printout of the occupational information obtained.

DOORS is based on an existing library information retrieval system and therefore offers the opportunity of expansion to incorporate a very wide range of occupational information, such as employment legislation, local labour market information, etc.

A number of alternative methods of delivering the system are being considered. PRESTEL and/or microprocessors are two of the alternatives.

### Gradscope

Since October 1978, the thesis writer has been employed as a research associate at the Central Services Unit for Careers and Appointments Services (CSU) based in the University of Manchester. The appointment was arranged by AGCAS and funded mainly by appeals to certain employers of graduates with some funds from AGCAS and CSU. In the initial six-month period, October 1978 to April 1979, Gradscope was changed as indicated by the field trial evidence and comments, before introduction as a centrally operated batch processed service open to all Universities and Polytechnics in the U.K. and Republic of Ireland.

### Student Data

The new student questionnaire consists of 50 questions divided into the



same three sections as before, but the sections are now presented in a different order. The order is:-

- (a) work activities,
- (b) demands made by the work,
- (c) conditions of work.

(See Appendix 1, the Gradscope handbook - the present questionnaire is at the end.)

The new order avoids questions on money and other 'hygiene' factors coming first. Certain questions have been omitted, not because analysis showed them to be seldom selected, but because they seemed to duplicate other questions or to be inappropriate.

Questions omitted were (see student questionnaire QE, Figure 8.5.):-

- Q3 Eventual possible earnings for the very ambitious and successful.
- Q7 More permanent employment abroad.
- Q10 Size of overall employing organisation.
- Q21 Moving home for career advancement and promotion at your own choice.
- Q27 Possibility of being able to work at own home after necessary training and experience.
- Q37 Dealing on a face to face basis with a person or group.
- Q45 Dealing with information, knowledge and concepts.
- Q50 Concern for and dealings with material things.

All three overall 'people', 'data' and 'things' questions were omitted and only the constituent questions used.

Q51, 52 and 53 were completely changed.

Other questions were added because comments and general use of the questionnaire had suggested a need for them. Questions added were (see new questionnaire in Appendix 1):-



Q11, 12 and 13 are new 'things' questions that would be applicable when scientific and engineering occupations were added much later on.

Q17 Ability to argue compellingly.

Q18 Ability to use entrepreneurial initiative.

Q19 Ability to deal with financial matters.

Q29 Further study and exams necessary after graduation.

Q49 Observable results in the short term by which achievement can be judged.

The form of question structure has been changed; the questions are now statements which students consider on a five-point scale ranging from 'strongly for' to 'strongly against' with the midpoint indicating neutrality or no effect on occupational choice. During the trials, a significant number of students said that they would prefer a five rather than the earlier three point scale which they felt forced them to describe themselves as neutral because they did not feel strongly enough to use the other option.

The questions have been arranged on the inside of a folded A3 sheet with instructions on the front and back pages so that all questions can be scanned together. Up to three choices may be weighted as having extra significance but only from questions already rated 1 or 5 (strongly for or strongly against). Students record their choices on an A4 form from which the information can be taken by an optical mark reader. Optical mark forms were found to be the cheapest and most practical way of submitting the student data to a computer as, in effect, the student does his own data preparation. The input form has been designed to take up to 60 questions should any extra questions prove necessary in the future.

#### Occupations

The occupations are 'any discipline' entry as before. There are still



112 occupations but some have been deleted or amalgamated and a few added. (See Appendix 1 for present list of occupations.)

### The Data Bank

The new occupations, new factors and the people, data and things factors (previously only adapted to a 3-5 scale) were re-rated and checked as described in Chapter Seven.

### The Match

The match operates on the same principles as during the field trials. Each student choice is multiplied by the appropriate factor for each occupation. The products are summed to give a total for each occupation. However, now the student choice for each factor may be rated on a 1 to 5 scale, -2, -1, 0, +1 or +2 as for the occupations. Weighted factors multiply the product obtained in the normal way by an extra five. The level of five was chosen because it was sufficient to show an effect, but not so large that it overwhelmed all other choices.

The program disallows weights against factors not already rated 1 or 5 and ignores all weightings if more than three are placed altogether. If weightings have been disallowed, a message on the printout indicates the fact and explains why it has happened.

### Printouts

There are two separate printouts: for careers adviser and student as before. The layouts have been changed and new information is given. Eight to twelve occupations are now presented.

### Careers Adviser Printout

(For example see Gradscope Handbook, Appendix 1, page 15.)

Student replies are presented in full but divided into the sections of the questionnaire for easier reference. All the 'products' that have gone to make up the 'total' are presented in two blocks of 25 each, against the occupational titles with their totals. Occupations 9, 10, 11 and 12 are printed should their total equal the total of occupation 8. Most printouts therefore present eight occupations.

Careers advisers are also presented with a summary of student choice tendencies which is called 'overall choices' and summarises the total number of 5, 4, 3, 2 and 1 choices the student has made to the questionnaire.

### Student Printout

(See Gradscope Handbook, Appendix 1, page 16.)

Students are not presented with totals or products as before in case the numbers impart a false feeling of reliability or alarm the non-numerate.

The student receives a list of his 'choices' to the questionnaire in the same format as on the careers adviser printout. Weightings are marked with an asterisk and if too many weights are given no weightings are allowed and the student is notified of the fact.

The titles of the eight to twelve occupations are printed together with the title of the relevant AGCAS careers information sheet and the number of any question where his choice has led to a significant positive contribution to the overall results. 'Influential factors' on the printout are those question choices leading to products of +4 or more for the occupation.



There is also a message stating that careers advisers may be consulted for further detail. Careers services are free to distribute results to students as they feel is best.

### Setting Up the Central Batch Processing Service

It was decided that Gradscope should first be made available to AGCAS Careers Services as a central batch processing service. The system would then be inexpensive during its introductory phase; some degree of central supervision could be exercised and adjustments made with relative ease whenever necessary. If the system proved useful to Careers Services, later arrangements could allow for local computer processing after any problems and program 'bugs' had been removed.

Several considerations were taken into account in the design of the batch processing service. The service costs had to be met by the users, that is, the careers services. It was therefore important to keep charges to a minimum if interest was to be shown by AGCAS. The system and service needed to be simple to use from the point of view of all concerned. Students would not want to be bothered with anything too complicated; individual careers services would prefer the least necessary additional administrative burden; the complications at the computer processing end would need to be minimal to ensure cheapness; the central administrative effort (which would be expended by the thesis writer) at CSU could not exceed one person's capacity with time set aside to monitor the system and introduce changes. The service had to fit in with existing procedures at CSU. The time delay between students completing questionnaires and receiving results was to be as short as was consistent



with keeping costs and administration to a minimum. There needed to be a reliable procedure for identifying the origin of student inputs, transferring that origin to the printouts, returning them to the right place and charging accordingly. A means of monitoring the effect of the system in use was important and sufficient inbuilt flexibility to allow for significant changes if necessary.

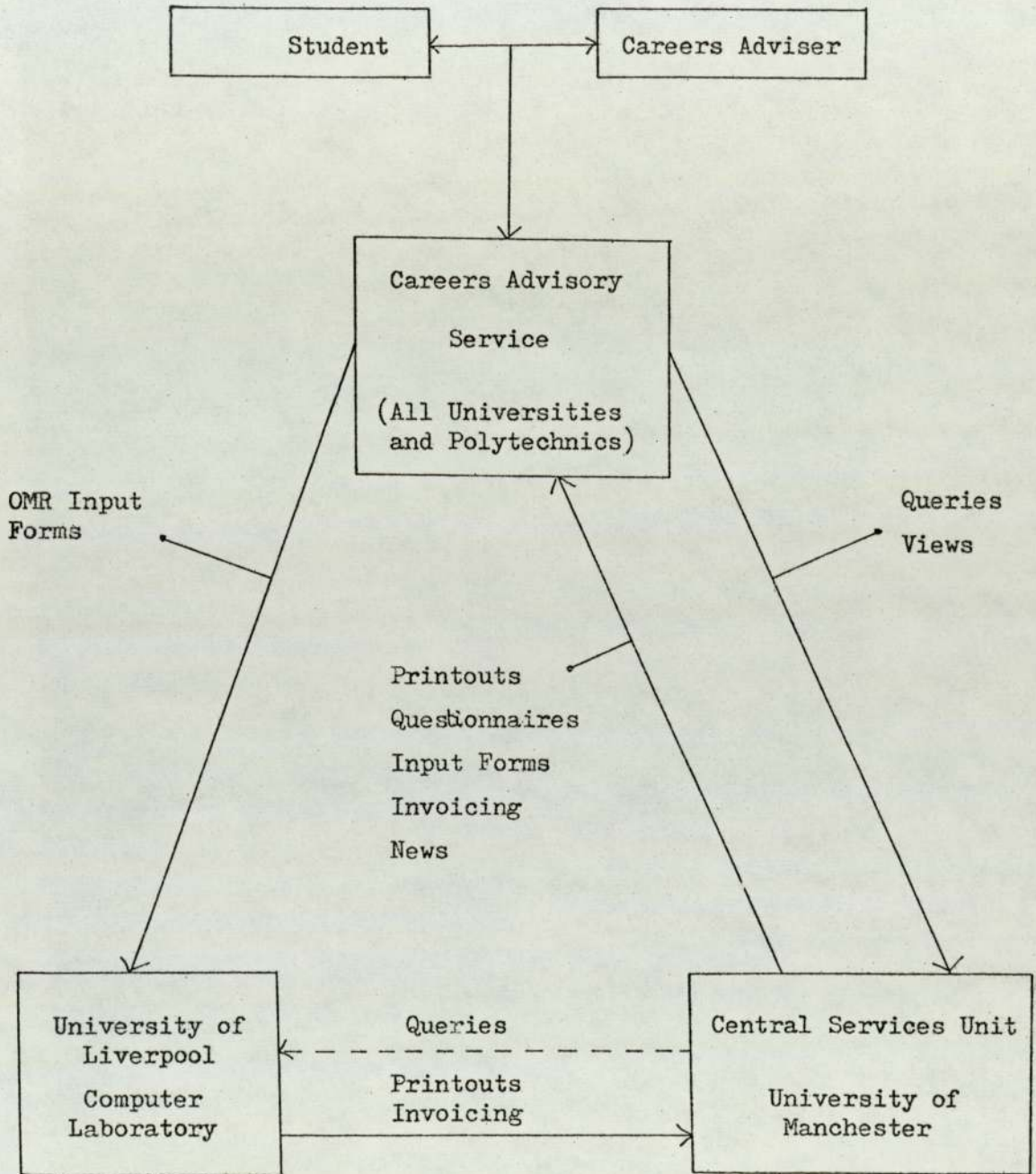
The present compromise is a batch service run once a week on the University of Liverpool computer. Student data is read from A4-sized forms by an optical mark sensing machine on to magnetic tape and thence to the computer. The data is processed overnight and the results transmitted by telephone link (part of the N.W. computer network) to the computer at the University of Manchester for printing and collection the following morning. Printouts are listed in alphabetical order of careers service (each service has an identifying 'centre' number) and can be separated and sent out with the usual weekly CSU mailing service to all subscribers. Each service sends a statement (batch processing form) with their input forms to the University of Liverpool, giving the number of inputs included. The number is noted at Liverpool and the statements and input forms sent on to CSU where they can be checked against the output received and any discrepancies noted and corrected - even unidentified printouts can normally be allocated to the correct centre. Records are kept of the input forms received from each careers service for invoicing purposes.

Figure 11.1 shows the administrative structure of the central batch processing service. See Appendix 1, the Gradscope Handbook, for more specific detail about the service.



Figure 11.1

Structure of the Gradscope Central Batch Processing Service



## System Monitoring

The system was ready for use by April 1979. Six training courses were held in different parts of the country for AGCAS careers advisers and information officers who wanted to learn about the theory of the system and the batch processing arrangements before the first weekly run on April 4th, 1979. By August 1980, over 13,000 inputs have been processed. All university careers services and 75% of polytechnic careers services have tried Gradscope. The central batch program collects details in a computer file on certain aspects of Gradscope use. The file for the Autumn Term 1979, containing details on 4,540 users, has been analysed by the Statistical Package for Social Sciences (SPSS) program. Some of the results are shown below.

### Distribution of Careers Services Using Gradscope

	<u>% of Inputs</u>
Universities	74.5
Polytechnics	22.5
Other - mostly uncoded forms	3.0
	<hr/>
	100.0
	<hr/>



Figure 11.2

Degree Disciplines of Users

<u>Discipline</u>	<u>%</u>	<u>Total %</u>
<u>ARTS</u>		
Modern languages	8.3	
Philosophy, theology, classics archæology	2.6	
English, history	11.9	
Drama, music, fine arts	1.1	
Other	6.4	
		30.3
<u>SOCIAL SCIENCE</u>		
Economics, accountancy	6.3	
Business Studies, management	4.3	
Law	2.3	
Psychology	3.7	
Sociology	1.9	
Social, public administration	1.5	
Geography	7.0	
Politics	1.8	
Other	4.2	
		33.0
<u>PURE SCIENCE</u>		
Biological Science	10.0	
Physical Science	13.7	
		23.7
<u>APPLIED SCIENCE</u>		
Civil Engineering	1.0	
Remainder	5.4	
		6.4
<u>UNCODED</u>		
		6.6
		<hr/> 100.0

Arts and Social Science students account for the majority of use as would be expected with a system based on any discipline entry occupations. However, a sizeable number of Science and Engineering students have tried Gradscope. Civil Engineering was the only one of the applied sciences to account for more than 1% of users.

Figure 11.3

Student Use of the Weighting Option

<u>Number of Weights Placed</u>	<u>% of Users Placing</u>
0	36.9
1	11.3
2	17.6
3	34.2

The weighting option is used as can be seen in Figure 11.3. It is not certain why some students place no weights; it may be from choice, by mistake or due to careers adviser instructions not to weight.

Figure 11.4

Distribution of Weightings by Questionnaire Section and Number of Questions Per Section

<u>Questionnaire Section</u>	<u>No of Weighting</u>	<u>No of Questions in Section</u>	<u>No of Weightings No of Questions</u>
Work Activities	1900 (28%)	14	135.7
Demands	1424 (21%)	11	129.5
Conditions	3451 (51%)	25	138

As shown in Figure 11.4, when number of questions in each section has been corrected for, roughly similar numbers of weights are given to questions from all three sections (at least overall). There does not seem to be a tendency to prefer to weight work activities.

Certain individual questions attract more or less weightings than average.

See Figure 11.5.



Figure 11.5

Factors Differing Noticeably from Average on Weightings

More Frequently Weighted Than Average

<u>Question</u>	<u>Description</u>	<u>Predominantly For/Against</u>
2	Negotiating	For
25	Rapport	For
38	Abroad	For
46	Restrictions	Against

Less Frequently Weighted Than Average

<u>Question</u>	<u>Description</u>
6	Investigating
12	Development - things
13	Using things
19	Dealing with financial matters
22	Methodical
23	Applying knowledge and skills in new ways
27	Competition for vacancies
30	First year earnings
36	Physical demands
47	Absent at night

It shows an interesting view of user preferences as does the following Figure 11.6, "Choices for each factor question". The 'moderately for' 4 response and 'neutral' 3 response are the most frequently used; "strongly against", is the least used response. Now that the scale is of five points, fewer people use the neutral option than for the previous version of Gradscope (see Figure 10.16). The least used neutral response was for question

Figure 11.6

Choices for Each Factor Question.

<u>Q. No.</u>	<u>% Choosing 1</u>	<u>% Choosing 2</u>	<u>% Choosing 3</u>	<u>% Choosing 4</u>	<u>% Choosing 5</u>
1	2.5	9.6	22.2	47.4	18.3
2	2.3	8.8	15.8	43.5	29.5
3	9.6	20.1	23.0	31.0	16.2
4	23.6	23.9	22.5	20.0	10.0
5	5.2	16.6	26.5	38.4	13.2
6	9.0	19.6	28.5	31.9	11.0
7	17.6	24.9	22.1	26.0	9.4
8	7.8	17.9	21.9	30.7	21.7
9	5.0	14.9	25.1	40.0	15.0
10	33.8	27.5	21.4	13.6	3.7
11	10.4	23.9	26.2	27.4	12.2
12	15.8	28.2	28.7	21.1	6.3
13	17.2	27.6	31.2	18.1	5.9
14	30.3	25.2	25.1	15.3	4.2
Mean %	13.6	20.6	24.3	28.9	12.6
15	1.8	8.7	19.6	43.6	26.3
16	1.3	4.1	15.9	46.8	31.9
17	11.9	24.1	23.4	28.4	12.1
18	11.8	22.8	26.6	28.5	10.3
19	10.9	18.6	29.9	30.7	9.9
20	16.3	20.8	24.1	25.0	13.7
21	4.3	13.3	25.8	40.0	16.5
22	2.6	12.0	25.1	40.6	19.7
23	1.3	11.1	34.2	42.3	11.1
24	4.9	19.5	28.7	35.2	11.7
25	1.5	7.2	17.7	39.3	34.3
Mean %	6.3	14.7	24.6	36.4	18.0
26	8.5	10.7	22.3	19.1	39.4
27	2.4	6.4	35.4	34.8	21.0
28	2.7	9.3	30.0	40.2	17.8
29	4.7	13.5	31.2	33.8	16.7
30	10.5	52.0	19.7	12.2	5.6
31	1.6	2.6	24.8	39.6	31.3
32	2.1	5.6	32.9	43.0	16.3
33	7.8	27.4	40.5	20.6	3.7
34	0.4	3.3	14.4	53.3	28.6
35	17.3	17.4	28.7	20.0	16.6
36	16.5	24.9	33.9	19.7	5.0
37	15.4	22.9	34.2	19.1	8.3
38	6.3	8.8	17.6	29.1	38.2
39	4.6	13.9	35.6	26.4	19.4
40	0.8	2.8	17.4	44.9	34.1
41	7.3	13.3	29.3	28.7	21.4
42	13.7	21.9	42.0	18.6	3.8
43	1.2	5.7	36.2	41.5	15.4
44	13.0	21.7	42.6	17.3	5.4
45	8.7	23.5	26.3	33.2	8.3
46	45.6	33.3	17.0	3.1	1.0
47	11.1	22.6	43.2	17.9	5.2
48	6.2	17.5	30.9	33.0	12.4
49	0.9	4.7	29.4	50.0	15.0
50	0.9	3.4	27.4	38.4	29.9
Mean %	8.4	15.6	29.7	29.5	16.8



Figure 11.7

Occurrences of Occupations in the Top Eight on Gradscope Printouts

<u>Rank by Frequency of Occurrences</u>		<u>Occupation</u>	<u>Frequency</u>
(Mk 1)	Mk 2		
(-)	1	Industrial Marketing	1827
(7)	2	Chartered Accountant	1750
(1)	3	Solicitor	1535
(5)	4	Advertising Account Executive	1196
(2)	5	Cost & Management Accountant	1184
(9)	6	Marketing - Product Manager	1122
(-)	7	Contracts Administrator	965
(4)	8	Barrister	933
(8)	9	Operational Research	932
(-)	10	Teacher & Researcher in H.E.	792
(3)	11	Merchant Banker	781
(13)	12	Company Secretary	760
(12)	13	Certified Accountant	722
(10=)	14	Diplomatic Service Admin Trainee	690
(6)	15	Export Sales	686
(16)	16	Teacher of the Handicapped	672
(14=)	17	Field Social Worker L.A.	598
(43=)	18	Journalist	563
(25)	19	Nursing	561
(53=)	20	Commodity Broker	559
(22=)	21	Speech Therapist	558
(10=)	22	Industrial Relations Officer	502
(37=)	23	Social Worker Residential L.A.	460
(14=)	24	Social Worker Field/Private Body	458
(21=)	25	Systems Analyst	447
(-)	26	HM Forces Commission Operational	430
(35)	27	Physiotherapist	416
(24)	28	Careers Adviser	407
(43=)	29	Teacher of English as a Foreign Lang.	382
(35=)	30	Volunteer Social Worker	362
(58=)	31	Archivist	359
(32)	32	Teacher of Liberal Studies in F.E.	351
(40=)	33	Civil Service Research Officer	348
(79=)	34	Computer Programmer	337
(66=)	35	Information Scientist	336
(18)	36	Probation Officer	336
(64=)	37	Banker	327
(56=)	38	Work Study Officer	325
(30=)	39	Insurance Broker	325
(32=)	40	Civil Service Admin Trainee	324
(-)	41	HM Forces Commission Administration	322
(43=)	42	Industrial Buyer	316
(49=)	43	Stockbroker/jobber	312
(60=)	44	Landscape Architect	312
(40=)	45	Production Manager - Industry	311
(19)	46	Sales Representative	305
(71=)	47	Occupational Therapist	280
(22=)	48	Teacher, Primary & Junior School	266
(60=)	49	Youth Organiser	265
(30=)	50	Air Pilot	261
(79=)	51	University/Polytechnic Administrator	247
(26)	52	HM Inspector of Taxes	246



(Mk 1)	Mk 2		
(43=)	53	Hotel Manager	244
(28)	54	Resident Soc Worker for Private Body	241
(60=)	55	Secretarial Work	241
(27)	56	Market Research Analyst	240
(37)	57	Minister of Religion	233
(71=)	58	Clerical Worker	216
(39)	59	Public Finance Accountant	201
(88=)	60	Production Planner	198
(42)	61	Insurance Underwriter	197
(26)	62	HM Inspector of Taxes	191
(71=)	63	Advertising Copywriter	191
(95=)	64	Museum/Art Gallery Curator	186
(20)	65	Teacher Secondary School	186
(49=)	66	Teacher in Adult Education	177
(95=)	67	Radiographer	177
(79=)	68	Retail Store Manager	161
(79=)	69	Fire Service	149
(102=)	70	Town and Country Planner	146
(43=)	71	Community Development Worker	137
(88=)	72	Traffic Manager Transport	137
(88=)	73	Training Officer	133
(53=)	74	Valuer Private Assets	130
(87)	75	Traffic Manager Distrib of Goods	128
(49=)	76	Broadcasting News Trainee	124
(79=)	77	HM Factory Inspector	123
(32=)	78	Public Relations	118
(79=)	79	Police Officer	111
(88=)	80	Market Research Interviewer	108
(66=)	81	Valuer of Property	103
(-)	82	Station Assistant, Local Radio	102
(71=)	83	Librarian	101
(102=)	84	Editor Publishing	92
(71=)	85	Civil Service Exec Officer	88
(88=)	86	Sales Administration	85
(53=)	87	Antique Dealer	84
(102=)	88	Building Society Administrator	78
(71=)	89	Recruitment & Selection Officer	74
(79=)	90	Commercial Art Gallery Work	72
(102=)	91	Broadcasting Trainee Studio Manager	69
(88=)	92	Public Sector Admin	69
(102=)	93	Sub Editor Publishing	67
(71=)	94	Auctioneer	65
(64=)	95	Valuer Industrial Assets	62
(56=)	96	Local Government Administrator	54
(95=)	97	Air Traffic Controller	49
(102=)	98	Hospital Services Administration	40
(102=)	99	Retail Buyer	38
(95=)	100	Environmental Health Officer	36
(79=)	101	Shipbroker	36
(66=)	102	Bookseller	34
(95=)	103	Assistant Prison Governor	33
(60=)	104	Diplomatic Service Executive Officer	33
(102=)	105	Valuer Inland Revenue	32
(102=)	106	Housing Estate Manager - Private Sector	30
(95=)	107	Consumer Protection Officer	24
(95=)	108	Consumer Advisory Officer	19
(102=)	109	Theatre/Cinema Manager	15
(71=)	110	Housing/Estate Manager L.A.	14
(-)	111	Merchandizer	4
(102=)	112	Insurance Inspector	1



34 (14.4%), "assumption of responsibility" and the most used (43.2%) was for question 47, "absences from home at night". There is still the same tendency to avoid extremes.

Figure 11.7 shows that all the occupations in Gradscope have appeared on printouts although some appear much more frequently than others. The order of number of appearances is of interest, and has been compared with the order of appearances for the earlier version of Gradscope. The differences could be related to the changes for the improved version of Gradscope, but they could also be a product of the smaller sample for the earlier listing.

Figure 11.8

<u>Range of Totals</u>			
<u>Total</u>	<u>Occupation 1 (%)</u>	<u>Occupation 8 (%)</u>	<u>Occupation 12 (%)</u>
			.6
0 - 9	.2	2.7	4.1
10 - 19	2.2	10.4	13.9
20 - 29	8.8	19.2	20.9
30 - 39	15.2	19.1	19.1
40 - 49	15.0	16.5	16.6
50 - 59	14.3	12.8	10.9
60 - 69	13.2	9.5	7.8
70 - 79	11.1	6.1	4.0
80 - 89	8.3	2.6	1.6
90 - 99	6.3	1.1	.3
100 - 109	3.2	.2	
110 - 119	1.6		
120 - 129	.3		
130 - 139	.1		

Figure 11.8 shows the range of totals to be expected for the occupations on the careers adviser printout.

Most first occupations printed have totals between 30 and 79. Most of the eighth occupation totals fall between 20 and 59 and twelfth occupation totals between 10 and 49, although a very few cases fall outside of these ranges. So far it has not been possible to carry out a survey of student user opinion or to correlate satisfaction with the system with some of the user statistics.

In July 1979, a brief survey of careers adviser reaction to the system was carried out after the system had been operational for three months. A similar survey followed in Spring 1980 to see how opinions have changed as careers advisers made greater use of Gradscope. The survey form and main results follow in Figures 11.9 and 11.10.

#### Local Use of the Program

Several careers services have been using Gradscope on their own local institution computer for some time. Shortly there will be fifteen careers services so placed. In most instances, the time lapse between completing the questionnaire and receiving results is no more than 24 hours. On-line use has been tried but because normally only one terminal is available, and for other reasons, a daily batch service has been a better compromise.

It is thought that over 1,500 students must have been processed locally but, as yet, very little detail on local operation is known. The local use of Gradscope involves separate administration; users must be licensed and there are different questionnaires, input forms, pricing and monitoring statistics arrangements. The collection of user statistics in particular has yet to be satisfactorily resolved.



Figure 11.9

Careers Adviser Survey Form

Comments on Gradscope

Name(s) \_\_\_\_\_

Institution \_\_\_\_\_

*Careers adviser reactions*

1. Have you used Gradscope with students? Yes/No  
If you have not yet used Gradscope please give your reasons. (The rest of the questionnaire will then be inapplicable except perhaps question 9).

2. In what way(s) are you using the system?  
Tick as appropriate.

- |   |              |
|---|--------------|
| (i) with individuals before interview                   | (i) _____    |
| (ii) with individuals after interview                   | (ii) _____   |
| (iii) with groups before interview                      | (iii) _____  |
| (iv) with groups after interview                        | (iv) _____   |
| (v) on demand (without necessarily having an interview) | (v) _____    |
| (vi) final year   | (vi) _____   |
| (vii) penultimate year                                  | (vii) _____  |
| (viii) earlier  | (viii) _____ |
| (ix) other - please specify                             | (ix) _____   |

3. Do you think the *questionnaire itself* is helpful for students? Comments. Yes/No  
Do you have any suggestions for improvements? e.g. layout, instructions, particular questions, input forms, etc.

4. Have you found the output suggestions useful and of interest? Comments. Yes/No  
Do you have any suggestions for improvement? e.g. layout, extra information, weightings, etc.

5. Has the system helped in:-

(i) interview discussion	(i) _____
(ii) career decision making	(ii) _____
(iii) use of information room	(iii) _____
(iv) time saving	(iv) _____
(v) other - specify	(v) _____

Please explain where possible.

Figure 11.9 (Cont'd)

6. Has the central batch service worked satisfactorily for you? Yes/No

7. Would a local service using your own institution's computer facilities be a *substantial* improvement? Comments. Yes/No

8. Will you continue to use Gradscope next academic year? Comments. Yes/No

9. Disregarding your particular views on Gradscope - do you feel that computer aids will eventually be accepted as part of careers advice? What would you like to see? Yes/No

*Student reactions*

10 Has student satisfaction (among those for whom the system is appropriate i.e. any discipline) been:-

- |               |             |
|---------------|-------------|
| (i) High      | (i) _____   |
| (ii) Moderate | (ii) _____  |
| (iii) Low     | (iii) _____ |

Student views available to you on any of the above issues would be helpful.

