Industrial change in the north east region and the implications for further education departments of electrical and electronic engineering

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INDUSTRIAL CHANGE IN THE NORTH EAST REGION AND THE IMPLICATIONS FOR FURTHER EDUCATION DEPARTMENTS OF ELECTRICAL AND ELECTRONIC ENGINEERING

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ABSTRACT OF THESIS

The research study examines a number of recent developments in the electrical/electronics industry in terms of new skill requirements of the workforce and in-service training provision for both employees in industry and teaching staff in the providing colleges of further education in the North East Region.

Many of the major changes which are taking place in the Region's industries are due mainly to the introduction or planned introduction of new microelectronic/computerised technology. Therefore, it is imperative that the relevant manpower planning which takes place in industry is supported by recent and relevant further education and training of its employees so that an adequate supply of sufficiently-skilled personnel is made available in order that companies can take advantage of high technology in their manufacturing processes.

Data was collected, using structured interview questionnaires, from samples of managers employed in local industry and teachers in further education departments of electrical/electronic engineering. The results were later analysed using computer standard non-parametric statistics.

Much of the data obtained from the survey shows that, although further training and retraining of staff was often necessary with the introduction of new computerised equipment into a company, very little reliance was actually placed on further education. Many of the in-

service training needs were provided by equipment manufacturers, external agencies, and in-company programmes.

Staff development in a number of the sampled colleges did not always place sufficient emphasis on regular retraining/updating of the teachers' subject area. Therefore, as a consequence, many FE teachers had not attended any recent subject-specific in-service training courses and often had to rely on text-books and other sources for information on new subject and curricular developments.

Although most of the sampled managers were aware of the lack of close liaison between their industry and colleges of further education, many recognised the need to further their own involvement in local education and contribute to the content and organisation of college course curricula. In education, a disproportionately large percentage of those teachers interviewed had little or no contact with local firms, even at a superficial level of involvement e.g. an industrial visit, and many had never consulted with industry nor discussed any issues involving the courses offered by their department. The absence of any structured links between the two samples has inevitably helped to exacerbate many existing problems, and in a number of cases has, unfortunately, resulted in a complete lack of co-operation and co-ordination in terms of course planning and design.

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A debt of gratitude is owed to the sample managers in the selected companies and to those teachers in further education departments of electrical and electronic engineering who were prepared to participate and contribute to the content and direction of this research study.

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CHAPTER 1

INTRODUCTION

The North East Region is still largely dependant upon its old and traditional industries although a much more diversified industrial structure is slowly being developed.[1] These older industries which rely heavily on traditional craft skills of the workforce are becoming increasingly vulnerable to competition from foreign countries, in particular the Far East, where human labour is very much cheaper.[2] The shipbuilding[3] and steel[4] industries which had been for many years the most important and major sources of employment in the North East are classical examples which epitomise the industrial and employment problems facing the Region. In the last five years, one third of the total labour in shipbuilding, amounting to more than 22,000 jobs, have been lost throughout the industry and in the North East alone more than 50 per cent of the total number of the Region's shipyards have either closed down completely or are threatened with closure resulting in a loss of more than 1100 jobs.[5] In the steel industry, almost 4000 jobs were lost in one town alone when British Steel closed down its plant and ceased production in the Consett area, causing unemployment figures to rise to 27.7%[6] - way above the national average.

As a base for future prosperity in the Region, such traditional industries seem less than adequate unless urgent updating and heavy investment in new technology takes place in an effort to enable them

to remain competitive and to sustain even the present employment levels amongst their workers.[7] However, changing the industrial character of an area is not a very realistic aim, at least in the short or medium term. What may be more realistic is to ensure that possible technological developments in industry, are not delayed because training or educational facilities have not been provided. Simply introducing new technology into a company's product or production processes is insufficient to maintain employment levels or indeed to ensure the company's survival. Management and shopfloor workers must have the necessary knowledge and skills to ensure the successful integration of the new technology into the company's products and processes in order to gain an advantage over its competitors.

Overall, there is very little evidence to suggest that the use of microelectronic technology will actually result in employment increases due to the creation of new jobs and positions within industry. In fact, the present industrial recession, resulting in the loss of many jobs in almost every sector of industry, has obscured some of the effects of microelectronic technology on employment levels, although there can be little doubt that its introduction can very often be responsible for the loss of both manual and non-manual jobs within a given firm or industrial sector.[8] This is not to say, however, that the introduction of microelectronic technology, even on a large scale, will inevitably result in mass unemployment because this new technology is very discriminative in its employment effects. Therefore, as employment in one particular sector of industry reduces

another sector may increase its staffing levels. In heavy engineering, for example, although many traditional craft skills, once needed by shop floor workers, will become obsolete, many workers with technician grade skills will be needed.[9] By and large, the use of microelectronic technology in the manufacturing process will increase output production thus reducing the unit price of a company's product, thereby allowing it to remain competitive and maintain employment levels. Evidence provided by successful companies suggest that employment levels within an industrial sector will fall more rapidly without, rather than with, the introduction of microelectronic technology.

The effects of this new technology on skills and the occupational composition of the labour force will vary from company to company and from industry to industry. However, what does seem clear is that staff at all levels of employment will be affected. Managers, for example, need to be retrained in the new technology in order that they may be in a better position to introduce and implement changes and developments in new machinery and equipment so as to ensure the competitiveness of their company. On the shop floor, as stated previously, the introduction of microelectronic technology into companies will cause an increase in the need for technician grade skills, especially in those areas concerned with maintenance and software engineering.

The increased need for specialist training of company staff in the new technologies has highlighted the many shortcomings of the

education service in general, and the FE sector in particular, where much criticism has been directed in recent years.[10] Many of these criticisms have been centred around the inability of the further education sector "to relate the courses it provides more closely to the needs of the customer and in the most cost effective way".[11] Further Education, in its defence, has often argued that industry does not always articulate its needs and requirements and hence many of the courses designed for industry and much of the curriculum planning remains in part, purely speculative. However, the stated complacency and insulated position of FE has often meant that even when the aims and objectives of local industries are clearly defined, "the colleges response is often disappointing".[12] This unsatisfactory situation has resulted in the emergence of private training agencies and the decision by central government that the Manpower Services Commission (now the Training Commission) should account for much more non-advanced further education provision in future years.[13]

In order to compete with external agencies and to satisfy its customers in terms of course provision, the further education sector must recognise the importance of its own manpower planning and the need for continuous staff development. Unfortunately, the training and retraining of teaching staff in many colleges in the North East Region is an area which has been sadly neglected in recent years, with the inevitable consequences that the syllabuses of courses offered by many colleges are often very dated and lack that content and specialism which is most needed to attract post-apprentice personnel from industry back into further education. All too often, "teachers

and colleges are required of face immediately new challenges with little opportunity for preparation, scant resources and without appropriate staff development or a clear national or regional framework of objectives".[14] As a result, many teachers in local colleges of further education in the region lack the knowledge and experience of modern industrial techniques and the skills necessary to equip local workers to enable them to survive and compete effectively in demanding markets by using the latest technological advances relevant to their jobs in industry.

The main objective of this study is to examine the information obtained on both the current uses and the likely future effects of developments in microelectronic technology in the electrical and electronics-related industries and the implications for further education provision in the Region i.e. the North East of England. The structure of the study essentially involves the analysis of data obtained from two main categories of respondents; (1) teachers in further education; (2) managers in the selected industry. Since it is the aim of this research to study the possible effects of computerised technology on local industry and further education in the North East Region, it is of added interest to briefly examine the rise and impact of the microelectronics industry both from an historic and an economic perspective before moving to a more detailed discussion of the problems explored in the survey.

The growth of the microelectronics industry has been greater, by far, than for any other industry in recent years. In 1978, for

example, when the microprocessor achieved widespread recognition in the world at large, the world market for electronic goods was already worth £60 billion with an estimated growth rate of 20 per cent per year, and by 1990 it was predicted that world production of integrated circuits alone would be around £15 billion annually.[15] The potential use of microelectronics in all sectors of industry is so great that it will be found in almost every industrial process in the future. So great is the importance of this 'foundation technology' in industry that it has been suggested that "the world leader in microelectronics will lead the world in everything else".[16]

In 1978 the microprocessor, utilising microelectronic technology, received worldwide recognition, even though only a few people in the electronics industry understood how it worked. Although the microprocessor is a microchip employing integrated circuitry, its flexibility lies in the fact that it is a programmable device and can therefore be used to perform many different functions and operations. Microprocessors were originally used to perform the measuring and testing of sophisticated electronic equipment but were soon used to even greater effect in many other areas. For example, they were soon successfully applied in manufacturing industries and helped to speed up the development and use of robotics and automated machinery. More recently, the use of microprocessors has not been restricted solely to industrial applications but, because of their flexibility, they have started to be used in many domestic household products.

Although the U.K. Ministry of Defence had supported microprocessor developments for defence equipment for a number of years, it was not until 1978 that the British government seemed to wake up to the uses of microprocessors in industry with the announcement by the Prime Minister that "Microelectronics is of crucial importance to the industrial future of the nation".[17] A realisation that Britain was lagging behind its industrial competitors and that "British management is reluctant to invest, and conservative in the face of new ideas and techniques",[18] forced the Department of Industry to set up a new Electronics Applications Division which announced two new comprehensive support schemes. The first of these schemes - the Microelectronics Industry Support Programme (MISP) - aimed at stimulating the growth of the U.K. microelectronics industry. The second scheme - the Microprocessor Application Project (MAP) - was designed to encourage U.K. industry to make use of microprocessor techniques. There was an imperative need for immediate action by the Government as a report published in 1978 showed that only 5 per cent of the British companies surveyed used the new technology to improve either their products or their processes and more than 50 per cent did not even know about the new technology and had no idea about microelectronic-based techniques in industry.[19] In a more recent study of twelve engineering firms in Britain and West Germany, it was found that there was more opposition to the introduction of new technology into British companies. Although "the main source of resistance to its introduction was found to be ignorant and backward management, ... the main source of job loss was the failure to adopt new techniques to meet the international competition".[20]

Although there are numerous reasons for this resistance to change in many sectors of British industry, especially in those companies which have a "closed-shop" employment policy or where union influence is particularly strong, much consideration must be given to the fact that as technology changes it not only stimulates ideas leading to the development of new machinery and equipment, it also brings in its wake new fears and hopes about employment, unemployment, economic and social changes. Thus, in the mid 1960's and early 1970's, there was much ambivalence concerning the introduction of computerisation and the prospect of a fully-automated manufacturing economy. To some, this idea was, and still is, seen as relieving mankind of work and providing plenty for all - a picture of Utopia was presented, especially by commercial advertising. Whilst to other observers, it was seen as leading to Armageddon with widespread unemployment, violence and financial suffering.[21]

The diffusion of automated plant into industry in the North East Region throughout the late 1960's and early 1970's was extremely slow, causing many earlier promises and predictions to be left completely unfulfilled.[22] Although the main cause of this slow diffusion was undoubtedly the high cost of the equipment and its unreliability due to many technical and development problems,[23] it can also be argued that because of the number of new skills and the new knowledge required by the workforce, the extent to which the education and training sectors responded to this new technology was critical to its success and diffusion in many industrial sectors. However, this accusation has been vehemently denied by a number of observers who

claim that there is actually less need to educate and train personnel because much of the new technology causes mass deskilling of the workforce and only succeeds in making man an adjunct to the machine.[24] Although this argument is true of some industrial sectors, there is no denying that in recent years more sophisticated technology has resulted in the need for more professional and technical manpower. So much so that this has caused severe difficulties in the rate of supply of trained personnel and raises questions about the quality of the supportive education and training provision.[25]

In conclusion to this chapter, the aim of this research is to study, in a particular region, some of the industrial changes that have occurred as a direct result of the developments in microelectronic technology and the implications this has for in-service training of employees in industry and teaching staff in further education departments of electrical and electronic engineering. In a condensed form, the very broad question that was being asked was:

> "What technological changes have occurred in recent years in the electrical and electronics-related industries, and how have these changes affected particular sectors of those industries in relation to education and training needs of their employees and technical teachers in the supporting colleges of further education."

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CHAPTER 2

RESEARCH METHODOLOGY

This research study investigated changes in the electrical/electronics industry in the North East Region both in terms of perceived new skills and knowledge of employees, and the in-service training of managers and staff at all levels. Also, a simultaneous study of teachers in colleges of further education departments of electrical/electronic engineering was initiated in an attempt to illicit information on how teachers keep up to date with developments in their subject area and to determine the match/mismatch in further education provision.

Two structured interview questionnaires were used, one for manager respondents and the other for teacher respondents, in an effort to determine opinion and facts concerning training courses and how individuals in selected companies and colleges of further education keep up to date with technological advances in their industry. The general data derived was translated into a set of statements about the policies and practices of companies and colleges in the North East Region.

The conduct of the survey and the measuring instruments used are now described in some detail.

1. Sampling Procedures and Conduct of Survey.

Due to the specificity of the teacher sample population to be used and the paucity of respondents available, random sampling of colleges of further education could not be employed. Therefore, in order to provide a reasonable working sample, all of the major colleges of further education in Northumberland, Tyne and Wear, and Durham were used. For the industrial sample, it was decided to use information from the departments of the sample colleges of further education, where past and present records of firms, which had relied on them for training provision, were available. This source of information was considered to be especially useful since it seemed only practicable to enter into consultations, in an attempt to evaluate training/educational provision and policies, with companies that were known to have at least some interest in and knowledge of such areas.

2. The Interview Programme.

Having first established the sampling procedure and the possible source of colleges and companies within the region to be surveyed, the interview programme, involving teachers and employees in electrical/electronic engineering, started in mid September 1987 and lasted for approximately three and a half months. It was necessary to start early with the interviewing of teachers so that the programme would finish before the start of the Christmas holidays, when, in effect, almost one month could have been lost.

The corresponding interview programme for each of the two groups of respondents was carried out as follows.

Managers in Industry.

In each firm visited, every attempt was made to interview a training officer, supervisor or a senior manager, and in the larger companies this was successfully carried out. However, in smaller companies more than one of these roles was performed by a single individual e.g. the senior manager might also cover the training function in the company.

The actual interviews, which invariably involved a tour of the companies premises, varied in length from 30 minutes to 2 hours and were principally concerned with the following general objectives:

(1) To identify areas where continuous adult training is necessary. This was achieved by an analysis of the following:

   (a) the present knowledge and skills of the workforce in the field of computerisation and microelectronic technology;
   (b) the changing skills required by the workforce as a direct result of introducing new computerised equipment.

(2) To determine company policy on training and retraining.

(3) To determine which organisations contributed most to the training/retraining of employees in the industry.

(4) To assess the relationships that existed between industry and colleges of further education in the Region.

Teachers in Colleges of Further Education.

In every college visited, either the Principal or Head of Department was approached to obtain permission to interview members of their staff. Almost all of the teachers in the relevant departments of the colleges visited were co-operative and agreed to be interviewed.

The actual interviews, which sometimes involved a tour of the departments' facilities, varied in length from 30 minutes to 2 hours and were principally concerned with the following general objectives:

(1) To determine college policy on training and retraining of of teachers.

(2) To determine if in-service training of academic staff was being adequately supported.

(3) To discover how, with all of the various methods available, teachers keep up to date with subject knowledge and technological developments in their industry.

(4) To assess the relationships that existed between colleges of further education and local industry.

3. The Measuring Instruments Used.

(i) Description and design of the teachers' questionnaire.

A copy of the questionnaire is given in Appendix IV, see page 158.

The structured interview questionnaire, used with the teaching members of staff in colleges of further education, was divided into the following four sections.

SECTION ONE: 'Personal details and industrial experience'.

This section was covered by questions 1 - 16 inclusive and gave the independent variables for hypothesis testing.

SECTION TWO: 'Microelectronic technology awareness implementation and employment effects'.

This section, covered in questions 17 - 25, was divided into two different types of questions (1) factual (2) opinion seeking questions which were used to elicit information in each of the following areas:

(1) Factual questions:-

(a) the effects of new technology on such areas as (i) employment levels (ii) skill requirements of the workforce (iii) training requirements (iv) efficiency in completing the task;

(2) Opinion seeking questions. These questions asked the respondents to give their views on the importance of areas such as:

(a) whether any new system or equipment which is introduced into a company should be understood by all personnel;

(b) methods of ensuring good communications between employers and employees in relation to developments in new technology.

SECTION THREE: 'In-service training and course preference'.

This section, covered in questions 26 - 54, was once again divided into fact and opinion-type questions. The factual questions were designed to elicit information on in-service training, essentially categorised under two headings, as far as possible:

(1) in-service training policies of colleges;

(2) the microelectronic technology training given at both academic and pedagogic levels.

Other factual questions, concerned with how teachers keep up to date with recent developments in their subject area, were asked in order to obtain some idea of how recent the teachers' information was and whether or not its acquisition was totally dependent upon self motivation. In addition, four questions which involved the appraisal and personal development of the teacher were asked in an effort to determine the existence and efficiency of staff development programmes, where these existed.

The opinion-seeking questions asked the respondents to rate the usefulness of current in-service courses and to select certain courses, in an effort to determine the priorities of individual teachers.

SECTION FOUR: 'Liaison between local industry and colleges of further education'.

This section, covered in questions 55 - 60, was also divided into factual and opinion-seeking questions. The factual questions were concerned with the role played by industry when decisions are made about the content and organisation of courses.

The opinion questions sought to explore the attitudes of teachers towards the existing relationship between industry and colleges, and ways in which this relationship could be improved.

(ii) Description and design of the managers' questionnaire.

A copy of the questionnaire is given in Appendix V, see page 180.

The structured interview questionnaire, used with senior members of staff in the electrical/electronics industry, was divided into the following four sections.

SECTION ONE: 'Personal details and industrial experience'.

This section was covered by questions 1 - 14 inclusive and gave the independent variables for hypothesis testing.

SECTION TWO: 'Microelectronic technology awareness, implementation and employment effects'.

This section, covered in questions 15 - 30, was divided into two types of questions (1) factual (2) opinion seeking questions which were used to elicit information in the following areas:

(1) Factual questions:

(a) was the company considered progressive and therefore responsive to technological changes and innovation?

(b) the effects of new technology on such areas as (i) employment levels (ii) training requirements (iii) efficiency in completing a task;

(c) the new skills and knowledge required by the workforce and the type of training/retraining needed;

(d) company policies in relation to long term plans for technological developments.

(2) Opinion seeking questions. These questions asked the respondents to give their views on the importance of such areas as:

(a) whether or not any new system or equipment which is introduced into a company should be understood by all personnel;

(b) methods of ensuring good communications between employers and employees in relation to developments in the new technology.

SECTION THREE: 'In-service training and course preference'.

This section, covered in questions 31 - 48, was once again divided into fact and opinion type questions. The factual questions were designed to elicit information on in-service training and to discover which organisations, i.e. the company, equipment manufacturers, or further education contributed most to the training of employees in the new technology.

In the opinion seeking questions, the respondents were asked to rate, using a five point Likert scale, the courses offered by the above three organisations. The main aim being to determine the priorities of the employers and employees in relation to training/retraining and the role played by each of the selected organisations in the training programmes under development.

SECTION FOUR: 'Liaison between the industry and local colleges of further education'.

This section, covered by questions 49 - 52, was also divided into fact and opinion seeking questions. The factual questions were concerned with the role played by industry when decisions are made about the content and organisation of courses.

The opinion questions sought to explore the attitudes of managers towards the existing relationship between industry and colleges, and ways in which this relationship could be improved.

4. Processing of Data/Statistical Procedures.

Following the administration and completion of the structured interview questionnaires, the coded data was loaded into data files and processed by SPSS-X[1], a statistical package using the Michigan Terminal System[2] (see Appendices VI - VII, pp. 200-266).

Hypotheses in the research were tested by using the following non-parametric test of analysis:

Chi-square (X^2).

Categorical data was assembled into contingency tables, and differences in frequency distributions were explored using chi-square procedures. This is carried out by calculating the expected cell frequencies (FE) from the column and row totals. The calculated values of FE are then compared to the actual observed frequencies (FO) given in the table by using the following formula:

$$X^2 = \frac{(FO - FE)^2}{FE}$$

Higher values of X^2 will be expected from the results when the discrepancies between FO and FE increase.[3]

For low expected frequencies (NFE = < 10) and non-continuity in 2 x 2 contingency tables, Yates correction was automatically applied,

even though it has been shown that the X^2 statistic works well even when the average expected frequency is as low as 2.[4]

Although the chi-square statistic helps to decide whether or not a relationship or dependence exists between variables, it does not give any indication of the strength of the relationship. Therefore, several statistics are available which adjust chi-square and allow it to become a basis for assessing the strength and relationship of variables. Some of these statistics, which were used in this study included:

Phi (ϕ)

This statistic was used for all 2 x 2 tables to give a measure of the strength of the relationship between the variables under analysis.

The value of phi varies from 0 when there is no relationship, to a maximum of +1 when there is a perfect relationship between the variables.

Cramer's V

This statistic, which is a modified version of phi, also varies from 0 to +1 and is used for contingency tables larger than a 2 x 2 format. Although degrees of association are obtained by the use of Cramer's V, it does not indicate the manner in which the variables are associated.

Lambda (λ)

Values of Lambda range from a maximum of 1 to a minimum of 0 and is the ability to measure the percentage of improvement in predicting the value of the dependent variable once the independent variable is known. Thus, a value of Lambda of 0.15 would improve our predictive ability by an increase of 15 per cent.

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CHAPTER 3

EFFECTS OF COMPUTERISATION ON EMPLOYMENT, TRAINING AND SKILL REQUIREMENTS OF EMPLOYEES AS GIVEN BY THE SAMPLES OF TEACHERS AND MANAGERS IN THE SELECTED INDUSTRY

In Chapter 1, reference was made to employment levels in specific sectors of industry and the general changes which have taken place due to advances in, and the introduction of, computerised technologies. It is proposed to look more closely at overall employment changes due to the use of computerisation in industry and evaluate some of the current literature on the subject before discussing the implications for employment in the Region as indicated by the results of the survey findings.

It is generally acknowledged that the impact of recent developments in microelectronic technology will be far reaching as it is a predictable fact that more people will come into contact with microelectronically-based products and services in their daily lives at work and at leisure.[1] The range of applications is such that microelectronics are likely to affect almost every industry and occupation.[2]

The relationship between microelectronic technology and employment opportunities most commonly discussed is the tendency for technology to be labour-saving and thus eliminate employment

opportunities - if not actual jobs.[3] Stonier considers that by the end of this century only 10% of the workforce of an industrial nation will be involved in manufacture or agriculture - the rest will be either unemployed or at work in the service sector.[4] As microelectronics is continually being developed and used in manufacturing industries to raise productivity and to enhance the utilisation of resources (usually labour)[5] in some way, it is, perhaps, naive to expect that the technology will create jobs faster than it destroys them. As productivity per capita has greatly increased in the manufacturing area, owing to innovations in processes and machinery, the necessity for skilled labour is decreasing.[6]

Although, in the U.K., present unemployment figures have reached record levels where job prospects are now less than ever before in the history of our society, it is all too obvious that many influencing factors determine employment opportunities. The decline in employment can be attributed in varying proportions to a drop in demand for an industry's products; the growth of foreign competition; and increases in productivity, the causes of which include nationalisation, the removal of restrictive practices and other factors besides the adoption of labour-saving technology.[7] This multi-variable approach to the problem of unemployment has been accepted and postulated by a number of authors, arguing that the use of new technology has tended to play a minor part in reducing job opportunities. Jenkins and Sherman remind us, albeit cynically, that we have a choice "remain as we are, reject the new technology and we face unemployment of up to 5.5 million by the end of the century.