Please return to CSU

Linda Wilson  
March 1980



Figure 11.10

Careers Adviser Views of Gradscope

<u>Question</u>	<u>1979 (136 replies)</u>	<u>1980 (112 replies)</u>
1 Yes/No	85%/15%	97%/3%
2 (i)	32%	37%
(ii)	87%	90%
(iii)	18%	14%
(iv)	7%	3%
(v)	32%	52%
(vi)	79%	86%
(vii)	87%	79%
(viii)	31%	35%
(ix)	30%	21%
3 Yes/No	94%/1%	94%/1%
4 Yes/No	78%/1%	76%/8%
5 (i)	78%	85%
(ii)	42%	62%
(iii)	41%	54%
(iv)	7%	19%
(v)	18%	7%
6 Yes/No	78%/9%	79%/6%
7 Yes/No	57%/30%	48%/34%
8 Yes/No	95%/0%	92%/1%
9 Yes/No	89%/1%	89%/1%
10 (i)	26%	12%
(ii)	53%	63%
(iii)	7%	4%

## Chapter Twelve

### FURTHER DISCUSSION AND CONCLUSIONS

In the last eighteen months, several minor modifications have been made to Gradscope and major changes are planned over the next two years. More data on system functioning is required, particularly on student opinion of the system.

#### Comparison with Original Aims

Data supplied by careers advisers, the central computer program monitoring statistics and the results of the first field trials allow comparison of Gradscope with the original project aims.

##### 1. Improving Careers Advice in Some Way

Objective improvement of careers advice cannot be demonstrated for reasons outlined previously. However, the level of interest in Gradscope indicates that it is, at present, considered helpful.

##### 2. Building upon Existing Knowledge and Theory

The system data bank is a compilation of existing careers adviser knowledge, but the particular occupations and factors are associated for the first time. One to five scales are not new but their use to



demonstrate agreement among careers advisers and to describe occupational factors is a new application.

3. Designing for Easy Adaptation and Extension

All occupations and factors are processed to the same pattern so either can be subtracted from or added to the system with the minimum disturbance of the whole. Additions to the system require AGCAS co-operation as ratings are necessary, but it may be possible to abbreviate the proceedings in future by organising a panel of careers advisers whenever necessary.

An alternative match logic could easily be substituted for the existing one but in the meantime the present algorithm allows the experimentation with profile information and testing of hypotheses (without re-writing the program) that will eventually lead to evidence necessary to make adjustments to the match. The factor weighting arrangements are also easily changed.

The system can be transferred to a micro-computer with some reduction of the present format and information, but with the gain of immediate feedback of results. An on-line version for a main frame computer could easily offer the same benefits.

Despite the system being relatively easy to change, there are some practical difficulties now that the system is operational; changes have effects on other parts of the system which have to be catered for. It is important that the effects of any changes are monitored.

4. Giving Priority to Graduate Chooser Needs in the Occupational Data Structure

The factors were selected because they suit graduate choosers' needs rather than the requirements of the recruiting employers. The occupational data and the match algorithm are not deliberately biased to produce "desirable" output. The student choices and weightings



control the process.

5. Helping Those with Relatively Unformed Occupational Ideas

Evidence shows that using the factor questionnaire and considering the suggested occupations does stimulate student thought and discussion with careers advisers.

6. Preparing a Working System Within Three Years

The first version of Gradscope was working and field-tested within three years of the start of the project.

7. Producing an Inexpensive System to Install, Update and Maintain

The system was designed to be inexpensive to install, update and maintain, and compares favourably in these areas with any other significant operational system. As the thesis writer is the only full-time person involved with Gradscope, manpower costs have been minimal.

8. Avoiding Ideas of Computer Suggestions Being Definitive Suggestions

By making the computer logic explicit to the user, Gradscope encourages students to be aware of the advantages and the inevitable disadvantages of even the 'top' occupations. (Special note - there is some evidence that the "demystification of the oracle" - aim 8 - tends to devalue the system credibility according to some cynics.)

9. Stressing Exploration Rather Than Matching as the System Philosophy

The system deliberately avoids the concept of exact match and GO/NOGO logic and consequently can produce unexpected, non-stereotyped suggestions. As explained in aim 8 above, presenting the reasoning behind the suggestions encourages further investigation and an under-



standing of certain aspects of decision making.

10. Avoiding Fears of the System Replacing Careers Advisers; It Must Fit In With Existing Facilities

Gradscope has been fitted into existing AGCAS careers facilities in a variety of ways with minimal problems. It has not replaced any careers advisers but, instead, has helped them to deal with certain student problems more effectively.

11. Keeping Members of AGCAS Fully Informed of Progress and Intentions

AGCAS members were involved with the provision of Gradscope's data and have been consulted throughout. The thesis writer and members of the Steering Committee have attended training and discussion meetings throughout the country. News of Gradscope is circulated from CSU. It is intended to involve AGCAS members in some of the future improvements, for example, an extension to cover occupations in all disciplines.

Comparison with Traditional Careers Advice

Objective measures of careers advice are difficult to obtain and likely to be unsatisfactory and, as discussed earlier, are not necessary. Gradscope complements rather than imitates other forms of careers advice - it is not, therefore, intended to compare.

## Extra Dimensions to the Process of Careers Advice

Gradscope has provided careers services with the facility to manipulate 50 factors relating to 112 occupations - a task that would not be undertaken in the normal course of careers advice.

Gradscope does not stereotype occupations or students and therefore frequently produces unexpected - but often worthwhile - results that are fully explained.

Many careers services have used Gradscope as a preliminary exercise prior to interview. The Gradscope Data Bank booklet (see Appendix 9) provides a new source of information for careers advisers.

### Conclusions

Gradscope has met the original project aims.

The system is widely used and accepted by students and careers advisers who regard it as 'helpful' in a variety of applications.

The installation of Gradscope has provided a means of introducing careers advisory services to the potential of computer-aided guidance systems. Students and careers advisers should be better placed to understand the strengths and limitations of computer aids and to press for sensible future development.

Gradscope has been a catalyst in prompting some careers services to establish contact with their local computer departments and arrange computing resources both for Gradscope and other undertakings.

The central batch service, established by the thesis writer, has shown



that CSU and AGCAS can arrange, from within, computer services for their own projects.

Gradscope provides a good foundation and the experience from which to extend and develop computer aids for careers services and could be the basis of research to further the understanding of careers advice.

A P P E N D I C E S



Appendix 1

GRADSCOPE HANDBOOK

Contents

BACKGROUND

Origins  
Aims  
Development  
Test Data

USING THE SYSTEM

Batch Service  
Materials  
Procedure  
The Profile Questionnaire  
The Computer Input Form  
Results  
Interpretation  
Future Developments

## GRADSCOPE

### BACKGROUND

#### Origins

Gradscope was set up in 1975 as a Ph.D. project in the University of Aston's Interdisciplinary Higher Degrees Department. Financial support was provided jointly by the Science Research Council and AGCAS (through SCOEG donations).

By 1974, it seemed that computer technology would continue to advance and reduce in cost and that computer aids would soon be available (and expected) for many new applications. AGCAS members felt that AGCAS should actively involve itself in reviewing computer potential for careers advice and in shaping future development to suit AGCAS needs and philosophy.

Certain computer advantages were already apparent. Careers advice increasingly involves manipulating large masses of data. Computers allow a consistency and impartiality that the careers adviser can never hope to equal. If some routine tasks could be removed from careers advisers, they would have more time to specialise in the personal rather than data difficulties of their clients.

#### Aims

Gradscope has been specifically designed for students in Higher Education. It is intended for the aspects of Careers Advice that help students to choose occupations they would like to follow.

NOTE: CAPS (Computer Assisted Placement Scheme), an earlier AGCAS/SCOEG venture, was for the placement aspects of careers advice and compared students looking for specific occupations with employer vacancies or jobs.

Gradscope is not intended to be a complete guidance process in itself, rather it is a device to alert students to the problems they will encounter in choosing an occupation. It is probably most useful for focussing the ideas of students who have so far given little thought to their future.



2. Organising and selecting reliably from a mass of data in a way which a single adviser could not do.
3. Providing consistent answers to the same input thereby reducing the likelihood of personal prejudice being introduced by careers advisers.
4. Providing a sensible, cost-effective means of guiding students into the careers library by directing their attention to the most relevant reading.
5. Helping careers advisers to concentrate on the educational part of careers advice and to deal with the individual at a deeper, more sophisticated level.

### Development

Gradscope is based upon existing knowledge and theory in careers advice.

The occupations in the data bank are any discipline entry to suit students from non-vocationally oriented degree subjects and others likely to have difficulty with their choice.

The factors that describe the occupations are based upon findings in the literature and suggestions from careers advisers.

The occupational data is relative or comparative. Occupations are described by their relationship to other occupations for each of the factors (in practice, a 1 - 5 rating scale). Such an approach was thought best with data of an inexact kind like careers data.

Ratings for the data bank are provided from AGCAS careers adviser expertise. Careers advisers are more likely than other experts and practitioners of particular occupations to be able to place occupations in an overall framework. The required level of agreement between raters was achieved.

Students describe themselves by questionnaire for the data bank factors and also using a 1 - 5 scale, but their scales indicate their strength of feeling towards each factor. Factors that will not influence their choice of occupation are rated 3 and it is assumed that any level of that factor will be acceptable to them in an occupation. 4 and 5 and 2 and 1 indicate level of feeling for or against the factor.

Occupational suggestions are produced from manipulations based on decision theory.



### The System

Two thirds of students said that the system as a whole had helped them.

### The Questionnaire

Half of all students said that the profile questions themselves had been helpful. Their thoughts had been better organised and in some cases new ideas had resulted.

In one fifth of cases, the careers advisers thought the student better prepared for an interview because of the profile questionnaire.

### The Suggestions

Three quarters of students were interested in three or more of their suggestions.

The same number of careers advisers thought three or more suggestions appropriate for their students.

Nearly all students and careers advisers reported that at least one of the occupations would not have been considered or discussed without Gradscope. Two thirds of the surprise suggestions were of interest to the students.

### First Destination Information

First destination data is limited to 56 students from Liverpool, 29 of whom entered employment after summer, 1978. Of these, 17 are in occupations that appeared on their printouts and 3 are in work related to printout suggestions. Some were not interested in any discipline occupations. Only 4 entered something completely unrelated to their suggestions.

### Control Experiment

A small control experiment was run on 30 students at the University of Liverpool. Each one filled in a profile questionnaire and was later given a scrambled list of 30 occupations to consider. The occupations were the individual's personal top 10, bottom 10 and a randomly selected 10. Results showed that the greatest number of occupations of interest came from the top 10, a lesser number from the random 10 were listed, and very few from the bottom 10 evoked any interest.

Gradscope was shown to select occupations at a better than chance level.



USING THE SYSTEMBatch Service

Gradscope will first be available to all AGCAS careers services as a centralised batch service. The program will be run once a week at the University of Liverpool Computer Laboratory. All profiles received by the specified day will be processed and the resulting outputs posted back to the appropriate careers services.

For convenience, students will mark their choices on a special "optical mark" form, from which a computer input device will read the information directly. Errors likely in transferring the data to punched cards are eliminated.

Materials

The basic materials are as follows:-

(1) Gradscope Handbook(2) Student Profile Questionnaire

To be retained by students, and available from CSU.

(3) Computer Input Forms

Students record their choices on these forms which are sent to the computer at Liverpool. They are available from CSU.

(4) Centre Number

Each AGCAS careers service has been allocated a computer code number which will be given with the first order of Gradscope forms.

(5) Degree Discipline Codes

A list of degree subjects and codes will be found at the back of the Gradscope handbook.

(6) Gradscope Number

Services should issue each student user with a personal Gradscope number (0001 - 9999). A record must be kept of student name against the issued number, as the Gradscope number will be the only means of identifying the printout when it is returned.



8. Send the completed input forms (unfolded) and a batch record form in an A4 envelope to:-

The Chief Punch Operator  
 Computer Laboratory  
 University of Liverpool  
 P O Box 147  
 LIVERPOOL L69 3BX

#### Returned Printouts

9. Processing will take place on Wednesday evenings and printouts will be despatched on Thursdays with regular CSU mailings.
10. The printouts will be a continuous strip of perforated sheets which will need to be separated. Each individual's printout comprises two sheets, one to be given to the student (labelled 'STUDENT VERSION'), the other should be retained by the careers service to be available when the student consults a careers adviser.
11. If a student's printout is not returned, this will normally mean that the input form was faulted by the Computer Laboratory's optical mark reader, for example, because of stray pencil marks or creases. Initially, faulted forms will be returned with an explanation to enable the elimination of further similar errors. Otherwise, input forms will be retained by the Computer Laboratory.

#### The Profile Questionnaire

A set of Gradscope profile questions is included in the handbook. The questionnaire includes full instructions for the student.

Space (the column, 'choice') has been provided beside each question for students to record the choices entered on their input forms for easier future reference. This separate record is not essential, as a list of choices is given on the printout. (Input forms are not returned.)

Students should keep their questionnaires, as they are necessary to interpret their printout.

#### The Computer Input Form

An input form is included at the back of the handbook. It has been designed and printed very precisely to suit computer optical mark



Centre Number										Gradscope Number																
0	3	9	100	200	300	400	500	600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	4	0	8	7		
			0	10	20	30	40	50	60	70	80	90	100	200	300	400	500	600	700	800	900					
			0	1	2	3	4	5	6	7	8	9	0	10	20	30	40	50	60	70	80	90				
Degree Discipline													Degree Related List										Leave Blank			
0	6	10	20	30	40	50	60	70	80	90											Mark 'General List'					
		0	1	2	3	4	5	6	7	8	9															

Students fill in their names, degree disciplines and the date of completing the form in the vertical area on the left.

Name  
 SURNAME SMITH  
 FIRST NAMES GRAHAM

Degree  
 DISCIPLINE COMBINED ARTS Date Day 1 Month 6 Year 1979

Student Profile Marking

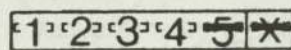
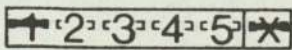
Spaces for questions 1 to 50 should be marked.

Spaces 51 - 60 should not be used. These spaces may be incorporated into later discipline-related versions of Gradscope.

The 1 to 5 spaces for questions 1 to 50 should all be marked with one correct mark in each.

N.B. Unmarked questions or those with two marks or more will be automatically allocated a '3' rating (removing them from the computer calculations).

Up to three 'X' spaces (to the right of the 1 to 5 spaces) for factors already marked 1 or 5:-



may be marked to indicate special weightings.

N.B. If there are more than three correctly marked weightings, the printout will be produced without any special weightings.



## Results

Each input profile will result in 8 to 12 occupational suggestions. The suggestions will be listed on two different printouts. (See diagrams on pages 15 and 16.)

Printout 1 is a careers adviser version to be retained by the careers service. It has details of the student's choice for each question, a list of the number of choices at each choice value (1, 2, 3, 4 and 5) and the computer calculations and scores for each of the occupations.

It was felt that this level of detail would be misleading and unattractive to most students, but useful if students wanted to follow up any particular points with their careers adviser and perhaps try an alternative input profile.

This printout can also form a good starting point for careers adviser interviews with students.

Printout 2 is intended for students to take away and use on their own. There is a reminder of their own input choices and a list of occupations with the numbers of the factors which have most influenced the results.

This is why students should retain their profile questions.

Titles of relevant information sheets for further reading and research are also given. (In a few cases, there will be no relevant information sheet available, e.g., Civil Service occupations.)

## Interpretation

The following is intended as a guide to the use of the information available from the printouts. Further experience with the Gradscope system should provide some more definite parameters to refer to.

### Student Printout

Straightforward information is given as follows:-

1. The original input question choices.
2. The eight to 12 occupations most likely to be of interest as they offer most scope for the student's stated preferences.
3. Relevant information sheets that can be consulted for further reading.
4. The number of the factor choices that have most influenced the results. In view of the outcomes, do students still feel the same about their original choices? Further inputs may lead to new ideas.



CAREERS ADVISER PRINTOUT

108 LEICESTER POLY

GRANDSCOPE COMPUTER-ASSISTED CAREERS GUIDANCE ON 26/06/79  
 CAREERS ADVISER'S VERSION OF ADVICE FOR STUDENT NUMBER 461

QUESTION NUMBERS READ VERTICALLY

REPLIES TO QUESTIONNAIRE      ACTIVITIES      DEMANDS      CONDITIONS      PRODUCTS

QUESTION 000000 001 1111 : 11111222222 : 222233333333334444444445  
 NUMBER 1234567 890 1234 : 56789012345 : 6789012345678901234567890

REPLY 4454454 552 5432 : 5532444334323354453543233325  
 WEIGHTED

SEE SCORE	TOTAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
20	40	-1	-1	20	-2	-1	-2	0	4	0	1	2	0	0	2	4	4	0	2	-2	0	1	4	1	2	0
00	30	1	0	0	-2	0	0	1	2	4	-1	0	-1	0	2	0	2	0	0	0	2	2	2	2	0	0
05	29	0	20	-2	1	0	1	0	1	0	0	0	-4	2	4	2	0	0	1	-1	0	0	2	1	0	0
	28	1	0	-2	1	0	2	0	4	0	0	0	-1	0	2	2	2	0	-2	1	1	2	0	1	0	0
	27	1	1	-10	-2	0	2	0	4	4	-1	2	0	0	2	2	2	0	2	0	2	2	4	2	0	0
	26	-1	-1	20	-2	1	0	1	-2	0	1	-4	-2	0	2	4	2	0	2	-2	0	0	-2	0	0	0
	24	0	-1	20	-1	0	0	0	0	-2	2	-4	-2	0	2	4	2	0	2	-2	-1	-1	-2	0	0	1
	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
	4	2	0	-2	-1	0	0	0	0	0	0	2	0	0	-2	-1	2	0	4	-2	0	2	0	0	1	2
	4	0	0	1	1	1	0	0	1	0	0	2	0	0	1	1	0	0	2	-1	0	1	0	0	0	0
	4	1	0	-1	0	0	0	0	1	0	1	0	0	-2	0	0	0	0	-2	-1	0	1	0	0	0	0
	4	1	0	1	1	2	0	0	1	0	0	0	2	1	0	0	0	0	2	0	0	1	0	0	-1	0
	4	0	0	-1	0	0	0	0	0	0	0	1	0	-2	1	1	2	0	0	0	0	2	0	0	-1	0
	2	1	0	-1	0	1	0	0	1	0	1	0	0	-2	1	1	2	0	0	-1	0	2	0	0	-1	0
	0	0	0	0	0	1	1	0	0	1	0	1	0	0	-2	1	1	2	0	-1	0	-2	0	0	-1	0
	4	2	0	0	0	1	0	0	0	0	1	0	0	-4	0	-1	-2	0	2	-2	0	2	0	0	0	-2

OVERALL CHOICES:      FOR 5 = 13  
 4 = 17  
 NEUTRAL 3 = 12  
 AGAINST 2 = 8  
 1 = 0



Low scores are less likely to be reliable, because they normally indicate students with few strong preferences (perhaps the undecided students?). So there are fewer items to differentiate between occupations. However, in some cases the few choices made reflect strong and decided feelings and results are reliable.

The occupations at the top of the list need not necessarily be more acceptable than those lower down. Rather, the top eight are more likely to be of interest than the next eight and so on.

It is important to see how scores have been reached. (See section 'Products'.)

#### 4. Occupations

Are the occupations suggested of interest to students? Do they need to do further research into some that may be new ideas to them before they can decide? If students like an occupation, can they explain why and if they do not care for it, do they know why not? Factors not catered for in the original questionnaire may be involved, but the examination of reactions to the computer suggestions can produce new ideas to follow up.

#### 5. Products

The section, "products", shows each computer calculation and hence the basis of the computer "decision" to include a particular occupation in the top eight. Careers adviser and student may find that they disagree with the "reasoning" in some cases or that they would like to redefine their views on some of the factors.

Each product is the result of multiplying student choice by the appropriate data bank rating - both suitably adjusted to -2 to +2 values. Positive products reflect concurrence between student choice and the occupations, negative products show nonconcurrence. The larger the product, the greater the concurrence. Weighted factors are further multiplied by a constant to boost score where appropriate - the products for each occupation are summed to give the score.

It is possible to see from the products under each factor number which occupations meet with which student preferences.

It is also possible to see what the data bank rating is.



GRADSCOPE

ANY DISCIPLINE ENTRY OCCUPATIONS\*- MARCH, 1979

Accountancy: certified	Environmental Health Officer
Accountancy: chartered	Executive Officer: Civil Service
Accountancy: cost and management	Executive Officer: Diplomatic Service
Accountancy: public finance	Export Sales
Administration: Building Society	Fire Service
Administration: Hospital Service	HM Factory Inspector
Administration: Local Government	HM Forces: Commission - Administrative
Administration: Public Sector (Nationalised Industry, etc.)	HM Forces: Commission - Operational
Administration: Universities and Polytechnics	HM Forces: Education/Instructor Branch
Admin Trainee: Civil Service	HM Inspector of Taxes
Admin Trainee: Diplomatic Service	Hotel Manager
Advertising Account Executive	Housing/Estate Manager - Local Authority
Advertising Copywriter	Housing/Estate Management - (Private Owners & Estate Agents)
Air Pilot (nat. and private airlines incl. helicopters RAF & RN)	Information Science/Information Work
Air Traffic Controller: (nat. and private airfields UK and abroad <u>not</u> HM Forces)	Insurance Broker
Antique Dealer	Insurance Inspector
Archivist	Insurance Underwriter
Auctioneer	Journalist
Banker	Landscape Architect
Banker: merchant	Librarian
Barrister	Management: Retail Stores
Bookseller	Marketing: Industrial
Broadcasting: News Trainee	Marketing: Product Management
Broadcasting: Station Assistant Local Radio	Market Research: Analyst
Broadcasting: Trainee Studio Manager	Market Research: Interviewer
Buyer: industrial	Merchandise
Buyer: retail	Museum or Art Gallery Curator (public)
Careers Adviser	Nursing
Church Minister	Occupational Therapist
Clerical Work	Operational Research
Commercial Art Gallery Work	
Commodity Broker	
Community Development Worker	
Company Secretary	
Computer Programmer	
Consumer Advisory Officer	
Consumer Protection Officer (Trading Standards)	
Contracts administrator	

.../...



# Gradoscope

## Occupations open to graduates in any subject

The occupations have been described as briefly as possible with the aim of clarifying the area of work each title is meant to cover.

Definitions have been adapted from CODOT, the Department of Employment's Classification of Occupations and Dictionary of Occupational Titles published by HMSO. CODOT codes have been given wherever possible and further information may be obtained by consulting the appropriate sections.

The occupations have been listed to accord with the ROGET Types of Work. The ROGET Job Descriptions appendix gives further details of some of the occupations.

### 1 Scientific/Technical

- 1 *Air Pilot (241.05 - 241.35)*  
Includes national and private airlines, helicopters, RAF and RN.
- 2 *Air Traffic Controller (242.30 - 242.40)*  
Maintains radio and/or radar contact with aircraft to provide a safe and orderly passage for air traffic. Organises air traffic movements.

### 2 Production

- 1 *Production Manager - industry (270.00)*  
Plans, organises, directs and co-ordinates, often through or with the assistance of other managers, specialists and supervisors, the work involved in and the resources necessary for industrial operations. Takes frequent decisions affecting people and their work.
- 2 *Production Planner (259.10)*  
Plans production schedules and work sequences and procedures in manufacturing, processing or other production fields.
- 3 *Contracts Administrator*  
Engages in day to day contact with customers, seeing to their needs regarding orders placed with the firm through close contact with the other departments in the firm. This may be a function found only in larger concerns. Negotiates about price, delivery and control of the supply of goods or services. Oversees the completion of a contract.



- 9 *Insurance Inspector (373.30)*  
Stimulates activities of independent agents acting on behalf of an insurance company, advises agents and clients on problems arising in connection with insurance matters and appoints new agents.
- 10 *H.M. Inspector of Taxes (39.40)*  
Assesses tax liabilities of tax payers, and negotiates with private citizens, corporate bodies and/or their representatives about all taxation matters.
- 11 *Stockbroker/Jobber (34.05/34.01)*  
Broker acts as agent for the buying and selling of securities on behalf of clients and advises on investment - deals in securities on the Stock Exchange. Jobber buys and sells shares on the Stock Exchange.
- 12 *Commodity Broker (379.10)*  
Buys and sells commodities in bulk on behalf of clients. Examples of commodities: grain, metal, rubber, tea, wool, fur.
- 13 *Shipbroker (379.40)*  
Buys and sells shipping space for the transport of goods and/or acts as agent in the purchase and sale of ships.

## 5 Legal

- 1 *Barrister (22.10)*  
Pleads cases usually in the higher courts, and gives specialised legal advice. Other titles: Advocate, Counsel.
- 2 *Solicitor (22.20)*  
Advises clients on, and handles on their behalf, the legal aspects of personal and business problems.
- 3 *Company Secretary (31.10)*  
Ensures that legal, statutory and other provisions governing or affecting the running of a company are observed and acts as representative of the company. Usually is the management focus for the company's legal and financial affairs.

## 6 Buying/Selling

- 1 *Advertising Account Executive (51.25)*  
Plans, organises and directs advertising campaigns on behalf of one or more of an advertising agency's clients and co-ordinates agency activities in relation to client's accounts for which he is responsible.
- 2 *Advertising Copywriter (151.35)*  
Writes original advertising copy designed to arouse public interest in a particular product or service, for presentation through such media as posters, the press or television.
- 3 *Buyer: Retail (61.10)*  
Buys merchandise from manufacturers, importers, wholesalers and other sources for resale through retail distribution outlets.
- 4 *Buyer: Industrial (61.30)*  
Buys raw materials, plant equipment and other items from suppliers on behalf of an industrial, commercial or public undertaking. Other titles: purchasing officer.
- 5 *Marketing: Industrial (51.05)*  
Formulates policies to promote the sales and direct the sales activities of an organisation. Plans the product image, its advertisement, pricing, distribution and profitability. The market is frequently other industrial concerns.



- 4 *Admin. Trainee Diplomatic Service*  
Works for the Foreign Office on work with a high policy content - financial affairs, energy resources, defence - and looks after political relations with foreign countries. A training grade for potential senior members of the diplomatic service.
- 5 *Administration - Local Government (69.30)*  
Undertakes administrative or executive functions in one of the fields of local government.
- Office Manager (general) (281.02)*  
Plans, organises, directs and co-ordinates, often through supervisors, the work and resources of offices or departments carrying out clerical and related functions.
- Specialisations include:-
- 6 *Administration - Building Society (281.24)*
- 7 *Administration - Hospital Services*
- 8 *Administration - Public Sector*
- 9 *Administration - Universities and Polytechnics*
- 10 *Clerical Work (319.02)*  
Performs a variety of routine office work requiring a considerable knowledge of systems or procedures.
- 11 *Secretarial Work (321.10)*  
Records dictation in shorthand, transcribes notes into a type-written form and relieves others of clerical and other routine tasks. The responsibility and initiative varies - see personal assistant (69.10).
- 12 *Hotel Manager (248.05 - 284.99)*  
Plans, organises, directs and co-ordinates on own account and on behalf of employers and often through other managers and supervisors, the work and resources of hotels, restaurants, etc.
- 13 *Theatre/Cinema Manager (285.35/285.40)*  
Plans, organises, directs and co-ordinates often through other managers or supervisors, all activities and resources necessary for the running of a theatre or cinema.
- 14 *Librarian (63.10)*  
Appraises potential library acquisitions, arranges for them to be obtained, indexed and made available to library users, and organises and controls other library services.
- 15 *Archivist (63.20)*  
Collects, appraises and controls the safe keeping and preservation of all kinds of recorded material which has historical significance.
- 16 *Information Scientist (63.30)*  
Collects, appraises, indexes and disseminates information. Other titles: Information Officer.
- 17 *Museum or Art Gallery Curator (Public) (63.50)*  
Organises, develops and maintains collections in a national, municipal, county or other museum, art gallery or similar institution.
- 18 *Commercial Art Gallery Work*  
As for Art Gallery Curator but performs in the private sector. Involves more buying and selling.



- 8 *Occupational Therapist (117.50)*  
Plans, organises and conducts, under medical direction, activities designed to improve ability and independence in patients suffering from physical or mental illnesses or disabilities.
- 9 *Speech Therapist (117.60)*  
Assists patients, under medical direction, to overcome or minimise the effects of defects and disorders of speech.

*Welfare Occupations (Unit Group 102)*

Workers in this group help individuals and families or communities to solve their social and personal problems, run social, welfare and related services to meet the needs of persons in a community and of the community itself and plan, organise, direct and co-ordinate these activities.

These occupations include:-

- 10 *Social Work - Field - Local Authority*
- 11 *Social Work - Field - Private Organisation*
- 12 *Social Work - Residential - Local Authority*
- 13 *Social work - Residential - Private Organisation*
- 14 *Social Work on a Voluntary Basis*
- 15 *Youth Organiser (102.16)*
- 16 *Community Development Worker*
- 17 *Probation Officer (102.08)*  
Helps individuals placed under his supervision by the Courts towards social rehabilitation and undertakes other social work required by the Courts.
- 18 *Housing/Estate Manager - Local Authority (102.42)*
- 19 *Housing/Estate Manager - Private Organisation (102.42)*  
Administers housing estates on behalf of bodies such as local authorities and housing associations, both from the social and the business point of view.
- 20 *Minister of Religion (103.10)*  
Conducts religious worship according to the form of service of a particular faith or denomination and ministers to the needs of its members. Generally seeks to fulfill a caring and teaching role within the community as a whole.
- 21 *Careers Adviser (109.10/109.20)*  
Gives guidance on choice of careers, occupation, training and related matters to people on behalf of a public or private organisation.
- Teaching and Instructing Occupations (Minor Group 09)*  
Workers in this group give instruction and plan, organise, control and advise on instruction in academic, technical, vocational, leisure and other subjects.
- 22 *Teacher - Primary Schools (95.00)*
- 23 *Teacher - Secondary Schools (94.00)*
- 24 *Teacher - Adult Education*
- 25 *Teacher - Liberal Studies in Further Education (93.00)*
- 26 *Teacher/Research in Higher Education (91.00)*



DEGREE/DISCIPLINE CODES

ARTS

- 2 - Modern languages
- 3 - Philosophy, theology, classics, archaeology
- 4 - English, history
- 5 - Drama, music, fine arts
- 5 - Other arts and combinations

SOCIAL SCIENCE

- 3 - Economics, accountancy
- 9 - Business studies, management
- 0 - Law
- 1 - Psychology
- 2 - Sociology
- 3 - Social administration, public administration
- 4 - Geography
- 5 - Politics
- 5 - Other social sciences

PURE SCIENCE

- 3 - Mathematics, statistics
- 9 - Computer science
- 0 - Physics
- 1 - Chemistry
- 2 - Microbiology
- 3 - Biochemistry
- 4 - Botany
- 5 - Zoology
- 5 - Biology
- 7 - Other biological sciences
- 8 - Pharmacy, pharmacology

- 29 - Geology, geophysics, geochemistry
- 30 - Other pure sciences

APPLIED SCIENCE

- 32 - Mechanical engineering
- 33 - Production engineering
- 34 - Civil engineering, building, structural
- 35 - Chemical engineering
- 36 - Electrical engineering
- 37 - Electronics
- 38 - Aeronautical engineering
- 39 - Mining engineering, exploration science
- 40 - Materials science, metallurgy
- 41 - Marine engineering
- 42 - Naval architecture
- 43 - Nuclear engineering
- 44 - Instrumentation and control engineering
- 45 - General engineering, engineering science
- 46 - Agricultural sciences, forestry
- 47 - Architecture
- 48 - Town and Country planning
- 49 - Industrial design
- 50 - Food science/technology
- 51 - Polymer science/technology
- 52 - Textile science/technology
- 53 - Other applied sciences and technologies



# GRADSCOPE


(Association of Graduate Careers Advisory Services)

## Occupational Suggestions for Students in Higher Education


### COMPLETING YOUR GRADSCOPE INPUT FORM

#### Marking the Input Form


Please use HB pencil throughout. Do not otherwise mark or bend the form. This is essential if your data is to be read accurately into the computer.


Mark your selected spaces with a firm pencil line *between the notches* thus: 

Do not do this:  too faint

or this:  angled

or this:  blob

or this:  extended

You should cancel your mistakes like this: 

Then mark the correct space.

#### Your Gradscope profile

You will find 50 straightforward factor questions about your occupational preferences on pages 2 and 3 of this sheet.

Consider each factor carefully and decide how it will affect your choice of occupation.

Return to the appropriate set of spaces on the input form:

If you feel it will make no difference to your choice, that is, you are neutral towards it:

Mark space '3' if neutral

1	2	3	4	5	X
---	---	---	---	---	---

Otherwise you should decide whether you are *for* or *against* the factor in your work and how *strongly* you feel about it. Mark the input form as follows:

mark space '5' if strongly for

1	2	3	4	5	X
---	---	---	---	---	---

mark space '4' if moderately for

1	2	3	4	5	X
---	---	---	---	---	---

mark space '2' if moderately against

1	2	3	4	5	X
---	---	---	---	---	---

mark space '1' if strongly against

1	2	3	4	5	X
---	---	---	---	---	---

You should make only *one* valid mark in each set of 1 to 5 spaces.

Make sure that you mark every factor.

Space has been left beside each factor on *this form* for you to record your choices for your own reference if you wish. Input forms are not returned but your choices will be listed on your printout.

### SECTION 3 CONDITIONS OF WORK

Rate your choices to your expectations for your early years of employment.

.	<i>Geographical availability</i> of jobs; localised = 1; widespread = 5. For example this may be important if your spouse is liable to be moved in his/her job.
.	<i>Competition</i> for available vacancies. Very little = 1; very keen = 5.
.	Occupation associated with <i>job security</i> .
.	<i>Further study</i> and exams necessary after graduation.
.	<i>Earnings during first year</i> after graduation. Lower than average = 1; Higher than average = 5. Training and further study will involve one in lower earnings. If you are prepared to accept this mark '1' or '2'.
.	<i>Earnings 10 years after graduating</i> . Low for a graduate = 1; High = 5.
.	Rate of <i>promotion</i> to a position of power or authority. Slow = 1; rapid = 5.
.	<i>Supervision</i> of your work, that is, control and inspection.
.	Assumption of <i>responsibility</i> , that is, trust or charge for which you will be answerable.
.	Possibility of eventual <i>self-employment</i> .
.	Work which is <i>physically demanding</i> .
.	Work which will be mainly <i>out of doors</i> .
.	Chance to work <i>abroad</i> for short terms as part of the job.
.	<i>Working group</i> . On your own = 1; part of a team = 5.
.	Acquisition of <i>flexible skills</i> , that is, experience that can be easily transferred to other fields of work with same or other employer.
.	<i>Hours of work</i> . Shift work or irregular hours = 1; regular 9 to 5 or other standard day time hours = 5.
.	Requirement to <i>conform</i> in appearance, style of dress and manner. (An extreme example would be the armed forces).
.	Contact with people of a similar <i>educational background</i> .
.	<i>Moving of home</i> required by employer.
.	<i>High pressure work</i> with demanding deadlines and standards which may stimulate or stress depending on your view.
.	Restrictions on <i>behaviour</i> in outside life.
.	<i>Absences from home</i> at night because of travel (not for shift work which is covered elsewhere).
.	<i>Emotional involvement</i> – concern for other people's feelings.
.	<i>Observable results</i> in the short term by which achievement can be judged.
.	Ease of <i>resuming occupation</i> after a period away.

This present version finishes at question 50. Leave spaces 51 to 60 blank.

### ADJUSTMENTS (Optional)

Now that you have considered all 50 factors you *may* feel that some of them will be of overwhelming importance in your choice of occupation. *If this is the case*, go back and look at the factors you have marked '1' or '5' (those you feel strongly about). You may choose *up to three* of these for a special higher weighting. Do this by marking the 'X' space for those factors. Mark no more than *three*.



# GRADSCOPE COMPUTER INPUT FORM

## OCCUPATIONAL SUGGESTIONS FOR STUDENTS IN HIGHER EDUCATION

SERVICES UNIT  
 HOUSE  
 CENTRE  
 ROAD  
 TER

### CENTRE NUMBER

<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9
<input type="checkbox"/> 0	<input type="checkbox"/> 10	<input type="checkbox"/> 20	<input type="checkbox"/> 30	<input type="checkbox"/> 40	<input type="checkbox"/> 50	<input type="checkbox"/> 60	<input type="checkbox"/> 70	<input type="checkbox"/> 80	<input type="checkbox"/> 90
<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9

### GRADSCOPE NUMBER

<input type="checkbox"/> 0	<input type="checkbox"/> 100	<input type="checkbox"/> 200	<input type="checkbox"/> 300	<input type="checkbox"/> 400	<input type="checkbox"/> 500	<input type="checkbox"/> 600	<input type="checkbox"/> 700	<input type="checkbox"/> 800	<input type="checkbox"/> 900
<input type="checkbox"/> 0	<input type="checkbox"/> 100	<input type="checkbox"/> 200	<input type="checkbox"/> 300	<input type="checkbox"/> 400	<input type="checkbox"/> 500	<input type="checkbox"/> 600	<input type="checkbox"/> 700	<input type="checkbox"/> 800	<input type="checkbox"/> 900
<input type="checkbox"/> 0	<input type="checkbox"/> 10	<input type="checkbox"/> 20	<input type="checkbox"/> 30	<input type="checkbox"/> 40	<input type="checkbox"/> 50	<input type="checkbox"/> 60	<input type="checkbox"/> 70	<input type="checkbox"/> 80	<input type="checkbox"/> 90
<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9

### DEGREE DISCIPLINE

<input type="checkbox"/> 0	<input type="checkbox"/> 10	<input type="checkbox"/> 20	<input type="checkbox"/> 30	<input type="checkbox"/> 40	<input type="checkbox"/> 50	<input type="checkbox"/> 60	<input type="checkbox"/> 70	<input type="checkbox"/> 80	<input type="checkbox"/> 90
<input type="checkbox"/> 0	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7	<input type="checkbox"/> 8	<input type="checkbox"/> 9

DEGREE RELATED LIST

GENERAL LIST

DEGREE CODE No.   
 Date: Day  Month  Year

### QUESTIONS 1—20

1	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
2	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
3	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
4	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
5	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
6	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
7	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
8	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
9	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
10	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
11	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
12	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
13	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
14	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
15	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
16	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
17	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
18	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
19	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
20	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X

### QUESTIONS 21—40

21	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
22	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
23	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
24	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
25	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
26	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
27	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
28	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
29	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
30	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
31	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
32	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
33	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
34	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
35	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
36	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
37	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
38	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
39	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
40	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X

### QUESTIONS 41—60

41	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
42	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
43	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
44	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
45	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
46	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
47	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
48	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
49	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
50	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
51	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
52	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
53	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
54	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
55	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
56	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
57	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
58	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
59	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X
60	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> X

FIRST NAMES  
 Degree DISCIPLINE

CANCEL ERRORS THUS:   
 AND REMARK CORRECT CELL

WILSON

22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1









GIS System Factors

Section 1 Selectors

Part A: Characteristics About Industries

- |  |                                 |
|--|---------------------------------|
| 1. Agri-Business and Natural Resources | 8. Health                       |
| 2. Business and Office                 | 9. Hospitality and Recreations  |
| 3. Communications and Media            | 10. Manufacturing               |
| 4. Construction                        | 11. Marine Sciences             |
| 5. Consumer and Homemaking Education   | 12. Marketing and Distributions |
| 6. Environment                         | 13. Personal Services           |
| 7. Fine Arts and Humanities            | 14. Public Services             |
|  | 15. Transportation              |

Part B: Characteristics About Occupations Within Industries

- |  |                             |
|--|-----------------------------|
| Professional, Technical and Managerial Occupations | Processing Occupations      |
| Clerical and Sales Occupations                     | Machine Trades Occupations  |
| Service Occupations                                | Bench Work Occupations      |
| Farming, Fishery, Forestry and Related Occupations | Structural Work Occupations |
|  | Miscellaneous Occupations   |

Part C: Personal Characteristics - Interests

- |  |  |
|--|--|
| Situations involving a preference for activities dealing with things and objects.  | Situations involving a preference for activities concerned with people and the communication of ideas.   |
| Situations involving a preference for activities involving business contact with people.   | Situations involving a preference for activities of a scientific and technical nature.   |
| Situations involving a preference for activities of a routine, concrete, organized nature.   | Situations involving a preference for activities of an abstract and creative nature.   |
| Situations involving a preference for people for their presumed good, as in the social welfare sense or for dealing with people and language in social situations. | Situations involving a preference for activities that are nonsocial in nature, and are carried on in relation to processes, machines and techniques. |
| Situations involving a preference for activities resulting in prestige or the esteem of others.  | Situations involving a preference for activities resulting in tangible, productive satisfaction.   |



Part D: Educational Characteristics

Levels of Formal Education Usually Preferred or Required by the Employer

- Less than high school graduation.
- High school graduation required or preferred.
- Post high school graduate courses, no degree.
- Junior college, associate degree required or preferred.
- Post graduate technical - vocational training, no degree.
- Vocational - technical training 1 year required or preferred.
- Vocational - technical training, 2 years required or preferred.
- Vocational - technical training, 3 years required or preferred.
- Vocational - technical training, 4 years required or preferred.
- Vocational - technical training, 5 years required or preferred.
- Bachelor's degree required or preferred.
- Master's degree required or preferred.
- Post graduate professional degree required or preferred.
- Doctor's degree required or preferred.

Special Vocation Training Time Usually Required

Apprenticeship	Business School
At least 1 year	At least 1 year
At least 2 years	At least 2 years
At least 3 years	At least 3 years
At least 4 years	At least 4 years
At least 5 years	In plant training other than on-the-job training
On-the-job training	
Private instruction	Essential experience in similar jobs

Training Other than Formal Education as Preparation for the Occupation

Short demonstration only	Up to 2 years
Up to 30 days training	From 2 to 4 years
Up to 3 months training	From 4 to 10 years
Up to 6 months training	Over 10 years
Over 6 months training	

Appendix 4

OCCUPATIONS IN ICGS

Accountant (Chartered or Certified)	Butcher
Accountant (Cost and Management)	Buying/Purchasing Officer
Accountant (Municipal Treasurer)	Canteen Assistant
Account Executive	Card Punch Operator
Actuary	Careers Officer
Administrative Officer (Civil Service)	Joiner
Copywriter	Carpet Fitter
Aero Engine Fitter	Cartographic Draughtsman
Agricultural Mechanic	Ceramics/Glass Technology
Air Steward/Stewardess	Checkout Cashier
Air Traffic Control Officer	Chemical Engineer
Air Traffic Control Assistant	Chemist/Research
Alteration Hand (Clothing)	Chiropodist
Animal Nursing Auxiliary	Cinema Manager
Antique Dealer	Cinematographer
Archaeologist	Civil Engineer
Architect	Civil Engineering Technician
Architectural Technician	Clerical Officer (Civil Service)
Archivist	Clerical Assistant (Civil Service)
Armed Services (Commissioned) Army	Clerk
Armed Services (Other Ranks) Army	Cutter/Sewing Machinist (Clothing)
Artist/Visualiser	Company Secretary
Assembler (Electronics)	Composing (Printing)
Astronomer	Computer Operator
Auctioneer	Computer Programmer
Auto Electrician	Cook
Banking Manager	Customs & Excise Officer
Barrister	Customs & Excise Waterguard
Beauty Culture	Dancing
Biochemist	Deckhand
Biologist	Dental Auxiliary
Blacksmith/Farrier	Dental Surgery Assistant
Boatbuilder	Dentist
Bookbinding	Dietician
Botanist	Dispensing Optician
Brewer	Ophthalmic Optician
Bricklayer	Diplomatic Service (Administrative Officer)
Building Craftsman	Dental Technician
Building Society Work (Manager)	Doctor (G.P.)
Building Surveyor	Drama (Actor) (Actress)
Bus Driver	Draughtsman



Millinery	Public Relations Officer
Mining Craft Apprentice	Purser
Mining Surveyor	Quantity Surveyor
Minister of Religion	Radio and TV Mechanic
Model	Radiographer
Mothers Help	Receptionist
Motor Mechanic	Remedial Gymnast
Museum Attendant	Residential Care
Music	Retail Distribution Management
Musical Instrument Technology	Room Maid/Chambermaid
Neurophysiology Technician (out)	Rubber Technologist
Nursery Nurse	Sailmaker
Nursing	Sales Assistant - Retailing (Dept Store)
Occupational Therapist	Sawyer/Wood Machinist
Orthoptist	Scientific Work in the Civil Service
Osteopath	Secretary
Packer (Clothes)	Sewing Machinist (Clothing)
Painter & Decorator	Sheet Metal Worker
Paint Technologist	Shelf Filler (Supermarket)
Panel Beater (Vehicle Body Repairs)	Ship Broker/Air Broker
Patent Agent	Shorthand Typist
Patent Examiner	Snackbar Attendant
Personnel Officer	Social Worker
Petrol Pump Attendant	Solicitor
Pharmacist	Speech Therapist
Photographer	Spray Painter
Physicist	Stable Hand/Groom
Physiotherapist	Statistician
Pilot (Civil Aviation)	Stockbroker
Plasterer	Surveyor - Ordnance Survey
Plastics Technologist	Systems Analyst
Plumber	Tailoring (Bespoke)
Police (Man) (Woman)	Teaching
Polymer Technologist	Telephone Engineer (Post Office)
Poultry Hand	Telephonist
Printing - Machine Room	Television Aerial Erector
Printing - Warehouse Work	Timber Technologist
Probation Officer	Town Planner
Professional Sportsman (Soccer)	Translator
Psychologist	Travel Agent
Public Health Inspector	Copy Typist/Audio Typist

ICGS System Factors

1. Physical Characteristics

Unaided vision  
Colour vision  
Hearing  
Sense of smell  
Skin complaints  
Use of arms and hands  
Use of legs and feet  
Height  
Respiratory complaints  
Hay fever  
Sight of blood  
Animals  
Chemicals/fumes  
Fear of enclosed spaces  
Fear of heights

2. Qualifications

No qualification  
CSE  
'O' level, craft or technical  
'A' level ONC/OND  
Bachelor HNC/HND  
Master, Doctor, postgraduate diploma, professional qualification

3. Abilities

Arithmetic  
Shape recognition  
Vocabulary  
Reasoning and logic

4. Interests

Scientific  
Social service  
General service  
Persuading/influencing  
Literary  
Artistic  
Computational  
Practical  
Nature  
Outdoor/Active

5. School Subject Interest

List - may choose up to 5



## Entry and Training

Not good with words	In service
Not good with numbers	Not sociability
Not good with the hands	Not tact
Not good at drawing	Not attentiveness to detail
Not a logical mind	Not imagination
Not good at working under pressure	Not courage
Not good with mathematical problems	Not ability to work alone
Not good with scientific problems	Not ability to make decisions
Not interested in music	Not teamwork
Not a good memory	Not patience
Day release	Not persuasive
Block release	Not leadership
Sandwich course	Not sympathetic
On the job	

## Effects

No evenings  
No weekends  
No travel  
Not away from home for long periods  
Not away from home for short periods  
No requirement for particular behaviour outside work  
Warm feelings of others  
High prestige by general public  
At least average prestige by general public  
High prestige by work associates  
At least average prestige by work associates

## Description

Serving customers  
Working with animals  
Working with machines  
Dealing with people  
Adding up  
Writing a lot  
Talking a lot  
Working with instruments and tools  
Working with the hands  
Travelling  
Not a set routine  
Ability to specialise  
Not ability to schedule own tasks  
Ability to make decisions that affect others

## Conditions

Under £500/year starting salary	2 weeks' annual holiday
-	3 weeks' annual holiday
-	4 weeks' annual holiday
-	Over 4 weeks' annual holiday
Over £2,000/year starting salary	Fringe benefits
Under 35 hours/week	No restrictions such as smoking
35 - 40 hours per week	No professional code of conduct
40 - 45 hours per week	
Over 45 hours per week	
Regular paid overtime	
No unpaid overtime	

Occupations in SIGI

Actor/Actress	Engineering Technician
Advertising Copywriter	Electronics Technician
Aircond, Refrig & Heating Mechanic	Fine Artist/Private Art Teacher
Accountant	Funeral Director
Aircraft Mechanic	Flight Engineer
Appliance Repair Techn	Flight Attendant
Architect	Forester
Automobile Salesworker	Geographer
Architectural Drafter/ Techn	Home Economist
Avionics Technician	Hotel/Motel Manager
Automobile Mechanic	Insurance Agent
Actuary	Interior Designer/Decorator
Broadcast Technician	Industrial Engineer
Beautician	Industrial Traffic Manager
Botanist	Industrial Designer
Accounting Clerk	Instrument Repair Technician
Business Machine Repair Techn	Science Lab Technician
Bank Officer	Librarian
Bank Teller	Labor Relations Specialist
Commercial Artist	Library Technician
Clothing Designer	Lawyer
Chemical Engineer	Mathematician
Chemist	Physician
Clergy	Mechanical Engineer
Computer Operator	Meteorologist
Computer Programmer	Medical Records Admin
Civil Engineer	Medical Lab Technician
Dental Assistant	Model
Dentist	Market Researcher
Dental Hygienist	Manufacturer's Salesworker
Drafter	Medical Technologist
Dietician	Musician/Music Teacher
Diesel Mechanic	Machinist
Dancer/Dancing Teacher	Nurseryman/Landscaper
Economist	Newspaper Reporter
Electrical/Electronics Engineer	Oceanographer
	Optician, Dispensing



Legal Assistant	Electrician
Farmer	Metallurgist
Agricultural Engineer	Nursing Home Administrator
Agricultural Extension Agent	Probation/Parole Officer
Agricultural Scientist	Psychologist, Clinical/Counseling
Air Traffic Controller	Psychologist Experimental
Biochemist	Underwriter
Business Administrator	Wildlife Biologist
Buyer, Retail Store	Optical Lab Technician
Carpenter	Job Analyst
Claim Adjuster/Examiner	Travel Agent
Credit Manager	

Revised 6/78

## Appendix 7

### Occupations in DISCOVER

OCCUPATIONAL TITLE	DISCOVER #
Accountant	001
Accounting/Statistical Clerk	002
Actor/Actress	004
Actuary	005
Addresser	481
Administrative Assistant	006
Administrator, Engineer	007
Advertising Copywriter	462
Advertising Manager	009
Advertising Worker	609
Aeronautical Engineer	010
Aerospace Engineering Technician	011
Agronomist	012
Air Conditioning/Refrig. Mechanic	013
Air Traffic Controller	014
Aircraft Mechanic	015
Airline Dispatcher	456
Airplane Navigator	017
Airplane Pilot	016
Animal Scientist	618
Anthropologist	018
Architectural Drafting Worker	021
Architect	020
Art Goods Dealer	022
Art Teacher	023
Artist	024
Assembler (General)	624
Astronomer	025
Athlete (Professional)	026
Athletic Coach	027
Attorney (See Lawyer)	
Auctioneer	474
Auto Body Repairer	029
Automobile Dealer	031
Automobile Mechanic	033
Automotive Engineer	032
Bacteriologist (Microbiologist)	034
Baggageman/woman (See Porter)	
Bailiff	483
Baker	036
Bank Teller	394
Banker (Financial Manager)	037
Barber	038
Bartender	039
Beautician/Cosmetologist	087
Bill Collector	040
Billor (Billing Clerk)	041
Biochemist	042
Biologist	043
Blacksmith	044
Blaster	045
Boilermaker	046
Bookbinder	047
Bookkeeper	048
Bookkeeping Machine Operator	049
Bootblack	478
Botanist	050
Brakeman/woman (See Railroad Brakeman/woman)	
Branch Manager	051
Bricklayer	052
Building Custodian (See Janitor)	
Building Inspector (Construction)	053



DISCOVER OCCUPATIONS AND THEIR THREE-DIGIT DISCOVER NUMBERS

OCCUPATIONAL TITLE	DISCOVER #
Delivery Person (Foodstuffs/Laundry)	457
Demonstrator	097
Dental Assistant	101
Dental Hygienist	098
Dental Technician	099
Dentist	100
Designer (See Furrier, Furniture Designer, Jewelry Designer, Interior Decorator, Tool Designer, Women's Garment Designer)	
Detective	103
Detective (See Store Detective)	
Dietitian	104
Director, Compensation & Benefits	106
Director, Industrial Relations	107
Director, Recreation (Social Director)	108
Director, Social Service	109
Disk Jockey (See Radio/TV Announcer)	
Dispatcher (See Airline Dispatcher)	
Dock Worker (See Longshoreman/woman)	460
Doctor, Medical (Physician)	305
Dorm Director	111
Drafting Worker	611
Draftsman/woman (See Architectural Draftsman/woman, Drafting Worker)	
Drama Coach	112
Drama Teacher	113
Dramatist	114
Dressmaker	115
Drill Press Operator	116
Dry Cleaner	117
Duplicating Machine Operator	118
Economist	119
Editor	120
Educational Administrator	121
Electrical Engineer	122
Electrician	622
Electronic Technician	124
Electrologist	123
Electroplater	125
Elementary Teacher	126
Elevator Mechanic	127
Elevator Operator	128
Employment Advisor (See Manpower Advisor)	
Employment Interviewer	130
Employment Representative	131
Engineer	133
Engineer (See Aeronautical Engineer, Automotive Engineer, Chemical Engineer, Civil Engineer, Electrical Engineer, Environmental Health Engineer, Industrial Engineer, Mechanical Engineer, Metallurgical Engineer, Mining Engineer, Radio/TV Engineer)	
Engineer Administrator (See Administrator, Engineer)	
Engineer Aide	135

DISCOVER OCCUPATIONS AND THEIR THREE-DIGIT DISCOVER NUMBERS

OCCUPATIONAL TITLE	DISCOVER #
High-Speed Printer Operator	192
Historian	193
History Teacher	194
Home Economics Teacher	195
Home Economist	196
Home Service Representative	197
Horticulturist	198
Hospital Administrator (Superintendent)	473
Host/Hostess (Hotel, Tea Room)	199
House Painter (See Painter, House)	
Housekeeper (See Executive Housekeeper)	
Housekeeper (Hotel)	200
Houseparent	201
Illustrator	490
Importer-Exporter (Wholesaler)	203
Industrial Arts Teacher	204
Industrial Engineer	205
Industrial Engineer Technician	605
Industrial Truck Operator	206
Inhalation Therapist	479
Inspector (See Building Inspector, Customs Inspector, Food & Drug Inspector)	
Inspector, Hardness	607
Installer Repairer (Telephone)	207
Instrument Maintenance Mechanic	209
Instrument Repairer	210
Insurance Manager	212
Insurance Underwriter	213
Interior Decorator (Designer)	214
Internist	215
Interviewer (See Employment Interviewer)	
Janitor (Building Custodian)	217
Jeweler	218
Jewelry Designer	219
Job Analyst	220
Journalist/Reporter (Newspaper)	221
Judge	477
Key Punch Operator	223
Kitchen Helper	224
Knitter	225
Labor Arbitrator	226
Laboratory Technician	227
Laborer (Construction)	228
Laundry Worker	441
Lawyer/Attorney	028
Legal Secretary (Stenographer)	454
Librarian	230
Library Assistant	231
Licensed Practical Nurse (LPN)	232
Life Insurance Salesworker	233
Lineman/woman (Tel. & Tel.)	234
Liquor Store Manager	235
Literature Teacher	236
Load Checker	237
Locksmith	238
Locomotive Engineer (See Railroad Engineer)	
Logger	239
Longshoreman/woman (See Dockworker)	
Loom Changer	639
Loom Fixer	240
Machine Operator	641
Machine Repairer	642



DISCOVER OCCUPATIONS AND THEIR THREE-DIGIT DISCOVER NUMBERS

OCCUPATIONAL TITLE	DISCOVER #
Parking Lot Attendant	287
Parole Officer	288
Pathologist	289
Patrol Officer (See Police Officer)	
Payroll Clerk	290
Personnel Assistant (Worker)	292
Personnel Clerk	293
Personnel Director	294
Personnel Manager	295
Personnel Recruiter	296
Personnel Secretary	297
Pharmacist	298
Pharmacologist	480
Photoengraver	461
Photograph Retoucher	300
Photographer	301
Photolithographer	302
Physical Education Teacher	303
Physical Therapist	304
Physician (See Doctor, Medical)	
Physicist	450
Physiologist	306
Piano Tuner	307
Pilot (See Airplane Pilot, Ship Pilot)	
Pipefitter	309
Plasterer	310
Plumber	311
Podiatrist (Foot Doctor)	312
Poet (Songwriter)	466
Police Officer (Patrol Officer)	313
Political Scientist	314
Popular Singer	469
Porter (Baggageman/woman)	035
Postmaster/Postmistress	316
Power Plant Operator	317
Powerhouse Repairer	318
Press Operator (See Printer)	
Priest	653
Printer (Press Operator)	322
Production Expeditor	319
Professor (See College Professor)	
Programmer (See Computer Programmer, Systems Analyst)	
Production Manager	320
Production Planner	321
Professional Nurse (Registered)	323
Proof Reader	324
Psychiatrist	325
Psychologist	326
Public Health Service Officer	327
Public Relations Worker	328
Quality Control Technician	442
Rabbi	674
Radio Mechanic (See Mechanic, Radio)	
Radio Program Writer	331
Radio/TV Announcer (Disk Jockey)	332
Radio/TV Engineer	333
Radio/TV Mechanic	654
Radio/TV Station Operator	330
Railroad Brakeman/woman	334
Railroad Conductor	335
Railroad Engineer (Locomotive)	635
Rancher (See Cattle Rancher)	
Real Estate Appraisor	336

DISCOVER OCCUPATIONS AND THEIR THREE-DIGIT DISCOVER NUMBERS

OCCUPATIONAL TITLE	DISCOVER #
Social Worker (See Group Worker, Director, Social Service)	
Sociologist	371
Songwriter (See Poet)	
Special Education Teacher	373
Speech & Hearing Clinician	374
Speech Teacher	375
Spinner	376
Sporting Goods Salesperson	377
Statistician (See Mathematician)	
Stenographer (See Legal Secretary, Clerk-Stenographer)	
Steward/Stewardess (See Flight Attendant)	
Stockbroker (See Securities Salesperson)	
Stock Clerk	378
Stock Handler	379
Stone Cutter	380
Store Detective	484
Structural Steel Worker	382
Stuntman/Stuntwoman	489
Supervisor (Ticket Sales)	383
Surgeon	384
Surveyor	385
Switchman/woman (Tel. & Tel.)	386
Systems Analyst (Business EDP)	387
Tabulating Machine Operator	388
Tailor	389
Taxicab Driver	390
Teacher (See Art Teacher, Business Teacher, Dancing Teacher, Drama Teacher, Elementary Teacher, English Teacher, Foreign Language Teacher, History Teacher, Home Economics Teacher, Industrial Arts Teacher, Literature Teacher, Mathematics Teacher, Music Teacher, Natural Science Teacher, Physical Education Teacher, Social Science Teacher, Special Education Teacher, Speech Teacher, Teacher Aide, Vocational Agriculture Teacher)	
Teacher Aide	471
Technical Writer	463
Technician (See Electronic Technician, Laboratory Technician, Chemical Laboratory Technician, Engineering Technician, Aerospace Engineering Technician, Industrial Engineer Technician, Nuclear Reactor Technician, Quality Control Technician, X-Ray Technician)	
Telegraph Operator	392
Telephone Operator	393
Telephone Service Person (See Installer Repairer)	



Appendix 3

USR TYPE OF WORK INDEX

It is likely that initially there will be gaps in this index and if a job is not listed it does not necessarily mean that it should go into the OTHER category - 950. Where jobs are not listed, whatever category is decided as appropriate, it would be extremely helpful in achieving standardisation and a better index if the secretary of the Statistics Committee is notified. This must be done for all entries in OTHER - 950.