Embrace the new technology, accept the challenge and we end up with unemployment of about 5 million".[8] However, any attempts to estimate the number of unemployed by some projected future date must be treated with some measure of care and suspicion, not only because of the large number of dependent variables involved, but also because the number of completely new jobs, which should emerge as a result of microelectronic expansion, is far more difficult to forecast than many observers would have us believe.[9]

It may well be that the employment impacts on industries producing and using microelectronic equipment and apparatus will be less than feared by some. For despite widespread claims that microelectronics will have catastrophic effects on aggregate employment there is little evidence to support this view. There are, of course, numerous estimates of the extent of job displacement which is likely to occur in individual industries/occupations,[10] both home and abroad, but many of the case studies of individual industries[11] give no guide to the aggregate employment effects of technological change. They tend to focus on job destruction in the industries under review and ignore the possibility of job creation elsewhere. Also, the employment impact of microelectronics will be less in certain industries, including transport, communications, mining, construction, chemicals, agriculture, certain services, and public administration, where reductions of 10 - 20% in total employment are expected.[12] In fact, Jenkins and Sherman identify three areas of expected growth, professional and scientific services, various kinds of consultancy services, and gas, electricity and water. Other

manufacturing, in small co-operatives or self-employment are seen as providing perhaps 24% more jobs.[13] The development of new products and services based on microelectronics will further increase employment, and the industries and firms that will suffer employment declines will be the technologically less progressive ones that will become less competitive both at home and internationally.[14]

The implications of new technology on the electrical/electronics-related industries has been quite dramatic since full-time employment within this sector has continued to rise in recent years.[15] In fact the rapid rate of rise of the new technology outstripped many indigenous industries and prompted the Department of Employment to report on a shortage of electronic engineers and the "absence of top managerial interest in radical innovation" as the reasons as to why Britain appears to be behind our industrial competitors in exploiting the opportunities arising from technological convergence.[16] This response from the DoE was, of course, necessary because most usually it is firms which fail to innovate that are likely to suffer the most job losses. Competition within a static market is based on capturing part of that market from other firms and in such a context losers are inevitable. In this situation some firms may be in a better position to succeed than others, for example, the option to innovate may not be open to many small firms. The high cost of capital investment to automate processes or to introduce equipment which will raise the quality of the products prevents some firms from adopting this strategy. If they are to survive they have to cultivate specialist markets and rely on their flexibility and low overheads to maintain

these markets. Firms unable to find such market niches and unable to innovate are likely to go out of business, or at least suffer very substantial job losses.[17]

Whilst the magnitude of job losses during the recession has made it particularly difficult to identify those directly attributable to changes in technology,[18] the general conclusion which emerges from the literature analysis, with exceptions in particular areas, is that over the next five to ten years the effects of microelectronic technology in reducing industries demands for labour are unlikely to be any more dramatic than those of many previous examples of technological improvement.[19]

Table 3.1 presents the results from question 17(a) of the teachers questionnaire (see page 166) and question 18(a) of the managers questionnaire (see page 188). The responses of sample teachers and managers are compared and tabulated to show the wide variation of responses and the disproportionately high degree of variance expressed by the two different categories of respondents, where the ratio of 2:1 is almost consistent within each category of expressed opinion.

The greatest proportion of managers in the sample (52%) stated that employment levels within their company had remained the same even with the introduction and use of computerised technology, whereas only 24% of teachers in colleges of further education were of the opinion that such levels would remain static. The largest percentage of

teachers in the sample (40%) were of the opinion that employment levels within the industry would actually increase, whereas only 24% of managers stated that this was in fact the case. Surprisingly, perhaps, lower than expected percentages of respondents claimed that such new technology would actually reduce the level of jobs within companies, teaches (29%), managers (19%). This may be explained by the fact that the present industrial recession has been biting hard for some time now and that companies have in fact already shed many jobs and pruned the workforce to such an extent that any further loss would severely affect the economic viability of the company.

The large discrepancies between the responses of teachers in FE and the managers in industry may be a corollary due to the teachers lack of contact with and hence recent knowledge of their industry.

TABLE 3.1.

THE EFFECTS OF COMPUTERISED TECHNOLOGY ON EMPLOYMENT LEVELS IN THE ELECTRICAL/ELECTRONICS INDUSTRY - A COMPARISON BETWEEN THE RESPONSES OF TEACHERS AND MANAGERS

(Q.17a/Q.18a)

CATEGORY OF RESPONDENTS	EFFECTS OF COMPUTERISED TECHNOLOGY ON EMPLOYMENT LEVELS (TEACHER AND MANAGER RESPONDENTS)				N =	%
	NO IDEA	INCREASE	SAME	DECREASE		
Teachers	4 (7%)	23 (40%)	14 (24%)	17 (29%)	58	100
Managers	2 (5%)	10 (24%)	22 (52%)	8 (19%)	42	100

Total number of teachers in sample = 58

Total number of managers in sample = 42

Skill requirements of the workforce as a result of introducing computerised technology into industry:-

A brief assessment of the overall effects of computerised technology on job skills is presented before discussing further the responses of teachers and manages in the sample.

There are three main assertions about the effect of technological change on skills.[20] The first is that an overall deskilling will take place in many sectors of industry, especially in such areas as

maintenance, heavy engineering and clerical work. Secondly, that a division or polarisation of skills of the workforce will take place. Thirdly there will actually be a rise in the level of skills required by many workers, especially as software programs and hardware products continue to increase in complexity and sophistication. However, the skill implications and the necessity to adjust to technological change in microelectronics will not be evenly distributed across all industries and occupations, or across all members of the workforce.[21]

Although the electronics industry has been on the front line of those feeling the effects of technological change, as well as being the source of the changes that affect the rest of the economy,[22] it could be argued that production workers have over the years been more affected by changes in method and machinery than any other group.[23] In manufacturing, many traditional high level training skills are still being used, although the drive for lower unit costs has led to new and more automated machines being introduced to provide greater accuracy and quality with higher throughput. Plant machines have progressed from manual controls via NC and CNC (which memorise the craftsman's movements, timing and control of the machine), with the prospect in view of direct computer control of machining centres and integrated materials handling systems.[24] Industrial robots are increasingly being used, as their development and sophistication improves, in repetitive, hazardous and very hard physical work, e.g. welding and manoeuvring heavy objects. This increasing sophistication of production equipment is having a profound effect on the skills of maintenance workers throughout the manufacturing

industry.[25] The use of electronic controls are often based on replaceable modules which actually tell the repair man which board to replace; the replacement is made by simply unplugging the faulty board and plugging in a new one. The faulty board may then be scrapped, examined by a qualified technician, or returned to a specialised workshop for repair.[26]

The advantages to management of the recent developments in information technology are obvious in terms of opportunities for increased productivity, marketing, new products, an improved information base for decision-making and tighter control of the use of labour, capital and raw material.[27] Planning, particularly manpower and training planning, becomes more important when the dimensions of technological change is added to the others that management have to assess. Management needs greater technical skills to be able to analyse the new equipment available and decide which is best for their firms' needs,[28] and to develop suitable new electronic products. The application of microelectronics in any sector of industry can lead to a concentration of required skills in a limited number of new jobs, which are primarily computer-related. The skills, for which there is an increasing demand, as a result of microelectronics, can be roughly broken down into three broad types.[29] Firstly, there is an increasing demand for engineering skills, primarily in the microelectronics field but also involving the understanding of control, production and mechanical systems. Secondly, there is an increasing demand for logic, systems and software skills. Thirdly, there is a demand for general data processing awareness, although not

necessarily specialised. In consequence, if the new technology is to be successfully applied and used, many new skills need to be acquired and the implications this has for effective training schemes and vocational education are great. In the past, it was usual for an apprenticeship to give somebody a trade for life. It may now be that complete retraining will be necessary for most workers two or even three times during their normal working life.[30]

Whilst there are certain similarities between the responses given by teachers and managers (Table 3.2), surprisingly 27.5% of all teachers interviewed were of the opinion that with the introduction of computerisation into industry, the skill requirements of the workforce would either remain the same or else would decrease. 7% of teachers and only 5% of managers could not express an opinion as they had no idea about skill requirements. Overall, the majority of respondents from both categories stated that skill requirements of employees would actually increase, the managers (81%) in industry giving a higher percentage of responses in the affirmative when compared with teachers (65.5%).

When asked what new skills and knowledge would be required by employees as a result of introducing computerised technology into their company, the responses given by the managers in the sample were quite wide and varied (see Table 3.3). Some of the responses given were, unfortunately, quite vague and very general, however, the most popular response being the acquisition of specific operator skills (35.7%). Servicing and maintenance skills were considered very

necessary by 21.4% of the sample, indeed, a number of those respondents interviewed stated that this was an area of concern since sufficiently qualified personnel were difficult to find (see Table 3.5, page 50).

TABLE 3.2.

CHANGES IN EXISTING SKILL REQUIREMENTS OF EMPLOYEES IN THE ELECTRICAL/ELECTRONICS INDUSTRY AS A DIRECT RESULT OF INTRODUCING NEW COMPUTERISED TECHNOLOGY - A COMPARISON BETWEEN THE RESPONSES OF TEACHERS AND MANAGERS

(Q.17b/Q.18b)

CATEGORY OF RESPONDENTS	THE CHANGES IN SKILL REQUIREMENTS OF EMPLOYEES RESULTING FROM THE INTRODUCTION OF COMPUTERISED TECHNOLOGY (TEACHER AND MANAGER RESPONDENTS)				N=	%
	NO IDEA	INCREASE	SAME	DECREASE		
Teachers	4 (7%)	38 (65.5%)	7 (12%)	9 (15.5%)	58	100
Managers	2 (5%)	34 (81%)	6 (14%)	0 (0%)	42	100

Total number of teachers in sample = 58

Total number of managers in sample = 42

TABLE 3.3

NEW SKILLS AND KNOWLEDGE REQUIRED BY EMPLOYEES IN THE ELECTRICAL/ELECTRONICS INDUSTRY AS A DIRECT RESULT OF INTRODUCING COMPUTERISED TECHNOLOGY - RESPONSES OF MANAGERS

(Q. 27)

NEW SKILLS AND KNOWLEDGE REQUIRED BY EMPLOYEES AS A RESULT OF THE INTRODUCTION OF COMPUTERISED TECHNOLOGY IN INDUSTRY	NUMBER OF POSITIVE RESPONSES N=	%
Operator skills	15	35.7
Communicating/interacting with computers	12	28.6
Servicing/maintenance/diagnostic skills	9	21.4
Keyboard skills	9	21.4
Knowledge and use of systems	8	19.0
Basic understanding and use of computer language	5	12.0
Programming	4	9.5
Knowledge and use of program controllers	1	2.4
Training on specific company equipment	1	2.4
Microprocessor and digital techniques	1	2.4
Knowledge of hardware and software packages	1	2.4
Hands on experience	1	2.4
Awareness of computer routines	1	2.4
Awareness and understanding of modern techniques	1	2.4
Interactive systems	1	2.4
Computer applications	1	2.4
Implications of I.T.	1	2.4
None	2	4.8
Uncertain	5	12.0

Total number of managers in sample = 42

Even with very high unemployment in the Region, both managers (33.3%) and teachers (43%) stated that there was an increased problem in the recruitment of sufficiently skilled personnel into industry (see Table 3.4). This situation is exacerbated by the severe problem presented by industry in that many of the skill requirements for a given job are specific to a particular company or sector of the industry and therefore is often neglected by the general education given in courses offered by colleges of further education. Most of the sample managers (60%) and 40% of the teachers interviewed were of the opinion that with the introduction of computerised technology into industry recruitment problems would in fact remain the same. This would imply that either sufficient numbers of computer-skilled personnel are available in the Region or that the work involved can be quite easily carried out by workers with the minimum amount of training, which incidentally was often carried out 'in-house' in most of the companies used in the sample. When asked "is your company experiencing difficulties in employing sufficient numbers of computer skilled personnel at all levels?" (Q. 28, page 191) only 26% of managers said "Yes". Once again, the suggestion being that there is not a major recruitment problem in this industry and given that a candidate for a particular job had the required prerequisites, then in-company training would be given and the necessary knowledge and skills needed would be acquired 'in-house'. However, exceptions to this are to be found and job areas where recruitment problems do exist are included in Table 3.5 below. Maintenance and servicing which obviously includes diagnostic skills is seen to be an area where

employers have the greatest difficulty in recruiting sufficient numbers of suitably skilled personnel. This problem must be recognised by educators in the further education sector and steps taken to attract the older more mature type of employees, who last attended college as apprentices, back to the classroom to update their skills and knowledge as well as training younger students who are new to the industry.

TABLE 3.4

EFFECTS ON RECRUITMENT IN THE ELECTRICAL/ELECTRONICS INDUSTRY AS A DIRECT RESULT OF INTRODUCING COMPUTERISED TECHNOLOGY - A COMPARISON BETWEEN THE RESPONSES OF TEACHERS AND MANAGERS

(Q.17c/Q.18c)

CATEGORY OF RESPONDENTS	EFFECTS ON RECRUITMENT RESULTING FROM THE INTRODUCTION OF COMPUTERISED TECHNOLOGY (TEACHER AND MANAGER RESPONDENTS)				N=	%
	NO IDEA	INCREASE	SAME	DECREASE		
Teachers	7 (12%)	25 (43%)	23 (40%)	3 (5%)	58	100
Managers	3 (7.2%)	14 (33.3%)	25 (59.5%)	0 (0%)	42	100

Total number of teachers in sample = 58

Total number of managers in sample = 42

TABLE 3.5

JOBS/AREAS DEEMED TO BE THE MOST DIFFICULT TO FILL OR RECRUIT IN THE ELECTRICAL/ELECTRONICS INDUSTRY - RESPONSES OF MANAGERS

(Q.29)

JOBS/AREAS DEEMED TO BE THE MOST DIFFICULT TO FILL OR RECRUIT AS A RESULT OF COMPUTERISATION IN INDUSTRY	NUMBER OF POSITIVE RESPONSES N=	%
Maintenance/Servicing	4	9.5
Programming	3	7.1
Systems Analyst	1	2.4
Computer Specialist	1	2.4
Development Engineer	1	2.4
Technical Systems Engineer	1	2.4
None	22	52.4
Uncertain	8	19.1

Total number of managers in sample = 42

Almost all of the sample managers (88%) interviewed stated that the introduction of computerisation into their company had in fact increased the training requirements of its employees (see Table 3.6). Even though there was a very positive attitude towards training in most of the companies visited, there was rarely a corporate strategy which governed in-service training, nor were there signs of intense continuous training of employees. In most of the sample companies, training was often ad hoc and in response to an immediate and sometimes unforeseen problem. Sometimes the old method of 'sitting next to Nellie' was used and in a number of companies where training officers and managers were employed, their status was relatively low in the hierarchy of the firm's organisation. A number of training personnel had secured their positions because of redeployment within the company and not because of any great willingness or desire to promote training for employees. Sometimes, it was the personnel officer or manager who was also responsible for company training policies and often training programmes were only devised for new machine operators or for retraining existing operators on new machinery. Rarely were training managers involved in major company decisions or policy making but instead were often seen as merely providing a back up service in responding only to the needs of other departments.

A number of managers were highly critical of the provision of training by some colleges of further education, arguing that many courses were offered without due consultations with personnel in industry and that convenient courses were offered simply to match the

skills and knowledge of lecturing staff. It was also claimed that many lecturers not only possessed dated skills but often did little to update their knowledge by liaising with or visiting industry. Fortunately this was not always the case. A few of the colleges visited had a good working relationship with local industry and that many of the courses patronised were the direct result of contact with individual companies. Perhaps lack of incentives or accountability have created, in some cases, an air of complacency and incompetence towards the training needs of local industries. Most educators must surely be aware of the fact that if institutions are to provide an up-to-date service for employees in local industries then the monitoring of needs and the changing skill requirements of workers must take place. They themselves must then be prepared to update and improve their own skills and knowledge in order to be in a position to reappraise and modify existing college course curricula.

TABLE 3.6

EFFECTS OF COMPUTERISED TECHNOLOGY ON TRAINING REQUIREMENTS OF EMPLOYEES IN THE ELECTRICAL/ELECTRONICS INDUSTRY - A COMPARISON BETWEEN THE RESPONSES OF TEACHERS AND MANAGERS

(Q.17d/Q.18d)

CATEGORY OF RESPONDENTS	EFFECTS OF COMPUTERISED TECHNOLOGY ON TRAINING REQUIREMENTS (TEACHER AND MANAGER RESPONDENTS)				N=	%
	NO IDEA	INCREASE	SAME	DECREASE		
Teachers	2 (3.4%)	52 (89.7%)	1 (1.7%)	3 (5.2%)	58	100
Managers	3 (7%)	37 (88%)	2 (5%)	0 (0%)	42	100

Total number of teachers in sample = 58

Total number of managers in sample = 42

A high percentage of managers (86%) and teachers (77%) were in overall agreement concerning the increased efficiency of a task due to the use of computerised technology (see Table 3.7). However, it must be realised that the efficiency of such equipment is primarily determined by the skill and knowledge of its operators. Once again this shows the importance and necessity for training programmes which are specific to a particular task. Staff in further education could help in this area, not merely by offering courses of a general nature

but by setting up special courses to serve particular employers and to provide courses on company premises. All of this will, of course, require careful marketing and close liaison between industry and the providing colleges of further education if the work is to prove a success and continue to be an ongoing process of development.

TABLE 3.7

EFFECTS ON EFFICIENCY RESULTING FROM THE INTRODUCTION OF COMPUTERISED TECHNOLOGY IN THE ELECTRICAL/ELECTRONICS INDUSTRY - A COMPARISON BETWEEN THE RESPONSES OF TEACHERS AND MANAGERS

(Q.17e/Q.18e)

CATEGORY OF RESPONDENTS	EFFECTS ON EFFICIENCY RESULTING FROM THE INTRODUCTION OF COMPUTERISED TECHNOLOGY				N=	%
	NO IDEA	INCREASED	SAME	DECREASED		
Teachers	3 (5%)	45 (77%)	5 (9%)	5 (9%)	58	100
Managers	3 (7%)	36 (86%)	3 (7%)	0 (0%)	42	100

Total number of teachers in sample = 58

Total number of managers in sample = 42

Question 30 of the managers' questionnaire asked:-

"What are the long term plans for your company in terms of technological developments?"

In response to this question, almost 30% of those managers interviewed stated that in the long term, technological developments in their company would involve automated production on the shop floor (see Table 3.8). Other areas of planned developments included; computer-aided design (19%), increased number of computer terminals in all departments (12%), and the use of wordprocessors in all offices (12%). The other areas of stated planned developments give a relatively low percentage of positive responses mainly because many of the developments were specific to a particular company and therefore their use elsewhere would be very limited, e.g. digital mapping of pipes (2.4%), desk top publishing (2.4%).

Although 31% of all sample managers were either uncertain or else had no idea about long term technological developments in their company, this can be best explained by the fact that many of the firms visited had their headquarters outside of the Region, and therefore a number of those managers interviewed were unlikely to have the status to influence capital investment decisions.

TABLE 3.8

THE LONG TERM TECHNOLOGICAL DEVELOPMENTS IN COMPUTERISATION PLANNED FOR THEIR COMPANIES - MANAGER RESPONDENTS

(Q.30)

THE LONG TERM TECHNOLOGICAL DEVELOPMENTS IN COMPUTERISATION PLANNED FOR THEIR COMPANIES (MANAGER RESPONSES)	NUMBER OF POSITIVE RESPONSES (Managers)	%
Automated production on shop floor	12	28.6
Computer Aided Design (CAD)	8	19.0
Increase in computer terminals in different departments	5	12.0
Use of the wordprocessor in offices	5	12.0
CNC machines	3	7.1
Use of microcomputers in stock control	2	4.8
Software developments	2	4.8
Use of all new tech. developments	2	4.8
Digital mapping of pipes	1	2.4
Electronic mail	1	2.4
Developments in microelectronics	1	2.4
Process control	1	2.4
Data logging/record keeping	1	2.4
Developments in fibre optics	1	2.4
Computer simulation of circuits	1	2.4
Desk top publishing	1	2.4
Computer aided manufacturing (CAM)	1	2.4
Manufacturing system to be used for planning work scheduling	1	2.4
Developments in laser control	1	2.4
Microprocessor based systems for monitoring and control of industrial plant	1	2.4
Automatic test equipment	1	2.4
Uncertain	12	28.6
No idea	1	2.4

Total number of managers in sample = 42

In conclusion to this chapter it can be stated that the overall increase in skill requirements of the workforce (see Tables 3.2 and 3.3, pages 46 and 47) due to the introduction or planned introduction of computerised technology has emphasised the importance of training/retraining of employees in the electrical/electronics industry. Therefore, teachers in further education whose job it is to identify and respond to these training needs, were interviewed and an analysis of these findings is given in Chapter 4.

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CHAPTER 4

ANALYSIS OF DATA OBTAINED FROM THE SURVEY OF TEACHERS IN FE DEPARTMENTS OF ELECTRICAL/ELECTRONIC ENGINEERING

The following discussion involves the responses of 58 teachers employed in the electrical/electronic departments of eight colleges of further education in the North East Region.

The discussion and presentation of the data in this chapter follows the layout and format of the structured interview questionnaire used with this group of respondents (see Appendix IV page 158 for a copy of the teachers questionnaire.

TABLE 4.1.

SEX DISTRIBUTION OF TEACHERS IN THE SAMPLE

(Q.1)

SEX OF RESPONDENTS	TEACHER RESPONDENTS BY SEX DISTRIBUTION		N=	%
	MALE	FEMALE		
Male	57	0	57	98.3
Female	0	1	1	1.7
Total	57	1	58	100

Total number of teachers in sample = 58

It is hardly surprising perhaps to find only one female teacher in a sample of departments which have traditionally been, for many years, male domains (see Table 4.1). This situation may indeed reflect the regional culture of the North East and manifest itself as a conscious or subconscious act of discrimination against women. There is no apparent reason why women should not be trained in the field of electronics and be allowed, if sufficiently qualified, to teach in further education.[1]

The age range of the selected sample of teachers was investigated (Table 4.2) on the basis of the following hypothesis that:-

Ho: There was no significant difference between grade of post held and the age of teachers in electrical/electronic departments of further education.

TABLE 4.2.

AGE BY GRADE OF TEACHERS IN DEPARTMENTS OF ELECTRICAL/ ELECTRONIC ENGINEERING.
(Q.2/Q.3)

GRADE OF TEACHERS	TEACHER RESPONDENTS BY AGE DISTRIBUTION				N=	%
	25-34yrs	35-44yrs	45-54yrs	55-65yrs		
Lecturer 1	4	7	7	2	20	34.5
Lecturer 2	2	5	4	5	16	27.6
SL or above	0	5	12	5	22	37.9
Total	6(10.3%)	17(29.3%)	23(39.7%)	12(20.7%)	58	100

Total number of teachers in sample = 58

$X^2 = 8.9$ D.F. = 6 P = > 0.05

$\lambda = 0.17$ with GRADE dependent

Cramer's V = 0.28

Therefore Ho was accepted at the 0.05 level of statistical significance.

In many of the sample colleges, staff in the departments of electrical/electronic engineering were not automatically given promotion simply because of years of service (see Table 4.2). Instead, a number of members of staff offering skills in the new technology were given promotion over those older members whose skills were now less in demand. One college went so far as to split its department into two staff rooms, one housing members with older, less fashionable skills and the other exclusively with staff whose skills were in the new technology. This situation unfortunately created two rival camps with one camp seeing itself as an elitist group and any promotions that were in the offing were given to those teachers involved in computerisation. This situation created inevitable conflict and resentment between the two staff rooms resulting in very little harmony or close co-operation.

In a number of colleges, higher grades of employment were offered to attract new members of staff from industry into teaching. Whilst this was necessary in order to promote new courses and develop existing curricula, once again older members of the teaching staff

were overlooked in the promotion stakes and had to be content with their present grade or position.

TABLE 4.3.

YEARS EMPLOYED IN PRESENT DEPARTMENT OF ELECTRICAL/ELECTRONIC ENGINEERING

(Q.4)

TEACHER RESPONDENTS BY YEARS EMPLOYED IN PRESENT DEPARTMENT			N=	%
0 - 5 years	6 - 10 years	More than 10 years		
13 (23%)	10 (17%)	35 (60%)	58	100

Total number of teachers in sample = 58

Close examination of Table 4.3 would seem to indicate that during the past five years a mini-boom has been taking place in departments of electrical/electronic engineering. This is obviously reflecting the changes which are taking place in industry and the rest of society where the ubiquitous use of new technology has affected almost every sector of life. A high number of respondents (60%) had been employed in their present department for more than ten years, thus emphasising the security and status of teaching as an occupation.

Of the total number interviewed, 36% of the respondents held an HNC/HND qualification, 33% a first degree (a third of which held an Open University qualification), and 19% a City and Guilds certificate (see Table 4.4). In terms of years since obtaining their qualification, 82.7% stated that it was eight or more years, and 70.7% stated that it was eleven or more years. One does not have to think very hard to realise the changes which have taken place in both electrical/electronic technology and industrial practices over this same time period.

TABLE 4.4

HIGHEST SUBJECT QUALIFICATIONS OF TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING AND TIME SINCE OBTAINING QUALIFICATION

(Q.8)

QUALIFICATIONS IN TEACHING SUBJECT	TEACHER RESPONDENTS BY YEARS SINCE OBTAINING HIGHEST SUBJECT QUALIFICATION					N=	%
	0-1yrs	2-4yrs	5-7yrs	8-10yrs	11 or more years		
Higher degree	2	0	0	1	1	4	7
First degree	0	2	5	3	9	19	33
HND/HNC	0	0	0	1	20	21	36
OND/ONC	0	0	0	0	0	0	0
Higher TEC/TEC	0	0	0	0	2	2	3
C and G Full Tech.Cert.	0	1	0	2	8	11	19
Other	0	0	0	0	1	1	2
TOTAL	2 (3.5%)	3 (5.2%)	5 (8.6%)	7 (12%)	41 (70.7%)	58	100

Total number of teachers in sample = 58

The teaching qualifications obtained by the teachers in the sample were also determined (see Table 4.5) by use of the structured interview questionnaire. Exactly 50% of those respondents interviewed had obtained an in-service Certificate in Education and only 17.2% of the sample were considered to be unqualified. Whilst these figures are encouraging and show that a large percentage (82.8%) of staff do in fact hold a qualification in education, only 24.1% of the respondents obtained their qualification within the last seven years. From this evidence, it would appear that once the qualification is obtained (usually an in-service Certificate in Education) little is done to encourage the teacher to pursue further qualifications in this field.

Although there is an increase in the provision of training courses for FE staff,[2] it must be realised that colleges are increasingly involved with more direct funding from Central Government Departments e.g. MSC (YTS, TVEI), OPEN TECH, PICKUP, and in-service training schemes such as GRIST, where such funding is often short term and at variance with most of the college commitments which are invariably long term. Also, problems arise because almost all of this funding is very specific and the priorities of those making the funds available on a national scale may not be those of a college which has to meet the needs of local industry and commerce.[3] Unfortunately, adult education has not found it easy to find alternative sources of funding, such as the MSC, which, for understandable reasons, is concerned more with training related to

industrial than educational or pedagogic needs. Much of the recent emphasis on the vocational role of adult education is understandable in the light of mass unemployment and social deprivation, but "there are dangers in concentrating on a curriculum for unemployment which include undue emphasis on skills for jobs which are temporary and transient".[4] Teachers, too, are given scant opportunity to fulfil ambitions or to acquire knowledge outside of their immediate teaching commitments. Often, the teachers attendance on short non-award-bearing in-service courses will only be given support by the appropriate funding body if it involves satisfying the needs and specific criteria of those courses on offer to FE students/customers (see Table 4.11, page 81). However, longer award-bearing courses are given little or no support by employers who argue that such courses of study are invariably undertaken for private/career motives (see Table 4.4, page 65 , and Table 4.5, page 69). It was, therefore, hardly surprising to find that an award-bearing course such as an Open University first degree was most popular with practising teachers, as it requires much private study and makes little or no demands on the candidate's employer (see page 64). New modular courses to be introduced in Departments of Education within Universities and Polytechnics will, however, attempt to improve professional development by offering award-bearing options to practising teachers.

Such modular courses would have to be carefully planned and implemented in order to cater for those individual teachers who find difficulty in attending classes due to work and home commitments.

Many of the courses to be offered could include elements of 'open-learning' where only occasional attendance in college would be required for tutorial sessions. Also, the subjects and status of the qualifications on offer must be such that both short and long-serving teachers are sufficiently interested to be attracted back, as students, into the environment of the classroom.

TABLE 4.5

HIGHEST QUALIFICATIONS IN EDUCATION OF TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING AND TIME SINCE OBTAINING QUALIFICATION

(Q.9)

QUALIFICATIONS IN EDUCATION	TEACHING RESPONDENTS BY YEARS SINCE OBTAINING HIGHEST EDUCATION QUALIFICATION					N=	%
	0-1yrs	2-4yrs	5-7yrs	8-10yrs	11 or more years		
Unqualified	0	0	0	0	0	10	17.2
Higher degree	0	0	1	0	0	1	1.7
First degree	0	0	0	0	0	0	0
DAES/DIP.FE.	0	0	0	0	2	2	3.5
CERT.ED(In-Service)	0	4	6	7	12	29	50
CERT.ED(Pre-Service)	0	0	0	3	9	12	20.7
City and Guilds Cert.	1	1	1	0	1	4	6.9
TOTAL	1 (1.7%)	5 (8.6%)	8 (13.8%)	10 (17.2%)	24 (41.4%)	58	100

Total number of teachers in sample = 58

Of the total number of respondents interviewed, only 8.6% had left industry within the last five years to take up a teaching career in a college of further education, and a massive 74.1% had not been in industry or had any full time industrial experience for eleven or more years (see Table 4.6). This gap in industrial experience must surely put the technical teacher at a disadvantage, for one can imagine the many changes which have taken place in the industrial setting as a direct result of the introduction of new technology over this time span.

TABLE 4.6

INDUSTRIAL EXPERIENCE OF THE TEACHERS AND TIME SINCE LEAVING INDUSTRY

(Q.12)

NUMBER OF YEARS SPENT IN INDUSTRY	TEACHER RESPONDENTS BY YEARS SINCE LAST IN INDUSTRY					N=	%
	0-1yrs	2-5yrs	6-10yrs	11-20yrs	More than 20yrs		
2 - 5	0	0	2	3	0	5	8.6
6 - 10	1	1	0	5	4	11	19
More than 10	1	2	6	18	13	40	69
No industrial experience	0	0	0	0	0	2	3.4
TOTAL	2 (3.4%)	3 (5.2%)	8 (13.8%)	26 (44.8%)	17 (29.3%)	58	100

Total number of teachers in sample = 58

A traditionally-accepted means by which teachers in further education can keep in touch with recent developments in their subject area is by subscription to a professional body or institute. However, when asked the question "Are you a member of a professional institute?" only 33% of those respondents interviewed answered in the affirmative.

The professional institutes subscribed to by the sample teachers in electrical/electronic engineering are listed in Appendix I, Table I.1, page 155.

Job mobility of workers has been commented upon by a number of observers over the years, where it has been stated that mobility of labour in the Region was greater than the national average.[5] Mindful of these findings, it was decided to examine the present situation in the teaching departments used in the sample and to determine what changes, if any, had taken place in recent years.

In their entire careers, 86% of all those respondents interviewed had in fact been employed in only 1 or 2 teaching institutions and only 4% had worked in 5 or more institutions (see Table 4.7). On the number of years employed in their present position, 57% had been employed for six years or more and 26% of the sample were employed in the last two years (see Table 4.8). The implications of these findings are twofold. Firstly, that there is very little job mobility amongst teaching staff in departments of electrical/electronic engineering where teachers showed a reluctance

to move from their present job or college even to pursue their career at a higher grade (see Table 4.7). Secondly, the figures reflect the status of the industry in the Region where a mini-boom has taken place in college departments as a result of expansion and widespread use of the new technology in society (see Table 4.8).

TABLE 4.7.

NUMBER OF INSTITUTIONS IN WHICH EMPLOYED AS A LECTURER IN FURTHER EDUCATION

(Q.13)

NUMBER OF TEACHING INSTITUTIONS IN WHICH EMPLOYED	N=	%
1 - 2	50	86
3 - 4	6	10
5 or more	2	4
TOTAL	58	100

Total number of teachers in sample = 58

TABLE 4.8

NUMBER OF YEARS EMPLOYED IN PRESENT POSITION - TEACHER RESPONDENTS (Q.14)

NUMBER OF YEARS SPENT IN PRESENT POSITION	N=	%
0 - 2	15	26
3 - 5	10	27
6 or more	33	57
TOTAL	58	100

Total number of teachers in sample = 58

In-service training and course preference of teachers in further education.

As further education has expanded its provision in recent years, the planning and organisation of its courses has become much more complex and, in many cases, the demands made upon and the expectations from its teaching staff have greatly increased. With an increase in the vocational training needs of the 16 - 19 year old age group, many new courses and initiatives, under the auspices of DES and the Manpower Services Commission, are being offered by colleges of further education. Also, the changing structure and teaching strategies of technician and business education resulting from the ongoing course assessment procedures and training philosophies implemented by the

BTEC validating body have all contributed to the changing and increased demands made upon staff in further education. As far as the technical teachers of electrical/electronic engineering are concerned, the enormous developments which are taking place in their subject discipline are totally revolutionising many sectors of industry. With the result that in most cases the skills and knowledge of the teacher rapidly becomes dated and therefore many new subjects have to be quickly learned if success with new courses and initiatives is to be achieved.

Large amounts of retraining and the acquisition of appropriate skills and subject knowledge are needed by the technical teacher in order to update and keep pace with the changes due to rapid developments in microelectronics and computerised technology. The imperative nature of this updating of knowledge means that increased pressure is again being placed upon teaching staff and the question that was asked was, are the teachers being given adequate support by their employer and are the necessary in-service training courses being offered? It may well be that staff development in colleges has hitherto been interpreted by many as meaning only the training of teachers in pedagogic/teaching skills and that subject knowledge has been, for many years, completely neglected in terms of formalised subject/technology provision in staff development programmes.[6]

On the whole, initial in-service training is no longer seen or accepted as being an adequate preparation for a lifelong career in teaching.[7] It is now generally accepted that staff development

should be a regular feature throughout an individual's working life, from "recruitment and induction, to planned in-service career development, related to curricular developments with which the teacher is concerned".[8] The realisation that ongoing development and updating of the teacher's subject knowledge is of paramount importance to Further Education policies and practices, and to the process of continuing professional development has strongly come to the fore only in the light of recent Central Government Initiatives.

Before the introduction of DES Circular 6/86, LEAs were not generally required to produce detailed and comprehensive staff development plans.[9] The issue of DES Circular 6/86 and its successor 9/87 which sets out the details of the Local Education Authority Training Grants Scheme for the financial year 1987-88, places a responsibility on the LEA to determine priorities, produce plans, implement and evaluate programmes of in-service training[10] to an extent to which few, if any, authorities had previously carried out such exercises.[11] Over recent years, the steady move towards greater LEA involvement in the planning of staff development/INSET actually started with the MSC training subsidy for YOP (the Robertson Shilling), developed through DES Circulars 4.84, 5/85 and 1/86 and included CPVE staff development, TRIST, and the Work-Related NAFE Development Plan exercise.[12]

In the North East, a group of authorities are working together, through the Regional Advisory Council (NCFE), to initiate, provide and support Curriculum/Staff Development activity through INSET programmes

in relation to 14 - 19 and adult education i.e. schools and colleges. Although New College, Durham, is the centre for both initial in-service training and continuing professional development other individual colleges within the Region provide key training staff for regional in-service training.[13]

In 1982, PICKUP was launched by the DES to encourage a major shift in the priorities of colleges, polytechnics and universities in the direction of adult vocational updating. PICKUP has promoted open learning for the professions (involving the Open University amongst others in developing materials), as well a short courses, which are designed and tailored-to-the-firm-in-question.[14] As far as staff development is concerned, PICKUP aims to update Further and Higher Education staff in the latest subject knowledge and in the teaching and learning skills appropriate for working adults.[15] It proposes to increase the collaboration between colleges and employers in order to develop short part-time courses for staff in each sector.

In addition, the joint PICKUP/MSC "Local Collaborative Projects", was launched in Spring 1984 to establish employer-provider partnerships to define and deliver adult updating.[16] This LCP will inform and stimulate staff in colleges, co-ordinate activities and ensure that the LEA and its members are able to support PICKUP. Complementing this, there are a further three small-scale LCPs looking at specific areas of need; one college based, one employer based and one initiated by a Manpower Forum.[17]

In an attempt to discover more about the in-service training of teachers in colleges of further education in the North East Region and to assess current staff development programmes, where they exist, the number of courses attended by teachers on education and subject matter was investigated (see Tables 4.9 and 4.11) by use of the structured interview questionnaire (see Appendix IV page 158).

The number of in-service, non-certificated, courses on education/pedagogic skills attended by the sample teachers in the last five years was investigated on the basis of the hypothesis that:-

Ho: There was no significant difference between the number of courses on education attended and the status of the teachers in electrical/electronic engineering.

TABLE 4.9

NUMBER OF COURSES ON EDUCATION ATTENDED BY GRADE OF POST OF TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING

(Q.29/Q.3)

NUMBER OF COURSES ON EDUCATION ATTENDED	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL OR ABOVE	L11	L1		
0	12 (20.7%)	7 (12.1%)	14 (24.1%)	33	56.9
1+	10 (17.2%)	9 (15.5%)	6 (10.4%)	25	43.1
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

$X^2 = 2.58$ DF = 2 P = > 0.05

λ = 0.06 with 'GRADE' dependent

Cramer's V = 0.21

Therefore Ho was accepted at the 0.05 level of statistical significance.

TABLE 4.10

AVERAGE TIME DURATION OF COURSES ON EDUCATION ATTENDED BY TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING

(Q.30)

COURSE DURATION (DAYS)	NUMBER OF POSITIVE RESPONSES N=	%
Less than 1	3	12
1 - 2	13	52
3 - 6	6	24
More than 6	3	12
TOTAL	25	100

Total number of teachers in sample = 58

Of the total number of sample teachers interviewed, only 43.1% had actually attended a non-certificated course on education within the last five years (see Table 4.9). Although the null hypothesis, Ho, was accepted as attendance on these courses was not dependent upon the grade of the respondent at the 0.05 level of statistical significance, there was evidence to suggest that a greater percentage of teachers at the L11 grade were more likely to attend than not attend courses on education. Although the average time duration of the attended courses on education did vary slightly, the greatest

number of courses (52%) lasted for between 1 - 2 days (see Table 4.10). Only 12% of the courses attended by the teachers in the sample lasted for more than six days.

The number of in-service, non-certificated, courses on subject matter/technological advances attended by teachers during the last five years was investigated on the basis of the hypothesis that:-

Ho: There was no significant difference between the number of courses on subject matter/technological advances attended and the status of the teachers in electrical/ electronic engineering.

TABLE 4.11

NUMBER OF COURSES ON SUBJECT MATTER ATTENDED BY GRADE OF POST OF TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING

(Q.33/Q.3)

NUMBER OF COURSES ON SUBJECT MATTER ATTENDED	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
0	7 (12%)	7 (12%)	7 (12%)	21	36
1+	15 (25.9%)	9 (15.6%)	13 (22.5%)	37	64
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in the sample = 58

X^2 = 0.59 D.F. = 2 P = > 0.05

λ = 0.0 with 'GRADE' dependent

Cramer's V = 0.1

Therefore Ho was accepted at the 0.05 level of statistical significance.

TABLE 4.12

AVERAGE TIME DURATION OF COURSES ON SUBJECT MATTER/TECHNOLOGICAL ADVANCES ATTENDED BY TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING

(Q.34)

COURSE DURATION (DAYS)	NUMBER OF POSITIVE RESPONSES N=	%
Less than 1	1	2.7
1 - 2	10	27
3 - 6	17	46
More than 6	9	24.3
TOTAL	37	100

Total number of teachers in sample = 58

More than one third (36%) of the teacher respondents interviewed had not attended a course on their teaching subject within the last five years (see Table 4.11). Of those courses attended, a number were 'in-house', that is to say, a member of the department having some knowledge of a particular subject area would in fact teach to his colleagues on a short college-based course. The null hypothesis, Ho, was accepted at the 0.05 level of statistical significance as attendance on courses on subject matter/technological advances was not dependent upon the respondent's grade.

Although the average time duration of the attended courses on subject matter varied considerably (see Table 4.12), the majority of the respondents (46%) who had attended such courses stated that they lasted for a maximum of 3 - 6 days.

If teachers in FE had a choice, what in-service non-certificated course or programme would they prefer? Q. 36-40 of the teachers' questionnaire (see Appendix IV, page 174) listed a number of possible areas where courses could be offered, and teachers were asked to rate each proposed course using a three point scale ranging from 'very important' to 'not important'. The results of the teachers' opinions on their in-service training needs are indicated in the analysis of questions 36 - 40 given in Table 4.13 below on the basis of the hypothesis:-

Ho: That there was no significant difference between the opinion of teachers in electrical/electronic engineering on the rating of each of four major in-service course needs/programme areas.

TABLE 4.13

OPINIONS OF TEACHERS CONCERNING FOUR MAJOR IN-SERVICE COURSE NEEDS/PROGRAMME AREAS

(Q.36 - 40)

OPINION RATINGS	TEACHER RESPONDENTS BY IN-SERVICE COURSE NEEDS/ PROGRAMME AREAS				N=	%
	Subject matter Updating	Secondment to industry	Education method	Management and admin.		
Very important	47 (81%)	32 (55%)	11 (19%)	6 (10%)	96	41
Important	11 (19%)	26 (45%)	45 (78%)	40 (69%)	122	53
Not important	0 (0%)	0 (0%)	2 (3%)	12 (21%)	14	6
TOTAL	58 (100%)	58 (100%)	58 (100%)	58 (100%)	232	100

Total number of teachers in sample = 58

$X^2 = 96.5$ DF = 6 P = < 0.01

Therefore Ho was rejected at the 0.01 level of statistical significance.

A majority of the sample teachers (81%) in departments of electrical/electronic engineering expressed the opinion that courses concerned with recent technological and industrial developments in their teaching subject were very important (see Table 4.13). A period of secondment to industry (55%), educational methods and teaching skills (19%), and management/admin skills (10%) were all seen as being successively less important.

Other areas suggested as possible bases for in-service courses are listed below:-

	N=
Student counselling	4
Safety at work	1
Career counselling	1
Pastoral care	1
Specific training on manufacturers' equipment	1

The opinions of different grades of teachers in electrical/electronic engineering on the importance of the above mentioned four major staff development areas are indicated in the analysis of the data obtained from questions 36 - 40 of the structured

interview questionnaire and given in Tables 4.14 - 4.17 below on the basis of the hypothesis that:-

Ho: There was no significant difference between the ratings in importance of each of four major staff development needs by teachers of different grades in electrical/ electronic engineering departments.

TABLE 4.14

IMPORTANCE OF SUBJECT MATTER UPDATING BY GRADE OF POST OF TEACHERS

(Q.36/Q.3)

IMPORTANCE OF SUBJECT MATTER UPDATING IN STAFF DEVELOPMENT PROGRAMMES	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Very important	18 (31%)	14 (24.1%)	15 (25.9%)	47	81
Important	4 (6.9%)	2 (3.5%)	5 (8.6%)	11	19
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

$X^2 = 0.92$ DF = 2 P = > 0.05

$\lambda = 0.03$ with 'GRADE' dependent

Cramer's V = 0.13

TABLE 4.15

IMPORTANCE OF SECONDMENT TO INDUSTRY FOR RETRAINING/UPDATING OF TEACHING SUBJECTS BY GRADE OF POST OF TEACHERS

(Q.37/Q.3)

IMPORTANCE OF SECONDMENT TO INDUSTRY IN STAFF DEVELOPMENT PROGRAMMES	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Very important	14 (24.1%)	7 (12.1%)	11 (19%)	32	55.2
Important	8 (13.8%)	9 (15.5%)	9 (15.5%)	26	44.8
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

X^2 = 1.48 DF = 2 P = > 0.05

λ = 0.03 with 'GRADE' dependent

Cramer's V = 0.16

TABLE 4.16

IMPORTANCE OF UPDATING EDUCATIONAL METHODS AND TEACHING SKILLS

BY GRADE OF POST OF TEACHERS

(Q.38/Q.3)

IMPORTANCE OF EDUCATION METHOD UPDATING IN STAFF DEVELOPMENT PROGRAMMES	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Very important	4 (6.9%)	4 (6.9%)	3 (5.2%)	11	19
Important	17 (29.3%)	12 (20.7%)	16 (27.6%)	45	77.6
Not important	1 (1.7%)	0	1 (1.7%)	2	3.4
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

X^2 = 1.28 DF = 4 P = > 0.05

λ = 0.0

Cramer's V = 0.1

TABLE 4.17

IMPORTANCE OF MANAGEMENT/ADMINISTRATION TRAINING BY GRADE OF POST OF TEACHERS

(Q.39/Q.3)

IMPORTANCE OF MANAGEMENT/ ADMIN TRAINING IN STAFF DEVELOPMENT PROGRAMMES	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Very important	3 (5.2%)	1 (1.7%)	2 (3.4%)	6	10.3
Important	14 (24.1%)	15 (25.9%)	11 (19%)	40	69
Not important	5 (8.6%)	0	7 (12.1%)	12	20.7
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

$X^2 = 7.9$ DF = 4 P = > 0.05

$\nearrow$ = 0.08 with 'GRADE' dependent

Cramer's V = 0.26

Therefore, Ho was accepted at the 0.05 level of statistical significance.

The opinions of teachers in electrical/electronic engineering on the rating of importance of four major staff development areas was not dependent upon grade of post.

Despite significant developments and changes in their subject, more than one third of teachers in electrical/electronic engineering departments of further education had not attended a course on subject updating within the last five years (see Table 4.11, page 81). In these circumstances, it is obvious that self-development is vital to the technical teacher and is arguably the most important aspect of present in-service training programmes. Tables 4.18 and 4.19 present the findings obtained from an analysis of the responses to Q.41 - 49 of the teachers' questionnaire (see Appendix IV page 175), where the sample teachers were asked to rate, using a five point scale, the frequency of use of materials and methods for self-updating in their subject matter.