Group heading codes are used where no sub-category is entirely appropriate or where the type of work runs into more than one category. Code numbers which apply to group headings are marked \*.

<u>CODE</u>	<u>TYPE OF WORK</u>
651	abstracting
	academic research - see research
406	account executive (advertising)
501	accountancy - articulated clerk
502	" - other
604	acting
505	actuarial
220 *	administration (non-specialist)
654	advisory - economic/sociological
403	" - sales
655	" - statistical
458	" - technical
656	" - other non-scientific
406	advertising - account executive
606	" - art work
601	" - copywriting
404	" - marketing (including brand management)
405	" - market research
406	" - media planning
655	" - media research
407	" - public relations and promotional work
458	Agricultural Development Advisory Service
351	agricultural work - management
	agricultural advisory work - according to job - 304, 403 or 458
950 *	air hostess/steward = other
351	air traffic controller
502	analysis - financial
506	" - investment
405	" - market
455	" - operational
301	" - routine scientific
	apprenticeships - see 'professional traineeships'
401.	antique dealing
	approved school work - see community schools



<u>CODE</u>	<u>TYPE OF WORK</u>
801	community school psychological work
900 *	" " teaching
801	community welfare/development work
454	computer operation/management
452	" programming
450 *	consultancy - management
815	consumer protection
405	consumer research work
303	control - routine quality/scientific control
601	copywriting
502	cost accountancy
600 *	creative, entertainment work not otherwise listed
702	curatorship - public art galleries
702	" - museums
220 *	Customs and Excise
604	dancing - ballet etc
	data processing - according to work - 452, 453, 454, or 450 *
900 *	demonstrator - university/technical college
809	dental - dentist
352	departmental production manager
401	departmental store manager
271	design - architectural
353	" - installation and maintenance engineering
606	" - packaging
355	" - production
252	" - scientific
606	" - stage
272	" - town and country planning
273	" - traffic engineering
800 *	dietician
220 *	diplomatic Service
806	dispensing optician in professional training
807	dispensing pharmacist in professional training
351	district forest officer
808	doctor (medical)
604	drama - acting
605	" - production
654	economic/sociological advisory and research work
605	editing - film
602	" - journalistic
603	" - other, including publishing
900 *	education/instructor branches armed forces
220 *	education administration
654	education - adviser
	engineering - apprentice - by function as below
275	" - civil
352	" - civil - site management
353	" - installation and maintenance
355	" - production development
352	" - production management
252	" - scientific design
253	" - scientific development
251	" - scientific research



<u>CODE</u>	<u>TYPE OF WORK</u>
220 *	governmental administration - non-specialist
606	graphic design
754	health and safety executive
407	home service adviser - Gas Council
351	horticultural management
458	" advisory work .
220 *	hospital administration
351	hotel management
801	housemaster - community schools
	housewife - eliminated by primary classification
351	housing management
920 *	indexing
450 *	industrial consultancy
355	" design
753	" relations
651	information work - abstracting
653	" " - /technical writing
650 *	" " - other
754	inspector - factory
403	" - insurance
300	" - public health (including trainee)
508	" - tax
300	" - weights & measures (including trainee)
504	insurance (including broking, inspector, surveying, underwriting, assessors)
652	interpreting
506	investment analysis/management/research
602	journalistic work
301	laboratory routine analysis
303	" - quality control
253	" - scientific development
251	" - scientific research
302	" - routine testing
351	land agency
272	land use planning
272	landscape architecture/design
652	language work - translating/interpreting
	law see legal work
802	lay work (Churches)
900 *	lecturing
552	legal work - patents
551	" " - solicitors articles
554	" " - company secretarial
553	" " - trustee work
550 *	" " - other
701	librarianship
504	Lloyds underwriting/broking
353	maintenance and installation engineering
803	male nursing
	management - see appropriate job or function
450 *	management consultancy
	" services - see services to management
	" trainee - according to job for which training
200 *	" " - general



<u>CODE</u>	<u>TYPE OF WORK</u>
750 *	personnel - other
807	pharmacist - in training
606	photographer
	pilot - civil aviation - in training eliminated by primary classification
272	planning assistant (T & C planning)
804	police constable
220 *	political agent
654	political research
	postgraduate apprentices in engineering - by function for which being trained
800 *	prison governors
920 *	private secretary - shorthand typist
801	probation work
355	production development
353	" installation and maintenance
352	" management
351	" - operational
354	" planning and control
355	production research and development
352	" traineeship
605	" - broadcasting/film/theatre
604	professional actors, musicians, sportsmen
805	professional trainee - clinical psychology
	" " - engineering - by function for which being trained
351	" " - estate management
806	" " - opticians
807	" " - pharmacists
	" " - for professional qualification in engineering - by function for which being trained
452	programming - computer
354	progress chasing
407	promotional work
801	psychiatric social work
251	psychological research = scientific
654	" " = sociological
805	psychologists - clinical in training
801	" - community school
300	public health inspector (including trainee)
603	publishing editorial work
303	quality control
274	quantity surveyor
605	radio production
751	recruitment - personnel
802	religious ministry
251	research - scientific
654	" - economic/sociological
655	" - statistical
656	" - other non scientific
602	reporting - journalistic



<u>CODE</u>	<u>TYPE OF WORK</u>
605	television production
302	testing - routine scientific
303	" - quality control
604	theatrical acting
220 *	" agent
605	" production
	town and country planning - full-time training - primary classification eliminates
273	town and country planning - traffic engineering
272	" " " " - other
200 *	traineeships - general
	traineeships - professional - in engineering - by function for which being trained
	" - others by function for which being trained
752	training (personnel)
652	translating
458	trouble shooting - technical advisory work
553	trust work
920 *	typing
654	university research - economic/sociological
251	" " - scientific
655	" " - statistical
656	" " - other non scientific
900 *	" teaching
509	valuation (not related to buying and selling)
400 *	valuation relating to buying and selling
810	veterinary work
606	visual art
300	weights and measures inspector (including trainee)
801	welfare work
401	wholesale buying and selling
457	work study
601	writing - copy
602	" - journalistic
653	" - technical
603	" - other
755	youth employment work
801	youth organiser
801	youth work







	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	
TRAFFIC MANAGER DISTRIM. GOODS	2	5	1	1	5	2	4	2	5	3	2	1	3	2	4	3	4	4	4	4	4	4	4	3	5	3	3	3	2	3	4	3	3	5	1	3	2	2	4	4	3	3	1	3	4	1	2	2	4	2	
TRAFFIC MANAGER TRANSPORT	2	5	2	1	5	3	4	2	4	3	1	2	2	1	4	3	4	4	4	3	3	4	3	5	4	5	3	3	3	3	3	3	4	2	5	2	3	3	2	4	3	2	3	1	3	5	1	2	2	5	3
TRAINING OFFICER	3	3	5	2	4	3	4	2	3	2	1	1	1	1	5	4	3	2	2	3	3	4	4	3	5	4	4	4	2	1	2	3	3	4	1	2	1	2	1	2	3	4	4	2	2	3	2	3	3		
UNIVERSITY/POLYTECHNIC ADMIN.	2	4	1	1	4	2	3	2	4	3	1	1	1	1	4	5	3	1	3	3	3	4	2	2	3	3	5	5	2	3	3	3	3	3	1	1	1	1	1	4	3	5	5	1	3	1	1	2	3	3	
VALUER INDUSTRIAL ASSETS	4	4	1	1	2	2	3	2	3	3	1	1	1	1	3	4	3	2	5	5	4	4	3	2	3	4	4	4	5	2	3	3	1	5	4	3	3	2	3	2	4	4	3	2	3	1	2	1	4	3	
VALUER INLAND REVENUE	3	3	1	1	2	2	2	2	4	4	1	1	1	1	3	4	3	1	5	4	4	4	2	2	3	4	4	5	3	3	3	3	4	2	2	3	1	3	2	5	4	3	4	2	2	1	1	3	3		
VALUER PRIVATE ASSETS	5	3	2	1	1	1	3	2	3	3	1	1	2	2	3	4	4	4	5	3	2	3	2	3	3	2	4	5	2	4	4	3	1	4	5	1	2	3	3	3	1	2	1	2	2	4	3				
VALUER PROPERTY	5	4	2	1	2	1	2	1	3	3	1	1	1	1	3	3	4	5	4	3	4	2	2	4	5	3	4	5	2	4	4	3	4	4	3	4	3	4	2	2	2	4	2	1	2	2	1	4	3		
VOLUNTIER SOCIAL WORKER	4	2	2	5	1	3	3	1	2	1	1	1	1	1	2	5	3	1	1	1	1	1	3	3	5	5	2	3	2	1	1	2	3	1	4	3	2	3	1	1	1	1	1	1	2	1	2	5	2	5	
WORK STUDY OFFICER	2	4	3	1	4	5	4	3	5	4	3	2	2	1	4	4	3	2	2	5	5	5	4	3	4	5	3	3	4	3	3	3	3	2	2	2	2	4	4	4	3	3	2	3	1	1	2	4	3		
YOUTH ORGANISER	4	4	4	4	3	3	3	2	2	1	1	1	1	1	2	4	3	3	1	2	1	2	3	3	3	3	5	3	3	4	2	2	1	5	1	4	3	1	3	3	1	2	2	1	2	3	2	5	3	4	

FACTOR NUMBER	VALUE 1	NO. OF OCCUPATIONS	VALUE 2	NO. OF OCCUPATIONS	VALUE 3	NO. OF OCCUPATIONS	VALUE 4	NO. OF OCCUPATIONS	VALUE 5	NO. OF OCCUPATIONS	
	<p>COMPUTER PROGRAMMER                      SUB-EDITOR PUBLISHING                      AIR TRAFFIC CONTROLLER                      AIR PILOT                      MARKET RESEARCH INTERVIEWER                      M.M. FORCES COMMISSION OPERATIONAL                      INDUSTRIAL MARKETING</p>	20	<p>PRODUCTION PLANNER                      ASSISTANT PRISON GOVERNOR                      THEATRE/CINEMA MANAGER                      SECRETARIAL WORK                      PRODUCTION MANAGER - INDUSTRY                      DIPLOMATIC SERVICE EXECUTIVE OFFICER                      MERCHANDIZER</p>	34	<p>CIVIL SERVICE RESEARCH OFFICER                      WORK STUDY OFFICER                      EXPORT SALES                      UNIVERSITY/POLYTECHNIC ADMINISTRATOR                      HM INSPECTOR OF TAXES                      OPERATIONAL RESEARCH                      PUBLIC SECTOR ADMINISTRATION                      RETAIL BUYER                      COST AND MANAGEMENT ACCOUNTANT                      COMMODITY BROKER                      TEACHER AND RESEARCHER IN H.E.</p>	21	<p>TEACHER OF LIBERAL STUDIES IN F E                      VALUER INLAND REVENUE                      INSURANCE UNDERWRITER                      PUBLIC FINANCE ACCOUNTANT                      TEACHER OF THE HANDICAPPED                      SPEECH THERAPIST                      PUBLIC RELATIONS</p>	21	<p>INFORMATION SCIENTIST                      HOUSING/ESTATE MANAGER-LOCAL AUTHORITY                      FIRE SERVICE                      LANDSCAPE ARCHITECT                      VALUER INDUSTRIAL ASSETS                      PROBATION OFFICER                      CERTIFIED ACCOUNTANT</p>	16	<p>CAREERS ADVISER                      ENVIRONMENTAL HEALTH OFFICER                      HOUSING/ESTATE MANAGER-PRIVATE SECTOR                      CONSUMER PROTECTION OFFICER                      BARRISTER</p>
	<p>INDUSTRIAL BUYER                      BROADCASTING NEWS TRAINEE                      CLERICAL WORKER                      EDITOR-PUBLISHING                      H.M. FORCES COMMISSION ADMINISTRATIVE                      CONTRACTS ADMINISTRATOR</p>		<p>TRAFFIC MANAGER TRANSPORT                      TEACHER OF ENGLISH AS A FOREIGN LANGUAGE                      BROADCASTING TRAINEE STUDIO MANAGER                      SHIPROKER                      ADVERTISING ACCOUNT EXECUTIVE                      RETAIL STORE MANAGER                      HOSPITAL SERVICES ADMINISTRATOR                      SALES ADMINISTRATION</p>		<p>TOWN &amp; COUNTRY PLANNER                      DIPLOMATIC SERVICE ADMIN TRAINEE                      RECRUITMENT AND SELECTION OFFICER                      ANTIQUE DEALER                      JOURNALIST                      LOCAL GOVERNMENT ADMINISTRATOR                      MUSEUM/ART GALLERY CURATOR</p>		<p>RESIDENT SOCIAL WORKER FOR PRIVATE RUDY                      LIBRARIAN                      BOOK SELLER                      HM FACTORY INSPECTOR                      BUILDING SOCIETY ADMINISTRATOR                      POLICE OFFICER                      NURSING</p>		<p>CHURCH MINISTER                      VALUER PROPERTY                      SOLICITOR                      FIELD SOCIAL WORKER PRIVATE RUDY                      FIELD SOCIAL WORKER LOCAL AUTHORITY                      BANKER</p>		
			<p>INDUSTRIAL BUYER                      BROADCASTING NEWS TRAINEE                      CLERICAL WORKER                      EDITOR-PUBLISHING                      H.M. FORCES COMMISSION ADMINISTRATIVE                      CONTRACTS ADMINISTRATOR</p>		<p>TRAFFIC MANAGER DISTRIBUTION OF GOODS                      TEACHER PRIMARY AND JUNIOR SCHOOL                      SALES REPRESENTATIVE                      HOTEL MANAGER                      ADVERTISING COPYWRITER                      H.M. FORCES EDUCATION/INSTRUCTOR BRANCH                      SYSTEMS ANALYST                      COMMERCIAL ART GALLERY WORK                      MARKETING - PRODUCT MANAGEMENT                      CIVIL SERVICE ADMIN TRAINEE                      STATION ASSISTANT LOCAL RADIO</p>		<p>COMPANY SECRETARY                      TRAINING OFFICER                      TEACHER SECONDARY SCHOOLS                      HERCHANT BANKER                      RESIDENT SOCIAL WORKER LOCAL AUTHORITY                      CIVIL SERVICE EXECUTIVE OFFICER                      TEACHER IN ADULT EDUCATION</p>		<p>STOCKBROKER/JOBBER                      COMMUNITY DEVELOPMENT WORKER                      PHYSIOTHERAPIST                      OCCUPATIONAL THERAPIST                      INSURANCE INSPECTOR                      VOLUNTEER SOCIAL WORKER                      YOUTH ORGANISER</p>		<p>INSURANCE BROKER                      CHARTERED ACCOUNTANT                      VALUER PRIVATE ASSETS                      AUCTIONEER                      CONSUMER ADVISORY OFFICER</p>

Professionally advising or acting for members of the normal population depending upon their particular requirements.



FACTOR NUMBER	3	VALUE 1	NO. OF OCCUPATIONS	32
MARKET RESEARCH ANALYST	STOCKBROKER/JOBBER	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY		
TRAFFIC MANAGER DISTRIBUTION OF GOODS	PRODUCTION PLANNER	BOOK SELLER		
INDUSTRIAL BUYER	VALUER INLAND REVENUE	EXPORT SALES		
SUB-EDITOR PUBLISHING	PUBLIC FINANCE ACCOUNTANT	BROADCASTING NEWS TRAINEE		
JOURNALIST	UNIVERSITY/POLYTECHNIC ADMINISTRATOR	VALUER INDUSTRIAL ASSETS		
THEATRE/CINEMA MANAGER	HOUSING/ESTATE MANAGER-PRIVATE SECTOR	CLERICAL WORKER		
ADVERTISING COPYWRITER	LOCAL GOVERNMENT ADMINISTRATOR	CIVIL SERVICE EXECUTIVE OFFICER		
SECRETARIAL WORK	EDITOR-PUBLISHING	MARKET RESEARCH INTERVIEWER		
PUBLIC SECTOR ADMINISTRATION	COMMERCIAL ART GALLERY WORK	ADVERTISING ACCOUNT EXECUTIVE		
NURSING	DIPLOMATIC SERVICE EXECUTIVE OFFICER	COMMODITY BROKER		
CONTRACTS ADMINISTRATOR	STATION ASSISTANT LOCAL RADIO			
FACTOR NUMBER 3	VALUE 2	NO. OF OCCUPATIONS	53	
TOWN & COUNTRY PLANNER	RESIDENT SOCIAL WORKER FOR PRIVATE BODY	INFORMATION SCIENTIST		
COMPUTER PROGRAMMER	CIVIL SERVICE RESEARCH OFFICER	LIBRARIAN		
COMPANY SECRETARY	DIPLOMATIC SERVICE ADMIN TRAINEE	RADIOGRAPHER		
HA FACTORY INSPECTOR	INDUSTRIAL RELATIONS OFFICER	RECRUITMENT AND SELECTION OFFICER		
LANDSCAPE ARCHITECT	INSURANCE UNDERWRITER	SALES REPRESENTATIVE		
ANTIQUE DEALER	ASSISTANT PRISON GOVERNOR	INSURANCE BROKER		
BUILDING SOCIETY ADMINISTRATOR	VALUER PROPERTY	MERCHANT BANKER		
ENVIRONMENTAL HEALTH OFFICER	AIP TRAFFIC CONTROLLER	CHARTERED ACCOUNTANT		
SOLICITOR	HOTEL MANAGER	TRAFFIC MANAGER TRANSPORT		
INSURANCE INSPECTOR	HQ INSPECTOR OF TAXES	AIR PILOT		
OPERATIONAL RESEARCH	VALUER PRIVATE ASSETS	FIELD SOCIAL WORKER PRIVATE BODY		
CONSUMER PROTECTION OFFICER	BROADCASTING TRAINEE STUDIO MANAGER	ACTIONEER		
FIELD SOCIAL WORKER LOCAL AUTHORITY	SHIPBROKER	PRODUCTION MANAGER - INDUSTRY		
POLICE OFFICER	RETAIL BUYER	PROBATION OFFICER		
H.M. FORCES COMMISSION ADMINISTRATIVE	CONSUMER ADVISORY OFFICER	COST AND MANAGEMENT ACCOUNTANT		
VOLUNTEER SOCIAL WORKER	BANKER	CIVIL SERVICE ADMIN TRAINEE		
HOSPITAL SERVICES ADMINISTRATOR	CERTIFIED ACCOUNTANT	INDUSTRIAL MARKETING		
MERCHANDIZER	SALES ADMINISTRATION			
FACTOR NUMBER 3	VALUE 3	NO. OF OCCUPATIONS	10	
WORK STUDY OFFICER	FIRE SERVICE	PHYSIOTHERAPIST		
ARCHIVIST	RESIDENT SOCIAL WORKER LOCAL AUTHORITY	SYSTEMS ANALYST		
BARRISTER	MARKETING - PRODUCT MANAGEMENT	RETAIL STORE MANAGER		
PUBLIC RELATIONS				
FACTOR NUMBER 3	VALUE 4	NO. OF OCCUPATIONS	6	
COMMUNITY DEVELOPMENT WORKER	CAREERS ADVISER	OCCUPATIONAL THERAPIST		
H.M. FORCES COMMISSION OPERATIONAL	MUSEUM/ART GALLERY CURATOR	YOUTH ORGANISER		
FACTOR NUMBER 3	VALUE 5	NO. OF OCCUPATIONS	11	
TEACHER OF LIBERAL STUDIES IN F E	CHURCH MINISTER	TEACHER PRIMARY AND JUNIOR SCHOOL		
TRAINING OFFICER	TEACHER SECONDARY SCHOOLS	TEACHER OF THE HANDICAPPED		
TEACHER OF ENGLISH AS A FOREIGN LANGUAGE	SPEECH THERAPIST	MIL FORCES EDUCATION/INSTRUCTOR BRANCH		
TEACHER IN ADULT EDUCATION	TEACHER AND RESEARCHER IN H.E.			

Teaching and instructing on the basis of your special knowledge and skills.



FACTOR NUMBER	VALUE 1	NO. OF OCCUPATIONS	VALUE 2	NO. OF OCCUPATIONS
11	<p>SALES REPRESENTATIVE</p> <p>CLERICAL WORKER</p> <p>MARKET RESEARCH INTERVIEWER</p> <p>CONSUMER ADVISORY OFFICER</p>	11	<p>BROADCASTING NEWS TRAINEE</p> <p>ADVERTISING COPYWRITER</p> <p>COMMERCIAL ART GALLERY WORK</p> <p>VOLUNTEER SOCIAL WORKER</p>	<p>JOURNALIST</p> <p>VALUER PRIVATE ASSETS</p> <p>BARRISTER</p>
35	<p>MARKET RESEARCH ANALYST</p> <p>STOCKBROKER/JODDER</p> <p>BOOK SELLER</p> <p>HM FACTORY INSPECTOR</p> <p>LANDSCAPE ARCHITECT</p> <p>ANTIQUE DEALER</p> <p>VALUER PROPERTY</p> <p>SOLICITOR</p> <p>TEACHER OF ENGLISH AS A FOREIGN LANGUAGE</p> <p>SECRETARIAL WORK</p> <p>PROMOTION OFFICER</p> <p>TEACHER AND RESEARCHER IN M.E.</p>	35	<p>INFORMATION SCIENTIST</p> <p>CIVIL SERVICE RESEARCH OFFICER</p> <p>RADIOGRAPHER</p> <p>CAREERS ADVISER</p> <p>INSURANCE UNDERWRITER</p> <p>SUB-EDITOR PUBLISHING</p> <p>ENVIRONMENTAL HEALTH OFFICER</p> <p>TEACHER OF THE HANDICAPPED</p> <p>SPEECH THERAPIST</p> <p>CONSUMER PROTECTION OFFICER</p> <p>COMMODITY BROKER</p> <p>STATION ASSISTANT LOCAL RADIO</p>	<p>COMPUTER PROGRAMMER</p> <p>CHURCH MINISTER</p> <p>PHYSIOTHERAPIST</p> <p>VALUER INLAND REVENUE</p> <p>OCCUPATIONAL THERAPIST</p> <p>INSURANCE BROKER</p> <p>VALUER INDUSTRIAL ASSETS</p> <p>INSURANCE INSPECTOR</p> <p>FIELD SOCIAL WORKER PRIVATE BODY</p> <p>FIELD SOCIAL WORKER LOCAL AUTHORITY</p> <p>PUBLIC RELATIONS</p>
30	<p>TOWN &amp; COUNTRY PLANNER</p> <p>LIBRARIAN</p> <p>TEACHER PRIMARY AND JUNIOR SCHOOL</p> <p>EXPORT SALES</p> <p>ARCHIVIST</p> <p>OPERATIONAL RESEARCH</p> <p>SYSTEMS ANALYST</p> <p>RETAIL BUYER</p> <p>DIPLOMATIC SERVICE EXECUTIVE OFFICER</p> <p>YOUTH ORGANISER</p>	30	<p>RESIDENT SOCIAL WORKER FOR PRIVATE BODY</p> <p>COMMUNITY DEVELOPMENT WORKER</p> <p>INDUSTRIAL RELATIONS OFFICER</p> <p>PUBLIC FINANCE ACCOUNTANT</p> <p>AIR TRAFFIC CONTROLLER</p> <p>BROADCASTING TRAINEE STUDIO MANAGER</p> <p>SHIPBROKER</p> <p>MUSEUM/ART GALLERY CURATOR</p> <p>TEACHER IN ADULT EDUCATION</p> <p>INDUSTRIAL MARKETING</p>	<p>TEACHER OF LIBERAL STUDIES IN F E</p> <p>INDUSTRIAL BUYER</p> <p>RECRUITMENT AND SELECTION OFFICER</p> <p>MERCHANT BANKER</p> <p>RESIDENT SOCIAL WORKER LOCAL AUTHORITY</p> <p>AUCTIONEER</p> <p>POLICE OFFICER</p> <p>ADVERTISING ACCOUNT EXECUTIVE</p> <p>CERTIFIED ACCOUNTANT</p> <p>MERCHANTIZER</p>
24	<p>HOUSING/ESTATE MANAGER-LOCAL AUTHORITY</p> <p>DIPLOMATIC SERVICE ADMIN TRAINEE</p> <p>TRAINING OFFICER</p> <p>CHARTERED ACCOUNTANT</p> <p>AIR PILOT</p> <p>CIVIL SERVICE EXECUTIVE OFFICER</p> <p>COST AND MANAGEMENT ACCOUNTANT</p> <p>BANKER</p>	24	<p>COMPANY SECRETARY</p> <p>WORK STUDY OFFICER</p> <p>TEACHER SECONDARY SCHOOLS</p> <p>HOUSING/ESTATE MANAGER-PRIVATE SECTOR</p> <p>LOCAL GOVERNMENT ADMINISTRATOR</p> <p>EDITOR-PUBLISHING</p> <p>MUSING</p> <p>CIVIL SERVICE ADMIN TRAINEE</p>	<p>PRODUCTION PLANNER</p> <p>FIRE SERVICE</p> <p>UNIVERSITY/POLYTECHNIC ADMINISTRATOR</p> <p>HM INSPECTOR OF TAXES</p> <p>HM FORCES EDUCATION/INSTRUCTOR BRANCH</p> <p>R.M. FORCES COMMISSION ADMINISTRATIVE</p> <p>MARKETING - PRODUCT MANAGEMENT</p> <p>CONTRACTS ADMINISTRATOR</p>
12	<p>TRAFFIC MANAGER DISTRIBUTION OF GOODS</p> <p>THEATRE/CINEMA MANAGER</p> <p>PUBLIC SECTOR ADMINISTRATION</p> <p>RETAIL STORE MANAGER</p>	12	<p>ASSISTANT PRISON GOVERNOR</p> <p>HOTEL MANAGER</p> <p>PRODUCTION MANAGER - INDUSTRY</p> <p>HOSPITAL SERVICES ADMINISTRATOR</p>	<p>BUILDING SOCIETY ADMINISTRATOR</p> <p>TRAFFIC-MANAGER TRANSPORT</p> <p>R.M. FORCES COMMISSION OPERATIONAL</p> <p>SALES ADMINISTRATION</p>

Organising and controlling the work procedures and schedules of others - supervising.



FACTOR NUMBER 7 VALUE 1 NO. OF OCCUPATIONS 9  
 RADIOGRAPHER  
 TEACHER OF THE HANDICAPPED  
 SPEECH THERAPIST  
 AIR TRAFFIC CONTROLLER  
 AIR PILOT  
 MARKET RESEARCH INTERVIEWER

FACTOR NUMBER 7 VALUE 2 NO. OF OCCUPATIONS 22  
 INFORMATION SCIENTIST  
 LIBRARIAN  
 VALUER INLAND REVENUE  
 PUBLIC FINANCE ACCOUNTANT  
 RESIDENT SOCIAL WORKER LOCAL AUTHORITY  
 CIVIL SERVICE EXECUTIVE OFFICER  
 NURSING  
 STATION ASSISTANT LOCAL RADIO  
 COMPUTER PROGRAMMER  
 TEACHER PRIMARY AND JUNIOR SCHOOL  
 OCCUPATIONAL THERAPIST  
 VALUER PROPERTY  
 HM INSPECTOR OF TAXES  
 BROADCASTING TRAINEE STUDIO MANAGER  
 DIPLOMATIC SERVICE EXECUTIVE OFFICER  
 CIVIL SERVICE RESEARCH OFFICER  
 PHYSIOTHERAPIST  
 SUB-EDITOR PUBLISHING  
 BROADCASTING NEWS TRAINEE  
 TEACHER OF ENGLISH AS A FOREIGN LANGUAGE  
 MUSEUM/ART GALLERY CURATOR  
 TEACHER IN ADULT EDUCATION

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FACTOR NUMBER 7 VALUE 3 NO. OF OCCUPATIONS 35  
 TOWN & COUNTRY PLANNER  
 TEACHER OF LINGUAL STUDIES IN F E  
 PRODUCTION PLANNER  
 LANDSCAPE ARCHITECT  
 BUILDING SOCIETY ADMINISTRATOR  
 CHARTERED ACCOUNTANT  
 THEATRE/CINEMA MANAGER  
 VALUER PRIVATE ASSETS  
 POLICE OFFICER  
 CONSUMER ADVISORY OFFICER  
 CIVIL SERVICE ADMIN TRAINEE  
 YOUTH ORGANISER  
 RESIDENT SOCIAL WORKER FOR PRIVATE BODY  
 HOUSING/ESTATE MANAGER-LOCAL AUTHORITY  
 CAREERS ADVISER  
 INSURANCE UNDERWRITER  
 JOURNALIST  
 VALUER INDUSTRIAL ASSETS  
 HOTEL MANAGER  
 FIELD SOCIAL WORKER PRIVATE BODY  
 H.M. FORCES COMMISSION ADMINISTRATIVE  
 VOLUNTEER SOCIAL WORKER  
 HOSPITAL SERVICES ADMINISTRATOR  
 TEACHER AND RESEARCHER IN H.E.  
 MARKET RESEARCH ANALYST  
 COMPANY SECRETARY  
 RECRUITMENT AND SELECTION OFFICER  
 TEACHER SECONDARY SCHOOLS  
 UNIVERSITY/POLYTECHNIC ADMINISTRATOR  
 SOLICITOR  
 OPERATIONAL RESEARCH  
 FIELD SOCIAL WORKER LOCAL AUTHORITY  
 H.M. FORCES COMMISSION OPERATIONAL  
 BANKER  
 CERTIFIED ACCOUNTANT

FACTOR NUMBER 7 VALUE 4 NO. OF OCCUPATIONS 31  
 STOCKBROKER/JOBBER  
 BOOK SELLER  
 FIRE SERVICE  
 TRAINING OFFICER  
 ENVIRONMENTAL HEALTH OFFICER  
 LOCAL GOVERNMENT ADMINISTRATOR  
 CONSUMER PROTECTION OFFICER  
 SHIPROCKER  
 PROBATION OFFICER  
 COMMODITY PRIMER  
 SALES ADMINISTRATION  
 TRAFFIC MANAGER DISTRIBUTION OF GOODS  
 INDUSTRIAL BUYER  
 HM FACTORY INSPECTOR  
 ASSISTANT PRISON GOVERNOR  
 HM FORCES EDUCATION/INSTRUCTOR BRANCH  
 PUBLIC SECTOR ADMINISTRATION  
 PRODUCTION MANAGER - INDUSTRY  
 COMMERCIAL ART GALLERY WORK  
 CONTRACTS ADMINISTRATOR  
 COMMUNITY DEVELOPMENT WORKER  
 WORK-STUDY OFFICER  
 INDUSTRIAL RELATIONS OFFICER  
 MERCHANT BANKER  
 HOUSING/ESTATE MANAGER-PRIVATE SECTOR  
 EDITOR-PUBLISHING  
 SYSTEMS ANALYST  
 RETAIL BUYER  
 COST AND MANAGEMENT ACCOUNTANT  
 MERCHANDIZER

FACTOR NUMBER 7 VALUE 5 NO. OF OCCUPATIONS 15  
 CHURCH MINISTER  
 SALES REPRESENTATIVE  
 INSURANCE INSPECTOR  
 BARPISTER  
 RETAIL STOCK MANAGER  
 DIPLOMATIC SERVICE ADMIN TRAINEE  
 ANTIQUE DEALER  
 ADVERTISING COPYWRITER  
 ADVERTISING ACCOUNT EXECUTIVE  
 PUBLIC RELATIONS  
 EXPORT SALES  
 INSURANCE BROKER  
 AUCTIONEER  
 MARKETING - PRODUCT MANAGEMENT  
 INDUSTRIAL MARKETING

Persuading or influencing others in favour of a product, service or point of view.



FACTOR NUMBER 9	VALUE 1	NO. OF OCCUPATIONS 5	TEACHER OF ENGLISH AS A FOREIGN LANGUAGE
CHURCH MINISTER	PHYSIOTHERAPIST		
SPEECH THERAPIST	COMMERCIAL ART GALLERY WORK		
FACTOR NUMBER 9	VALUE 2	NO. OF OCCUPATIONS 24	
TEACHER OF LIBERAL STUDIES IN F R	COMMUNITY DEVELOPMENT WORKER		BOOK SELLER
FIRE SERVICE	TEACHER PRIMARY AND JUNIOR SCHOOL		LANDSCAPE ARCHITECT
TEACHER SECONDARY SCHOOLS	OCCUPATIONAL THERAPIST		ANTIQUE DEALER
SUB-EDITOR PUBLISHING	TEACHER OF THE HANDICAPPED		RESIDENT SOCIAL WORKER LOCAL AUTHORITY
CERICAL WORKER	ADVERTISING COPYWRITER		FIELD SOCIAL WORKER PRIVATE BODY
SECRETARIAL WORK	MARKET RESEARCH INTERVIEWER		BROADCASTING TRAINEE STUDIO MANAGER
FIELD SOCIAL WORKER LOCAL AUTHORITY	VOLUNTEER SOCIAL WORKER		NURSING
PUBLIC RELATIONS	TEACHER IN ADULT EDUCATION		YOUTH ORGANISER
FACTOR NUMBER 9	VALUE 3	NO. OF OCCUPATIONS 31	
RESIDENT SOCIAL WORKER FOR PRIVATE BODY	LIBRARIAN		RADIOGRAPHER
NM FACTORY INSPECTOR	CAREERS ADVISER		TRAINING OFFICER
RECRUITMENT AND SELECTION OFFICER	EXPORT SALES		SALES REPRESENTATIVE
ASSISTANT PRISON GOVERNOR	VALUER PROPERTY		BROADCASTING NEWS TRAINEE
ARCHIVIST	VALUER INDUSTRIAL ASSETS		THEATRE/CINEMA MANAGER
HOTEL MANAGER	HOUSING/ESTATE MANAGER-PRIVATE SECTOR		NM FORCES EDUCATION/INSTRUCTOR BRANCH
CIVIL SERVICE EXECUTIVE OFFICER	VALUER PRIVATE ASSETS		EDITOR-PUBLISHING
AUCTIONEER	POLICE OFFICER		RETAIL BUYER
PROBATION OFFICER	MUSEUM/ART GALLERY CURATOR		CONSUMER ADVISORY OFFICER
DIPLOMATIC SERVICE EXECUTIVE OFFICER	MERCHANTIZER		TEACHER AND RESEARCHER IN H.E.
STATION ASSISTANT LOCAL RADIO			
FACTOR NUMBER 9	VALUE 4	NO. OF OCCUPATIONS 35	
INFORMATION SCIENTIST	COMPUTER PROGRAMMER		STOCKBROKER/JOBBER
HOUSING/ESTATE MANAGER-LOCAL AUTHORITY	INDUSTRIAL BUYER		INDUSTRIAL RELATIONS OFFICER
VALUER INLAND REVENUE	BUILDING SOCIETY ADMINISTRATOR		PUBLIC FINANCE ACCOUNTANT
MERCHANT BANKER	JOURNALIST		ENVIRONMENTAL HEALTH OFFICER
UNIVERSITY/POLYTECHNIC ADMINISTRATOR	CHARTERED ACCOUNTANT		SOLICITOR
TRAFFIC MANAGER TRANSPORT	INSURANCE INSPECTOR		NM INSPECTOR OF TAXES
AIR PILOT	LOCAL GOVERNMENT ADMINISTRATOR		CONSUMER PROTECTION OFFICER
PUBLIC SECTOR ADMINISTRATION	SHIPBROKER		PRODUCTION MANAGER - INDUSTRY
H.M. FORCES COMMISSION ADMINISTRATIVE	H.M. FORCES COMMISSION OPERATIONAL		BARISTER
ADVERTISING ACCOUNT EXECUTIVE	BANKER SERVICE ADMIN TRAINEE		RETAIL STORE MANAGER
COMMODITY BROKER	CIVIL SERVICE ADMIN TRAINEE		HOSPITAL SERVICES ADMINISTRATOR
INDUSTRIAL MARKETING	SALES ADMINISTRATION		
FACTOR NUMBER 9	VALUE 5	NO. OF OCCUPATIONS 17	
TOWN & COUNTRY PLANNER	MARKET RESEARCH ANALYST		CIVIL SERVICE RESEARCH OFFICER
COMPANY SECRETARY	TRAFFIC MANAGER DISTRIBUTION OF GOODS		PRODUCTION PLANNER
DIPLOMATIC SERVICE ADMIN TRAINEE	WORK STUDY OFFICER		INSURANCE UNDERWRITER
INSURANCE BROKER	AIR TRAFFIC CONTROLLER		OPERATIONAL RESEARCH
SYSTEMS ANALYST	COST AND MANAGEMENT ACCOUNTANT		MARKETING - PRODUCT MANAGEMENT
CERTIFIED ACCOUNTANT	CONTRACTS ADMINISTRATOR		

Co-ordinating and arranging data to determine the appropriate decisions and actions to take.



FACTOR NUMBER 11	VALUE 1	NO. OF OCCUPATIONS	80
RESIDENT SOCIAL WORKER FOR PRIVATE BODY	MARKET RESEARCH ANALYST		INFORMATION SCIENTIST
TEACHER OF LINEAR STUDIES IN F E	STOCKBROKER/JOBBER		CIVIL SERVICE RESEARCH OFFICER
LIBRARIAN	COMPANY SECRETARY		CHURCH WIKER
COMMUNITY DEVELOPMENT WORKER	BOOK SELLER		DIPLOMATIC SERVICE ADMIN TRAINEE
INDUSTRIAL BUYER	FIRE SERVICE		PHYSIOTHERAPIST
CAREERS ADVISER	INDUSTRIAL RELATIONS OFFICER		VALUER INLAND REVENUE
TRAINING OFFICER	RECRUITMENT AND SELECTION OFFICER		INSURANCE UNDERWRITER
EXPORT SALES	TEACHER SECONDARY SCHOOLS		SALES REPRESENTATIVE
OCCUPATIONAL THERAPIST	ANTIQUE DEALER		ASSISTANT PRISON GOVERNOR
INSURANCE BROKER	BUILDING SOCIETY ADMINISTRATOR		PUBLIC FINANCE ACCOUNTANT
VALUER PROPERTY	BROADCASTING NEWS TRAINEE		MERCHANT BANKER
ARCHIVIST	JOURNALIST		ENVIRONMENTAL HEALTH OFFICER
AIR TRAFFIC CONTROLLER	UNIVERSITY/POLYTECHNIC ADMINISTRATOR		CHARTERED ACCOUNTANT
VALUER INDUSTRIAL ASSETS	SOLICITOR		THEATRE/CINEMA MANAGER
HOTEL MANAGER	TRAFFIC MANAGER TRANSPORT		RESIDENT SOCIAL WORKER LOCAL AUTHORITY
HOUSING/ESTATE MANAGER-PRIVATE SECTOR	CLERICAL WORKER		INSURANCE INSPECTOR
HM INSPECTOR OF TAXES	AIR PILOT		LOCAL GOVERNMENT ADMINISTRATOR
TEACHER OF ENGLISH AS A FOREIGN LANGUAGE	SPEECH THERAPIST		NY FORCES EDUCATION/INSTRUCTOR BRANCH
CIVIL SERVICE EXECUTIVE OFFICER	VALUER PRIVATE ASSETS		FIELD SOCIAL WORKER PRIVATE BODY
SECRETARIAL WORK	MARKET RESEARCH INTERVIEWER		CONSUMER PROTECTION OFFICER
BROADCASTING TRAINEE STUDIO MANAGER	AUCTIONEER		PUBLIC SECTOR ADMINISTRATION
FIELD SOCIAL WORKER LOCAL AUTHORITY	POLICE OFFICER		PROBATION OFFICER
H.M. FORCES COMMISSION ADMINISTRATIVE	H.M. FORCES COMMISSION OPERATIONAL		COMMERCIAL ART GALLERY WORK
BARRISTER	CONSUMER ADVISORY OFFICER		COST AND MANAGEMENT ACCOUNTANT
VOLUNTEER SOCIAL WORKER	NUSSING		DIPLOMATIC SERVICE EXECUTIVE OFFICER
BANKER	RETAIL STORE MANAGER		COMMODITY BROKER
CIVIL SERVICE ADMIN TRAINEE	PUBLIC RELATIONS		TEACHER IN ADULT EDUCATION
HOSPITAL SERVICES ADMINISTRATOR	CERTIFIED ACCOUNTANT		YOUTH ORGANISER
CONTRACTS ADMINISTRATOR	MERCHANTIZER		STATION ASSISTANT LOCAL RADIO
SALES ADMINISTRATION			
FACTOR NUMBER 11	VALUE 2	NO. OF OCCUPATIONS	13
HOUSING/ESTATE MANAGER-LOCAL AUTHORITY	TRAFFIC MANAGER DISTRIBUTION OF GOODS		RADIOGRAPHER
TEACHER PRIMARY AND JUNIOR SCHOOL	HM FACTORY INSPECTOR		SUB-EDITOR PUBLISHING
TEACHER OF THE HANDICAPPED	ADVERTISING COPYWRITER		EDITOR-PUBLISHING
SHIPROKER	PRODUCTION MANAGER - INDUSTRY		RETAIL BUYER
INDUSTRIAL MARKETING			
FACTOR NUMBER 11	VALUE 3	NO. OF OCCUPATIONS	6
COMPUTER PROGRAMMER	WORK STUDY OFFICER		SYSTEMS ANALYST
MUSEUM/ART GALLERY CURATOR	ADVERTISING ACCOUNT EXECUTIVE		MARKETING - PRODUCT MANAGEMENT
FACTOR NUMBER 11	VALUE 4	NO. OF OCCUPATIONS	5
TOWN & COUNTRY PLANNER	PRODUCTION PLANNER		LANDSCAPE ARCHITECT
OPERATIONAL RESEARCH	TEACHER AND RESEARCHER IN H.E.		
FACTOR NUMBER 11	VALUE 5	NO. OF OCCUPATIONS	0



FACTOR NUMBER 13	VALUE 1	NO. OF OCCUPATIONS 72
RESIDENT SOCIAL WORKER FOR PRIVATE BODY	MARKET RESEARCH ANALYST	INFORMATION SCIENTIST
TEACHER OF LINEAL STUDIES IN F E	STOCKBROKER/JORDER	COMPANY SECRETARY
CHURCH MINISTER	COMMUNITY DEVELOPMENT WORKER	DIPLOMATIC SERVICE ADMIN TRAINEE
INDUSTRIAL BUYER	CAREERS ADVISER	INDUSTRIAL RELATIONS OFFICER
VALUER INLAND REVENUE	TRAINING OFFICER	RECRUITMENT AND SELECTION OFFICER
INSURANCE UNDERWRITER	EXPORT SALES	TEACHER SECONDARY SCHOOLS
SALES REPRESENTATIVE	ANTIQUE DEALER	SUB-EDITOR PUBLISHING
ASSISTANT PRISON GOVERNOR	INSURANCE BROKER	BUILDING SOCIETY ADMINISTRATOR
PUBLIC FINANCE ACCOUNTANT	VALUER PRIVATE PROPERTY	MERCHANT BANKER
ARCHIVIST	JOURNALIST	UNIVERSITY/POLYTECHNIC ADMINISTRATOR
CHARTERED ACCOUNTANT	VALUER INDUSTRIAL ASSETS	SOLICITOR
HOTEL MANAGER	RESIDENT SOCIAL WORKER LOCAL AUTHORITY	CLERICAL WORKER
INSURANCE INSPECTOR	HM INSPECTOR OF TAXES	ADVERTISING COPYWRITER
LOCAL GOVERNMENT ADMINISTRATOR	TEACHER OF ENGLISH AS A FOREIGN LANGUAGE	SPEECH THERAPIST
CIVIL SERVICE EXECUTIVE OFFICER	FIELD SOCIAL WORKER PRIVATE BODY	EDITOR-PUBLISHING
MARKET RESEARCH INTERVIEWER	AUCTIONEER	PUBLIC SECTOR ADMINISTRATION
FIELD SOCIAL WORKER LOCAL AUTHORITY	SHIPROKER	PROBATION OFFICER
H.M. FORCES COMMISSION ADMINISTRATIVE	COMMERCIAL ART GALLERY WORK	BARRISTER
CONSUMER ADVISORY OFFICER	ADVERTISING ACCOUNT EXECUTIVE	COST AND MANAGEMENT ACCOUNTANT
VOLUNTEER SOCIAL WORKER	MARKETING - PRODUCT MANAGEMENT	DIPLOMATIC SERVICE EXECUTIVE OFFICER
BANKER	COMMODITY BROKER	CIVIL SERVICE ADMIN TRAINEE
PUBLIC RELATIONS	TEACHER IN ADULT EDUCATION	HOSPITAL SERVICES ADMINISTRATOR
CERTIFIED ACCOUNTANT	YOUTH ORGANISER	CONTRACTS ADMINISTRATOR
INDUSTRIAL MARKETING	MERCHANDIZER	SALES ADMINISTRATION

FACTOR NUMBER 13	VALUE 2	NO. OF OCCUPATIONS 21
TOWN & COUNTRY PLANNER	CIVIL SERVICE RESEARCH OFFICER	LIBRARIAN
HOUSING/ESTATE MANAGER-LOCAL AUTHORITY	BOOK SELLER	WORK STUDY OFFICER
TEACHER PRIMARY AND JUNIOR SCHOOL	BROADCASTING NEWS TRAINEE	TRAFFIC MANAGER TRANSPORT
TEACHER OF THE HANDICAPPED	HOUSING/ESTATE MANAGER-PRIVATE SECTOR	OPERATIONAL RESEARCH
HM FORCES EDUCATION/INSTRUCTOR BRANCH	VALUER PRIVATE ASSETS	SECRETARIAL WORK
SYSTEMS ANALYST	POLICE OFFICER	RETAIL BUYER
RETAIL STORE MANAGER	TEACHER AND RESEARCHER IN H.E.	STATION ASSISTANT LOCAL RADIO

FACTOR NUMBER 13	VALUE 3	NO. OF OCCUPATIONS 11
COMPUTER PROGRAMMER	TRAFFIC MANAGER DISTRIBUTION OF GOODS	PRODUCTION PLANNER
PHYSIOTHERAPIST	LANDSCAPE ARCHITECT	ENVIRONMENTAL HEALTH OFFICER
MUSEUM/ART GALLERY CURATOR	CONSUMER PROTECTION OFFICER	H.M. FORCES COMMISSION OPERATIONAL
	NURSING	

FACTOR NUMBER 13	VALUE 4	NO. OF OCCUPATIONS 6
FIRE SERVICE	HM FACTORY INSPECTOR	OCCUPATIONAL THERAPIST
AIR TRAFFIC CONTROLLER	BROADCASTING TRAINEE STUDIO MANAGER	PRODUCTION MANAGER - INDUSTRY

FACTOR NUMBER 13	VALUE 5	NO. OF OCCUPATIONS 2
RADIOGRAPHER	AIR PILOT	

Installing, checking or using things in the course of your work.



FACTOR NUMBER 15	VALUE 1	NO. OF OCCUPATIONS 2	
COMPUTER PROGRAMMER			CIVIL SERVICE RESEARCH OFFICER PHYSIOTHERAPIST INSURANCE UNDERWRITER BUILDING SOCIETY ADMINISTRATOR VALUER INDUSTRIAL ASSETS CIVIL SERVICE EXECUTIVE OFFICER MUSEUM/ART GALLERY CURATOR
FACTOR NUMBER 15	VALUE 2	NO. OF OCCUPATIONS 2	
FIRE SERVICE			STOCKBROKER/JOBBER TRAFFIC MANAGER DISTRIBUTION OF GOODS BOOK SELLER SUB-EDITOR PUBLISHING JOURNALIST CHARTERED ACCOUNTANT RESIDENT SOCIAL WORKER LOCAL AUTHORITY ADVERTISING COPYWRITER OPERATIONAL RESEARCH BROADCASTING TRAINEE STUDIO MANAGER POLICE OFFICER COMMERCIAL ART GALLERY WORK HOSPITAL SERVICES ADMINISTRATOR MERCHANDIZER
FACTOR NUMBER 15	VALUE 3	NO. OF OCCUPATIONS 23	
TOWN & COUNTRY PLANNER			INFORMATION SCIENTIST RADIOGRAPHER LANDSCAPE ARCHITECT ANTIQUARIAN DEALER VALUER PROPERTY HOUSING/ESTATE MANAGER-PRIVATE SECTOR SYSTEMS ANALYST CERTIFIED ACCOUNTANT
FACTOR NUMBER 15	VALUE 4	NO. OF OCCUPATIONS 43	
RESIDENT SOCIAL WORKER FOR PRIVATE BODY HOUSING/ESTATE MANAGER-LOCAL AUTHORITY PRODUCTION PLANNER INDUSTRIAL BUYER ASSISTANT PRISON GOVERNOR ENVIRONMENTAL HEALTH OFFICER HOTEL MANAGER INSURANCE INSPECTOR AIR PILOT SECRETARIAL WORK PUBLIC SECTOR ADMINISTRATION RETAIL BUYER COST AND MANAGEMENT ACCOUNTANT YOUTH ORGANISER SALES ADMINISTRATION			MARKET RESEARCH ANALYST COMPANY SECRETARY COMMUNITY DEVELOPMENT WORKER WORK STUDY OFFICER INSURANCE BROKER UNIVERSITY/POLYTECHNIC ADMINISTRATOR TRAFFIC MANAGER TRANSPORT HM INSPECTOR OF TAXES LOCAL GOVERNMENT ADMINISTRATOR CONSUMER PROTECTION OFFICER SHIPROKER H.M. FORCES COMMISSION ADMINISTRATIVE BANKER CONTRACTS ADMINISTRATOR
FACTOR NUMBER 15	VALUE 5	NO. OF OCCUPATIONS 42	
TEACHER OF LIBERAL STUDIES IN FE TEACHER PRIMARY AND JUNIOR SCHOOL INDUSTRIAL RELATIONS OFFICER EXPORT SALES BROADCASTING NEWS TRAINEE SOLICITOR SPEECH THERAPIST EDITOR-PUBLISHING FIELD SOCIAL WORKER LOCAL AUTHORITY H.M. FORCES COMMISSION OPERATIONAL ADVERTISING ACCOUNT EXECUTIVE DIPLOMATIC SERVICE EXECUTIVE OFFICER CIVIL SERVICE ADMIN TRAINEE INDUSTRIAL MARKETING			DIPLOMATIC SERVICE ADMIN TRAINEE CAREERS ADVISER RECRUITMENT AND SELECTION OFFICER SALES REPRESENTATIVE AIR TRAFFIC CONTROLLER TEACHER OF ENGLISH AS A FOREIGN LANGUAGE FIELD SOCIAL WORKER PRIVATE BODY AUCTIONEER PROBATION OFFICER CONSUMER ADVISORY OFFICER MARKETING - PRODUCT MANAGEMENT COMMODITY BROKER TEACHER IN ADULT EDUCATION STATION ASSISTANT LOCAL RADIO
FACTOR NUMBER 15	VALUE 6	NO. OF OCCUPATIONS 42	
CHURCH MINISTER HM FACTORY INSPECTOR TRAINING OFFICER TEACHER SECONDARY SCHOOLS MERCHANT BANKER TEACHER OF THE HANDICAPPED HM FORCES EDUCATION/INSTRUCTOR BRANCH MARKET RESEARCH INTERVIEWER PRODUCTION MANAGER - INDUSTRY BARRISTER VOLUNTEER SOCIAL WORKER RETAIL STORE MANAGER PUBLIC RELATIONS TEACHER AND RESEARCHER IN H.E.			TEACHER OF LIBERAL STUDIES IN FE TEACHER PRIMARY AND JUNIOR SCHOOL INDUSTRIAL RELATIONS OFFICER EXPORT SALES BROADCASTING NEWS TRAINEE SOLICITOR SPEECH THERAPIST EDITOR-PUBLISHING FIELD SOCIAL WORKER LOCAL AUTHORITY H.M. FORCES COMMISSION OPERATIONAL ADVERTISING ACCOUNT EXECUTIVE DIPLOMATIC SERVICE EXECUTIVE OFFICER CIVIL SERVICE ADMIN TRAINEE INDUSTRIAL MARKETING

Ability to communicate clearly and effectively in speech.