TABLE 4.18

FREQUENCY OF USE OF MATERIALS AND METHODS FOR SELF-UPDATING IN SUBJECT MATTER - TEACHER RESPONDENTS
(Q.41 - 49)

MATERIALS AND METHODS USED FOR SELF-UPDATING	TEACHER RESPONDENTS BY FREQUENCY OF USE OF MATERIALS AND METHODS					MEAN	N=
	Very often (1)	Often (2)	Sometimes (3)	Not very often (4)	Never (5)		
Journals published by a professional body	15 (26%)	23 (40%)	12 (21%)	3 (5%)	5 (8%)	2.3	58
Magazines published weekly/monthly (periodicals)	12 (21%)	21 (36%)	18 (31%)	7 (12%)	0	2.4	58
Text books	32 (55%)	23 (40%)	3 (5%)	0	0	1.5	58
Visit exhibitions	0	10 (17%)	27 (47%)	16 (28%)	5 (8%)	3.3	58
As other members of staff	13 (22%)	22 (38%)	14 (25%)	6 (10%)	3 (5%)	2.4	58
Staff room chat	13 (22%)	20 (35%)	13 (22%)	10 (18%)	2 (3%)	2.5	58
Ask students	1 (2%)	8 (14%)	28 (48%)	18 (31%)	3 (5%)	3.2	58
Liaison with industry	4 (7%)	9 (15%)	14 (25%)	19 (33%)	12 (20%)	3.5	58
Undertake/supervise research projects	0	2 (3%)	8 (14%)	6 (10%)	42 (73%)	4.5	58

Total number of teachers in sample = 58

The dichotomous table 4.19 represents Table 4.18 with columns 1 - 2 and 3 - 5 combined and the materials and methods used for self-updating placed in rank order of popularity (see Table 4.19). Text books were by far the most important source of subject updating as 95% of the sample teachers consulted them with 'very often - often' regularity. The least used method of subject updating was the undertaking or supervising of research projects with only 3% of the sample regularly using this method (see Table 4.19).

In order to determine the significance of industry, as a means of subject updating, in relation to other methods, a comparison was made between the teachers responses to "LIAISON WITH INDUSTRY" (13, 45) with responses to "STAFF ROOM CHAT" (35, 25) by calculation of the X^2 statistic. This resulted in $X^2 = 14.6$, $DF = 1$, $P = < 0.01$. Thus, showing directly and by implication that "LIAISON WITH INDUSTRY" as a source for subject updating was significantly less important than:

Staff room chat
Magazines published weekly/monthly (periodicals)
Asking other members of staff
Journals published by a professional body
Text books.

Further analysis of the figures obtained from the sample of teachers interviewed showed that "LIAISON WITH INDUSTRY" as a source for updating subject matter was only held to be as important as visiting exhibitions and information gained from asking students, and only more

important than undertaking/supervising research projects (X^2 = 9.2, DF = 1, P = < 0.01). Whilst the sample teachers in FE stated that industry was a very important source for updating subject matter (see Table 4.13), in practice, very few actually used this method (see Table 4.19).

TABLE 4.19

FREQUENCY OF USE OF MATERIALS AND METHODS FOR SELF-UPDATING IN SUBJECT MATTER - TEACHER RESPONDENTS

(Q.41 - 49)

MATERIALS AND METHODS USED FOR SELF-UPDATING	TEACHER RESPONDENTS BY FREQUENCY OF USE OF MATERIALS AND METHODS		N=
	Very often - Often (1, 2)	Sometimes - Never (3, 4, 5)	
Text books	55 (95%)	3 (5%)	58
Journals published by a professional body	38 (66%)	20 (34%)	58
Ask other members of staff	35 (60%)	23 (40%)	58
Magazines published weekly/monthly (periodicals)	33 (57%)	25 (43%)	58
Staff room chat	33 (57%)	25 (43%)	58
Liaison with industry	13 (22%)	45 (78%)	58
Visit exhibitions	10 (17%)	48 (83%)	58
Ask students	9 (16%)	49 (84%)	58
Undertake/supervise research projects	2 (3%)	56 (97%)	58

Total number of teachers in sample = 58

Further sources of information which were used, by the sample teachers in departments of electrical/electronic engineering, as a means of keeping up to date with developments in their subject area are given in Table 4.20 below.

TABLE 4.20

FURTHER SOURCES OF INFORMATION USED FOR UPDATING SUBJECT KNOWLEDGE

(Q.50)

SOURCES OF INFORMATION USED FOR UPDATING SUBJECT KNOWLEDGE	N=
Manufacturers technical publications	6
Friends in industry	3
Open University programmes	3
Certificated courses	2
Videos/slides	2
Television programmes	2
Technical films	1
Professional institute meetings	1

Total number of teachers in sample = 58

The importance of the links between teachers in FE and personnel in local industry cannot be over stressed, however, at what level of discussion does this liaison take place and does the liaison exist in the context of updating teaching subject or simply college departmental management keeping personnel departments informed of student activities? The views of different grades of teachers in electrical/electronic engineering on their liaison with industry was investigated on the basis of the hypothesis:-

Ho: Frequency of liaison with industry was not dependent upon the grade of teacher.

TABLE 4.21

FREQUENCY OF LIAISON WITH INDUSTRY BY GRADE OF POST OF TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING

(Q.48/Q.3)

FREQUENCY OF LIAISON WITH INDUSTRY	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Very often/often	7 (12%)	5 (8.6%)	1 (1.7%)	13	22.3
Sometimes	4 (6.9%)	4 (6.9%)	6 (10.4%)	14	24.2
Not very often/never	11 (19%)	7 (12.1%)	13 (22.4%)	31	53.5
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

$X^2 = 5.57$ DF = 4 P = > 0.05

χ = 0.7 with 'GRADE' dependent

Cramer's V = 0.22

Therefore Ho was accepted at the 0.05 level of statistical significance.

Although Ho was accepted, there was evidence to suggest that the grade which had the greatest dealings with personnel in industry was the grade categorised as SL or above (see Table 4.21). Of the SL or above grade of respondents interviewed 32% liaised with industry on a regular basis, compared with only 5% of L1 teachers. Therefore, those members of the academic staff whose teaching grade is less than an SL have little or no opportunity to further or update their subject knowledge and skills through direct links with local industry.

Although staff development in many colleges of further education can be construed as the "identification of the professional needs of individual teachers and devising programmes to meet those needs",[18] there is, however, "no clear consensus as to what precisely staff development consists of and this problem of identity has caused its growth to be confused rather than coherent".[19] In practice, the function and aims of staff development in colleges of FE in the Region has been interpreted in many ways (see Tables 4.9, 4.11, 4.13, pages 79, 81, 84). Perceptions range from advancing the present and future needs of an individual employee to promoting the planned needs of a college both from a community and an academic standpoint.

The existence of a staff development unit in the sample colleges of further education is investigated in the analysis of question 51, as given in Table 4.22.

TABLE 4.22

EXISTENCE OF A STAFF DEVELOPMENT UNIT IN THE SAMPLE COLLEGES OF FURTHER EDUCATION - TEACHER RESPONDENTS

(Q.51)

KNOWLEDGE OF EXISTENCE OF A STAFF DEVELOPMENT UNIT	TEACHER RESPONSES N=	%
Yes	50	86
No	3	5
Uncertain	5	9
TOTAL	58	100

Total number of teachers in sample = 58

Many colleges operate some form of staff appraisal to assist in the training and development process with the aim of identifying training needs. Although, in practice, such schemes invariably have a number of aims and objectives, staff appraisal should normally be implemented in order to identify not only teachers current strengths and weaknesses but also their potential for both carrying out more complex tasks and taking on posts of greater responsibility.[20] Whilst the appraisal procedure will normally involve individual assessment of staff, such assessment can in fact vary quite considerably within and between institutions. Although a number of standard procedures do exist which are based on extensive sets of

forms and established times, rules and frequency of assessments,[21] all too often teachers are appraised in an ad hoc fashion by senior staff who discuss individual members' development and needs in an intermittent and informal way.

The existence of staff appraisal in the sample colleges of further education is investigated in the analysis of question 52, as given in Table 4.23 where the responses of different grades of teachers on their participation in formal appraisal interviews are indicated on the basis of the hypothesis:-

Ho: Teacher status in departments of electrical/electronic engineering did not determine their participation in the appraisal interview programme.

TABLE 4.23

APPRAISAL OR FORMAL INTERVIEW PARTICIPATION BY GRADE OF POST HELD

— TEACHER RESPONDENTS

(Q.52/Q.3)

APPRAISAL INTERVIEW PARTICIPATION	TEACHER RESPONDENTS BY GRADE OF POST				
	SL or above	L11	L1	N=	%
Yes	6 (10.3%)	3 (5.2%)	0 (0)	9	15.5
No	16 (27.6%)	13 (22.4%)	20 (34.5%)	49	84.5
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

X^2 = 6.12 DF = 2 P = < 0.05

λ = 0.11 with 'GRADE' dependent

Cramer's V = 0.33

Therefore Ho was rejected at the 0.05 level of statistical significance.

TABLE 4.24

NUMBER OF APPRAISAL INTERVIEWS ATTENDED IN THE LAST FIVE YEARS BY SAMPLE TEACHERS

(Q.63)

NUMBER OF APPRAISAL INTERVIEWS ATTENDED	TEACHER RESPONDENTS BY TIME SINCE LAST APPRAISAL INTERVIEW (MONTHS)						N=	%
	0 - 3	4 - 6	7 - 12	13 - 18	19 - 24	More than 24		
None	0	0	0	0	0	0	49	84.5
1 - 2	0	2	0	2	0	2	6	10.3
3 - 4	1	0	2	0	0	0	3	5.2

Total number of teachers in sample = 58

Although 86% of the sample teachers stated that a staff development unit did exist in their college (see Table 4.22, page 99), only 15.5% had ever been formally appraised in order to discuss personal and academic development (see Table 4.23, page 101). The situation revealed by these responses appears to indicate the continuance of "ad-hoc" staff development policies by management and a tendency on the part of staff to continue to write their own career patterns, especially in the planning and financing of award-bearing courses (see Table 4.4, page 65 , and Table 4.5, page 69). This situation does not appear to be changing, for although 78% of those respondents who had attended an appraisal interview had done so within the last 18 months (see Table 4.24), none had actually received any form of training or retraining even though there had been an identifiable need (see Table 4.25). Whilst staff appraisal does not appear a priority of management in most colleges, nevertheless, staff certainly continue to be given advice and in-service support on subject updating/training of the type offered by the MSC and DES (see pp. 76 - 77). The fact that these initiatives are effective is demonstrated by the findings in Table 4.11, page 81 , where 64% of all teachers sampled had attended at least one course on subject updating within the last five years.

Participation in appraisal interview programmes was determined by the grade of post held by the teacher (see Table 4.23, page 101), where Ho was rejected at the 0.05 level of statistical significance. None of the L1 grade of teachers interviewed had been formally appraised in the last five years, compared with 18.8% of L11 teachers

and 27.3% of those respondents categorised as 'SL or above'. This would suggest that the L11 grade and above are looked upon by management as career grades, where appraisal objectives are defined in terms of management/admin needs and the immediate and future requirements of the L1 grade of teachers appears to be ignored.

TABLE 4.25

TRAINING/RETRAINING CARRIED OUT AS A DIRECT RESULT OF THE APPRAISAL INTERVIEW - TEACHER RESPONDENTS

(Q.54)

AFTER APPRAISAL WAS THERE AN IDENTIFIABLE NEED FOR TRAINING/ RETRAINING	AFTER APPRAISAL WAS TRAINING/ RETRAINING CARRIED OUT BY TEACHER RESPONDENTS		N=	%
	NO	YES		
No	5	0	5	55.6
Yes	4	0	4	44.4
TOTAL	9	0	9	100

Total number of teachers in sample = 58

For colleges of further education to be both effective and successful in their approach to training, teaching staff must keep pace with the rapid developments in new technology in terms of subject knowledge and 'hands-on' experience. There is an urgent requirement for information on the ways in which new developments effect local industries to be rapidly made available in order to identify immediate industrial needs and to ensure that a wide range of relevant training programmes and courses, from which companies can choose, are constantly being offered. Obviously, close liaison and consultations between staff in colleges of FE and local industry would be a step towards the development of relevant course curricula and in reducing any mismatch in the further education provision, PICKUP and the Local Collaborative Projects (see pp. 76 - 77) will, if fully utilised, help towards this end. The roles of the Regional Advisory Council (NCFE) and the Regional Curriculum Base are also vital in determining staff development policies and in ensuring the successful partnership between employers and trainers when designing and implementing client-centred courses.

The ten regional advisory councils for further education (RACs) in England and Wales were established by Ministerial Circular in 1946, when it was stated as being an accepted principle that the organisation of further education needed to include a regional element and that there were many useful functions a regional body could perform.[22] In general, they fulfil a number of important functions which include: a regular review of further education provision to identify deficiencies and to avoid unnecessary duplication; the

provision of a forum for the exchange of ideas among the further education institutions and between them and industry, business, government agencies such as the MSC, and the universities in the region; and making known the facilities available in the region by publishing Directories, Bulletins, Reports, etc. RACs also commonly organise short courses, conferences and seminars and encourage the training and staff development of further education teachers.[23] In the main, the three major functions of the Northern RAC (Northern Council for Further Education - NCFE) can be listed as follows:[24]

1. Regional Examinations.

2. Regional Co-ordination of AFE and NAFE (including publishing the Regional Plan and the Guide to FE courses).

3. Staff and Curriculum Development (including The Northern Regional Staff Development Unit).

Following the April 1982 ACSET Further Education Teachers' Sub-Committee advice on Training and Development for MSC Expansion, the FEU invited the RACs in England to set up Regional Curriculum Bases.[25] In the Northern region, the RCB, which is located in New College, Durham, is supported by the Further Education Unit (DES) and the Regional Advisory Council (NCFE), through the nine Northern LEAs.[26]

The basic philosophy in setting up the RCBs was essentially to stimulate regional and local initiatives in curriculum and staff

development for vocational preparation. The main aims common to all RCBs are:[27]

(a) to support curriculum development generally in the areas of vocational preparation;

(b) to initiate and support staff development activities in areas of vocational preparation;

(c) to create/develop a network of interested persons/institutions throughout the region;

(d) to develop an information service and resource collection.

The existing links, tenuous or otherwise, between the sample colleges of FE and local industry are investigated in this study both from a teacher's perspective (see Tables 4.26 - 4.28, pages 108 - 111) and a managers perspective (see Tables 5.9 - 5.11, pages 130 - 132).

The consultations by local industry with colleges of FE about course content and organisation was investigated (see Table 4.26) on the basis of the hypothesis:

Ho: Consultations with teaching staff was not dependent upon the grade or status of the teacher.

TABLE 4.26

CONSULTATIONS INITIATED BY LOCAL INDUSTRY ABOUT COURSE CONTENT BY GRADE OF POST - TEACHER RESPONDENTS

(Q.55)

CONSULTATIONS INITIATED BY LOCAL INDUSTRY (TEACHER RESPONSES)	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Yes	16 (27.6%)	10 (17.2%)	5 (8.6%)	31	53.4
No	6 (10.4%)	6 (10.4%)	15 (25.8%)	27	46.6
TOTAL	22 (38%)	16 (27.6%)	20 (34.4%)	58	100

Total number of teachers in sample = 58

$X^2 = 10.32$ DF = 2 P = < 0.05

$\lambda = 0.25$ with 'GRADE' dependent

Cramer's V = 0.42

Therefore Ho was rejected at the 0.05 level of statistical significance.

The responses of different grades of teachers in the electrical/electronic departments on their consultations with local industry was also investigated on the basis of the hypothesis that:-

Ho: The consultations with local industry about the content and organisation of courses was not dependent upon the grade or status of the teacher.

TABLE 4.27

CONSULTATIONS WITH LOCAL INDUSTRY ABOUT COURSE CONTENT BY GRADE OF POST - TEACHER RESPONDENTS

(Q.56)

CONSULTATIONS WITH LOCAL INDUSTRY (TEACHER RESPONSES)	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Yes	13 (22.4%)	9 (15.5%)	7 (12.1%)	29	50
No	9 (15.5%)	7 (12.1%)	13 (22.4%)	29	50
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

$X^2 = 2.8$ DF = 2 P = > 0.05

χ = 0.11 with 'GRADE' dependent

Cramer's V = 0.21

Therefore Ho was accepted at the 0.05 level of statistical significance.

Once again, close examination of the findings reveals that it is the higher grade of teacher who consults with and is consulted by personnel in local industry (see Tables 4.26 and 4.27). When asked if employers should contribute to the content and organisation of courses, related to their industry, being offered by their college, 91% of the sample teachers answered in the affirmative (see Appendix IV, Q.57, page 178).

The opinions of the sample teachers in the departments under review on the state of the liaison that existed between their college and local industry was investigated on the basis of the hypothesis:-

Ho: The satisfactory liaison that exists between colleges of further education and local industry was not dependent upon grade of post or status of the teacher.

TABLE 4.28

OPINIONS ON THE LIAISON THAT EXISTS BETWEEN THEIR COLLEGE OF FURTHER EDUCATION AND LOCAL INDUSTRY BY GRADE OF POST

(Q/59)

TEACHER RESPONSES ON THE LIAISON THAT EXISTS BETWEEN THEIR COLLEGE AND LOCAL INDUSTRY	TEACHER RESPONDENTS BY GRADE OF POST			N=	%
	SL or above	L11	L1		
Satisfactory	9 (15.5%)	7 (12.1%)	9 (15.5%)	25	43.1
Unsatisfactory	13 (22.4%)	9 (15.5%)	11 (19%)	33	56.9
TOTAL	22 (37.9%)	16 (27.6%)	20 (34.5%)	58	100

Total number of teachers in sample = 58

$X^2 = 0.08$ DF = 2 P = > 0.05

$\nwarrow = 0$ with 'GRADE' dependent

Cramer's V = 0.036

Therefore Ho was accepted at the 0.05 level of statistical significance.

The majority of teachers in the sample (56.9%) were of the opinion that the liaison that existed between their college of further education and local industry was unsatisfactory (see Table 4.28). Even though 59% of teachers in the 'SL or above' grade and 56% of L11 teachers stated that they had consulted local industry about course content and organisation within the last two years (see Table 4.27, page 109) the same percentages, i.e. 59% and 56% respectively also stated that the liaison that existed was in fact unsatisfactory (see Table 4.28).

When asked to list ways in which the liaison between local industry and their college of FE could be improved, a range of positive responses was given including secondment of teachers to industry and the appointment of a college liaison officer (see Table 4.29). Although many of the listed suggestions would to a greater or lesser degree work, considerable care would have to be taken in the planning and implementation of such methods. For example, a number of teacher respondents were very cynical of consultative groups or any scheme or idea which involved personnel in industry, arguing that such methods were often one-sided with industry only becoming involved when its interests alone were at stake. Unfortunately, many of the manager respondents also argued that such methods were one sided but that it was FE staff who would often fail to respond to new initiatives or any suggestion of change (see Chapter 5, page 117). Secondment of teachers to industry and regular visits to companies were suggestions given by some of the sample teachers. However, many teacher respondents would only consider such methods if their local

authority would agree a package involving time allowance and expenses. These demands unfortunately coming at a time when teaching staff are under pressure to increase their commitment in terms of higher class contact hours.

TABLE 4.29

SUGGESTIONS GIVEN BY TEACHERS FOR IMPROVING LIAISON WITH THEIR LOCAL INDUSTRY

(Q.60)

TEACHERS SUGGESTIONS FOR IMPROVING LIAISON WITH LOCAL INDUSTRY	NUMBER OF POSITIVE RESPONSES
Secondment of teachers to industry	4
Visits to industry	3
Exchange visits between teachers in FE and staff in industry	3
Consultative meetings with personnel in industry	2
Appointment of a college liaison officer	2
Increase college marketing	2
College open days/evenings	2
Staff exchanges between local industry and colleges of FE	1
FE to help develop company products and allow industry use of college facilities	1
College exhibitions/trade fairs	1
Groups of engineers in FE and industry to discuss and design courses	1
Teachers attendance on short courses provided by industry	1
Staff timetables to cater for visits	1
Seminars for staff in FE and industry	1
Closer liaison with training managers	1
Exchange of projects for students in FE and industry	1

Although it is desirable that all grades of teachers come into contact with local industry, by whatever means is unanimously agreed upon, any solution to this problem would obviously involve direct liaison and contact with managers, at all levels, in the appropriate industry. Therefore, a sample of managers in the electrical and electronics industry were interviewed and an analysis of these findings is given in Chapter 5.

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CHAPTER 5

EXAMINATION AND CONSIDERATION OF DATA PROVIDED BY SURVEY OF MANAGERS IN ELECTRICAL/ELECTRONIC RELATED INDUSTRIES.

The responses of a sample of 42 managers in electrical/electronics related industries in the North East Region is presented and discussed in the following chapter. The format and presentation of the discussed data is in keeping with the layout of the structured interview questionnaire used with this group of respondents (see Appendix V , pages 180 - 199) for a copy of the managers' questionnaire).

All of the management staff interviewed in the electrical/electronics industry were male. This situation could be construed as positive discrimination against females as, in most cases, there was no apparent reason why males should dominate management positions in the companies visited, especially when women have the potential to become successful industrial managers and are capable of rising to the highest levels.[1]

The grades comprising the largest sector of the sample were Training Officers (19%) and Supervisors (19%) followed by Divisional Managers (11.9%) (see Table 5.1). The actual spread of job titles, which was unexpectedly large, indicated the specific tasks undertaken by each of the respondents in the firms used in the sample. The largest group of respondents (45.2%) were aged between 35 - 44 years,

whilst the second largest group (33.3%) was aged between 25 - 34 years (see Table 5.1). This relatively young group of workers reflects the recency of microelectronic technology and the need for industry to have a workforce with appropriate knowledge and up-to-date skills.[2]

TABLE 5.1. AGE BY GRADE OF THE SAMPLE OF MANAGERS IN ELECTRICAL/ELECTRONIC ENGINEERING (Q.2/Q.3)

GRADE OF MANAGERS IN SAMPLE	MANAGER RESPONDENTS BY AGE DISTRIBUTION					N=	%
	Under 25 yrs	25-34 yrs	35-44 yrs	45-54 yrs	55-65 yrs		
Training officer	0	1	6	1	0	8	19
Supervisor	0	2	2	3	1	8	19
Divisional manager	0	1	3	1	0	5	11.9
Electrical engineer	1	2	0	0	0	3	7.1
Technical manager	0	1	1	0	0	2	4.7
Production manager	0	1	1	0	0	2	4.7
Director	0	1	0	0	0	1	2.4
General manager	0	0	1	0	0	1	2.4
Personnel manager	0	0	0	0	1	1	2.4
Training manager	0	0	1	0	0	1	2.4
Maintenance engineer	0	0	1	0	0	1	2.4
Automation engineer	0	1	0	0	0	1	2.4
Electronics design engineer	0	1	0	0	0	1	2.4
Product engineer	0	1	0	0	0	1	2.4
Personnel and industrial relations manager	0	0	1	0	0	1	2.4
Senior engineer	0	0	1	0	0	1	2.4
Project engineer	0	1	0	0	0	1	2.4
Production manager	0	0	0	1	0	1	2.4
Development manager	0	1	0	0	0	1	2.4
Works manager	0	0	1	0	0	1	2.4
TOTAL	1	14	19	6	2	42	100

Total number of managers in sample = 42

The sample managers were asked to state the total number of years that they had been employed in the electrical/electronics industry (see Appendix V, Q.4, page 183), however, the following responses represent the number of years that each respondent had spent in his present industry. This must be pointed out because some of the companies visited could not really be classified a being solely in the electrical/electronics industry but indeed had some facet of their production process which involved computerised technology and did employ staff who were students studying electrical/electronic engineering at the local college of further education. Of the total sample of managers interviewed, 31% had been employed in their present industry for less than ten years, and 69% had been employed in their present industry for more than ten years.

In terms of identifying the category or status of the employer, a problem did arise because the spread of the employer's business was often quite large and invariably embraced more than one job category (see Table 5.2).

TABLE 5.2.

CATEGORY OR STATUS OF EMPLOYER USED IN THE SAMPLE - MANAGER RESPONDENTS

(Q.5)

CATEGORY OR STATUS OF EMPLOYER	NUMBER OF POSITIVE RESPONSES	%
Electrical/electronic engineering	23	54.8
Microelectronics/computer manufacturing	7	16.7
Telecommunications	6	14.3
Electrical maintenance/Servicing	6	14.3
Mechanical engineering	13	31
Instrumentation	12	28.6
Electrical installation	2	4.8
Production engineering	7	16.7
Manufacturer of quartz and silicon products	1	2.4
Plasma coating	1	2.4
Consumer electronics	1	2.4

Total number of managers in sample = 42

The majority (76.2%) of the managers employed staff who were directly responsible to them, thus highlighting the influence each sample respondent had over other workers in their industry in terms of in-company policies and practices (see Table 5.3).

TABLE 5.3

SPAN OF CONTROL OF MANAGERS IN THE SELECTED INDUSTRY.

(Q.8)

"SPAN OF CONTROL" OF SAMPLE MANAGERS	NUMBER OF POSITIVE RESPONSES (MANAGER RESPONDENTS)	%
0	10	23.8
1 - 9	22	52.4
10 - 19	7	16.7
20 or more	3	7.1
TOTAL	42	100

Total number of managers in sample = 42

Of the total sample of managers interviewed, 69% held a recognised formal qualification specific to their industry (see Tables 5.4 and II.1, page 156) and 38% held other recognised post-school qualifications outside of the field of electrical/electronics (see Tables 5.5 and III.1, page 124 and 157).

TABLE 5.4.

SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

(Q.9)

SUBJECT SPECIFIC QUALIFICATIONS HELD (MANAGER RESPONSES)	NUMBER OF POSITIVE RESPONSES (MANAGER RESPONDENTS)	%
Yes	29	69
No	13	31
TOTAL	42	100

Total number of managers in sample = 42

A complete list of subject specific qualifications held by sample managers is given in Appendix II, page 156.

TABLE 5.5.

NON-SUBJECT SPECIFIC QUALIFICATIONS HELD BY THE SAMPLE MANAGERS

(Q.13)

NON-SUBJECT SPECIFIC QUALIFICATIONS HELD (MANAGER RESPONSES)	NUMBER OF POSITIVE RESPONSES (MANAGER RESPONDENTS)	%
Yes	16	38
No	26	62
TOTAL	42	100

Total number of managers in sample = 42

A complete list of non-subject specific qualifications held by sample managers is given in Appendix III, page 157.

Only 14% of the sample managers subscribed to a professional institute (see Table 5.6) and of these institutes, half were not in electrical/electronic engineering. The list of professional institutes subscribed to by the sample managers is listed as follows:-

	N=
Institute of Personnel Management	2
I.E.E.I.E.	2
British Computer Society	1
Institute of Industrial Managers	1

TABLE 5.6.

PROFESSIONAL INSTITUTE STATUS OF MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

(Q.11)

MEMBERSHIP OF A PROFESSIONAL INSTITUTE (MANAGER RESPONSES)	NUMBER OF POSITIVE RESPONSES (MANAGER RESPONDENTS)	%
Yes	6	14
No	36	86
TOTAL	42	100

Total number of managers in sample = 42

In-service training and course preference.

The success of many regional companies in markets both home and abroad will obviously depend upon a number of factors, not least amongst them being the speed with which training programmes can be introduced in an effort to update the skills and knowledge of all grades and levels of the workforce.[3] Although most companies (81%) did offer some form of in-service training for its employees (see Table 5.7), the majority of courses on offer were aimed at those members of staff who were required to respond to an immediate need; for example, those staff, mainly machine operators, who required immediate on-the-spot training when any new system or method was to be introduced into their company.

TABLE 5.7.

PROVISION OF IN-SERVICE TRAINING FOR EMPLOYEES IN THE ELECTRICAL/ELECTRONICS INDUSTRY - MANAGER RESPONDENTS

(Q.31)

IN-SERVICE TRAINING PROVISION AVAILABLE (MANAGER RESPONSES)	NUMBER OF POSITIVE RESPONSES (MANAGER RESPONDENTS)	%
Yes	34	81
No/uncertain	8	19
TOTAL	42	100

Total number of managers in sample = 42

The number of courses on subject updating attended by the sample of managers during the last five years was investigated on the basis of the hypothesis that:-

Ho: There was no significant relationship between the number of courses attended by the sample managers in electrical/ electronic engineering and the type of each course.

TABLE 5.8.

NUMBER OF IN-COMPANY, EXTERNAL AND FE COURSES ON SUBJECT UPDATING ATTENDED DURING THE LAST FIVE YEARS - MANAGER RESPONDENTS

(Q.37, Q.40, Q.45)

NUMBER OF COURSES ATTENDED	MANAGER RESPONDENTS BY TYPE OF COURSES ATTENDED			N=	%
	IN-COMPANY	EXTERNAL	FE		
0	15 (36%)	17 (40%)	37 (88%)	69	54.8
1+	27 (64%)	25 (60%)	5 (12%)	57	45.2
TOTAL	42 (100%)	42 (100%)	42 (100%)	126	100

Total number of managers in sample = 42

$X^2 = 28.5$ DF = 2 P = < 0.01

Therefore Ho was rejected at the 0.01 level of statistical significance.

Of the total sample managers interviewed, 36% had not attended a subject updating training course during the last five years. Of the courses attended, in-company courses were the most popular with 64% attendance, followed by external courses (largely provided by equipment manufacturers) with 60% attendance, and lastly, a very low percentage of respondents (12%) having attended a course on subject updating in a college of further education (see Table 5.8). These figures, which are significant at the 0.01 level of statistical significance (X^2 = 28.5, DF = 2), highlight disproportionately large gaps between the public and private sector provision.

Why should this be the case? Especially when further education has traditionally sought to meet the needs of industry[4] and it is now so widely recognised that the interests of both industry and education are closely related?[5] Could it be that although the North East has a multitude of institutions and agencies engaged in education and training, they have difficulty in responding to the "now very insistent signals from the market for skilled people and developing a consistent response"?[6] Or is it because the picture for those managers, who are concerned about training, has become incomprehensible and there is a need for an educative process about the developments in education and training which need to be undertaken?[7]

Whilst there is clear evidence that over a very long period industry's needs have remained a very low priority in the education processes,[8] many managers have not understood most of the recent

changes in the further education system since the establishment of BTEC. Therefore, without an understanding of the education system and the processes involved in training, how can they relate their own training needs and objectives to those offered in FE courses. The fact that two-thirds of all the training was actually carried out in-house or by external agencies such as equipment manufacturers (see Table 5.8, page 127) suggests that very specific client-centred training is required and it may be that colleges in the Region can only offer that training which is broad-based and not necessarily pertinent to immediate company needs.

For colleges of further education to be both effective and successful in their approach to vocational training, teaching staff must constantly keep up to date with their subject and be made aware of the developments in local industry in order to update course curricula and reduce any mismatch in the further education provision. Obviously, close liaison and consultations between personnel in local industry and staff in FE would be a necessary step towards achieving these objectives. Therefore, the existing links, tenuous or otherwise, between the sample colleges of further education and local industry are investigated in this study both from a manager's perspective (see Tables 5.9 - 5.11, pages 130 - 132) and a teacher's perspective (see Tables 4.26 - 4.28, pages 108 - 111).

The views of two different levels of management i.e. senior and middle on their consultations with staff of local colleges of further

education about the content and organisation of courses during the last two years was investigated on the basis of the hypothesis that:-

Ho: The consultations with teaching staff about the content and organisation of courses being offered by local colleges of further education was not dependent upon the status of managers employed in the electrical/electronics industry.

TABLE 5.9.

CONSULTATIONS WITH LOCAL COLLEGES OF FE ABOUT THE CONTENT AND ORGANISATION OF COURSES BY LEVEL OF MANAGEMENT

(Q.49)

CONSULTATIONS HELD WITH LOCAL COLLEGES (MANAGER RESPONSES)	MANAGER RESPONDENTS BY LEVEL OF MANAGEMENT		N=	%
	SENIOR	MIDDLE		
Yes	1 (2.4%)	5 (11.9%)	6	14.3
No	8 (19%)	28 (66.7%)	36	85.7
TOTAL	9 (21.4%)	33 (78.6)	42	100

Total number of managers in sample = 42

X^2 = 0 (after YATES correction) DF = 1 P = > 0.05

λ = 0

Phi = 0.05

Therefore Ho was accepted at the 0.05 level of statistical significance.

Only 14.3% of sample managers in the electrical/electronics industry had ever been consulted by staff in FE about the content and organisation of courses being offered by local colleges of further education (see Table 5.9), even though 88.1% of this sample argued that they should be so consulted (see Table 5.10).

TABLE 5.10.

OPINIONS ON CONTRIBUTIONS BY EMPLOYERS TO THE CONTENT AND ORGANISATION OF FE COURSES OFFERED TO THEIR INDUSTRY - MANAGER RESPONDENTS

(Q.50)

CONTRIBUTION BY EMPLOYERS TO COURSE CONTENT (MANAGER RESPONSES)	MANAGER RESPONDENTS BY LEVEL OF MANAGEMENT		N=	%
	SENIOR	MIDDLE		
Yes	7 (16.7%)	30 (71.4%)	37	88.1
No/uncertain	2 (4.8%)	3 (7.1%)	5	11.9
TOTAL	9 (21.5%)	33 (78.5%)	42	100

Total number of managers in sample = 42

X^2 = 0.25 (after YATES correction) DF = 1 P = > 0.05

The opinions of the sample managers in electrical/electronic engineering on the state of the liaison that existed between their company and the local colleges of further education was investigated on the basis of the hypothesis:-

Ho: The satisfactory liaison that exists between local industry and colleges of further education was not dependent upon grade or status of the manager.

TABLE 5.11.

OPINIONS ON THE LIAISON THAT EXISTS BETWEEN THEIR INDUSTRY AND LOCAL COLLEGES OF FURTHER EDUCATION BY LEVEL OF MANAGEMENT

(Q.52)

MANAGER RESPONSES ON THE LIAISON THAT EXISTS BETWEEN THEIR INDUSTRY AND LOCAL COLLEGES OF FE	MANAGER RESPONDENTS BY LEVEL OF MANAGEMENT		N=	%
	SENIOR	MIDDLE		
Satisfactory	2 (4.8%)	6 (14.2%)	8	19
Unsatisfactory	7 (16.7%)	27 (64.3%)	34	81
TOTAL	9 (21.5%)	33 (78.5%)	42	100

Total number of managers in sample = 42

X^2 = 0 (after YATES correction) DF = 1 P = > 0.05

χ = 0

Phi = 0.04

Therefore Ho was accepted at the 0.05 level of statistical significance.

A disproportionately high percentage (81%) of manager respondents stated that the existing liaison between themselves and local colleges of FE was unsatisfactory (see Table 5.11). This compares with 56.9% of teachers who were also of the opinion that liaison with local industry was unsatisfactory (see Table 4.28, page 111).

TABLE 5.12.

SUGGESTIONS GIVEN BY MANAGERS FOR IMPROVING LIAISON WITH THEIR LOCAL COLLEGE OF FURTHER EDUCATION

(Q.52)

MANAGERS SUGGESTIONS FOR IMPROVING LIAISON WITH LOCAL COLLEGES OF FURTHER EDUCATION	NUMBER OF POSITIVE RESPONSES
Discussions between managers and teachers on course content.	3
Exchange visits between personnel in industry and colleges.	2
FE students to visit industry.	2
Greater communication at all levels of staffing.	1
Managers to contribute to course content and to present certain parts/areas of the course.	1
Board consisting of educators and industrialists.	1
Employers allowed to assess students' work and to discuss progress/course content.	1
Staff in industry invited to lecture to classes in FE.	1
A liaison officer to co-ordinate visits.	1

Total number of managers in sample = 42

When asked to list ways in which liaison could be improved, a range of positive responses was given which included; greater discussions between managers and FE staff on matters which involved course curricula, and the appointment of a liaison officer (see Table 5.12, page 133 and Table 4.29, page 113).

The idea of a liaison officer is not new as the earliest attempts at building links with industry were through the role of industrial liaison officers.[9] Often, liaison officers were not skilled instructors, although by implication and openly they were social and life skills tutors who were mainly viewed as a type of industrial tutor.[10] They were essentially employed to manage the relations between tutors, industry and commerce, trainees and external agencies and to ensure the integration of off-the-job and on-the-job training as well as the assessment of training programme.[11]

A number of recent reports have expressed concern that many employers, particularly small businesses and those in newer industries, do not make as much use of their local college as they might.[12] However, a possible reason for this could be that, in the light of the recent industrial recession, some employers feel unable to devote time and money to the further education and training of employees. Although it has been suggested that "industry itself has found it difficult to articulate a clear statement of its needs",[13] attempts to correct this are under way. The CBI has been working with other national bodies including BACIE, IPM and ABCC to help co-ordinate the efforts of national bodies to find groups to articulate

employers needs locally and thereby help to make the best use of college resources.[14]

All medium and large companies should, it is argued, have a policy of educational liaison and a programme for its effective local implementation[15] and that they should involve their employees, from both industry and commerce, in the mainstream activities of colleges; namely the development of curriculum, assessment and staff in-service training.[16] Colleges, in turn, need to "read the Labour Market" at local level in order that there can be an effective employer input into resource planning in colleges.[17] There are, of course, in many regions, good examples of close co-operation and collaboration between employers and education institutions,[18] helped in recent year by a number of college/employer initiatives including; the College Employer Links Project (CELP), PICKUP and the Local Collaborative Projects (LCP). The main aim of these initiatives is to encourage local industry and colleges of further and higher education to pool their resources in a determined effort to identify training aims and objectives and to use LCPs to help solve ongoing technical problems. The CELP and LCP schemes are particularly useful to industry, especially small firms which have limited budgets, as they allow companies access to college resources, including testing and monitoring facilities.[19] The PICKUP initiative, in particular, is especially effective in highlighting problems and suggesting solutions which could be universally applied. For example, it has brought to the fore empirical evidence that employers are increasingly looking for flexible, modular provision to update their employees knowledge as

and when required rather than long inflexible courses which may at least in part be of less relevance to the individual and/or his company.[20]

Another important joint project between industry and education is the Information Technology Centres or ITeCs which have been set up jointly by the Department of Trade and Industry and the Manpower Services Commission. Although providing a more specific type of vocational education, particularly for 16 - 18 year olds, the rapid expansion of ITeCs has been achieved with the help of many Local Authorities and companies; the former often helping with premises and the latter with staff and expertise.[21]

It is obviously important that teaching staff are encouraged to develop contacts and liaise with all levels of staff in local industry. This could be prompted and sustained, in part, by adequate remission of teaching duties to allow for visits to local firms. LEA policies on college staff development should encourage industrial secondment and the updating of college staff in addition to sending teachers on courses leading to further academic qualifications or research.[22] In order to facilitate this secondment of staff, BACIE are to run a PICKUP brokerage scheme of industrial secondments as a pilot for 18 months. It will seek to achieve new secondment places relevant to PICKUP and to arrange placements between FHE and industry.[23]

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CHAPTER 6

AN INTERPRETATION OF THE SURVEY FINDINGS AND GENERAL CONCLUSIONS

Due to the long slow decline of traditional heavy industries, the North East Region of England exhibits all the characteristics of a "problem" or deprived area as defined by the EEC. This has prompted various British governments to designate the whole region as a priority area for industrial investment, offering a number of substantial financial incentives in an effort to attract and encourage the growth of industrial and commercial projects.[1] Overseas investment is a vital part of the industrial development of the North East and firms from North America, Japan, Europe and Australia have all settled in the region, providing important new investment and employment opportunities. Some 150 such manufacturing establishments, representing 16 countries, are currently operating[2] and between 1963 and 1985, employment in manufacturing establishments with overseas parents had increased from 8,000 to nearly 50,000, or from 2% to 10% of total manufacturing employment in the region.[3]

The North East has experienced a century of dramatic changes since the days when it was considered to be the crucible of the Industrial Revolution.[4] A much more diversified industrial structure, including significant contributions in electronics, scientific instruments, pharmaceuticals, petrochemicals (which in turn has brought with it the support industries and services - transport, financial, professional, scientific, business and distributive -

necessary for manufacturing expansion),[5] is slowly taking place, in spite of the Region's long-standing dependence on traditional industries such a coal mining, shipbuilding and heavy engineering. These older-type industries, although in rapid decline, still rely heavily on traditional craft skills of the workforce and are becoming increasingly vulnerable to competition from foreign countries, in particular the Far East, where human labour is very much cheaper.[6] Therefore, such traditional practices are obviously less than adequate for a depressed region which is in urgent need of new investment and updating of its industries so that they can remain competitive and sustain even the present employment levels amongst their workers.[7] Education, in turn, must ensure that technological developments in industry are not delayed because training or educational facilities have not been provided. A solution to the problem of mismatch between training/education provision and the needs of industry[8] must be sought after in an effective and sustained manner, if the region is to be revitalised and unemployment reduced to an acceptable low level.

A major problem in the UK is the existence of a long standing communication gap between Education and Industry.[9] Much time has been spent by both 'sides' blaming the other, but now there is a general recognition that something constructive must be done to close the gap. Given the different attitudes and values prevalent in education and industry, this problem will not be solved by goodwill alone, but requires a range of well-conceived initiatives.[10]

Effective liaison between colleges and local employers is fundamental to the provision of relevant vocational courses and in determining the requirements of the industrial base of a region. Hitherto, links with industry have been developed primarily through part-time day-release education and have been constrained by the dictates of examining and course validating bodies.[11] Liaison must be carefully planned and maintained, for simply establishing dialogue between industry and eduction does not necessarily mean that satisfactory links exist (see Table 4.28, page 111 and Table 5.11, page 132).

Further education is generally looked upon as being good value for money[12] and the survey shows that the main factors influencing the employers' choice of college were location, the college's responsiveness to employer needs, and cost. The credibility of a college, in the eyes of an employer, is also very important and it is by and large true, that the reputation of a college is totally dependant upon the personal relationships which have developed between company personnel and college staff.[13] The problems of education establishing links with industry are generally greatest with respect to small firms. Where major companies, e.g. British Telecom, provides a large number of students the courses are usually tailored to the needs of that company; company training programmes are often matched to and compatible with, those provided by the college.[14] Also the larger companies are more likely to have a training officer who will acquaint himself with curricular developments. From the side of education, there is the natural tendency, based on simple

efficiency, for large colleges to link with large firms, in looking for student sandwich placements, staff secondments, collaborative research and consultancy contracts.[15] With small and medium-sized firms, there is clearly a major problem in establishing communications as it is difficult for the college to make specific provision for each employer because of their diversity of interests, and growing numbers. Also, small firms are widely dispersed throughout an area and frequently have few staff.[16]

Recently, the MSC and DES have assumed the roles of pro-active brokers or agents, by developing and implementing, for example, PICKUP and TVEI initiatives to form linking mechanisms between school, industry and adult education. The response of colleges to these initiatives has been mixed and varied, creating atmospheres of both enthusiastic and reluctant involvement. When colleges have responded to the new initiatives in a variety of positive ways, in many cases, this has been due to the enthusiasm of individuals rather than an institutional response.[17]

The 'Technical and Vocational Educational Initiative' (TVEI) has been described as "the first step towards creating an educational system geared solely to the interests of industry rather than to the needs of the individual - a system where young people are 'cultivated' to suit the needs of the economic system rather than educated".[18] Its objectives include not only developing, and thereby enhancing the status of, both technical and vocational education, and attuning formal education more closely with the world of work, but also

providing planned work experience; encouraging initiative and problem-solving abilities; developing new forms of assessment; providing equal opportunities and avoiding sex stereotyping in curricular choice; and catering for the full ability range.[19] In general, the main intention of the scheme is to ensure that young people will acquire qualifications which will be of direct value at work. Whilst the MSC has denied that TVEI is about premature vocational choice and specialisation, they see TVEI courses linked to subsequent training and educational opportunities.[20]

The DES PICKUP Programme concentrates upon the growing need for updating that most valuable resource - the skills of professionals and other key employees in industry and education. Since 1982, PICKUP has been aiming to:-

(a) Encourage a major shift in the priorities of colleges, polytechnics and universities in the direction of adult vocational updating needs in their region and plan ways of meeting them.

(b) Promote the development of new types of courses, new materials and new ways of teaching so that updating needs can be met effectively and economically.

(c) Build up sources of information so that potential clients in industry and commerce can discover what is available, and

providers can make the best use of available materials and avoid wasteful duplication of effort.[21]

In funding FE provision through the afore-mentioned initiatives, the MSC and DES require engineering departments to relate courses more directly to the training requirements of industry. Although some engineering departments have, over the years, built up a good working relationship with industry (see Tables 4.26 - 4.28, pages 108 - 111) the involvement in DES and MSC initiatives has increased the awareness of local industrial needs other than those covered by traditional training and further eduction.[22] Where departments had made efforts to strengthen links with local employers, representatives from industry were invited to participate in departmental planning/advisory committees, and a small number of teachers had been seconded to local firms to update their knowledge and increase their expertise in a specific skill, e.g. CNC machines. In some cases, where the links with local firms were particularly good, electronic equipment, albeit slightly dated, was given to colleges in order to augment existing departmental stocks.

Of the colleges visited, all but one were rapidly adjusting to changes brought about by; (a) the overall decline in student members, (b) the effect of new technology in industrial practice, and (c) new national educational initiatives.[23] But, despite many curriculum innovations being introduced into colleges, many managers interviewed were concerned that they had little or no influence on course content even though many were of the opinion that they should

be involved (see Tables 5.9 and 5.10, pages 130 and 131). In fact, in many college, curricular areas have been, at best, loosely planned to meet what are seen as local labour market needs; one or two representatives of local employers have been placed on planning/management committees, but there has been no systematic consultation.[24] Often, curriculum provision in colleges is developed in response to an immediate situation or set of circumstances with little or no opportunity for preparation.[25]

When responding to the needs of local industry, a client-centred approach is needed in term of both their content and their mode, time and place of attendance. For these requirements to be met adequately, there is a demand for curriculum development skills of a very high level. The contexts in which these skills may have to be exercised can be broadly divided into three.[26]

1. Staff may be able to base their provision on already well understood programmes, or on bringing together units from the range of existing qualification-bearing programmes.