FACTOR NUMBER 17	VALUE 1	NO. OF OCCUPATIONS 9	FACTOR NUMBER 17	VALUE 2	NO. OF OCCUPATIONS 15	FACTOR NUMBER 17	VALUE 3	NO. OF OCCUPATIONS 43	FACTOR NUMBER 17	VALUE 4	NO. OF OCCUPATIONS 34	FACTOR NUMBER 17	VALUE 5	NO. OF OCCUPATIONS 11
COMPUTER PROGRAMMER PHYSIOTHERAPIST CLERICAL WORKER	RADIOGRAPHER OCCUPATIONAL THERAPIST SECRETARIAL WORK	FIRE SERVICE ARCHIVIST MARKET RESEARCH INTERVIEWER	RESIDENT SOCIAL WORKER FOR PRIVATE BODY SUB-EDITOR PUBLISHING RESIDENT SOCIAL WORKER LOCAL AUTHORITY SPEECH THERAPIST COMMERCIAL ART GALLERY WORK	LIBRARIAN AIR TRAFFIC CONTROLLER AIR PILOT CIVIL SERVICE EXECUTIVE OFFICER MUSEUM/ART GALLERY CURATOR	TEACHER OF LIBERAL STUDIES IN F E PRODUCTION PLANNER CAREERS ADVISER RECRUITMENT AND SELECTION OFFICER TEACHER SECONDARY SCHOOLS BUILDING SOCIETY ADMINISTRATOR BROADCASTING NEWS TRAINEE VALUER INDUSTRIAL ASSETS HOUSING/ESTATE MANAGER-PRIVATE SECTOR HM FORCES EDUCATION/INSTRUCTOR BRANCH BROADCASTING TRAINEE STUDIO MANAGER H.M. FORCES COMMISSION OPERATIONAL RETAIL STORE MANAGER YOUTH ORGANISER	MARKET RESEARCH ANALYST CIVIL SERVICE RESEARCH OFFICER WORK STUDY OFFICER VALUER INLAND REVENUE LANDSCAPE ARCHITECT ANTIQUE DEALER PUBLIC FINANCE ACCOUNTANT ENVIRONMENTAL HEALTH OFFICER THEATRE/CINEMA MANAGER LOCAL GOVERNMENT ADMINISTRATOR FIELD SOCIAL WORKER PRIVATE BODY PUBLIC SECTOR ADMINISTRATION VOLUNTEER SOCIAL WORKER TEACHER IN ADULT EDUCATION MERCHANDIZER	INFORMATION SCIENTIST HOUSING/ESTATE MANAGER-LOCAL AUTHORITY TEACHER PRIMARY AND JUNIOR SCHOOL TRAINING OFFICER INSURANCE UNDERWRITER ASSISTANT PRISON GOVERNOR VALUER PROPERTY UNIVERSITY/POLYTECHNIC ADMINISTRATOR HOTEL MANAGER OPERATIONAL RESEARCH EDITOR-PUBLISHING SYSTEMS ANALYST DIPLOMATIC SERVICE EXECUTIVE OFFICER CERTIFIED ACCOUNTANT	TOWN & COUNTRY PLANNER TRAFFIC MANAGER DISTRIBUTION OF GOODS HM FACTORY INSPECTOR MERCHANT MARKER INSURANCE INSPECTOR VALUER PRIVATE ASSETS FIELD SOCIAL WORKER LOCAL AUTHORITY POLICE OFFICER CONSUMER ADVISORY OFFICER BANKER CONTRACTS ADMINISTRATOR SALES ADMINISTRATION	COMPANY SECRETARY COMMUNITY DEVELOPMENT WORKER EXPORT SALES CHARTERED ACCOUNTANT HM INSPECTOR OF TAXES CONSUMER PROTECTION OFFICER SHIPBROKER RETAIL BUYER COST AND MANAGEMENT ACCOUNTANT CIVIL SERVICE ADMIN TRAINEE TEACHER AND RESEARCHER IN H.E.	CHURCH MINISTER INDUSTRIAL BUYER INSURANCE BROKER TRAFFIC MANAGER TRANSPORT ADVERTISING COPYWRITER AUCTIONEER PRODUCTION MANAGER - INDUSTRY PRODUCTION OFFICER MARKETING --PRODUCT MANAGEMENT HOSPITAL SERVICES ADMINISTRATOR STATION ASSISTANT LOCAL RADIO	STOCKBROKER/JUMPER SALES REPRESENTATIVE BARRISTER PUBLIC RELATIONS	DIPLOMATIC SERVICE ADMIN TRAINEE JOURNALIST ADVERTISING ACCOUNT EXECUTIVE INDUSTRIAL MARKETING	INDUSTRIAL RELATIONS OFFICER SOLICITOR COMMODITY BROKER	

Ability to argue compellingly in exchange with other professionals/in public/on radio or television  
 - to think on your feet.



**FACTOR NUMBER 19**      **VALUE 1**      **NO. OF OCCUPATIONS 29**  
 RESIDENT SOCIAL WORKER FOR PRIVATE BODY      INFORMATION SCIENTIST  
 RADIOGRAPHER      FIRE SERVICE  
 PHYSIOTHERAPIST      CAREERS ADVISER  
 OCCUPATIONAL THERAPIST      BROADCASTING NEWS TRAINEE  
 ENVIRONMENTAL HEALTH OFFICER      AIR TRAFFIC CONTROLLER  
 RESIDENT SOCIAL WORKER LOCAL AUTHORITY      AIR PILOT  
 SPEECH THERAPIST      H.M. FORCES EDUCATION/INSTRUCTOR BRANCH  
 BROADCASTING TRAINEE STUDIO MANAGER      POLICE OFFICER  
 VOLUNTEER SOCIAL WORKER      NURSING  
 TEACHER AND RESEARCHER IN N.E.      STATION ASSISTANT LOCAL RADIO

TEACHER OF LIBERAL STUDIES IN F.E.  
 TEACHER PRIMARY AND JUNIOR SCHOOL  
 TEACHER SECONDARY SCHOOLS  
 ARCHIVIST  
 TEACHER OF THE HANDICAPPED  
 TEACHER OF ENGLISH AS A FOREIGN LANGUAGE  
 MARKET RESEARCH INTERVIEWER  
 H.M. FORCES COMMISSION OPERATIONAL  
 TEACHER IN ADULT EDUCATION

**FACTOR NUMBER 17**      **VALUE 2**      **NO. OF OCCUPATIONS 24**  
 COMPUTER PROGRAMMER      CIVIL SERVICE RESEARCH OFFICER  
 CHURCH MINISTER      COMMUNITY DEVELOPMENT WORKER  
 WORK STUDY OFFICER      H.M. FACTORY INSPECTOR  
 RECRUITMENT AND SELECTION OFFICER      SUB-EDITOR PUBLISHING  
 JOURNALIST      CLERICAL WORKER  
 FIELD SOCIAL WORKER PRIVATE BODY      SECRETARIAL WORK  
 PROBATION OFFICER      BARRISTER  
 DIPLOMATIC SERVICE EXECUTIVE OFFICER      PUBLIC RELATIONS

LIBRARIAN  
 DIPLOMATIC SERVICE ADMIN TRAINEE  
 TRAINING OFFICER  
 ASSISTANT PRISON GOVERNOR  
 ADVERTISING COPYWRITER  
 FIELD SOCIAL WORKER LOCAL AUTHORITY  
 MUSEUM/ART GALLERY CURATOR  
 YOUTH ORGANISER

**FACTOR NUMBER 17**      **VALUE 3**      **NO. OF OCCUPATIONS 17**  
 TOWN & COUNTRY PLANNER      MARKET RESEARCH ANALYST  
 PRODUCTION PLANNER      INDUSTRIAL RELATIONS OFFICER  
 UNIVERSITY/POLYTECHNIC ADMINISTRATOR      LOCAL GOVERNMENT ADMINISTRATOR  
 CIVIL SERVICE EXECUTIVE OFFICER      EDITOR-PUBLISHING  
 SYSTEMS ANALYST      PRODUCTION MANAGER - INDUSTRY  
 CONSUMER ADVISORY OFFICER      CIVIL SERVICE ADMIN TRAINEE

HOUSING/ESTATE MANAGER-LOCAL AUTHORITY  
 LANDSCAPE ARCHITECT  
 OPERATIONAL RESEARCH  
 CONSUMER PROTECTION OFFICER  
 H.M. FORCES COMMISSION ADMINISTRATIVE

**FACTOR NUMBER 19**      **VALUE 4**      **NO. OF OCCUPATIONS 19**  
 TRAFFIC MANAGER DISTRIBUTION OF GOODS      BOOK SELLER  
 SALES REPRESENTATIVE      ANTIQUE DEALER  
 THEATRE/CINEMA MANAGER      HOTEL MANAGER  
 HOUSING/ESTATE MANAGER-PRIVATE SECTOR      PUBLIC SECTOR ADMINISTRATION  
 ADVERTISING ACCOUNT EXECUTIVE      MARKETING - PRODUCT MANAGEMENT  
 HOSPITAL SERVICES ADMINISTRATOR      INDUSTRIAL MARKETING  
 SALES ADMINISTRATION

EXPORT SALES  
 SOLICITOR  
 TRAFFIC MANAGER TRANSPORT  
 COMMERCIAL ART GALLERY WORK  
 RETAIL STORE MANAGER  
 MERCHANDIZER

**FACTOR NUMBER 19**      **VALUE 5**      **NO. OF OCCUPATIONS 23**  
 STOCKBROKER/JOBBER      COMPANY SECRETARY  
 VALUER INLAND REVENUE      INSURANCE UNDERWRITER  
 BUILDING SOCIETY ADMINISTRATOR      PUBLIC FINANCE ACCOUNTANT  
 MERCHANT BANKER      CHARTERED ACCOUNTANT  
 INSURANCE INSPECTOR      H.M. INSPECTOR OF TAXES  
 AUCTIONEER      SHIPBROKER  
 COST AND MANAGEMENT ACCOUNTANT      BANKER  
 CERTIFIED ACCOUNTANT      CONTRACTS ADMINISTRATOR

INDUSTRIAL BUYER  
 INSURANCE BROKER  
 VALUER PROPERTY  
 VALUER INDUSTRIAL ASSETS  
 VALUER PRIVATE ASSETS  
 RETAIL BUYER  
 COMMODITY BROKER

Ability to deal with financial matters.



FACTOR NUMBER 21 VALUE 1 NO. OF OCCUPATIONS 5  
 RESIDENT SOCIAL WORKER FOR PRIVATE BODY CHURCH MINISTER LOCAL AUTHORITY  
 COMMERCIAL ART GALLERY WORK VOLUNTEER SOCIAL WORKER

FACTOR NUMBER 21 VALUE 2 NO. OF OCCUPATIONS 27  
 TEACHER OF LINEAL STUDIES IN F E COMMUNITY DEVELOPMENT WORKER  
 RADIOGRAPHER TEACHER PRIMARY AND JUNIOR SCHOOL  
 LANDSCAPE ARCHITECT OCCUPATIONAL THERAPIST  
 SUB-EDITOR PUBLISHING THEATRE/CINEMA MANAGER  
 TEACHER OF THE HANDICAPPED HOUSING/ESTATE MANAGER-PRIVATE SECTOR  
 ADVERTISING COPYWRITER SPEECH THERAPIST  
 FIELD SOCIAL WORKER PRIVATE BODY SECRETARIAL WORK  
 AUCTIONEER FIELD SOCIAL WORKER LOCAL AUTHORITY  
 MUSEUM/ART GALLERY CURATOR TEACHER IN ADULT EDUCATION

FACTOR NUMBER 21 VALUE 3 NO. OF OCCUPATIONS 45  
 TOWN & COUNTRY PLANNER STOCKBROKER/JOBBER  
 HOUSING/ESTATE MANAGER-LOCAL AUTHORITY DIPLOMATIC SERVICE ADMIN TRAINEE  
 CAREERS ADVISER INDUSTRIAL RELATIONS OFFICER  
 RECRUITMENT AND SELECTION OFFICER EXPORT SALES  
 SALES REPRESENTATIVE ASSISTANT PRISON GOVERNOR  
 VALUER PROPERTY BROADCASTING NEWS TRAINEE  
 ENVIRONMENTAL HEALTH OFFICER UNIVERSITY/POLYTECHNIC ADMINISTRATOR  
 INSURANCE INSPECTOR HM FORCES EDUCATION/INSTRUCTOR BRANCH  
 MARKET RESEARCH INTERVIEWER CIVIL SERVICE EXECUTIVE OFFICER  
 POLICE OFFICER CONSUMER PROTECTION OFFICER  
 RETAIL BUYER  
 CONSUMER ADVISORY OFFICER ADVERTISING ACCOUNT EXECUTIVE  
 MARKETING - PRODUCT MANAGEMENT DIPLOMATIC SERVICE EXECUTIVE OFFICER  
 PUBLIC RELATIONS HOSPITAL SERVICES ADMINISTRATOR  
 MERCHANDIZER STATION ASSISTANT LOCAL RADIO

FACTOR NUMBER 21 VALUE 4 NO. OF OCCUPATIONS 26  
 MARKET RESEARCH ANALYST INFORMATION SCIENTIST  
 COMPANY SECRETARY TRAFFIC MANAGER DISTRIBUTION OF GOODS  
 INDUSTRIAL BUYER HM FACTORY INSPECTOR  
 INSURANCE UNDERWRITER INSURANCE BROKER  
 MERCHANT BANKER ARCHIVIST  
 VALUER INDUSTRIAL ASSETS AIR PILOT  
 PRODUCTION MANAGER - INDUSTRY H.M. FORCES COMMISSION ADMINISTRATIVE  
 BANKER COMMODITY BROKER  
 CERTIFIED ACCOUNTANT TEACHER AND RESEARCHER IN H.E.

FACTOR NUMBER 21 VALUE 5 NO. OF OCCUPATIONS 9  
 COMPUTER PROGRAMMER WORK STUDY OFFICER  
 SOLICITOR HM INSPECTOR OF TAXES  
 SYSTEMS ANALYST COST AND MANAGEMENT ACCOUNTANT

RESIDENT SOCIAL WORKER LOCAL AUTHORITY

BOOK SELLER  
 PHYSIOTHERAPIST  
 ANTIQUE DEALER  
 HOTEL MANAGER  
 CLERICAL WORKER  
 VALUER PRIVATE ASSETS  
 BROADCASTING TRAINEE STUDIO MANAGER  
 PROBATION OFFICER  
 YOUTH ORGANISER

LIBRARIAN  
 FIRE SERVICE  
 TRAINING OFFICER  
 TEACHER SECONDARY SCHOOLS  
 BUILDING SOCIETY ADMINISTRATOR  
 JOURNALIST  
 TRAFFIC MANAGER TRANSPORT  
 TEACHER OF ENGLISH AS A FOREIGN LANGUAGE  
 EDITOR-PUBLISHING  
 SHIPBROKER  
 NURSING  
 W.H. FORCES COMMISSION OPERATIONAL  
 RETAIL STORE MANAGER  
 INDUSTRIAL MARKETING  
 SALES ADMINISTRATION

CIVIL SERVICE RESEARCH OFFICER  
 PRODUCTION PLANNER  
 VALUER INLAND REVENUE  
 PUBLIC FINANCE ACCOUNTANT  
 AIR TRAFFIC CONTROLLER  
 PUBLIC SECTOR ADMINISTRATION  
 BARRISTER  
 CIVIL SERVICE ADMIN TRAINEE

CHARTERED ACCOUNTANT  
 OPERATIONAL RESEARCH  
 CONTRACTS ADMINISTRATOR

Ability to be extremely logical.



FACTOR NUMBER 23	VALUE 1	NO. OF OCCUPATIONS 4	BUILDING SOCIETY ADMINISTRATOR
BOOK SELLER CLERICAL WORKER	RADIOGRAPHER		
FACTOR NUMBER 23	VALUE 2	NO. OF OCCUPATIONS 23	
INFORMATION SCIENTIST PHYSIOTHERAPIST SUB-EDITOR PUBLISHING ENVIRONMENTAL HEALTH OFFICER RESIDENT SOCIAL WORKER LOCAL AUTHORITY VALUER PRIVATE ASSETS AUCTIONEER CONSUMER ADVISORY OFFICER	LIRAKIAN VALUER INLAND REVENUE VALUER PROPERTY AIR TRAFFIC CONTROLLER HOUSING/ESTATE MANAGER-PRIVATE SECTOR SECRETARIAL WORK SHIPBROKER HOSPITAL SERVICES ADMINISTRATOR		CHURCH MINISTER INSURANCE UNDERWRITER ARCHIVIST UNIVERSITY/POLYTECHNIC ADMINISTRATOR CIVIL SERVICE EXECUTIVE OFFICER MARKET RESEARCH INTERVIEWER POLICE OFFICER
FACTOR NUMBER 23	VALUE 3	NO. OF OCCUPATIONS 62	
TOWN & COUNTRY PLANNER TEACHER OF LIBERAL STUDIES IN F E HOUSING/ESTATE MANAGER-LOCAL AUTHORITY DIPLOMATIC SERVICE ADMIN TRAINEE TEACHER PRIMARY AND JUNIOR SCHOOL RECRUITMENT AND SELECTION OFFICER SALES REPRESENTATIVE ASSISTANT PRISON GOVERNOR BROADCASTING NEWS TRAINEE VALUER INDUSTRIAL ASSETS TRAFFIC MANAGER TRANSPORT HM INSPECTOR OF TAXES TEACHER OF ENGLISH AS A FOREIGN LANGUAGE EDITOR-PUBLISHING PUBLIC SECTOR ADMINISTRATION PROBATION OFFICER MUSEUM/ART GALLERY CURATOR DIPLOMATIC SERVICE EXECUTIVE OFFICER COMMODITY BROKER YOUTH ORGANISER STATION ASSISTANT LOCAL RADIO	RESIDENT SOCIAL WORKER FOR PRIVATE BODY STOCKEXCHANGER/JOBBER TRAFFIC MANAGER DISTRIBUTION OF GOODS INDUSTRIAL BUYER HM FACTORY INSPECTOR EXPORT SALES OCCUPATIONAL THERAPIST INSURANCE BROKER JOURNALIST THEATRE/CINEMA MANAGER TEACHER OF THE HANDICAPPED AIR PILOT SPEECH THERAPIST CONSUMER PROTECTION OFFICER FIELD SOCIAL WORKER LOCAL AUTHORITY H.M. FORCES COMMISSION ADMINISTRATIVE VOLUNTEER SOCIAL WORKER BANKER TEACHER IN ADULT EDUCATION CONTRACTS ADMINISTRATOR SALES ADMINISTRATION		COMPUTER PROGRAMMER CIVIL SERVICE RESEARCH OFFICER COMMUNITY DEVELOPMENT WORKER FIRE SERVICE CAREERS ADVISER TEACHER SECONDARY SCHOOLS ANTIQUE DEALER PUBLIC FINANCE ACCOUNTANT CHARTERED ACCOUNTANT HOTEL MANAGER INSURANCE INSPECTOR LOCAL GOVERNMENT ADMINISTRATOR HM FORCES EDUCATION/INSTRUCTOR BRANCH BROADCASTING TRAINEE STUDIO MANAGER RETAIL BUYER COMMERCIAL ART GALLERY WORK NURSING RETAIL STORE MANAGER CERTIFIED ACCOUNTANT MERCHANDIZER
FACTOR NUMBER 23	VALUE 4	NO. OF OCCUPATIONS 21	
MARKET RESEARCH ANALYST WORK STUDY OFFICER LANDSCAPE ARCHITECT ADVERTISING COPYWRITER H.M. FORCES COMMISSION OPERATIONAL COST AND MANAGEMENT ACCOUNTANT PUBLIC RELATIONS	COMPANY SECRETARY INDUSTRIAL-RELATIONS OFFICER MERCHANT BANKER FIELD SOCIAL WORKER PRIVATE BODY BARRISTER MARKETING - PRODUCT MANAGEMENT INDUSTRIAL MARKETING		PRODUCTION PLANNER TRAINING OFFICER SOLICITOR PRODUCTION MANAGER - INDUSTRY ADVERTISING ACCOUNT EXECUTIVE CIVIL SERVICE ADMIN TRAINEE TEACHER AND RESEARCHER IN H.E.
FACTOR NUMBER 23	VALUE 5	NO. OF OCCUPATIONS 2	
OPERATIONAL RESEARCH	SYSTEMS ANALYST		

Ability to apply knowledge and skills in new ways.



FACTOR NUMBER 25	VALUE 1	NO. OF OCCUPATIONS 3	CLERICAL WORKER
COMPUTER PROGRAMMER			
FACTOR NUMBER 25	VALUE 2	NO. OF OCCUPATIONS 10	
FIRE SERVICE PUBLIC FINANCE ACCOUNTANT ADVERTISING COPYWRITER TEACHER AND RESEARCHER IN H.E.		INSURANCE UNDERWRITER ARCHIVIST AIR PILOT	SUB-EDITOR PUBLISHING AIR TRAFFIC CONTROLLER PUBLIC SECTOR ADMINISTRATION
FACTOR NUMBER 25	VALUE 3	NO. OF OCCUPATIONS 28	
TOWN & COUNTRY PLANNER LIBRARIAN PRODUCTION PLANNER TEACHER SECONDARY SCHOOLS VALUER INDUSTRIAL ASSETS CIVIL SERVICE EXECUTIVE OFFICER BROADCASTING TRAINEE STUDIO MANAGER H.M. FORCES COMMISSION ADMINISTRATIVE COST AND MANAGEMENT ACCOUNTANT CERTIFIED ACCOUNTANT		MARKET RESEARCH ANALYST COMPANY SECRETARY VALUER INLAND REVENUE BUILDING SOCIETY ADMINISTRATOR HM INSPECTOR OF TAXES VALUER PRIVATE ASSETS SYSTEMS ANALYST H.M. FORCES COMMISSION OPERATIONAL CIVIL SERVICE ADMIN TRAINEE	INFORMATION SCIENTIST TRAFFIC MANAGER DISTRIBUTION OF GOODS LANDSCAPE ARCHITECT UNIVERSITY/POLYTECHNIC ADMINISTRATOR LOCAL GOVERNMENT ADMINISTRATOR EDITOR-PUBLISHING PRODUCTION MANAGER - INDUSTRY MUSEUM/ART GALLERY CURATOR HOSPITAL SERVICES ADMINISTRATOR
FACTOR NUMBER 25	VALUE 4	NO. OF OCCUPATIONS 41	
TEACHER OF LIBERAL STUDIES IN F E BOOK SELLER WORK STUDY OFFICER HM FACTORY INSPECTOR ASSISTANT PRISON GOVERNOR ENVIRONMENTAL HEALTH OFFICER THEATRE/CINEMA MANAGER HOUSING/ESTATE MANAGER-PRIVATE SECTOR OPERATIONAL RESEARCH CONSUMER PROTECTION OFFICER RETAIL BUYER MARKETING - PRODUCT MANAGEMENT COMMUNITY SPOKER MERCHANTIZER		STOCKBROKER/JOBBER RADIOGRAPHER TEACHER PRIMARY AND JUNIOR SCHOOL OCCUPATIONAL THERAPIST VALUER PROPERTY CHARTERED ACCOUNTANT TRAFFIC MANAGER TRANSPORT INSURANCE INSPECTOR HM FORCES EDUCATION/INSTRUCTOR BRANCH AUCTIONEER COMMERCIAL ART GALLERY WORK DIPLOMATIC SERVICE EXECUTIVE OFFICER TEACHER IN ADULT EDUCATION SALES ADMINISTRATION	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY INDUSTRIAL BUYER PHYSIOTHERAPIST ANTIQUE DEALER MERCHANT BANKER SOLICITOR TEACHER OF THE HANDICAPPED TEACHER OF ENGLISH AS A FOREIGN LANGUAGE SECRETARIAL WORK SHIPBROKER BARRISTER BANKER CONTRACTS ADMINISTRATOR
FACTOR NUMBER 25	VALUE 5	NO. OF OCCUPATIONS 30	
RESIDENT SOCIAL WORKER FOR PRIVATE BODY DIPLOMATIC SERVICE ADMIN TRAINEE TRAINING OFFICER SALES REPRESENTATIVE JOURNALIST SPEECH THERAPIST FIELD SOCIAL WORKER LOCAL AUTHORITY CONSUMER ADVISORY OFFICER NURSING YOUTH ORGANISER		CHURCH WITNESS CAREERS ADVISER RECRUITMENT AND SELECTION OFFICER INSURANCE BROKER HOTEL MANAGER FIELD SOCIAL WORKER PRIVATE BODY POLICE OFFICER ADVERTISING ACCOUNT EXECUTIVE RETAIL STORE MANAGER INDUSTRIAL MARKETING	COMMUNITY DEVELOPMENT WORKER INDUSTRIAL RELATIONS OFFICER EXPORT SALES BROADCASTING NEWS TRAINEE RESIDENT SOCIAL WORKER LOCAL AUTHORITY MARKET RESEARCH INTERVIEWER PROBATION OFFICER VOLUNTEER SOCIAL WORKER PUBLIC RELATIONS STATION ASSISTANT LOCAL RADIO

Ability to establish rapport — good relationships — with strangers.



FACTOR NUMBER	VALUE 1	NO. OF OCCUPATIONS	VALUE 2	NO. OF OCCUPATIONS	VALUE 3	NO. OF OCCUPATIONS	VALUE 4	NO. OF OCCUPATIONS	VALUE 5	NO. OF OCCUPATIONS
27	CHURCH MINISTER	2	CLERICAL WORKER	7	42	28	33	28	5	
27	COMPUTER PROGRAMMER SECRETARIAL WORK CERTIFIED ACCOUNTANT	7	FIRE SERVICE PRODUCTION MANAGER - INDUSTRY	42	28	33	28	5	5	
27	RESIDENT SOCIAL WORKER FOR PRIVATE BODY PRODUCTION PLANNER RADIOGRAPHER PHYSIOTHERAPIST INSURANCE UNDERWRITER ASSISTANT PRISON GOVERNOR PUBLIC FINANCE ACCOUNTANT TRAFFIC MANAGER TRANSPORT INSURANCE INSPECTOR CIVIL SERVICE EXECUTIVE OFFICER POLICE OFFICER CONSUMER ADVISORY OFFICER BANKER CONTRACTS ADMINISTRATOR	42	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY COMMUNITY DEVELOPMENT WORKER INDUSTRIAL BUYER CAREERS ADVISER TEACHER SECONDARY SCHOOLS INSURANCE BROKER VALUER PROPERTY TEACHER OF THE HANDICAPPED SPEECH THERAPIST MARKET RESEARCH INTERVIEWER PROBATION OFFICER COST AND MANAGEMENT ACCOUNTANT RETAIL STORE MANAGER MERCHANDIZER	28	33	28	5	5		
27	MARKET RESEARCH ANALYST COMPANY SECRETARY INDUSTRIAL RELATIONS OFFICER EXPORT SALES AIR TRAFFIC CONTROLLER HOTEL MANAGER LOCAL GOVERNMENT ADMINISTRATOR VALUER PRIVATE ASSETS AUCTIONEER RETAIL BUYER TEACHER IN ADULT EDUCATION	33	INFORMATION SCIENTIST TEACHER PRIMARY AND JUNIOR SCHOOL TRAINING OFFICER ANTIQUE DEALER HOUSING/ESTATE MANAGER-PRIVATE SECTOR TEACHER OF ENGLISH AS A FOREIGN LANGUAGE FIELD SOCIAL WORKER PRIVATE BODY PUBLIC SECTOR ADMINISTRATION H.M. FORCES COMMISSION OPERATIONAL HOSPITAL SERVICES ADMINISTRATOR	28	33	28	5	5		
27	TOWN & COUNTRY PLANNER CIVIL SERVICE RESEARCH OFFICER SUB-EDITOR PUBLISHING ARCHIVIST SOLICITOR EDITOR-PUBLISHING COMMERCIAL ART GALLERY WORK ADVERTISING ACCOUNT EXECUTIVE CIVIL SERVICE ADMIN TRAINEE STATION ASSISTANT LOCAL RADIO	5	TEACHER OF LIBERAL STUDIES IN F.E. DIPLOMATIC SERVICE ADMIN TRAINEE BROADCASTING NEWS TRAINEE JOURNALIST ADVERTISING COPYWRITER BROADCASTING TRAINEE STUDIO MANAGER PARLIAMENTER DIPLOMATIC SERVICE EXECUTIVE OFFICER PUBLIC RELATIONS	5	5	5	5	5		
27	SALES REPRESENTATIVE VOLUNTEER SOCIAL WORKER	5	LIBRARIAN HM FACTORY INSPECTOR RECRUITMENT AND SELECTION OFFICER ENVIRONMENTAL HEALTH OFFICER THEATRE/CINEMA MANAGER HM INSPECTOR OF TAXES OPERATIONAL RESEARCH OFFICER CONSUMER PROTECTION OFFICER FIELD SOCIAL WORKER LOCAL AUTHORITY MARKETING - PRODUCT MANAGEMENT INDUSTRIAL MARKETING	5	5	5	5	5		
27	TRAFFIC MANAGER DISTRIBUTION OF GOODS BOOK SELLER WORK STUDY OFFICER VALUER INLAND REVENUE OCCUPATIONAL THERAPIST BUILDING SOCIETY ADMINISTRATOR CHARTERED ACCOUNTANT RESIDENT SOCIAL WORKER LOCAL AUTHORITY HM FORCES EDUCATION/INSTRUCTOR BRANCH SYSTEMS ANALYST H.M. FORCES COMMISSION ADMINISTRATIVE NURSING YOUTH ORGANISER SALES ADMINISTRATION	5	STOCKBROKER/JOBBER LANDSCAPE ARCHITECT MERCHANT BANKER UNIVERSITY/POLYTECHNIC ADMINISTRATOR AIR PILOT SHIPBROKER MUSEUM/ART GALLERY CURATOR COMMODITY BROKER TEACHER AND RESEARCHER IN H.E.	5	5	5	5	5		

Competition for available vacancies. Very little = 1; very keen = 5.