2. Where courses have to be designed without precedent for purposes identified by market research, the operation of course design becomes much bigger. A job-oriented curriculum will in some cases be an appropriate solution, where the course content is jointly planned by industry and the college and is delivered by staff drawn from both.

3. Where the principle requirement is for short and ad hoc programmes, existing material has to be edited and re-ordered so as to provide a coherent and meaningful course, yet one which is not too long or inappropriately intense.

Since very few engineering departments in the sample had established procedures for curriculum review and evaluation, discussion of curricular issues, when it took place, was usually informal. This problem was compounded by the lack of liaison and co-operation between teaching staff in identifying common areas of the taught syllabus. This ultimately meant that there was much duplication and an artificial lengthening of courses and many deficiencies in the interpretation and development of technical aspects of the curriculum. A number of the colleges visited tended to simply offer those courses which were considered by many to be traditional and involved a curriculum which had been inherited, thus making it convenient for staff to teach year after year. Many new courses on offer resulted from the interests and skills of new members of staff, leaving some older teachers to happily continue to teach established courses in the "traditional way". Many older members of staff (60.4% of the sample were aged 45 years or more - see Table 4.2, page 61) were often incapable of providing any new initiatives, or indeed to teach on courses which involved microprocessor knowledge or skills since 74.1% of the sample teachers had not been in industry, nor had any full-time industrial experience for eleven or more years (see Table 4.6, page 71). A traditionally accepted means by which teachers in further education can keep in touch with recent developments in their subject

area is by subscription to a professional body or institute. However, of the total number of teachers sampled in the selected college departments, 67% were not, nor ever had, been members of a professional institute other than a trade union. The problem of ensuring that teachers have sufficient knowledge and expertise to meet the needs and requirements of local industry is not only common to the North East, but also to other regions nationwide. In a recent report, it was pointed out that "the performance of up to one fifth of the institutions visited was judged to be adversely affected by a shortage of appropriately experienced lecturers. This problem appeared to centre less upon absolute numbers and more upon the capacity of lecturers to adapt to changing demands..... and in acquiring the knowledge and skills related to computers and other newer kinds of technological equipment".[27]

The unprecedented rise of microelectronic technology has meant that, more than ever, there is an urgent need for forward manpower planning and as microelectronics is still a relatively new science, changes in its design, construction and applications are likely to be with us for many years to come. Because of this state of change due to ever increasing research and development, all education and training courses must be made highly flexible and regular updating and training of teaching staff must necessarily take place. In order to compete with external agencies and to satisfy the requirements of the Manpower Services Commission (now the Training Commission) in terms of course provision, the FE sector must recognise the importance of continuous training and retraining of teaching and support staff.[28]

Very few of the departments sampled had a formal procedure for identifying or meeting the in-service needs of staff (see Table 4.23, page 101). There were, invariably, signs of ad hoc staff development policies by management and a tendency on the part of staff to write their own career patterns and to self-select themselves for updating/retraining courses.

Over the past decade, FE teachers have had to cope with an unprecedented rate of change "with little opportunity for preparation, scant resources and without appropriate staff development or a clear national or regional framework of objectives",[29] and whilst some have coped well, others, particularly those with long service, had found adaption difficult.[30] For, although a substantial proportion of FE teachers had some form of commercial or industrial experience, little of it was recent[31] (see Table 4.6, page 71). Teaching staff were, by and large, reasonably well qualified in their subject discipline (even though industrial experience was dated), and 82-88% had some form of teaching qualification (see Table 4.4, page 65 and Table 4.5, page 69). However, because of limited long-term in-service staff development, there was a surplus of staff with traditional manufacturing and 'heavy-current' experience and a pronounced shortage in the new technology areas, particularly micro-processor and micro-electronic engineering.

Staff development units were said to exist within their college by 86% of the sample of FE teachers (see Table 4.22, page 99). Whilst staff development took place in one form or another in most of

the engineering departments visited, often its success very much depended on the initiatives of individual members of staff as there was rarely a systematic college process which identified course or personal development needs (see Table 4.23, page 101). Most college-operated staff development programmes were based upon a college development plan which was funded by a DES Educational Support Grant. The contents of such plans should, of course, be based upon the identified needs of individual lecturers, the needs of departments and the needs of the college's national priorities.[32] Whilst staff development will vary slightly from college to college, depending upon funding, staff expertise and college imperatives, a programme for action may give priority to each of the following suggested areas/projects:[33]

(a) Teacher Profiles - the development of a Teacher Profiling system which identifies strengths and weaknesses.

(b) Teachers into Industry - identification of needs and the placement of teachers into local industry.

(c) Education and Industry Workshops - a series of two to three hour workshop style sessions with teachers and managers combining and stating problems and concerns over such matters as curriculum, teaching methods and equipment.

(d) Teacher Resource Centre - maintaining and developing a centre of information and materials on national and local industries and organisation.

(e) Tape Slide Packages and Videos - provided by the teacher/manager partnership on a variety of relevant topics and to include those made by the partnership itself.

(f) Publications - produced by the partnership on a variety of relevant items such as; vocational education/training developments, new Government initiatives, and a comprehensive resource directory describing local companies and giving a list of activities supported by them.

(g) Industrial Liaison Unit[34] - to manage and administer the combined activities of research, consultancy, short courses, publicity and marketing services.

In response to this increased work load and commitment, staff at all levels should become involved and therefore it is necessary to encourage and motivate as well as providing incentives in the form of time-table and financial assistance.

This research study sought to determine the industrial developments in microelectronic technology in local industry and the implications this has for further education departments of electrical and electronic engineering in the North East Region. Whilst it is

recognised that there are obvious shortcomings and limitations in a broad-based study which examines an industry consisting of more than one sector, and the relationship between that industry and the local providing colleges of further education, nevertheless, an important outcome has been a highlighting of the limited amount of training given and the lack of training provision for many of the sample respondents. Further, there was much evidence of a very severe lack of liaison between the two sample areas, i.e. industry and FE, which ultimately led to a lack of co-ordination and inevitable disjunction between in-company training programmes and those on offer by the local providing colleges of further education. This meant that each training programme attended was often thought of as a separate entity by students and not as an important part of the total training process. In many cases, this situation very often led to the teaching and planning of "traditional" courses with much duplication and misuse of resources, resulting in inevitable time-wasting and an artificial lengthening of a training programme. Also, forward planning of training programmes by both industry and FE was less in evidence than one might have hoped for, with the result that any changes/updating of the taught curricula would only be implemented when an immediate problem came to light.

In many sectors of industry, rapid advances in manufacturing techniques due to developments in microelectronic technology have come to mean that education and training establishments must accept that change is the normal state, and that they must respond accordingly if they are to be successful in a society which has total disregard for

long standing traditional working practices.[35] Colleges of further education must remain flexible and open to the ever-changing demands made upon them by clients in industry. Industry, on the other hand, must do its part by articulating a much more detailed statement of its needs and make its voice heard at a higher level than has hitherto been the case. Effective mechanisms and increased methods of communication have to be made available in order to ensure that the needs of local industry are well known to potential trainers and that they are allowed to be developed in relation to the training provision required, and these must be in accordance with modern working techniques and industrial trends.

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APPENDIX I

PROFESSIONAL INSTITUTES SUBSCRIBED TO BY THE SAMPLE TEACHERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

TABLE I.1.

PROFESSIONAL INSTITUTE STATUS OF TEACHERS IN ELECTRICAL/ELECTRONIC ENGINEERING

(Q.11)

PROFESSIONAL INSTITUTE STATUS OF SAMPLE TEACHERS	NUMBER OF POSITIVE RESPONSES	%
MIELECIE	12	20.7
T.ENG (CEI)	3	5.2
MIMC (Inst. of Measurement and Control)	2	3.5
AMBCS (British Computer Society)	2	3.5
C.ENG	1	1.7
MIERE	1	1.7
MSERT	1	1.7
MIME (Inst. of Marine Engineers)	1	1.7
FIMMEE (Inst. of Mining Mech./Elect.Eng.)	1	1.7

Total number of teachers in sample = 58

Of those teacher respondents (33%) who subscribed to a professional institute, the increased number of positive responses was due to the fact that some actually subscribed to more than one institute.

APPENDIX II

SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

TABLE II.1

SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

(Q.9)

SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE SELECTED INDUSTRY	NUMBER OF POSITIVE RESPONSES	%
City and Guilds	14	33.3
ONC	8	19.1
HNC	7	16.7
B.Sc.	4	9.5
HND	1	2.4
M.Sc.	1	2.4
B.Sc.(Hons)	1	2.4
Post grad. qualification in automation technology	1	2.4
British computer studies (part 1)	1	2.4

Total number of managers in sample = 42

Of those manager respondents (69%) who held a subject specific qualification, the increased number of positive responses was due to the fact that a large proportion held more than one qualification.

APPENDIX III

NON-SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

TABLE III.1

NON-SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY

(Q.13)

NON-SUBJECT SPECIFIC QUALIFICATIONS HELD BY SAMPLE MANAGERS IN THE SELECTED INDUSTRY	NUMBER OF POSITIVE RESPONSES
City and Guilds (Gas Fitting)	1
BEC National Cert. (Business Studies)	1
Soccer Coach/Referee	1
Diploma in Personnel Management	1
Diploma in Mathematics	1
B.Sc. (Metallurgy)	1
Training Officers Certificate	1
Certificate in Industrial Relation Studies	1
B. Tech. (Applied Biology)	1
B.Sc. (General Degree)	1
Royal School of Music	1
Certificate in Industrial Management	1
Diploma in Industrial Management	1
B.Sc. (Management Studies)	1
City and Guilds FE Teachers Certificate	1

Total number of managers in sample = 42

APPENDIX IV

STRUCTURED INTERVIEW QUESTIONNAIRE USED WITH SAMPLE TEACHERS IN ELECTRICAL/ELECTRONIC DEPARTMENTS OF LOCAL COLLEGES OF FURTHER EDUCATION IN THE NORTH EAST REGION

Structured Interview - Questionnaire for Teachers in Further Education Teaching on Electrical and Electronic Engineering Courses

Interview Number 

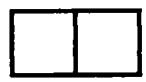
Index Number 

Date of Interview
(Record day and month) 

Category of Respondent 

Manager in Industry = 1

Teacher in F.E. = 2

College Reference
(if applicable) 

Firm Reference
(if applicable) 

SECTION ONE: 'PERSONAL DETAILS AND INDUSTRIAL EXPERIENCE'

Q.1 GENDER

If a MALE - enter 1 in the box

If a FEMALE - enter 2 in the box

Q.2 AGE

Write the code number corresponding to the respondent's age group in the box.

(a) under 25 - enter 1

(b) 25 - 34 - enter 2

(c) 35 - 44 - enter 3

(d) 45 - 54 - enter 4

(e) 55 - 65 - enter 5

Q.3 PRESENT GRADE OR POSITION

What is your present teaching grade/position in this college?

(a) H.O.D. or higher - enter 1

(b) Principal lecturer - enter 2

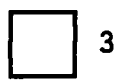
(c) Senior lecturer - enter 3

(d) L11 - enter 4

(e) L1 - enter 5

(f) Temporary member of staff - enter 6

(g) Part-time member of staff - enter 7



Q.4 YEARS EMPLOYED AT PRESENT COLLEGE/INSTITUTE

How many years have you been employed in your present college/institute?

(a) 0 - 1 year - enter 1

(b) 2 - 5 years - enter 2

(c) 6 - 10 years - enter 3

(d) 11 - 20 years - enter 4

(e) More than 20 years - enter 5

☐ 4

Q.5 CATEGORY OR STATUS OF TEACHING INSTITUTE

State the category or status of your present teaching institute.

(a) Higher Education Institute (including Polytechnics) - enter 1

(b) Further Education Institute - enter 2

☐ 5

Q.6 YEARS SPENT TEACHING FULL-TIME IN FURTHER EDUCATION

State the total number of years that you have taught full-time in further education.

(a) 0 - 1 year - enter 1

(b) 2 - 5 years - enter 2

(c) 6 - 10 years - enter 3

(d) 11 - 20 years - enter 4

(e) More than 20 years - enter 5

☐ 6

Q.7 MAJOR TEACHING SUBJECT(S

What is/are your major teaching subject(s)

Record

Q.8 HIGHEST SUBJECT QUALIFICATION AND TIME SINCE OBTAINING QUALIFICATION.

Write in the box the number corresponding to the highest subject qualification you hold and time lapse since obtaining it.

Qualification in Teaching Subject	Years since obtaining Qualification				
	0-2	2-4	5-7	8-10	11 or More
Higher Degree	1	2	3	4	5
First Degree	6	7	8	9	10
HND/HNC	11	12	13	14	15
OND/ONC	16	17	18	19	20
Higher TEC/TEC	21	22	23	24	25
C & G Full Tech.Cert	26	27	28	29	30
Other (Specify Below)	31	32	33	34	35

7

Q.9 HIGHEST TEACHING/EDUCATION QUALIFICATION AND TIME SINCE OBTAINING QUALIFICATION.

Write in the box the number corresponding to the highest teaching/education qualification held and time lapse since obtaining it.

Qualification in Education	Years Since Obtaining Qualification				
	0-1	2-4	5-7	8-10	11 or More
Unqualified	0	0	0	0	0
Higher Degree	1	2	3	4	5
First Degree	6	7	8	9	10
DAES/Dip.FE	11	12	13	14	15
Cert.Ed (In-Service)	16	17	18	19	20
Cert.Ed (Pre-Service)	21	22	23	24	25
City & Guilds Teacher's Cert.	26	27	28	29	30
Other (Specify Below)	31	32	33	34	35

8

Q.10 Are you a member of a professional institute?

If YES - enter 1

If NO - enter 2

9

Q.11 If the response to Q.10 is YES please state which institute(s).

Record

Q.12 INDUSTRIAL EXPERIENCE AND TIME SINCE LEAVING INDUSTRY

Write in the box the number corresponding to the number of years spent in and time lapse since leaving industry.

Years Spent in Industry	Years Since Last in Industry				
	0-1	2-5	6-10	11-20	Over 20
0 - 1	1	2	3	4	5
2 - 5	6	7	8	9	10
6 - 10	11	12	13	14	15
11 - 20	16	17	18	19	20
Over 20	21	22	23	24	25

☐ 10

Q.13 State the number of Institutions in which you have worked as a lecturer in further education.

(a) 1 - 2 - enter 1

(b) 3 - 4 - enter 2

(c) 5 - 6 - enter 3

(d) More than 6 - enter 4

☐ 11

Q.14 YEARS SPEND IN PRESENT POSITION

For how many years have you been employed in your present position/grade.

(a) 0 - 2 years - enter 1

(b) 3 - 5 years - enter 2

(c) 6 - 9 years - enter 3

(d) More than 9 years - enter 4

☐ 12

Q.15 JOB FUNCTION(S)

State the main function(s) of your present job.

Record

Q.16 STAFF RESPONSIBILITY

State the number of staff who are directly responsible to you.

(a) None - enter 1

(b) 1 - 9 - enter 2

(c) 10 - 19 - enter 3

(d) 20 - 49 - enter 4

(e) 50 or more - enter 5

☐ 13

SECTION TWO: 'MICROELECTRONIC TECHNOLOGY AWARENESS, IMPLEMENTATION AND EMPLOYMENT EFFECTS'

Q.17 How has computerisation affected the Electrical/ Electronic Industry in relation to each of the following:

Use the five point Likert scale when scoring.

Very Greatly Increased	1	2	3	4	5	Very Greatly Decreased

NOT AT ALL

(a) Employment levels [ ] 14

(b) Skill requirements of the workforce [ ] 15

(c) Problems of recruitment [ ] 16

(d) Training requirements [ ] 17

(e) Efficiency in completing task [ ] 18

Q.18 In your opinion, is is important for effective introduction that any new system/equipment be clearly understood by all concerned?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

Other - enter 4 and specify

19

Record

Q.19 In your opinion, is it important to give all staff the knowledge and skill which will be required directly as a result of computerisation?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

Other - enter 4 and specify

20

Record

Q.20 - Q.25 Very Important - enter 1

Important - enter 2

Not Important - enter 3

How would you rate the importance of the following in ensuring good communication with employees so that they:

Q.20 Understand the reasons for introducing the new system/equipment. [ ] 21

Q.21 Are given an understanding of the new system/equipment. [ ] 22

Q.22 Are given the opportunity to express anxieties and receive answers to their queries. [ ] 23

Q.23 Have a chance to make a contribution to the changes. [ ] 24

Q.24 Can participate in in-company training sessions for managers and staff to give a general understanding and awareness of computerisation. [ ] 25

Q.25 Can participate in external (e.g. in F.E.) training sessions for managers and staff to give a general understanding and awareness of computerisation. [ ] 26

SECTION THREE: 'IN-SERVICE TRAINING AND COURSE PREFERENCE'

Q.26 Do you consider that continuous training and retraining of staff in the Electrical/Electronics Industry is essential?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

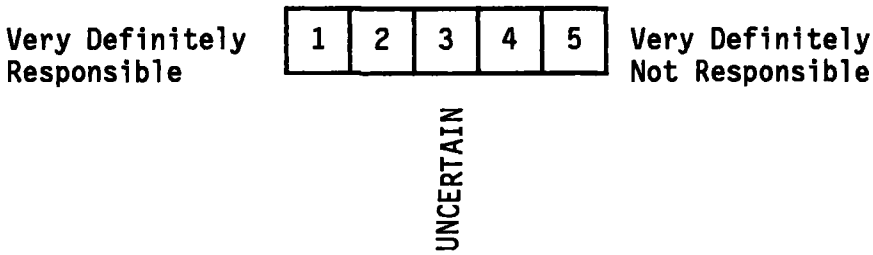
[ ] 27

Q.27 If the response to Q.26 is NO give reasons.

Record

Q.28 If the response to Q.26 is YES state which organisation(s) should be responsible for providing such staff training

Use the five point Likert scale when scoring.



(a) Individual Employers ☐ 28

(b) LEA'S ☐ 29

(c) Unions ☐ 30

(d) MSC/Government bodies ☐ 31

(e) Combination of providing bodies ☐ 32

(f) Other - please specify ☐ 33

Q.29 State the number of in-service, non-certificated, courses on education (pedagogic skills) attended in the last 5 years and the time lapse since last course attended.

Number of Courses Attended	Number of Years Since Last Attended Course			
	0-1	2-3	4-5	More than 5
0	0	0	0	0
1	1	2	3	4
2	5	6	7	8
3	9	10	11	12
4	13	14	15	16
5	17	18	19	20
More than 5	21	22	23	24

☐ 34

Q.30 What was the average time duration of such educational courses?

(a) Less than 1 day - enter 1

(b) 1 - 2 days - enter 2

(c) 3 - 4 days - enter 3

(d) 5 - 6 days - enter 4

(e) More than 1 week - enter 5 and specify

☐ 35

Q.31 How many of these educational courses were concerned with the introduction and application(s) of computerisation in education?

(a) None - enter 1

(b) 1 - 2 - enter 2

(c) 3 - 4 - enter 3

(d) 5 or more - enter 4 and specify

36

Q.32 How would you rate the usefulness of such courses?

Use the five point Likert scale when scoring.

Very Useful | 1 | 2 | 3 | 4 | 5 | Not Very Useful

UNCERTAIN

37

Q.33 State the number of in-service, non-certificated, courses on subject matter/technological advances attended by you in the last 5 years and the time lapse since last course attended.

Number of Courses Attended	Number of Years Since Last Attended Course			
	0-1	2-3	4-5	More Than 5
0	0	0	0	0
1	1	2	3	4
2	5	6	7	8
3	9	10	11	12
4	13	14	15	16
5	17	18	19	20
More than 5	21	22	23	24

38

Q.34 What was the average time duration of such subject matter courses?

(a) Less than 1 day - enter 1

(b) 1 - 2 days - enter 2

(c) 3 - 4 days - enter 3

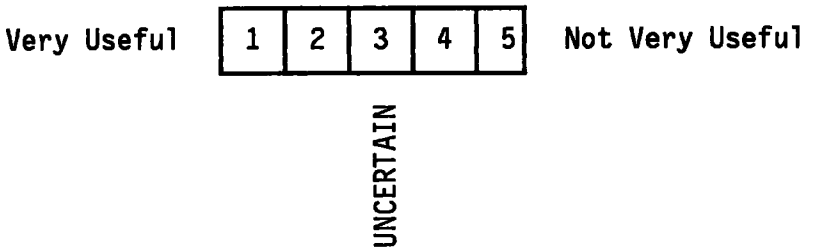
(d) 5 - 6 days - enter 4

(e) More than 1 week - enter 5 and specify

39

Q.35 How would you rate the usefulness of such courses?

Use the five point Likert scale when scoring.



40

Q.36 - Q.40 Very Important - enter 1

Important - enter 2

Not Important - enter 3

If in-service courses, not leading to a certificate, were to be provided, how would you rate the importance of the courses listed below:

Q.36 Courses concerned with recent technological and industrial developments in your teaching subject. 41

Q.37 A period of secondment in industry for retraining/updating of teaching subject. 42

Q.38 Educational methods and teaching skills. 43

Q.39 Management and/or Administration skills. 44

Q.40 Other areas - please specify 45

Record

Q.41 - Q.50	Very Often	- enter 1
	Often	- enter 2
	Sometimes	- enter 3
	Not Very Often	- enter 4
	Never	- enter 5

How do you keep up to date with recent developments in your subject area?

List, using the above scoring code, the regularity with which you use each of the following methods.

Q.41	Consult magazines/journals published by a professional body.	46
Q.42	Read magazines/journals published every week or month (periodicals).	47
Q.43	Consult text books.	48
Q.44	Visit exhibitions.	49
Q.45	Ask other members of staff.	50
Q.46	Staff room chat	51
Q.47	Ask students	52
Q.48	Liaison with industry.	53
Q.49	Undertake/supervise research in a specific industrial subject/field	54
Q.50	Other - please specify	55

Q.51 Is there, in your college, a Staff Development Unit?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3 [ ] 56

Q.52 Have you been interviewed or formally appraised over the last five years in order to discuss personal and academic development?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3 and specify [ ] 57

If the response to Q.52 is <u>NO</u> skip to Q.55

Q.53 Formal Appraisal of Teachers in Colleges of Further Education.

State the number of appraisal interviews attended in the last 5 years and the time lapse since the last interview.
Place appropriate number in the box.

Number of Appraisal Interviews	Time Since Last Appraisal Interview (in Months)					
	0-3	4-6	7-12	13-18	19-24	More than 24
0	0	0	0	0	0	0
1	1	2	3	4	5	6
2	7	8	9	10	11	12
3	13	14	15	16	17	18
4	19	20	21	22	23	24
5	25	26	27	28	29	30
More than 5	31	32	33	34	35	36

58

Q.54 Effectiveness of Appraisal Interview

Place appropriate number in the box.

After Appraisal was there an Identifiable need for Training/Retraining	Was Training/Retraining Carried Out	
	NO	YES
NO	1	2
YES	3	4

59

SECTION FOUR: 'LIAISON BETWEEN LOCAL INDUSTRY AND COLLEGES OF FURTHER EDUCATION'

Q.55 Have you at any time during the last two years been consulted by local industry about the content and organisation of courses?

If YES - enter 1

If NO - enter 2 [ ] 60

Q.56 Have you at any time during the last two years consulted local industry about the content and organisation of courses?

If YES - enter 1

If NO - enter 2 [ ] 61

Q.57 In your opinion should employers contribute to content and organisation of courses, related to their industry, being offered by your college?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3 [ ] 62

Q.58 If the response to Q.57 is NO give reasons.

Record

Q.59 In your opinion, is there a satisfactory liaison between your college of further education and the Electrical/Electronics Industry?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

63

Q.60 If the response to Q.59 is NO list ways in which the liaison between colleges of further education and industry could be improved.

Record

APPENDIX V

STRUCTURED INTERVIEW QUESTIONNAIRE USED WITH SAMPLE MANAGERS IN THE ELECTRICAL/ELECTRONICS INDUSTRY IN THE NORTH EAST REGION

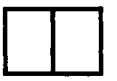
Structured Interview - Questionnaire

for Senior Management, Personnel/Training Officers,

Supervisors in the Electrical/Electronics Industry.

Interview Number 

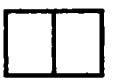
Index Number 

Date of Interview
(Record day and month) 

Category of Respondent 

Manager in Industry = 1

Teacher in FE = 2

College Reference
(if applicable) 

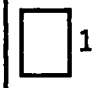
Firm Reference
(if applicable) 

SECTION ONE: 'PERSONAL DETAILS AND INDUSTRIAL EXPERIENCE'

Q.1 Gender

If a MALE - enter 1 in the box

If a FEMALE - enter 2 in the box



Q.2 Age

Write the code number corresponding to the respondents age group in the box

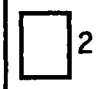
(a) under 25 - enter 1

(b) 25 - 34 - enter 2

(c) 35 - 44 - enter 3

(d) 45 - 54 - enter 4

(e) 55 - 65 - enter 5



Q.3 Present Grade or Position

What is your grade/position in this Company?

Enter code number in the box provided

(a) Director - enter 1

(b) General Manager - enter 2

(c) Divisional Manager - enter 3

(d) Personnel Manager - enter 4

(e) Training Manager - enter 5

(f) Personnel Officer - enter 6

(g) Training Officer - enter 7

(h) Supervisor - enter 8

(i) Other - enter 9 and specify job title.

3

Q.4 Years Spent in the Electrical/Electronic Industry.

For how many years have you been employed in the Electrical/Electronic Industry?

(a) 0 - 1 year - enter 1

(b) 2 - 5 years - enter 2

(c) 6 - 10 years - enter 3

(d) 11 - 20 years - enter 4

(e) 21 - 40 years - enter 5

(f) Over 40 years - enter 6

4

Q.5 Category or Status of Employer

State the main nature of your employer's business.

(a) Electrical/Electronic Engineering - enter 1

(b) Microelectronics/Computer Manufacturing - enter 2

(c) Telecommunications - enter 3

(d) Electrical Maintenance/Servicing - enter 4

(e) Mechanical Engineering - enter 5

(f) Instrumentation - enter 6

(g) Electrical Installation - enter 7

(h) Production Engineering - enter 8

(i) Other - enter 9 and specify

5

Q.6 Years Spend in Present Position.

How many years have you been employed in your present position?

(a) less than 1 year - enter 1

(b) 1 - 2 years - enter 2

(c) 3 - 4 years - enter 3

(d) 5 - 6 years - enter 4

(e) 7 - 8 years - enter 5

(f) 9 - 10 years - enter 6

(g) Over 10 years - enter 7 and specify

6

Q.7 Job functions

State the main function of your present job.

Record

Q.8 Staff Responsibility

State the number of staff who are directly responsible to you.

(a) none - enter 1

(b) 1 - 9 - enter 2

(c) 10 - 19 - enter 3

(d) 20 - 49 - enter 4

(e) 50 - 99 - enter 5

(f) 100 or more - enter 6

7

Q.9 Qualifications

Do you hold any recognised qualification(s) in the field of electrical/electronic engineering?

If YES - enter 1

If NO - enter 2

8

Q.10 If the response to Q.9 is YES please state the qualification(s) you have.

Record 1.

2.

3.

4.

Q.11 Are you a member of a professional institute?

If YES - enter 1

If NO - enter 2

☐ 9

Q.12 If the response to Q.11 is YES please give the name of the institute(s)

Record 1.

2.

3.

4.

Q.13 Do you hold any qualification(s), either by election or by examination, other than those in electrical/electronic subjects already specified?

If YES - enter 1

If NO - enter 2

☐ 10

Q.14 If the response to Q.13 is YES please state your qualification(s)

Record 1.

2.

3.

4.

SECTION TWO: 'MICROELECTRONIC TECHNOLOGY AWARENESS, IMPLEMENTATION AND EMPLOYMENT EFFECTS'

Q.15 Have either you or your company been affected by technological changes and innovation during the last 5-10 years?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

☐ 11

Q.16 Has your company installed any new machinery or equipment within the last 5 years?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

☐ 12

Q.17 If your response to Q.16 is YES does the construction of this new machinery or equipment utilise computerisation.

If YES - enter 1

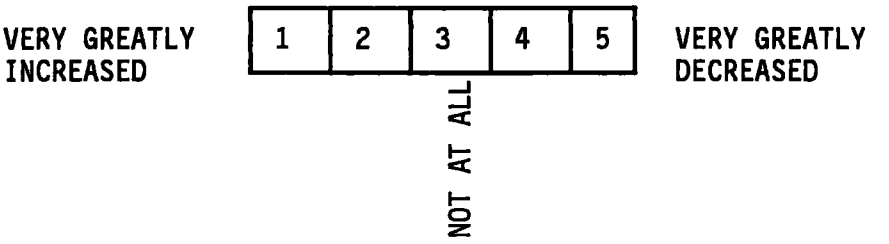
If NO - enter 2

Uncertain - enter 3

☐ 13

Q.18 How has computerisation affected your company in relation to each of the following:

Use the five point Likert scale when scoring.



(a) Employment levels [ ] 14

(b) Skill requirements of the workforce [ ] 15

(c) Problems of recruitment [ ] 16

(d) Training requirements [ ] 17

(e) Efficiency in completing task [ ] 18

Q.19 In your opinion, is it important for effective introduction that any new system/equipment be clearly understood by all concerned?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

Other - enter 4 and specify

Record

19

Q.20 In your opinion, is it important to give all staff the knowledge and skill which will be required directly as a result of computerisation?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

Other - enter 4 and specify

Record

20

Q.21 - Q.26 Very Important - enter 1

Important - enter 2

Not Important - enter 3

How would you rate the importance of the following in ensuring good communication with employees so that they:

Q.21 understand the reasons for introducing the new system/equipment [ ] 21

Q.22 are given an understanding of the new system/equipment [ ] 22

Q.23 are given the opportunity to express anxieties and receive answers to their queries [ ] 23

Q.24 have a chance to make a contribution to the changes [ ] 24

Q.25 can participate in in-company training sessions for managers and staff to give a general understanding and awareness of computerisation [ ] 25

Q.26 can participate in external (e.g. in F.E.) training sessions for managers and staff to give a general understanding and awareness of computerisation [ ] 26

Q.27 With the introduction of computerisation what new skill(s) and knowledge will be required by employees in your company?

Record

Q.28 Is your company experiencing difficulties in employing sufficient numbers of computer skilled personnel at all levels?

If YES - enter 1

If NO - enter 2 [ ] 27

Uncertain - enter 3

Q.29 If the response to Q.28 is YES please state which jobs are the most difficult to fill/recruit

Record 1.

2.

3.

4.

Q.30 What are the long term plans for your company in terms of technological developments?

Record

SECTION THREE: 'IN-SERVICE TRAINING AND COURSE PREFERENCE'

Q.31 Does your company offer in-service training courses for its employees?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

28

If the response to Q.31 is NO skip to Q.34

Q.32 Are these training courses compulsory for:

(a) all of the staff - enter 1

(b) only certain sectors of the staff - enter 2

(c) not compulsory - enter 3

29

Q.33 If your response to Q.32 is 2 please specify.

Record

Q.34 Do you consider that continuous training and retraining of staff in the Electrical/Electronics Industry is essential?

If YES - enter 1

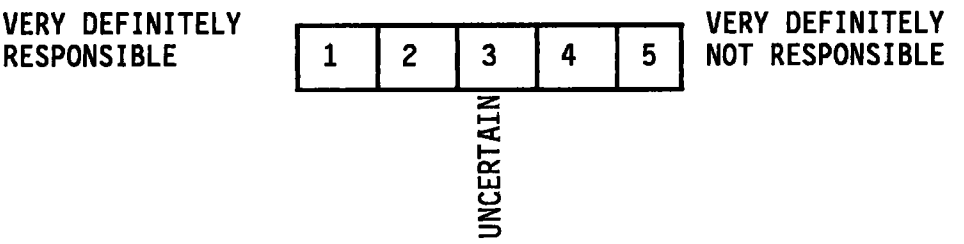
If NO - enter 2

Uncertain - enter 3

30

Q.35 In your opinion which organisation(s) should be responsible for providing such staff training?

Use the five point Likert scale when scoring.



(a) Individual employers 31

(b) LEA'S 32

(c) Unions 33

(d) MSC/Gov't bodies 34

(e) Combination of providing bodies 35

(f) Other - please specify 36

Q.36 State the number of in-company courses that you have attended over the last 5 years.

(a) None - enter 1

(b) 1 - 2 - enter 2

(c) 3 - 4 - enter 3

(d) 5 - 6 - enter 4

(e) 7 - 8 - enter 5

(f) 9 - 10 - enter 6

(g) Over 10 - enter 7 and specify

37

If the response to Q.36 is 1 skip to Q.40

Q.37 How many of these in-company courses were concerned with recent developments and applications of microelectronics/computerisation?

(a) None - enter 1

(b) 1 - 2 - enter 2

(c) 3 - 4 - enter 3

(d) 5 or more - enter 4

38

Q.38 What was the average time duration of such in-company training courses?

(a) Less than 1 day - enter 1

(b) 1 - 2 days - enter 2

(c) 3 - 4 days - enter 3

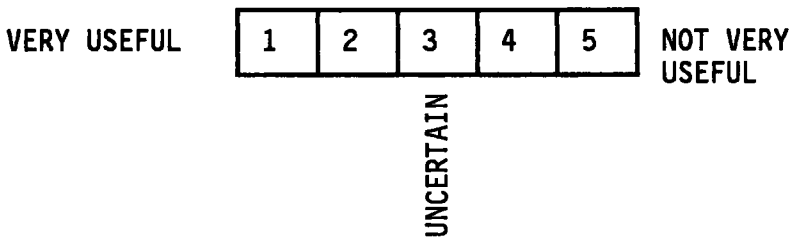
(d) 5 - 6 days - enter 4

(e) More than 1 week - enter 5 and specify

39

Q.39 How would you rate the usefulness of such courses?

Use the five point Likert scale when scoring.



40

Q.40 Have you attended any other course(s) on subject updating, outside of your company but not in a college of Further Education?

If YES - enter 1

If NO - enter 2

41

If the response to Q.40 is NO skip to Q.45

Q.41 How many of these courses have you attended over the last 5 years?

(a) None - enter 1

(b) 1 - 2 - enter 2

(c) 3 - 4 - enter 3

(d) 5 - 6 - enter 4

(e) 7 - 8 - enter 5

(f) 9 - 10 - enter 6 ☐ 42

(g) More than 10 - enter 7 and specify

Q.42 List the organisation(s) which sponsored the course(s) that you attended on subject matter updating.

Record 1.

2.

3.

4.

Q.43 What was the average time duration of such courses?

(a) Less than 1 day - enter 1

(b) 1 - 2 days - enter 2

(c) 3 - 4 days - enter 3

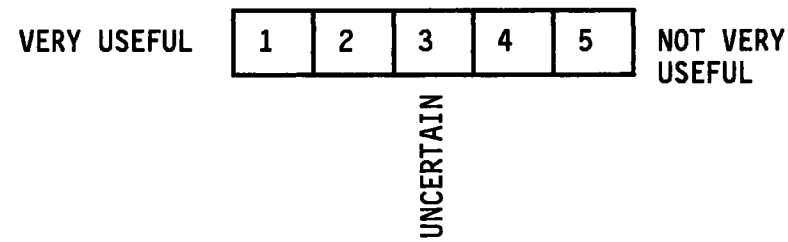
(d) 5 - 6 days - enter 4

(e) More than 1 week - enter 5 and specify

43

Q.44 How would you rate the usefulness of such courses?

Use the five point Likert scale when scoring



44

Q.45 Have you attended any external course(s) in microelectronics/computerisation at a local college of Further Education?

If YES - enter 1

If NO - enter 2

45

If the response to Q.45 is NO skip to Q.49

Q.46 How many of these Further Educational courses have you attended in the last five years?

(a) None - enter 1

(b) 1 - 2 - enter 2

(c) 3 - 4 - enter 3

(d) 5 or more - enter 4 and specify

46

Q.47 What was the average time duration of these courses?

(a) Less than 1 day - enter 1

(b) 1 - 2 days - enter 2

(c) 3 - 4 days - enter 3

(d) 5 - 6 days - enter 4

(e) More than 1 week - enter 5 and specify

47

Q.48 How would you rate the usefulness of such courses?

VERY USEFUL	1	2	3	4	5	NOT VERY USEFUL

UNCERTAIN

48

SECTION FOUR: **'LIAISON BETWEEN THE INDUSTRY AND LOCAL COLLEGES OF FURTHER EDUCATION'**

Q.49 Have you, at any time during the last two years, been consulted about the content and organisation of courses being offered by local colleges of Further Education?

If YES - enter 1

If NO - enter 2

49

Q.50 In your opinion should employers and senior staff contribute to the content and organisation of courses offered by local colleges of Further Education?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

50

Q.51 Is there, in your opinion, a satisfactory liaison between local colleges of Further Education and your industry?

If YES - enter 1

If NO - enter 2

Uncertain - enter 3

51

Q.52 If the response to Q.51 is NO list the ways in which liaison between industry and local colleges of Further Education could be improved.

Record

APPENDIX VI

DATA AND STATISTICAL ANALYSIS OF TEACHER QUESTIONNAIRES

```
QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QE
QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QE
QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QED
QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1
QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1
START JOB 1860       15:08   3 FEB 88         *********************************    NUMAC  (GROUND)
START JOB 1860       15:08   3 FEB 88         *********************************    NUMAC  (GROUND)
START JOB 1860       15:08   3 FEB 88         *********************************    NUMAC  (GROUND)
START JOB 1860       15:08   3 FEB 88         *********************************    NUMAC  (GROUND)
START JOB 1860       15:08   3 FEB 88         *********************************    NUMAC  (GROUND)

 JOB STATISTICS :  2312 CARDS,    2312 LINES,     0 CARDS PUNCHED, ENTERED FROM DUR.MTS  AT 15:02


 3 FEB 88    SPSS-X RELEASE 2.1  FOR IBM VM/MTS
14:44:59     University of Durham

For                    University of Durham                    License Number 1247

   1  0          FILE HANDLE TOM1SPSS / NAME="TEACHEL"
   2  0          SET LENGTH=NONE
   3  0          DATA LIST FILE=TOM1SPSS / id1 1-2 id2 3-4 sex 5 age 6 grade 7 yremploy 8
   4  0            status 9 yrteach 10 squaltim 11-12 equaltim 13-14 profinst 15
   5  0            indextim 16-17 noinst 18 yrspost 19 staffres 20 metemplo 21 metskill 22
   6  0            metrecru 23 metrain 24 meteff 25 undequip 26 stafskil 27 introsys 28
   7  0            undyst 29 anxsyst 30 contrib 31 incomp 32 extern 33 retrain 34 indemp 35
   8  0            lea 36 union 37 msc 38 combin 39 other 40 edinserv 41-42 eavtim 43
   9  0            edmet 44 edrate 45 sminserv 46-47 smavtim 48 smrate 49 techdev 50 secon 51
  10  0            edmeth 52 admin 53 area 54 mags 55 period 56 text 57 exhib 58 staf 59
  11  0            chat 60 stude 61 liais 62 resear 63 otharea 64 sdunit 65 aprais 66
  12  0            noaprais 67-68 efaprais 69 boencon 70 conind 71 empcon 72 satliais 73
THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE TOM1SPSS.
```

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
ID1	1	1	2	F	2	0
ID2	1	3	4	F	2	0
SEX	1	5	5	F	1	0
AGE	1	6	6	F	1	0
GRADE	1	7	7	F	1	0
YREMPLOY	1	8	8	F	1	0
STATUS	1	9	9	F	1	0
YRTEACH	1	10	10	F	1	0
SQUALTIM	1	11	12	F	2	0
EQUALTIM	1	13	14	F	2	0
PROFINST	1	15	15	F	1	0
INDEXTIM	1	16	17	F	2	0
NOINST	1	18	18	F	1	0
YRSPOST	1	19	19	F	1	0
STAFFRES	1	20	20	F	1	0
METEMPLO	1	21	21	F	1	0
METSKILL	1	22	22	F	1	0
METRECRU	1	23	23	F	1	0
METRAIN	1	24	24	F	1	0
METEFF	1	25	25	F	1	0
UNDEQUIP	1	26	26	F	1	0
STAFSKIL	1	27	27	F	1	0
INTRDSYS	1	28	28	F	1	0
UNDYST	1	29	29	F	1	0
ANXSYST	1	30	30	F	1	0
CONTRIB	1	31	31	F	1	0
INCOMP	1	32	32	F	1	0
EXTERN	1	33	33	F	1	0
RETRAIN	1	34	34	F	1	0
INDEMP	1	35	35	F	1	0
LEA	1	36	36	F	1	0
UNION	1	37	37	F	1	0
MSC	1	38	38	F	1	0
COMBIN	1	39	39	F	1	0
OTHER	1	40	40	F	1	0
EDINSERV	1	41	42	F	2	0
EAVTIM	1	43	43	F	1	0
EDMET	1	44	44	F	1	0
EDRATE	1	45	45	F	1	0
SMINSERV	1	46	47	F	2	0
SMAVTIM	1	48	48	F	1	0
SMRATE	1	49	49	F	1	0
TECHDEV	1	50	50	F	1	0
SECON	1	51	51	F	1	0
EDMETH	1	52	52	F	1	0
ADMIN	1	53	53	F	1	0
AREA	1	54	54	F	1	0
MAGS	1	55	55	F	1	0
PERIOD	1	56	56	F	1	0
TEXT	1	57	57	F	1	0
EXHIB	1	58	58	F	1	0
STAF	1	59	59	F	1	0
CHAT	1	60	60	F	1	0
STUDE	1	61	61	F	1	0
LIAIS	1	62	62	F	1	0
RESEAR	1	63	63	F	1	0
OTHAREA	1	64	64	F	1	0
SDUNIT	1	65	65	F	1	0
APRAIS	1	66	66	F	1	0
NOAPRAIS	1	67	68	F	2	0
EFAPRAIS	1	69	69	F	1	0
BEENCON	1	70	70	F	1	0
CONIND	1	71	71	F	1	0
EMPCON	1	72	72	F	1	0
SATLIAIS	1	73	73	F	1	0

END OF DATALIST TABLE.

13 0 LIST

THERE ARE 60352 BYTES OF SPSS MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS 60264 BYTES.
SPSS IS USING 65536 BYTES OF SYSTEM MEMORY
THERE ARE AT LEAST 2031616 BYTES OF SYSTEM MEMORY AVAILABLE.

2417 BYTES OF MEMORY REQUIRED FOR LIST PROCEDURE.
272 BYTES HAVE ALREADY BEEN ACQUIRED.
2145 BYTES REMAIN TO BE ACQUIRED.

```
THE VARIABLES ARE LISTED IN THE FOLLOWING ORDER:

LINE   1: ID1 ID2 SEX AGE GRADE YREMPLOY STATUS YRTEACH SQUALTIM EQUALTIM PROFIN
          METSKILL METRECRU METRAIN METEFF UNDEQUIP STAFSKIL INTROSYS UNDYST ANX
          MSC COMBIN OTHER EDINSERV EAVTIM EDMET EDRATE SMINSERV SMAVTIM SMRATE
          EXHIB STAF CHAT STUDE LIAIS RESEAR OTHAREA SDUNIT

LINE   2: APRAIS NOAPRAIS EFAPRAIS BEENCON CONIND EMPCON SATLIAIS

3 FEB 88    SPSS-X RELEASE 2.1  FOR IBM VM/MTS
14:45:03    University of Durham

     ID1: 99  1 1 5 5 4 2 4 25 25 1 19 1 4 1 4 2 3 2 1 1 1 1 1 1 2 2 2 1 1 1 2 2
APRAIS: 2  0 0 2 2 1 3

     ID1: 99  2 1 3 3 3 2 3 10 17 2 18 1 1 1 2 2 2 2 1 1 1 1 2 1 1 1 1 1 1 2 4 2
APRAIS: 2  0 0 2 2 1 2

     ID1: 99  3 1 4 5 4 2 4  8 25 2 19 1 4 1 2 2 1 2 4 1 1 1 1 1 1 2 1 1 1 2 2 2
APRAIS: 2  0 0 1 1 1 2

     ID1: 99  4 1 3 3 2 2 4 15 20 1 14 4 2 2 2 3 3 2 2 4 2 1 2 1 1 1 2 1 1 2 5 3
APRAIS: 2  0 0 1 2 1 2

     ID1: 99  5 1 4 3 5 2 5 15 20 1 20 1 4 2 2 4 4 4 4 1 4 2 2 2 2 2 2 1 2 1 3 1
APRAIS: 2  0 0 1 2 1 1

     ID1: 99  6 1 3 5 2 2 3 15 17 1 18 1 2 1 4 2 2 1 1 1 1 1 2 2 1 1 1 1 2 3 2 1
APRAIS: 2  0 0 2 2 1 3

     ID1: 99  7 1 4 5 3 2 4  9 18 2 19 1 3 1 2 3 3 2 2 1 2 1 1 1 2 1 2 1 1 2 3 3
APRAIS: 2  0 0 2 2 1 1

     ID1: 99  8 1 3 5 3 2 3 15 17 2 18 1 3 1 2 1 2 2 2 1 1 1 2 1 2 1 1 1 1 1 4 1
APRAIS: 2  0 0 1 1 1 1

     ID1: 99  9 1 4 3 4 2 4  8  0 1 19 1 2 2 2 2 0 2 3 1 2 1 1 1 2 1 1 1 1 1 3 1
APRAIS: 2  0 0 1 1 1 1

     ID1: 99 10 1 4 3 5 2 5 30  0 1 15 1 3 2 4 2 3 2 2 1 4 1 1 2 1 1 1 1 1 1 3 3
APRAIS: 2  0 0 1 1 1 1

     ID1: 99 11 1 4 2 4 2 4  4  0 1 19 1 2 3 2 1 2 2 1 2 2 1 2 1 1 1 1 1 1 2 2 2
APRAIS: 2  0 0 1 1 1 1

     ID1: 99 12 1 4 3 5 2 5 15 25 2 15 1 2 1 0 0 0 2 3 1 1 1 2 1 1 1 1 1 2 1 1 2
APRAIS: 2  0 0 1 2 1 2

     ID1: 99 13 1 3 3 4 2 4  5  0 1  9 1 3 1 2 3 2 2 2 2 1 1 1 1 1 2 2 1 2 2 3 3
APRAIS: 1  2 1 1 1 1 2

     ID1: 99 14 1 4 3 4 2 4 35  0 2 19 1 2 1 2 2 3 2 2 1 1 1 1 1 1 1 1 1 3 1 3 4
APRAIS: 1  4 1 2 2 1 3

     ID1: 99 15 1 3 4 2 2 2  1 28 1 17 1 1 1 4 2 2 2 1 1 4 2 1 1 2 2 2 1 2 1 3 2
APRAIS: 1  7 1 2 2 1 2

     ID1: 99 16 1 3 5 1 2 1 15  0 2 21 1 1 1 4 2 2 2 2 1 1 1 1 1 2 2 1 1 1 3 5 1
APRAIS: 2  0 0 1 1 3 1

     ID1: 99 17 1 5 4 4 2 4  7 30 2 19 1 3 1 1 2 0 2 3 1 1 2 1 1 2 2 1 1 2 2 2 2
APRAIS: 1  6 3 2 2 1 1

     ID1: 99 18 1 4 5 3 2 4 15 25 2 19 1 4 2 3 3 5 4 2 1 3 1 1 1 2 2 2 1 2 3 4 5
APRAIS: 2  0 0 2 2 1 2

     ID1: 99 19 1 5 3 5 2 5  9 25 1 20 1 4 1 2 2 3 2 2 1 4 1 2 1 1 1 2 1 1 2 2 2
APRAIS: 1  6 3 2 2 1 2

     ID1: 99 20 1 4 3 5 2 5 15 25 2 15 1 3 1 2 0 3 0 0 1 1 1 1 1 2 2 2 1 1 2 3 4
APRAIS: 2  0 0 2 2 1 3

     ID1: 99 21 1 5 3 5 2 5 15  0 1 20 1 1 2 3 3 3 4 4 1 1 0 0 0 0 0 0 1 1 2 2 2
APRAIS: 2  0 0 1 1 1 1

     ID1: 99 22 1 3 4 4 2 4 15 18 2  9 1 2 1 2 2 3 2 2 2 1 2 2 2 1 2 1 1 2 3 3 2
APRAIS: 1  4 3 1 1 1 2
```