FACTOR NUMBER 27	VALUE 1	NO. OF OCCUPATIONS 17
MARKET RESEARCH ANALYST ARTIQUE DEALER THEATRE/CINEMA MANAGER EDITOR-PUBLISHING COMMERCIAL ART GALLERY WORK STATION ASSISTANT LOCAL RADIO	BOOK SELLER SUB-EDITOR PUBLISHING CLERICAL WORKER MARKET RESEARCH INTERVIEWER ADVERTISING ACCOUNT EXECUTIVE SALES ADMINISTRATION	SALES REPRESENTATIVE BROADCASTING NEWS TRAINEE ADVERTISING COPYWRITER BROADCASTING TRAINEE STUDIO MANAGER DIPLOMATIC SERVICE EXECUTIVE OFFICER
FACTOR NUMBER 29	VALUE 2	NO. OF OCCUPATIONS 22
COMPUTER PROGRAMMER PRODUCTION PLANNER EXPORT SALES CIVIL SERVICE EXECUTIVE OFFICER RETAIL BUYER RETAIL STORE MANAGER PUBLIC RELATIONS MERCHANTIZER	CIVIL SERVICE RESEARCH OFFICER DIPLOMATIC SERVICE ADMIN TRAINEE MERCHANT BANKER SYSTEMS ANALYST VOLUNTEER SOCIAL WORKER COMMUNITY BROKER CONTRACTS ADMINISTRATOR	TRAFFIC MANAGER DISTRIBUTION OF GOODS INDUSTRIAL BUYER UNIVERSITY/POLYTECHNIC ADMINISTRATOR PRODUCTION MANAGER - INDUSTRY MARKETING - PRODUCT MANAGEMENT CIVIL SERVICE ADMIN TRAINEE INDUSTRIAL MARKETING
FACTOR NUMBER 29	VALUE 3	NO. OF OCCUPATIONS 12
RESIDENT SOCIAL WORKER FOR PRIVATE BODY ASSISTANT PRISON GOVERNOR TRAFFIC MANAGER TRANSPORT SHIPROKER	TEACHER OF LIBERAL STUDIES IN F E BUILDING SOCIETY ADMINISTRATOR HM FORCES EDUCATION/INSTRUCTOR BRANCH CONSUMER ADVISORY OFFICER	STOCKBROKER/JOBBER HOTEL MANAGER PUBLIC SECTOR ADMINISTRATION YOUTH ORGANISER
FACTOR NUMBER 29	VALUE 4	NO. OF OCCUPATIONS 21
INFORMATION SCIENTIST WORK STUDY OFFICER INDUSTRIAL RELATIONS OFFICER JOURNALIST INSURANCE INSPECTOR FIELD SOCIAL WORKER PRIVATE BODY MUSEUM/ART GALLERY CURATOR	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY FIRE SERVICE TRAINING OFFICER AIR TRAFFIC CONTROLLER LOCAL GOVERNMENT ADMINISTRATOR H.M. FORCES COMMISSION ADMINISTRATIVE TEACHER IN ADULT EDUCATION	COMMUNITY DEVELOPMENT WORKER CAREERS ADVISER RECRUITMENT AND SELECTION OFFICER HOUSING/ESTATE MANAGER-PRIVATE SECTOR OPERATIONAL RESEARCH H.M. FORCES COMMISSION OPERATIONAL HOSPITAL SERVICES ADMINISTRATOR
FACTOR NUMBER 29	VALUE 5	NO. OF OCCUPATIONS 40
TOWN & COUNTRY PLANNER CHURCH MINISTER PHYSIOTHERAPIST LANDSCAPE ARCHITECT OCCUPATIONAL THERAPIST VALUER PROPERTY CHARTERED ACCOUNTANT TEACHER OF THE HANDICAPPED AIR PILOT VALUER PRIVATE ASSETS AUCTIONEER PROBATION OFFICER NURSING TEACHER AND RESEARCHER IN H.E.	LIBRARIAN RADIOGRAPHER HM FACTORY INSPECTOR INSURANCE UNDERWRITER ARCHIVIST VALUER INDUSTRIAL ASSETS RESIDENT SOCIAL WORKER LOCAL AUTHORITY TEACHER OF ENGLISH AS A FOREIGN LANGUAGE SECRETARIAL WORK FIELD SOCIAL WORKER LOCAL AUTHORITY BARRISTER BANKER	COMPANY SECRETARY TEACHER PRIMARY AND JUNIOR SCHOOL VALUER INLAND REVENUE TEACHER SECONDARY SCHOOLS PUBLIC FINANCE ACCOUNTANT ENVIRONMENTAL HEALTH OFFICER SOLICITOR HM INSPECTOR OF TAXES SPEECH THERAPIST CONSUMER PROTECTION OFFICER POLICE OFFICER COST AND MANAGEMENT ACCOUNTANT CERTIFIED ACCOUNTANT

Further study and exams necessary after graduation.



FACTOR NUMBER	VALUE 1	NO. OF OCCUPATIONS	VALUE 2	NO. OF OCCUPATIONS	VALUE 3	NO. OF OCCUPATIONS	VALUE 4	NO. OF OCCUPATIONS	VALUE 5	NO. OF OCCUPATIONS
CHURCH MINISTER	3	3	CLERICAL WORKER							
RESIDENT SOCIAL WORKER FOR PRIVATE BODY			COMMUNITY DEVELOPMENT WORKER							
RADIOGRAPHER			PHYSIOTHERAPIST							
SPEECH THERAPIST			FIELD SOCIAL WORKER PRIVATE BODY							
NURSING			YOUTH ORGANISER							
MARKET RESEARCH ANALYST			INFORMATION SCIENTIST							
LIBRARIAN			HOUSING/ESTATE MANAGER-LOCAL AUTHORITY							
FIRE SERVICE			TEACHER PRIMARY AND JUNIOR SCHOOL							
VALUER INLAND REVENUE			TRAINING OFFICER							
TEACHER SECONDARY SCHOOLS			SUB-EDITOR PUBLISHING							
ARCHIVIST			ENVIRONMENTAL HEALTH OFFICER							
VALUER INDUSTRIAL ASSETS			THEATRE/CINEMA MANAGER							
TRAFFIC MANAGER TRANSPORT			TEACHER OF THE HANDICAPPED							
TEACHER OF ENGLISH AS A FOREIGN LANGUAGE			CIVIL SERVICE EXECUTIVE OFFICER							
MARKET RESEARCH INTERVIEWER			CONSUMER PROTECTION OFFICER							
FIELD SOCIAL WORKER LOCAL AUTHORITY			POLICE OFFICER							
COMMERCIAL ART GALLERY WORK			MUSEUM/ART GALLERY CURATOR							
DIPLOMATIC SERVICE EXECUTIVE OFFICER			TEACHER IN ADULT EDUCATION							
TEACHER AND RESEARCHER IN H.E.			STATION ASSISTANT LOCAL RADIO							
TOWN & COUNTRY PLANNER			COMPUTER PROGRAMMER							
TRAFFIC MANAGER DISTRIBUTION OF GOODS			PRODUCTION PLANNER							
HM FACTORY INSPECTOR			INDUSTRIAL RELATIONS OFFICER							
INSURANCE UNDERWRITER			EXPORT SALES							
ASSISTANT PRISON GOVERNOR			INSURANCE BROKER							
VALUER PROPERTY			BROADCASTING NEWS TRAINEE							
AIR TRAFFIC CONTROLLER			HOUSING/ESTATE MANAGER-PRIVATE SECTOR							
ADVERTISING COPYWRITER			LOCAL GOVERNMENT ADMINISTRATOR							
HM FORCES EDUCATION/INSTRUCTOR BRANCH			VALUER PRIVATE ASSETS							
PUBLIC SECTOR ADMINISTRATION			SYSTEMS ANALYST							
PRODUCTION MANAGER - INDUSTRY			RETAIL BUYER							
H.M. FORCES COMMISSION OPERATIONAL			BANKER							
PUBLIC RELATIONS			CONTRACTS ADMINISTRATOR							
SALES ADMINISTRATION										
STOCKBROKER/JOBBER			COMPANY SECRETARY							
SALES REPRESENTATIVE			MERCHANT BANKER							
SOLICITOR			HM INSPECTOR OF TAXES							
BARRISTER			ADVERTISING ACCOUNT EXECUTIVE							
MARKETING - PRODUCT MANAGEMENT			COMMODITY BROKER							
CERTIFIED ACCOUNTANT			INDUSTRIAL MARKETING							
BOOK SELLER			TEACHER OF LIBERAL STUDIES IN F E							
OCCUPATIONAL THERAPIST			WORK STUDY OFFICER							
SECRETARIAL WORK			CAREERS ADVISER							
			RECRUITMENT AND SELECTION OFFICER							
			BUILDING SOCIETY ADMINISTRATOR							
			UNIVERSITY/POLYTECHNIC ADMINISTRATOR							
			HOTEL MANAGER							
			RESIDENT SOCIAL WORKER LOCAL AUTHORITY							
			EDITOR-PUBLISHING							
			BROADCASTING TRAINEE STUDIO MANAGER							
			PROBATION OFFICER							
			CONSUMER ADVISORY OFFICER							
			HOSPITAL SERVICES ADMINISTRATOR							
			CIVIL SERVICE RESEARCH OFFICER							
			INDUSTRIAL BUYER							
			LANDSCAPE ARCHITECT							
			ANTIQUE DEALER							
			PUBLIC FINANCE ACCOUNTANT							
			JOURNALIST							
			INSURANCE INSPECTOR							
			OPERATIONAL RESEARCH							
			AUCTIONEER							
			SHIPBROKER							
			H.M. FORCES COMMISSION ADMINISTRATIVE							
			RETAIL STORE MANAGER							
			MERCHANDIZER							
			DIPLOMATIC SERVICE ADMIN TRAINEE							
			CHARTERED ACCOUNTANT							
			AIR PILOT							
			COST AND MANAGEMENT ACCOUNTANT							
			CIVIL SERVICE ADMIN TRAINEE							

Earnings 10 years after graduating. Low for a graduate = 1; High = 5.



**FACTOR NUMBER 33**    **VALUE 1**    **NO. OF OCCUPATIONS 12**  
 TEACHER OF LINGUAL STUDIES IN F E    ANTIQUE DEALER  
 SOLICITOR    TEACHER OF THE HANDICAPPED  
 AUCTIONER    COMMERCIAL ART GALLERY WORK  
 TEACHER IN ADULT EDUCATION    YOUTH ORGANISER  
  
**FACTOR NUMBER 33**    **VALUE 2**    **NO. OF OCCUPATIONS 40**  
 RESIDENT SOCIAL WORKER FOR PRIVATE BODY    MARKET RESEARCH ANALYST  
 COMPANY SECRETARY    CHURCH MINISTER  
 BOOK SELLER    TEACHER PRIMARY AND JUNIOR SCHOOL  
 HM FACTORY INSPECTOR    CAREERS ADVISER  
 TEACHER SECONDARY SCHOOLS    SALES REPRESENTATIVE  
 VALUER PROPERTY    ARCHIVIST  
 ENVIRONMENTAL HEALTH OFFICER    THEATRE/CINEMA MANAGER  
 TRAFFIC MANAGER TRANSPORT    RESIDENT SOCIAL WORKER LOCAL AUTHORITY  
 HM INSPECTOR OF TAXES    ADVERTISING COPYWRITER  
 TEACHER OF ENGLISH AS A FOREIGN LANGUAGE    SPEECH THERAPIST  
 EDITOR-PUBLISHING    MARKET RESEARCH INTERVIEWER  
 SHIPROKER    PRODUCTION OFFICER  
 CONSUMER ADVISORY OFFICER    ADVERTISING ACCOUNT EXECUTIVE  
 PUBLIC RELATIONS

VALUER INDUSTRIAL ASSETS  
 VALUER PRIVATE ASSETS  
 BARRISTER  
 TEACHER AND RESEARCHER IN H.E.

INFORMATION SCIENTIST  
 COMMUNITY DEVELOPMENT WORKER  
 PHYSIOTHERAPIST  
 LANDSCAPE ARCHITECT  
 OCCUPATIONAL THERAPIST  
 JOURNALIST  
 HOTEL MANAGER  
 HOUSING/ESTATE MANAGER-PRIVATE SECTOR  
 AIR PILOT  
 FIELD SOCIAL WORKER PRIVATE BODY  
 FIELD SOCIAL WORKER LOCAL AUTHORITY  
 MUSEUM/ART GALLERY CURATOR  
 VOLUNTEER SOCIAL WORKER

**FACTOR NUMBER 33**    **VALUE 3**    **NO. OF OCCUPATIONS 41**  
 TOWN & COUNTRY PLANNER    COMPUTER PROGRAMMER  
 CIVIL SERVICE RESEARCH OFFICER    LIBRARIAN  
 TRAFFIC MANAGER DISTRIBUTION OF GOODS    PRODUCTION PLANNER  
 INDUSTRIAL BUYER    WORK STUDY OFFICER  
 VALUER INLAND REVENUE    TRAINING OFFICER  
 EXPORT SALES    SUB-EDITOR PUBLISHING  
 INSURANCE BROKER    BROADCASTING NEWS TRAINEE  
 UNIVERSITY/POLYTECHNIC ADMINISTRATOR    INSURANCE INSPECTOR  
 CONSUMER PROTECTION OFFICER    DROADCASTING TRAINEE STUDIO MANAGER  
 PRODUCTION MANAGER - INDUSTRY    RETAIL BUYER  
 MARKETING - PRODUCT MANAGEMENT    RETAIL STORE MANAGER  
 CIVIL SERVICE ADMIN TRAINEE    HOSPITAL SERVICES ADMINISTRATOR  
 CONTRACTS ADMINISTRATOR    INDUSTRIAL MARKETING  
 STATION ASSISTANT LOCAL RADIO    SALES ADMINISTRATION

STOCKBROKER/JOBBER  
 HOUSING/ESTATE MANAGER-LOCAL AUTHORITY  
 RADIOGRAPHER  
 INDUSTRIAL RELATIONS OFFICER  
 RECRUITMENT AND SELECTION OFFICER  
 ASSISTANT PRISON GOVERNOR  
 HERCANT BANKER  
 OPERATIONAL RESEARCH  
 SYSTEMS ANALYST  
 COST AND MANAGEMENT ACCOUNTANT  
 COMMODITY BROKER  
 CERTIFIED ACCOUNTANT  
 MERCHANTIZER

GRADSCOPE - LIST OF OCCUPATIONS BY FACTOR VALUES

**FACTOR NUMBER 33**    **VALUE 4**    **NO. OF OCCUPATIONS 17**  
 DIPLOMATIC SERVICE ADMIN TRAINEE    FIRE SERVICE  
 BUILDING SOCIETY ADMINISTRATOR    PUBLIC FINANCE ACCOUNTANT  
 CHARITRED ACCOUNTANT    LOCAL GOVERNMENT ADMINISTRATOR  
 CIVIL SERVICE EXECUTIVE OFFICER    SECRETARIAL WORK  
 POLICE OFFICER    H.M. FORCES COMMISSION ADMINISTRATIVE  
 NURSING    DIPLOMATIC SERVICE EXECUTIVE OFFICER

INSURANCE UNDERWRITER  
 AIR TRAFFIC CONTROLLER  
 PUBLIC SECTOR ADMINISTRATION  
 H.M. FORCES COMMISSION OPERATIONAL

**FACTOR NUMBER 33**    **VALUE 5**    **NO. OF OCCUPATIONS 2**  
 CLERICAL WORKER    BANKER







**FACTOR NUMBER 37**      **VALUE 1**      **NO. OF OCCUPATIONS 68**  
 MARKET RESEARCH ANALYST      INFORMATION SCIENTIST  
 TEACHER OF LIBERAL STUDIES IN F E      STOCKBROKER/JOBBER  
 LIBRARIAN      COMPANY SECRETARY  
 BOOK SELLER      DIPLOMATIC SERVICE ADMIN TRAINEE  
 INDUSTRIAL BUYER      TEACHER PRIMARY AND JUNIOR SCHOOL  
 CAREERS ADVISER      INDUSTRIAL RELATIONS OFFICER  
 RECRUITMENT AND SELECTION OFFICER      INSURANCE UNDERWRITER  
 OCCUPATIONAL THERAPIST      ANTIQUE DEALER  
 ASSISTANT PRISON GOVERNOR      BUILDING SOCIETY ADMINISTRATOR  
 MERCHANT BANKER      ARCHIVIST  
 UNIVERSITY/POLYTECHNIC ADMINISTRATOR      SOLICITOR  
 HOTEL MANAGER      TEACHER OF THE HANDICAPPED  
 HM INSPECTOR OF TAXES      ADVERTISING COPYWRITER  
 TEACHER OF ENGLISH AS A FOREIGN LANGUAGE      SPEECH THERAPIST  
 CIVIL SERVICE EXECUTIVE OFFICER      SECRETARIAL WORK  
 BROADCASTING TRAINEE STUDIO MANAGER      PUBLIC SECTOR ADMINISTRATION  
 SHIPBROKER      RETAIL BUYER  
 COST AND MANAGEMENT ACCOUNTANT      MUSEUM/ART GALLERY CURATOR  
 BANKER      NURSING STORE MANAGER  
 CIVIL SERVICE ADMIN TRAINEE      PUBLIC RELATIONS  
 HOSPITAL SERVICES ADMINISTRATOR      CERTIFIED ACCOUNTANT  
 STATION ASSISTANT LOCAL RADIO      SALES ADMINISTRATION

COMPUTER PROGRAMMER  
 CIVIL SERVICE RESEARCH OFFICER  
 PRODUCTION PLANNER  
 RADIOGRAPHER  
 PHYSIOTHERAPIST  
 TRAINING OFFICER  
 TEACHER SECONDARY SCHOOLS  
 SUB-EDITOR PUBLISHING  
 PUBLIC FINANCE ACCOUNTANT  
 AIR TRAFFIC CONTROLLER  
 THEATRE/CINEMA MANAGER  
 CLERICAL WORKER  
 LOCAL GOVERNMENT ADMINISTRATOR  
 OPERATIONAL RESEARCH  
 EDITOR-PUBLISHING  
 SYSTEMS ANALYST  
 COMMERCIAL ART GALLERY WORK  
 ADVERTISING ACCOUNT EXECUTIVE  
 DIPLOMATIC SERVICE EXECUTIVE OFFICER  
 COMMODITY BROKER  
 TEACHER IN ADULT EDUCATION  
 TEACHER AND RESEARCHER IN H.E.

**FACTOR NUMBER 37**      **VALUE 2**      **NO. OF OCCUPATIONS 16**  
 RESIDENT SOCIAL WORKER FOR PRIVATE BODY      TRAFFIC MANAGER DISTRIBUTION OF GOODS  
 INSURANCE BROKER      CHARTERED ACCOUNTANT  
 HM FORCES EDUCATION/INSTRUCTOR BRANCH      VALUER PRIVATE ASSETS  
 PROBATION OFFICER      H.M. FORCES COMMISSION ADMINISTRATIVE  
 MARKETING - PRODUCT MANAGEMENT      CONTRACTS ADMINISTRATOR  
 MERCHANTIZER

WORK STUDY OFFICER  
 RESIDENT SOCIAL WORKER LOCAL AUTHORITY  
 PRODUCTION MANAGER - INDUSTRY  
 CONSUMER ADVISORY OFFICER  
 INDUSTRIAL MARKETING

**FACTOR NUMBER 37**      **VALUE 3**      **NO. OF OCCUPATIONS 17**  
 TOWN & COUNTRY PLANNER      HOUSING/ESTATE MANAGERS-LOCAL AUTHORITY  
 COMMUNITY DEVELOPMENT WORKER      VALUER INLAND REVENUE  
 BROADCASTING NEWS TRAINEE      VALUER INDUSTRIAL ASSETS  
 HOUSING/ESTATE MANAGER-PRIVATE SECTOR      INSURANCE INSPECTOR  
 CONSUMER PROTECTION OFFICER      AUCTIONEER  
 VOLUNTEER SOCIAL WORKER      YOUTH ORGANISER

CHURCH MINISTER  
 EXPORT SALES  
 TRAFFIC MANAGER TRANSPORT  
 FIELD SOCIAL WORKER PRIVATE BODY  
 FIELD SOCIAL WORKER LOCAL AUTHORITY

**FACTOR NUMBER 37**      **VALUE 4**      **NO. OF OCCUPATIONS 7**  
 HM FACTORY INSPECTOR      LANDSCAPE ARCHITECT  
 VALUER PROPERTY      JOURNALIST  
 AIR PILOT

SALES REPRESENTATIVE  
 ENVIRONMENTAL HEALTH OFFICER

**FACTOR NUMBER 37**      **VALUE 5**      **NO. OF OCCUPATIONS 4**  
 FIRE SERVICE      MARKET RESEARCH INTERVIEWER  
 H.M. FORCES COMMISSION OPERATIONAL

POLICE OFFICER

Work which will be mainly out of doors.



FACTUR NUMBER	VALUE 1	NO. OF OCCUPATIONS	VALUE 2	NO. OF OCCUPATIONS	VALUE 3	NO. OF OCCUPATIONS	VALUE 4	NO. OF OCCUPATIONS	VALUE 5	NO. OF OCCUPATIONS
39	ANTIQUA DEALER	3	VALUER PRIVATE ASSETS							
39	INFORMATION SCIENTIST	25	CHURCH MINISTER							
	TEACHER PRIMARY AND JUNIOR SCHOOL		HM FACTORY INSPECTOR							
	LANDSCAPE ARCHITECT		TEACHER SECONDARY SCHOOLS							
	OCCUPATIONAL THERAPIST		VALUER PROPERTY							
	JOURNALIST		SOLICITOR							
	TEACHER OF ENGLISH AS A FOREIGN LANGUAGE		SPEECH THERAPIST							
	AUCTIONEER		SHIPBROKER							
	BARRISTER		CONSUMER ADVISORY OFFICER							
	TEACHER IN ADULT EDUCATION									
39	MARKET RESEARCH ANALYST	37	COMPUTER PROGRAMMER							
	STOCKBROKER/JOBBER		CIVIL SERVICE RESEARCH OFFICER							
	COMPANY SECRETARY		COMMUNITY DEVELOPMENT WORKER							
	INDUSTRIAL BUYER		PHYSIOTHERAPIST							
	TRAINING OFFICER		RECRUITMENT AND SELECTION OFFICER							
	EXPORT SALES		INSURANCE BROKER							
	MERCHANT BANKER		ENVIRONMENTAL HEALTH OFFICER							
	TEACHER OF THE HANDICAPPED		HOUSING/ESTATE MANAGER-PRIVATE SECTOR							
	HM INSPECTOR OF TAXES		FIELD SOCIAL WORKER PRIVATE BODY							
	EDITOR-PUBLISHING		CONSUMER PROTECTION OFFICER							
	RETAIL BUYER		PROBATION OFFICER							
	VOLUNTEER SOCIAL WORKER		COMMODITY BROKER							
	MERCHANDIZER									
39	RESIDENT SOCIAL WORKER FOR PRIVATE BODY	33	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY							
	PRODUCTION PLANNER		DIPLOMATIC SERVICE ADMIN TRAINEE							
	INDUSTRIAL RELATIONS OFFICER		SYM-EDITOR PUBLISHING							
	BROADCASTING NEWS TRAINEE		UNIVERSITY/POLYTECHNIC ADMINISTRATOR							
	THEATRE/CINEMA MANAGER		TRAFFIC MANAGER TRANSPORT							
	AIR PILOT		LOCAL GOVERNMENT ADMINISTRATOR							
	HM FORCES EDUCATION/INSTRUCTOR BRANCH		CIVIL SERVICE EXECUTIVE OFFICER							
	SYSTEMS ANALYST		POLICE OFFICER							
	MARKETING - PRODUCT MANAGEMENT		DIPLOMATIC SERVICE EXECUTIVE OFFICER							
	CIVIL SERVICE ADMIN TRAINEE		CERTIFIED ACCOUNTANT							
	INDUSTRIAL MARKETING		STATION ASSISTANT LOCAL RADIO							
39	TOWN & COUNTRY PLANNER	14	FIRE SERVICE							
	AIR TRAFFIC CONTROLLER		HOTEL MANAGER							
	BROADCASTING TRAINEE STUDIO MANAGER		PRODUCTION MANAGER - INDUSTRY							
	H.M. FORCES COMMISSION OPERATIONAL		ADVERTISING ACCOUNT EXECUTIVE							
	RETAIL STORE MANAGER		HOSPITAL SERVICES ADMINISTRATOR							

TEACHER AND RESEARCHER IN H.E.

BOOK SELLER  
 CAREERS ADVISER  
 SALES REPRESENTATIVE  
 ARCHIVIST  
 INSURANCE INSPECTOR  
 MARKET RESEARCH INTERVIEWER  
 COMMERCIAL ART GALLERY WORK  
 PUBLIC RELATIONS

TEACHER OF LIBERAL STUDIES IN F E

LIBRARIAN  
 RADIOGRAPHER  
 VALUER INLAND REVENUE  
 INSURANCE UNDERWRITER  
 PUBLIC FINANCE ACCOUNTANT  
 VALUER INDUSTRIAL ASSETS  
 CLERICAL WORKER  
 SECRETARIAL WORK  
 FIELD SOCIAL WORKER LOCAL AUTHORITY  
 MUSEUM/ART GALLERY CURATOR  
 YOUTH ORGANISER

TRAFFIC MANAGER DISTRIBUTION OF GOODS

WORK STUDY OFFICER  
 BUILDING SOCIETY ADMINISTRATOR  
 CHARTERED ACCOUNTANT  
 ADVERTISING COPYWRITER  
 OPERATIONAL RESEARCH  
 PUBLIC SECTOR ADMINISTRATION  
 COST AND MANAGEMENT ACCOUNTANT  
 BANKER  
 CONTRACTS ADMINISTRATION  
 SALES ADMINISTRATION

ASSISTANT PRISON GOVERNOR  
 RESIDENT SOCIAL WORKER LOCAL AUTHORITY  
 H.M. FORCES COMMISSION ADMINISTRATIVE  
 NURSING

Working group. On your own = 1; part of a team = 5.



FACTOR NUMBER 41	VALUE 1	NO. OF OCCUPATIONS 19	COMMUNITY DEVELOPMENT WORKER JOURNALIST RESIDENT SOCIAL WORKER LOCAL AUTHORITY FIELD SOCIAL WORKER LOCAL AUTHORITY H.M. FORCES COMMISSION OPERATIONAL YOUTH ORGANISER
RESIDENT SOCIAL WORKER FOR PRIVATE BODY FIRE SERVICE THEATRE/CINEMA MANAGER AIR PILOT POLICE OFFICER VOLUNTEER SOCIAL WORKER STATION ASSISTANT LOCAL R.D.O	CHURCH MINISTER BROADCASTING NEWS TRAINEE HOTEL MANAGER FIELD SOCIAL WORKER PRIVATE BODY PROBATION OFFICER NURSING		
FACTOR NUMBER 41	VALUE 2	NO. OF OCCUPATIONS 16	DIPLOMATIC SERVICE ADMIN TRAINEE ANTIQUE DEALER TRAFFIC MANAGER TRANSPORT BROADCASTING TRAINEE STUDIO MANAGER PUBLIC RELATIONS
COMPUTER PROGRAMMER EXPORT SALES ASSISTANT PRISON GOVERNOR HM FORCES EDUCATION/INSTRUCTOR BRANCH PRODUCTION MANAGER - INDUSTRY TEACHER IN ADULT EDUCATION	LIBRARIAN SALES REPRESENTATIVE AIR TRAFFIC CONTROLLER MARKET RESEARCH INTERVIEWER ADVERTISING ACCOUNT EXECUTIVE		
FACTOR NUMBER 41	VALUE 3	NO. OF OCCUPATIONS 19	RADIOGRAPHER INSURANCE INSPECTOR VALUER PRIVATE ASSETS SYSTEMS ANALYST BARRISTER RETAIL STORE MANAGER
TEACHER OF LIBERAL STUDIES IN F E INDUSTRIAL RELATIONS OFFICER ADVERTISING COPYWRITER EDITOR-PUBLISHING. RETAIL BUYER MARKETING - PRODUCT MANAGEMENT INDUSTRIAL MARKETING	TRAFFIC MANAGER DISTRIBUTION OF GOODS SUB-EDITOR PUBLISHING TEACHER OF ENGLISH AS A FOREIGN LANGUAGE AUCTIONEER H.M. FORCES COMMISSION ADMINISTRATIVE DIPLOMATIC SERVICE EXECUTIVE OFFICER		
FACTOR NUMBER 41	VALUE 4	NO. OF OCCUPATIONS 38	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY BOOK SELLER HM FACTORY INSPECTOR RECRUITMENT AND SELECTION OFFICER VALUER PROPERTY CHARTERED ACCOUNTANT TEACHER OF THE HANDICAPPED OPERATIONAL RESEARCH COMMERCIAL ART GALLERY WORK COST AND MANAGEMENT ACCOUNTANT HOSPITAL SERVICES ADMINISTRATOR MERCHANDIZER
TOWN & COUNTRY PLANNER COMPANY SECRETARY INDUSTRIAL BUYER CAREERS ADVISER TEACHER SECONDARY SCHOOLS MERCHANT BANKER VALUER INDUSTRIAL ASSETS HOUSING/ESTATE MANAGER-PRIVATE SECTOR CONSUMER PROTECTION OFFICER MUSEUM/ART GALLERY CURATOR COMMODITY BROKER CERTIFIED ACCOUNTANT TEACHER AND RESEARCHER IN H.E.	MARKET RESEARCH ANALYST PRODUCTION PLANNER WORK STUDY OFFICER TRAINING OFFICER INSURANCE BROKER ENVIRONMENTAL HEALTH OFFICER SOLICITOR SPEECH THERAPIST SHIPROKER CONSUMER ADVISORY OFFICER CIVIL SERVICE ADMIN TRAINEE CONTRACTS ADMINISTRATOR SALES ADMINISTRATION		
FACTOR NUMBER 41	VALUE 5	NO. OF OCCUPATIONS 20	CIVIL SERVICE RESEARCH OFFICER VALUER INLAND REVENUE OCCUPATIONAL THERAPIST ARCHIVIST HM INSPECTOR OF TAXES SECRETARIAL WORK
INFORMATION SCIENTIST TEACHER PRIMARY AND JUNIOR SCHOOL LANDSCAPE ARCHITECT BUILDING SOCIETY ADMINISTRATOR UNIVERSITY/POLYTECHNIC ADMINISTRATOR LOCAL GOVERNMENT ADMINISTRATOR PUBLIC SECTOR ADMINISTRATION	STOCKBROKER/JOBBER PHYSIOTHERAPIST INSURANCE UNDERWRITER PUBLIC FINANCE ACCOUNTANT CLERICAL WORKER CIVIL SERVICE EXECUTIVE OFFICER BANKER		

Hours of work. Shift work or irregular hours = 1; regular 9 to 5 or other standard day time hours = 5.



RESIDENT SOCIAL WORKER FOR PRIVATE BODY  
 FIRE SERVICE  
 RESIDENT SOCIAL WORKER LOCAL AUTHORITY  
 POLICE OFFICER

CHURCH MINISTER  
 OCCUPATIONAL THERAPIST  
 MARKET RESEARCH INTERVIEWER  
 PROMOTION OFFICER

TRAFFIC MANAGER DISTRIBUTION OF GOODS  
 TRAFFIC MANAGER TRANSPORT  
 PRODUCTION MANAGER - INDUSTRY  
 VOLUNTEER SOCIAL WORKER

FACTOR NUMBER 43 VALUE 2 NO. OF OCCUPATIONS 31

HOUSING/ESTATE MANAGER-LOCAL AUTHORITY  
 PHYSIOTHERAPIST  
 TRAINING OFFICER  
 ASSISTANT PRISON GOVERNOR  
 JOURNALIST  
 HOTEL MANAGER  
 CLERICAL WORKER  
 FIELD SOCIAL WORKER PRIVATE BODY  
 AUCTIONEER  
 CONSUMER ADVISORY OFFICER  
 YOUTH ORGANISER

RADIOGRAPHER  
 INDUSTRIAL RELATIONS OFFICER  
 ANTIQUE DEALER  
 VALUER PROPERTY  
 THEATRE/CINEMA MANAGER  
 HOUSING/ESTATE MANAGER-PRIVATE SECTOR  
 SPEECH THERAPIST  
 CONSUMER PROTECTION OFFICER  
 N.M. FORCES COMMISSION OPERATIONAL  
 RETAIL STORE MANAGER

FACTOR NUMBER 43 VALUE 3 NO. OF OCCUPATIONS 30

LIBRARIAN  
 INDUSTRIAL BUYER  
 VALUER INLAND REVENUE  
 INSURANCE BROKER  
 SOLICITOR  
 TEACHER OF ENGLISH AS A FOREIGN LANGUAGE  
 SHIPBROKER  
 COST AND MANAGEMENT ACCOUNTANT  
 HOSPITAL SERVICES ADMINISTRATOR  
 MERCHANDIZER

BOOK SELLER  
 CAREERS ADVISER  
 EXPORT SALES  
 VALUER INDUSTRIAL ASSETS  
 LOCAL GOVERNMENT ADMINISTRATOR  
 VALUER PRIVATE ASSETS  
 COMMERCIAL ART GALLERY WORK  
 TEACHER IN ADULT EDUCATION  
 CONTRACTS ADMINISTRATOR  
 SALES ADMINISTRATION

FACTOR NUMBER 43 VALUE 4 NO. OF OCCUPATIONS 31

TOWN & COUNTRY PLANNER  
 COMPUTER PROGRAMMER  
 COMPANY SECRETARY  
 INSURANCE UNDERWRITER  
 ARCHIVIST  
 ADVERTISING COPYWRITER  
 HM FORCES EDUCATION/INSTRUCTOR BRANCH  
 PUBLIC SECTOR ADMINISTRATOR  
 MUSEUM/ART GALLERY CURATOR  
 DIPLOMATIC SERVICE EXECUTIVE OFFICER  
 INDUSTRIAL MARKETING

INFORMATION SCIENTIST  
 STOCKBROKER/JOBBER  
 LANDSCAPE ARCHITECT  
 PUBLIC FINANCE ACCOUNTANT  
 CHARTERED ACCOUNTANT  
 OPERATIONAL RESEARCH  
 BROADCASTING TRAINEE STUDIO MANAGER  
 N.M. FORCES COMMISSION ADMINISTRATIVE  
 MARKETING -- PRODUCT MANAGEMENT  
 PUBLIC RELATIONS

FACTOR NUMBER 43 VALUE 5 NO. OF OCCUPATIONS 8

CIVIL SERVICE RESEARCH OFFICER  
 MERCHANT BANKER  
 CIVIL SERVICE ADMIN TRAINEE

TEACHER SECONDARY SCHOOLS  
 BARRISTER

DIPLOMATIC SERVICE ADMIN TRAINEE  
 UNIVERSITY/POLYTECHNIC ADMINISTRATOR  
 TEACHER AND RESEARCHER IN H.E.

Contact with people of a similar educational background.



FACTOR NUMBER 45	VALUE 1	HO. OF OCCUPATIONS	4
LIBRARIAN	PHYSIOTHERAPIST		
MUSEUM/ART GALLERY CUPATOR			ARCHIVIST
FACTOR NUMBER 45	VALUE 2	NO. OF OCCUPATIONS	32
INFORMATION SCIENTIST	TEACHER OF LIBERAL STUDIES IN F E		CIVIL SERVICE RESEARCH OFFICER
CHURCH MINISTER	COMMUNITY DEVELOPMENT WORKER		BOOK SELLER
TEACHER PRIMARY AND JUNIOR SCHOOL	CAREERS ADVISER		VALUER INLAND REVENUE
LANDSCAPE ARCHITECT	OCCUPATIONAL THERAPIST		ANTIQUE DEALER
BUILDING SOCIETY ADMINISTRATOR	VALUER PROPERTY		ENVIRONMENTAL HEALTH OFFICER
TEACHER OF THE HANDICAPPED	RESIDENT SOCIAL WORKER LOCAL AUTHORITY		HOUSING/ESTATE MANAGER-PRIVATE SECTOR
CLERICAL WORKER	LOCAL GOVERNMENT ADMINISTRATOR		TEACHER OF ENGLISH AS A FOREIGN LANGUAGE
SPEECH THERAPIST	HM FORCES EDUCATION/INSTRUCTOR BRANCH		CIVIL SERVICE EXECUTIVE OFFICER
VALUER PRIVATE ASSETS	CONSUMER PROTECTION OFFICER		COMMERCIAL ART GALLERY WORK
CONSUMER ADVISORY OFFICER	VOLUNTEER SOCIAL WORKER		TEACHER IN ADULT EDUCATION
YOUTH ORGANISER	TEACHER AND RESEARCHER IN H.E.		
FACTOR NUMBER 45	VALUE 3	NO. OF OCCUPATIONS	33
TOWN & COUNTRY PLANNER	RESIDENT SOCIAL WORKER FOR PRIVATE BODY		COMPUTER PROGRAMMER
HOUSING/ESTATE MANAGER-LOCAL AUTHORITY	RADIOGRAPHER		WORK STUDY OFFICER
HM FACTORY INSPECTOR	TRAINING OFFICER		RECRUITMENT AND SELECTION OFFICER
INSURANCE UNDERWRITER	TEACHER SECONDARY SCHOOLS		ASSISTANT PRISON GOVERNOR
INSURANCE BROKER	PUBLIC FINANCE ACCOUNTANT		UNIVERSITY/POLYTECHNIC ADMINISTRATOR
VALUER INDUSTRIAL ASSETS	SOLICITOR		INSURANCE INSPECTOR
HM INSPECTOR OF TAXES	OPERATIONAL RESEARCH		FIELD SOCIAL WORKER PRIVATE BODY
SECRETARIAL WORK.	MARKET RESEARCH INTERVIEWER		AUCTIONEER
PUBLIC SECTOR ADMINISTRATION	FIELD SOCIAL WORKER LOCAL AUTHORITY		H.M. FORCES COMMISSION ADMINISTRATIVE
NURSING	DIPLOMATIC SERVICE EXECUTIVE OFFICER		BANKER
HOSPITAL SERVICES ADMINISTRATOR	CERTIFIED ACCOUNTANT		MERCHANDIZER
FACTOR NUMBER 45	VALUE 4	HO. OF OCCUPATIONS	26
MARKET RESEARCH ANALYST	STOCKBROKER/JORDER		COMPANY SECRETARY
TRAFFIC MANAGER DISTRIBUTION OF GOODS	PRODUCTION PLANNER		DIPLOMATIC SERVICE ADMIN TRAINEE
INDUSTRIAL BUYER	FIRE SERVICE		SUB-EDITOR PUBLISHING
MERCHANT BANKER	CHARTERED ACCOUNTANT		THEATRE/CINEMA MANAGER
HOTEL MANAGER	EDITOR-PUBLISHING		BROADCASTING TRAINEE STUDIO MANAGER
SYSTEMS ANALYST	SHIPBROKER		POLICE OFFICER
RETAIL BUYER	PROBATION OFFICER		H.M. FORCES COMMISSION OPERATIONAL
COST AND MANAGEMENT ACCOUNTANT	RETAIL STORE MANAGER		COMMODITY BROKER
CIVIL SERVICE ADMIN TRAINEE	SALES ADMINISTRATION		
FACTOR NUMBER 45	VALUE 5	HO. OF OCCUPATIONS	17
INDUSTRIAL RELATIONS OFFICER	EXPORT SALES		SALES REPRESENTATIVE
BROADCASTING NEWS TRAINEE	JOURNALIST		AIR TRAFFIC CONTROLLER
TRAFFIC MANAGER TRANSPORT	ADVERTISING COPYWRITER		AIR PILOT
PRODUCTION MANAGER - INDUSTRY	PARASITIST		ADVERTISING ACCOUNT EXECUTIVE
MARKETING - PRODUCT MANAGEMENT	PUBLIC RELATIONS		CONTRACTS ADMINISTRATOR
INDUSTRIAL MARKETING	STATION ASSISTANT LOCAL RADIO		

High pressure work with demanding deadlines and standards which may stimulate or stress depending on your view.



FACTOR NUMBER	VALUE 1	NO. OF OCCUPATIONS	VALUE 2	NO. OF OCCUPATIONS	VALUE 3	NO. OF OCCUPATIONS	VALUE 4	NO. OF OCCUPATIONS	VALUE 5	NO. OF OCCUPATIONS			
47	TOWN & COUNTRY PLANNER STOCKBROKER/JOBRER HOUSING/ESTATE MANAGER-LOCAL AUTHORITY WORK STUDY OFFICER CAREERS ADVISER INSURANCE UNDERWRITER SUB-EDITOR PUBLISHING PUBLIC FINANCE ACCOUNTANT UNIVERSITY/POLYTECHNIC ADMINISTRATOR TEACHER OF THE HANDICAPPED HM INSPECTOR OF TAXES TEACHER OF ENGLISH AS A FOREIGN LANGUAGE CIVIL SERVICE EXECUTIVE OFFICER CONSUMER PROTECTION OFFICER SYSTEMS ANALYST COMMERCIAL ART GALLERY WORK COST AND MANAGEMENT ACCOUNTANT COMMODITY BROKER HOSPITAL SERVICES ADMINISTRATOR	56	INFORMATION SCIENTIST CIVIL SERVICE RESEARCH OFFICER CHURCH MINISTER AND JUNIOR SCHOOL TEACHER PRIMARY AND JUNIOR SCHOOL VALUER INLAND REVENUE TEACHER SECONDARY SCHOOLS INSURANCE BROKER ARCHIVIST SOLICITOR HOUSING/ESTATE MANAGER-PRIVATE SECTOR ADVERTISING COPYWRITER SPEECH THERAPIST SECRETARIAL WORK AUCTIONEER FIELD SOCIAL WORKER LOCAL AUTHORITY MUSEUM/ART GALLERY CURATOR BANKER CIVIL SERVICE ADMIN TRAINER TEACHER AND RESEARCHER IN H.A.E.	37	RESIDENT SOCIAL WORKER FOR PRIVATE BODY TRAFFIC MANAGER DISTRIBUTION OF GOODS RADIOGRAPHER HM FACTORY INSPECTOR RECRUITMENT AND SELECTION OFFICER AIR TRAFFIC CONTROLLER HOTEL MANAGER INSURANCE INSPECTOR FIELD SOCIAL WORKER PRIVATE BODY POLICE OFFICER VOLUNTEER SOCIAL WORKER CERTIFIED ACCOUNTANT SALES ADMINISTRATION	37	MARKET RESEARCH ANALYST PRODUCTION PLANNER INDUSTRIAL BUYER INDUSTRIAL RELATIONS OFFICER VALUER PROPERTY CHARTERED ACCOUNTANT TRAFFIC MANAGER TRANSPORT OPERATIONAL RESEARCH BROADCASTING TRAINEE STUDIO MANAGER PROBATION OFFICER NURSING YOUTH ORGANISER	11	DIPLOMATIC SERVICE ADMIN TRAINEE MARKET RESEARCH INTERVIEWER ADVERTISING ACCOUNT EXECUTIVE MERCHANDIZER	5	BROADCASTING NEWS TRAINEE STATION ASSISTANT LOCAL RADIO	3	AIR PILOT
47	COMPANY SECRETARY ASSISTANT PRISON GOVERNOR H.M. FORCES COMMISSION ADMINISTRATIVE INDUSTRIAL MARKETING	56	TEACHER OF LIBERAL STUDIES IN F E LIBRARIAN BOOK SELLER PHYSIOTHERAPIST LANDSCAPE ARCHITECT OCCUPATIONAL THERAPIST BUILDING SOCIETY ADMINISTRATOR ENVIRONMENTAL HEALTH OFFICER THEATRE/CINEMA MANAGER CLEICAL WORKER LOCAL GOVERNMENT ADMINISTRATOR HM FORCES EDUCATION/INSTRUCTOR BRANCH EDITOR-PUBLISHING PUBLIC SECTOR ADMINISTRATION SHIPBROKER CONSUMER ADVISORY OFFICER RETAIL STORE MANAGER TEACHER IN ADULT EDUCATION	37	COMPUTER PROGRAMMER COMMUNITY DEVELOPMENT WORKER FIRE SERVICE TRAINING OFFICER MERCHANT BANKER VALUER INDUSTRIAL ASSETS RESIDENT SOCIAL WORKER LOCAL AUTHORITY VALUER PRIVATE ASSETS PRODUCTION MANAGER - INDUSTRY BARRISTER DIPLOMATIC SERVICE EXECUTIVE OFFICER CONTRACTS ADMINISTRATOR	11	ANTIQUE DEALER RETAIL BUYER PUBLIC RELATIONS	5	JOURNALIST	3	H.M. FORCES COMMISSION OPERATIONAL		
47	SALES REPRESENTATIVE MARKETING - PRODUCT MANAGEMENT	56	TEACHER OF LIBERAL STUDIES IN F E LIBRARIAN BOOK SELLER PHYSIOTHERAPIST LANDSCAPE ARCHITECT OCCUPATIONAL THERAPIST BUILDING SOCIETY ADMINISTRATOR ENVIRONMENTAL HEALTH OFFICER THEATRE/CINEMA MANAGER CLEICAL WORKER LOCAL GOVERNMENT ADMINISTRATOR HM FORCES EDUCATION/INSTRUCTOR BRANCH EDITOR-PUBLISHING PUBLIC SECTOR ADMINISTRATION SHIPBROKER CONSUMER ADVISORY OFFICER RETAIL STORE MANAGER TEACHER IN ADULT EDUCATION	37	COMPUTER PROGRAMMER COMMUNITY DEVELOPMENT WORKER FIRE SERVICE TRAINING OFFICER MERCHANT BANKER VALUER INDUSTRIAL ASSETS RESIDENT SOCIAL WORKER LOCAL AUTHORITY VALUER PRIVATE ASSETS PRODUCTION MANAGER - INDUSTRY BARRISTER DIPLOMATIC SERVICE EXECUTIVE OFFICER CONTRACTS ADMINISTRATOR	11	ANTIQUE DEALER RETAIL BUYER PUBLIC RELATIONS	5	JOURNALIST	3	H.M. FORCES COMMISSION OPERATIONAL		
47	EXPORT SALES	56	TEACHER OF LIBERAL STUDIES IN F E LIBRARIAN BOOK SELLER PHYSIOTHERAPIST LANDSCAPE ARCHITECT OCCUPATIONAL THERAPIST BUILDING SOCIETY ADMINISTRATOR ENVIRONMENTAL HEALTH OFFICER THEATRE/CINEMA MANAGER CLEICAL WORKER LOCAL GOVERNMENT ADMINISTRATOR HM FORCES EDUCATION/INSTRUCTOR BRANCH EDITOR-PUBLISHING PUBLIC SECTOR ADMINISTRATION SHIPBROKER CONSUMER ADVISORY OFFICER RETAIL STORE MANAGER TEACHER IN ADULT EDUCATION	37	COMPUTER PROGRAMMER COMMUNITY DEVELOPMENT WORKER FIRE SERVICE TRAINING OFFICER MERCHANT BANKER VALUER INDUSTRIAL ASSETS RESIDENT SOCIAL WORKER LOCAL AUTHORITY VALUER PRIVATE ASSETS PRODUCTION MANAGER - INDUSTRY BARRISTER DIPLOMATIC SERVICE EXECUTIVE OFFICER CONTRACTS ADMINISTRATOR	11	ANTIQUE DEALER RETAIL BUYER PUBLIC RELATIONS	5	JOURNALIST	3	H.M. FORCES COMMISSION OPERATIONAL		

Absences from home at night because of travel (not for shift work which is covered elsewhere).



FACTOR NUMBER 49	VALUE 1	NO. OF OCCUPATIONS 1
CHURCH MINISTER		
FACTOR NUMBER 49	VALUE 2	NO. OF OCCUPATIONS 17
LIBRARIAN	COMMUNITY DEVELOPMENT WORKER	DIPLOMATIC SERVICE ADMIN TRAINEE
CAREERS ADVISER	INSURANCE UNDERWRITER	ASSISTANT PRISON GOVERNOR
ARCHIVIST	RESIDENT SOCIAL WORKER LOCAL AUTHORITY	LOCAL GOVERNMENT ADMINISTRATOR
CIVIL SERVICE EXECUTIVE OFFICER	FIELD SOCIAL WORKER PRIVATE BODY	FIELD SOCIAL WORKER LOCAL AUTHORITY
PROMOTION OFFICER	WOLUNTEER SOCIAL WORKER	DIPLOMATIC SERVICE EXECUTIVE OFFICER
CIVIL SERVICE ADMIN TRAINEE	TEACHER AND RESEARCHER IN H.E.	
FACTOR NUMBER 49	VALUE 3	NO. OF OCCUPATIONS 30
TOWN & COUNTRY PLANNER	RESIDENT SOCIAL WORKER FOR PRIVATE BODY	MARKET RESEARCH ANALYST
TEACHER OF LITERAL STUDIES IN F E	CIVIL SERVICE RESEARCH OFFICER	HOUSING/ESTATE MANAGER-LOCAL AUTHORITY
COMPANY SECRETARY	TEACHER PRIMARY AND JUNIOR SCHOOL	HM FACTORY INSPECTOR
VALUER INLAND REVENUE	TRAINING OFFICER	RECRUITMENT AND SELECTION OFFICER
TEACHER SECONDARY SCHOOLS	BUILDING SOCIETY ADMINISTRATOR	PUBLIC FINANCE ACCOUNTANT
ENVIRONMENTAL HEALTH OFFICER	UNIVERSITY/POLYTECHNIC ADMINISTRATOR	TEACHER OF THE HANDICAPPED
SPEECH THERAPIST	PUBLIC SECTOR ADMINISTRATION	SYSTEMS ANALYST
H.M. FORCES COMMISSION ADMINISTRATIVE	COMMERCIAL ART GALLERY WORK	MUSEUM/ART GALLERY CURATOR
CONSUMER ADVISORY OFFICER	BANKER	PUBLIC RELATIONS
TEACHER IN ADULT EDUCATION	HOSPITAL SERVICES ADMINISTRATOR	YOUTH ORGANISER
FACTOR NUMBER 49	VALUE 4	NO. OF OCCUPATIONS 47
INFORMATION SCIENTIST	STOCKBROKER/JOBBER	TRAFFIC MANAGER DISTRIBUTION OF GOODS
PRODUCTION PLANNER	BOOK SELLER	INDUSTRIAL BUYER
WORK STUDY OFFICER	PHYSIOTHERAPIST	INDUSTRIAL RELATIONS OFFICER
LANDSCAPE ARCHITECT	OCCUPATIONAL THERAPIST	ANTIQUA DEALER
SUB-EDITOR PUBLISHING	INSURANCE BROKER	VALUER PROPERTY
BROADCASTING NEWS TRAINEE	MERCHANT BANKER	CHARTERED ACCOUNTANT
VALUER INDUSTRIAL ASSETS	SOLICITOR	THEATRE/CINEMA MANAGER
HOTEL MANAGER	HOUSING/ESTATE MANAGER-PRIVATE SECTOR	CLERICAL WORKER
INSURANCE INSPECTOR	HM INSPECTOR OF TAXES	TEACHER OF ENGLISH AS A FOREIGN LANGUAGE
OPERATIONAL RESEARCH	HM FORCES EDUCATION/INSTRUCTOR BRANCH	VALUER PRIVATE ASSETS
SECRETARIAL WORK	EDITOR-PUBLISHING	MARKET RESEARCH INTLVIEWER
CONSUMER PROTECTION OFFICER	SHIPBROKER	POLICE OFFICER
RETAIL BUYER	H.M. FORCES COMMISSION OPERATIONAL	COST AND MANAGEMENT ACCOUNTANT
NURSING	MARKETING - PRODUCT MANAGEMENT	RETAIL STORE MANAGER
COMMODITY BROKER	CERTIFIED ACCOUNTANT	MERCHANDIZER
STATION ASSISTANT LOCAL RADIO	SALES ADMINISTRATION	
FACTOR NUMBER 49	VALUE 5	NO. OF OCCUPATIONS 17
COMPUTER PROGRAMMER	RADIOGRAPHER	FIRE SERVICE
EXPORT SALES	SALES REPRESENTATIVE	JOURNALIST
AIR TRAFFIC CONTROLLER	TRAFFIC MANAGER TRANSPORT	ADVERTISING COPYWRITER
AIR PILOT	BROADCASTING TRAINEE STUDIO MANAGER	AUCTIONEER
PRODUCTION MANAGER - INDUSTRY	BARRISTER	ADVERTISING ACCOUNT EXECUTIVE
CONTRACTS ADMINISTRATOR	INDUSTRIAL MARKETING	

Observable results in the short term by which achievement can be judged.



Appendix 10

Survey Questionnaires QF and QG Computer Analysis Codings

Student code number

Sex

Degree Arts: SES: Science: Engineering

- QF question 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



YES:NO

- QG Interested in any discipline occupation
- Chosen an occupation
- Chosen occupation on P/O
- Occupations missing in student view
- Occupations missing in careers adviser view
- Better prepared for interview
- System been of help
- Student liked layout of P/O

Highest occupational total )  
 Range of totals )

relevant number

Number of occupations indicated

Student:	careers adviser:	expected	Yes	No. out of 10
			Perhaps	—
			No	—
				10

Not an expected occupation; liked by student YES:NO

Not an expected occupation; liked by careers adviser YES:NO



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## FIGURE A.1

### PLAN OF GRADSCOPE DEVELOPMENT

<u>AREA/TASK</u>	<u>QUESTIONNAIRES INVOLVED</u>
<u>OCCUPATIONS</u> Figure 5.9	
<u>FACTORS</u> Figure 6.2	QA
<u>DATA BANK</u> Figure 7.3	QB
<u>STUDENT QUESTIONNAIRE</u>	
1. Trial Student Questionnaire Figure 8.1	QC
2. Follow-up Question Sheet Figure 8.4	QD
3. Final Student Questionnaire Figure 8.5	QE
<u>MATCH ALGORITHM</u>	
<u>COMPUTER RESULTS</u>	
<u>EVALUATION OF COMPLETED SYSTEM</u>	
1. Questionnaire re. QE Figure 10.1	QF
2. Questionnaire re. Computer Results Figure 10.2	QG
<u>INTRODUCTION OF GRADSCOPE MARK TWO</u>	
<u>EVALUATION</u> See Chapter Eleven.	