ST INDEXTIM NOINST YRSPOST STAFFRES METEMPLD
SYST CONTRIB INCOMP EXTERN RETRAIN INCEMP LEA UNION
TECHDEV SECON EDMETH ADMIN AREA MAGS PERIOD TEXT

3 0 0 0 0 0 0 0 0 1 2 2 3 0 2 3 1 4 2 2 4 5 5 0 1

2 0 0 0 0 0 2 3 2 2 2 2 2 0 3 2 2 3 4 2 4 4 5 0 1

2 0 0 0 0 0 5 5 2 1 1 1 2 0 3 3 1 5 3 2 4 5 5 3 1

3 0 10 2 2 2 1 5 1 1 1 2 2 0 2 2 1 3 4 4 4 4 5 0 1

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1 3 0 0 0 0 9 3 2 1 1 2 3 0 4 1 2 5 5 3 3 5 5 0 1

2 0 0 0 0 0 2 5 2 1 2 2 2 2 2 3 1 4 2 1 3 4 5 3 1

3 3 0 0 0 0 2 5 1 1 1 2 2 2 2 3 1 3 1 1 3 2 5 4 1

1 3 6 2 1 2 0 0 0 1 1 2 2 0 1 2 1 3 3 1 2 3 5 3 1

2 2 10 2 1 2 10 2 2 1 1 2 2 0 1 3 2 2 2 2 2 1 4 0 1

5 0 6 4 2 2 0 0 0 1 1 1 2 2 2 2 2 5 2 2 4 4 4 0 2

1 0 0 0 0 0 9 4 1 1 1 1 2 0 1 2 2 3 3 3 3 4 2 0 3

4 1 0 0 0 0 3 3 1 1 1 3 2 0 2 2 1 4 2 1 4 3 5 3 1

2 3 0 0 0 0 5 5 1 1 1 2 2 0 2 2 1 3 1 2 3 3 3 4 2

2 0 1 3 2 1 6 4 2 1 1 1 2 0 2 2 1 3 1 1 4 5 5 0 1

2 0 0 0 0 0 5 5 2 1 2 2 1 0 3 3 2 2 3 2 3 4 5 3 1

3 0 0 0 0 0 0 0 0 1 1 2 2 0 3 4 2 3 1 1 3 5 4 0 1

1 3 0 0 0 0 3 3 4 2 1 2 1 0 3 2 2 4 3 2 3 4 5 0 3

0 2 0 0 0 0 0 0 0 1 2 2 3 0 2 2 3 4 1 1 4 5 5 0 1

2 0 6 2 1 2 2 4 2 1 2 2 1 0 2 2 1 3 1 2 3 3 5 0 1

2 2 9 2 2 2 6 2 1 1 1 2 2 2 4 3 1 3 5 3 5 2 3 0 1

```
   ID1: 99 23 1 5 2 3 2 4 10 15 1 19 1 3 1 2 1 2 2 4 2 2 1 2 2 1 1 2 1 1 3 2 1
APRAIS: 2  0 0 1 1 1 2

   ID1: 99 24 1 3 4 4 2 4 15 18 2 19 1 1 1 2 1 1 2 1 1 1 1 2 1 2 1 2 1 1 2 2 1
APRAIS: 2  0 0 1 1 1 2

   ID1: 99 25 1 5 4 4 2 5 15 20 2 20 2 4 1 2 2 0 1 2 3 1 1 1 1 2 2 2 1 1 2 3 2
APRAIS: 2  0 0 1 1 1 1

   ID1: 99 26 1 5 4 5 2 5 15 15 2 20 1 2 1 3 4 3 2 2 3 1 2 2 1 2 2 2 1 2 1 3 2
APRAIS: 2  0 0 2 2 1 1

   ID1: 99 27 1 4 2 2 2 4 10 18 2 19 3 1 4 4 2 2 1 2 1 1 1 1 1 2 1 2 1 2 1 2 1
APRAIS: 2  0 0 1 1 1 1
```

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2 0 21 2 1 1  0 0 0 1 2 2 2 0 1 3 1 3 3 4 3 4 5 0 1

1 0  9 2 1 2  0 0 0 1 2 2 2 0 3 3 2 4 2 2 4 2 5 0 1

2 2  0 0 0 0  0 0 0 1 1 2 2 0 1 1 1 3 3 2 3 4 3 0 1

1 0  9 1 1 4  5 2 2 2 2 1 2 0 3 3 1 3 2 1 3 4 5 0 1

2 3  0 0 0 0  0 0 0 1 1 2 2 0 2 2 2 3 2 3 3 1 4 0 1
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  ID1: 99 28 1 2 5 2 2 2 29  0 2 17 1 1 1 4 2 2 1 2 1 1 1 2 1 2 2 2 1 1 3 3 2
APRAIS: 2  0 0 1 1 1 1

  ID1: 99 29 1 5 4 4 2 4 15 19 2 25 1 3 1 3 2 3 2 2 1 1 1 1 1 1 1 1 1 1 3 2
APRAIS: 2  0 0 1 1 1 1

  ID1: 99 30 1 4 4 5 2 5 30 20 2 20 1 4 2 4 2 3 2 2 1 1 1 1 3 3 1 1 1 2 2 4 3
APRAIS: 2  0 0 1 1 1 1

  ID1: 99 31 1 2 5 1 2 1  9 24 2 11 1 1 1 1 1 2 1 2 1 1 2 2 2 1 2 2 1 1 2 4 4
APRAIS: 2  0 0 2 1 1 1

  ID1: 99 32 1 2 4 2 2 2 10 27 1 12 2 2 1 4 2 2 2 4 1 1 2 2 2 2 2 2 1 1 1 3 1
APRAIS: 2  0 0 1 1 1 1

  ID1: 99 33 1 4 3 4 2 4  8 20 2 19 1 3 1 4 2 2 2 2 1 1 1 1 1 2 1 2 1 2 2 3 1
APRAIS: 1  9 1 1 1 1 1

  ID1: 99 34 1 4 3 4 2 4 25 19 2 19 1 1 2 3 2 3 2 2 1 1 1 1 1 1 1 2 1 2 2 2 3
APRAIS: 1  9 1 1 1 1 1

  ID1: 99 35 1 4 3 4 2 4 30 20 1 19 1 2 1 1 2 2 2 2 1 1 1 2 1 1 1 1 1 1 1 1 1
APRAIS: 2  0 0 2 2 1 1

  ID1: 99 36 1 2 7 3 2 0 27 26 2 14 1 4 2 3 4 3 2 2 1 1 1 1 1 1 1 1 1 2 2 4 2
APRAIS: 2  0 0 2 2 1 1

  ID1: 99 37 1 4 5 4 2 4 30 18 2 19 1 4 1 4 2 3 2 2 1 1 2 2 1 2 1 2 1 1 2 3 3
APRAIS: 2  0 0 2 2 3 3

  ID1: 99 38 1 5 4 5 2 5 15 20 2 20 2 4 1 3 2 0 2 1 1 2 1 1 1 2 2 2 3 2 2 5 3
APRAIS: 2  0 0 1 1 3 1

  ID1: 99 39 1 5 3 5 2 5  7 20 1 20 2 4 2 3 2 0 2 2 1 1 1 1 1 2 2 2 1 1 2 3 2
APRAIS: 2  0 0 1 1 1 1

  ID1: 99 40 1 3 5 2 2 4 15 19 1  9 1 4 1 2 2 3 1 2 1 1 1 1 2 2 1 2 1 1 1 3 2
APRAIS: 2  0 0 2 2 1 2

  ID1: 99 41 1 5 3 5 2 5 15  0 2 20 2 4 1 4 4 3 3 1 1 2 1 2 2 2 2 1 1 2 1 3 3
APRAIS: 2  0 0 2 2 1 3

  ID1: 99 42 1 4 3 5 2 5 15 20 2 20 1 4 2 3 4 2 1 1 1 1 1 2 1 1 2 2 1 2 1 2 1
APRAIS: 2  0 0 2 2 3 3

  ID1: 99 43 1 4 5 4 2 4 10 20 2 20 2 4 1 3 3 3 2 3 1 3 1 2 1 2 2 2 1 2 1 2 3
APRAIS: 2  0 0 2 2 1 1

  ID1: 99 44 1 3 3 3 2 3  8 19 2 18 1 4 2 3 4 1 1 0 1 1 1 2 1 2 1 3 1 1 1 3 1
APRAIS: 2  0 0 1 1 1 2

  ID1: 99 45 1 3 5 3 2 3 14 17 2 18 1 3 1 1 4 4 2 1 2 2 1 2 2 2 2 3 1 2 2 3 2
APRAIS: 2  0 0 1 1 1 3

  ID1: 99 46 1 3 5 4 2 4 30 19 2 19 1 4 1 2 1 2 1 3 1 2 2 1 1 1 1 2 1 1 1 2 2
APRAIS: 2  0 0 2 2 1 1

  ID1: 99 47 1 3 4 1 2 2 10  3 1 14 1 1 1 4 2 3 2 1 1 2 1 2 1 2 2 2 1 1 2 2 2
APRAIS: 2  0 0 1 2 1 3

  ID1: 99 48 1 4 4 4 2 4 15 20 2 19 1 3 1 4 4 3 2 1 1 1 1 2 2 2 2 2 1 1 1 2 2
APRAIS: 2  0 0 2 2 1 2

  ID1: 99 49 1 3 5 4 2 4 30 19 2 14 1 4 1 4 2 3 2 1 1 1 1 2 1 2 1 2 1 1 2 4 1
APRAIS: 2  0 0 2 2 1 3

  ID1: 99 50 1 5 5 4 2 4 30 20 2 14 1 4 1 3 1 3 1 1 3 3 2 2 2 2 2 1 1 1 1 3 3
APRAIS: 2  0 0 2 2 3 3

  ID1: 99 51 1 4 4 3 2 3 30 18 2 18 1 1 1 4 4 2 2 2 1 2 2 1 2 2 2 2 1 2 2 3 2
APRAIS: 2  0 0 2 2 1 3

  ID1: 99 52 1 4 4 5 2 5 15 25 1 20 1 4 1 0 2 2 2 1 1 2 1 1 1 2 1 2 1 1 2 2 1
APRAIS: 2  0 0 1 1 1 3

  ID1: 99 53 1 4 5 4 2 4 29 19 2 19 1 4 1 0 0 1 2 2 1 3 2 2 1 2 2 2 3 1 2 5 5
APRAIS: 2  0 0 2 2 1 3
```

1	0	0	0	0	0	2	2	2	1	2	2	2	0	5	1	1	4	2	1	2	3	5	0	1
4	2	3	2	1	2	0	0	0	1	2	1	2	0	1	1	2	4	4	4	3	3	5	3	1
2	1	6	3	1	2	0	0	0	1	2	2	2	0	1	1	1	2	1	1	2	1	5	3	1
3	0	0	0	0	0	0	0	0	2	2	3	2	0	2	3	1	5	2	3	4	3	3	0	3
3	0	0	0	0	0	5	2	2	1	2	2	2	0	2	2	1	3	1	2	3	3	4	0	1
3	0	10	4	2	1	6	3	1	2	2	2	3	0	3	3	2	3	1	1	4	2	3	0	1
2	0	9	5	2	2	2	3	1	2	1	2	2	0	2	2	1	4	2	2	2	2	3	0	1
1	2	0	0	0	0	3	4	5	2	1	2	2	0	1	2	1	2	2	2	3	1	5	0	1
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2	0	1	5	2	1	0	0	0	1	2	2	2	0	1	2	2	3	3	4	3	4	5	0	1
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3	0	5	5	1	2	13	1	2	1	1	2	2	0	2	1	2	5	2	2	3	4	5	3	2
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3	0	6	4	2	2	0	0	0	2	1	2	3	0	1	1	1	2	3	3	3	4	5	0	1
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3	2	5	1	1	2	2	3	1	1	2	2	1	0	1	1	1	2	4	4	3	3	5	3	1
2	0	1	2	1	2	3	3	1	1	2	2	1	0	2	3	2	3	1	2	3	3	4	0	1
1	4	0	0	0	0	22	2	1	1	1	2	2	2	1	1	1	3	2	2	2	3	5	0	1
2	0	2	3	1	1	0	0	0	1	1	1	2	0	2	2	2	3	4	4	5	2	5	3	1
2	0	0	0	0	0	0	0	0	1	2	2	2	0	5	4	1	4	5	5	4	5	5	0	1
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1	1	0	0	0	0	13	3	2	1	1	2	2	0	3	4	2	3	4	4	4	4	5	0	1
3	2	0	0	0	0	2	3	2	2	1	2	3	0	5	3	1	3	1	2	4	4	5	0	1

```
   ID1: 99 54 2 2 5 2 2 2  3 25 2  0 1 1 1 3 2 1 1 2 1 3 1 1 1 1 1 1 1 1 2 3
APRAIS: 2  0 0 2 1 1 2

   ID1: 99 55 1 2 4 1 2 1  1 25 2  0 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 2 1 2 1 2 1
APRAIS: 2  0 0 2 2 1 3

   ID1: 99 56 1 3 4 2 2 2 10 24 2  0 1 1 1 4 2 2 2 1 1 1 1 1 1 2 2 1 1 2 2 4 4
APRAIS: 2  0 0 1 1 1 3

   ID1: 99 57 1 3 3 3 2 3 10 24 2  0 1 1 1 3 3 3 1 1 1 2 1 1 1 1 1 1 1 1 2 2 1
APRAIS: 1  2 3 1 1 1 2

   ID1: 99 58 1 4 2 4 2 5 10  0 1 15 1 4 4 0 0 0 0 0 1 2 2 2 2 2 2 2 1 1 2 2 2
APRAIS: 2  0 0 1 1 1 3
```

```
1 2 13 2 1 2  3 4 1 2 1 2 2 0 2 2 1 2 2 3 3 3 5 2 1

1 2 21 2 4 1 13 2 2 1 2 2 2 0 1 2 1 2 1 3 3 4 2 1 1

2 0  4 1 2 2 13 2 1 1 1 1 2 0 2 2 2 2 2 2 3 2 3 0 1

1 0  9 2 2 4 21 2 2 1 1 1 1 0 2 2 2 2 2 4 4 4 5 0 1

1 0 21 2 1 2 21 2 2 1 1 2 2 0 2 3 2 3 2 3 3 2 5 0 1
```

```
NUMBER OF CASES READ =      58    NUMBER OF CASES LISTED =      58

  3 FEB 88    SPSS-X RELEASE 2.1  FOR IBM VM/MTS
14:45:03      University of Durham

PRECEDING TASK REQUIRED       0.22 SECONDS CPU TIME;       0.99 SECONDS ELAPSED

   14   0          FREQUENCIES VARIABLES=SEX TO SATLIAIS /
   15   0                      FORMAT=CONDENSE / STATISTICS=ALL

THERE ARE    61744 BYTES OF SPSS MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS    61744 BYTES.
SPSS IS USING    65536 BYTES OF SYSTEM MEMORY
THERE ARE AT LEAST  2031616 BYTES OF SYSTEM MEMORY AVAILABLE.

***** MEMORY ALLOWS A TOTAL OF   5785 VALUES, ACCUMULATED ACROSS ALL VARIABLES.
      THERE ALSO MAY BE UP TO   1446 VALUE LABELS FOR EACH VARIABLE.

  3 FEB 88    SPSS-X RELEASE 2.1  FOR IBM VM/MTS
14:45:05      University of Durham

SEX

   VALUE   FREQ PCT CUM PCT    VALUE   FREQ PCT CUM PCT    VALUE   FREQ PCT CUM PCT

       1     57  98      98        2      1   2  100

MEAN          1.017          STD ERR        .017          MEDIAN        1.000
MODE          1.000          STD DEV        .131          VARIANCE       .017
KURTOSIS     59.000          S E KURT       .618          SKEWNESS      7.516
S E SKEW       .314          RANGE         1.000          MINIMUM       1.000
MAXIMUM       2.000          SUM          59.000

VALID CASES      58          MISSING CASES     0

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AGE

   VALUE   FREQ PCT CUM PCT    VALUE   FREQ PCT CUM PCT    VALUE   FREQ PCT CUM PCT

       2      6  10      10        4     23  40   79
       3     17  29      40        5     12  21  100

MEAN          3.707          STD ERR        .121          MEDIAN        4.000
MODE          4.000          STD DEV        .918          VARIANCE       .842
KURTOSIS      -.723          S E KURT       .618          SKEWNESS      -.219
S E SKEW       .314          RANGE         3.000          MINIMUM       2.000
MAXIMUM       5.000          SUM         215.000

VALID CASES      58          MISSING CASES     0

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GRADE

   VALUE   FREQ PCT CUM PCT    VALUE   FREQ PCT CUM PCT    VALUE   FREQ PCT CUM PCT

       2      4   7       7        4     16  28   66        7      1   2  100
       3     18  31      38        5     19  33   98

MEAN          3.931          STD ERR        .137          MEDIAN        4.000
MODE          5.000          STD DEV       1.041          VARIANCE      1.083
KURTOSIS      -.128          S E KURT       .618          SKEWNESS       .142
S E SKEW       .314          RANGE         5.000          MINIMUM       2.000
MAXIMUM       7.000          SUM         228.000

VALID CASES      58          MISSING CASES     0

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YREMPLOY

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	4	7	7	3	10	17	40	5	13	22	100
2	9	16	22	4	22	38	78				

MEAN	3.534	STD ERR	.158	MEDIAN	4.000
MODE	4.000	STD DEV	1.203	VARIANCE	1.446
KURTOSIS	-.585	S E KURT	.618	SKEWNESS	-.585
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	205.000		

VALID CASES 58 MISSING CASES 0

STATUS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
2	58	100	100								

MEAN	2.000	STD ERR	.000	MEDIAN	2.000
MODE	2.000	STD DEV	.000	VARIANCE	.000
RANGE	.000	MINIMUM	2.000	MAXIMUM	2.000
SUM	116.000				

VALID CASES 58 MISSING CASES 0

YRTEACH

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	2	6	10	17	4	26	45	74
1	3	5	7	3	7	12	29	5	15	26	100

MEAN	3.707	STD ERR	.159	MEDIAN	4.000
MODE	4.000	STD DEV	1.214	VARIANCE	1.474
KURTOSIS	.825	S E KURT	.618	SKEWNESS	-1.113
S E SKEW	.314	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	215.000		

VALID CASES 58 MISSING CASES 0

SQUALTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	2	3	3	9	3	5	24	27	1	2	81
4	1	2	5	10	9	16	40	29	2	3	84
5	1	2	7	14	1	2	41	30	8	14	98
7	2	3	10	15	20	34	76	35	1	2	100
8	5	9	19	25	2	3	79				

MEAN	15.621	STD ERR	1.132	MEDIAN	15.000
MODE	15.000	STD DEV	8.618	VARIANCE	74.275
KURTOSIS	-.534	S E KURT	.618	SKEWNESS	.681
S E SKEW	.314	RANGE	34.000	MINIMUM	1.000
MAXIMUM	35.000	SUM	906.000		

VALID CASES 58 MISSING CASES 0

EQUALTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	10	17	17	19	7	12	52	27	1	2	97
3	1	2	19	20	12	21	72	28	1	2	93
15	2	3	22	24	3	5	78	30	1	2	100
17	4	7	29	25	9	16	93				
18	6	10	40	26	1	2	95				

MEAN	17.069	STD ERR	1.158	MEDIAN	19.000
MODE	20.000	STD DEV	8.816	VARIANCE	77.714
KURTOSIS	.030	S E KURT	.618	SKEWNESS	-1.101
S E SKEW	.314	RANGE	30.000	MINIMUM	.000
MAXIMUM	30.000	SUM	990.000		

VALID CASES 58 MISSING CASES 0

PROFINST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	19	33	33	2	39	67	100				

MEAN	1.672	STD ERR	.062	MEDIAN	2.000
MODE	2.000	STD DEV	.473	VARIANCE	.224
KURTOSIS	-1.483	S E KURT	.618	SKEWNESS	-.754
S E SKEW	.314	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	97.000		

VALID CASES 58 MISSING CASES 0

INDEXTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	2	3	3	14	5	9	24	20	12	21	97
8	2	3	7	15	4	7	31	21	1	2	98
9	3	5	12	17	2	3	34	25	1	2	100
11	1	2	14	18	6	10	45				
12	1	2	16	19	18	31	76				

MEAN	16.655	STD ERR	.630	MEDIAN	19.000
MODE	19.000	STD DEV	4.800	VARIANCE	23.037
KURTOSIS	3.611	S E KURT	.618	SKEWNESS	-1.794
S E SKEW	.314	RANGE	25.000	MINIMUM	.000
MAXIMUM	25.000	SUM	966.000		

VALID CASES 58 MISSING CASES 0

NOINST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	50	86	86	3	1	2	98				
2	6	10	97	4	1	2	100				

MEAN	1.190	STD ERR	.072	MEDIAN	1.000
MODE	1.000	STD DEV	.545	VARIANCE	.297
KURTOSIS	13.609	S E KURT	.618	SKEWNESS	3.483
S E SKEW	.314	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	69.000		

VALID CASES 58 MISSING CASES 0

YRSPOST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	15	26	26	3	11	19	62				
2	10	17	43	4	22	38	100				

MEAN	2.690	STD ERR	.162	MEDIAN	3.000
MODE	4.000	STD DEV	1.231	VARIANCE	1.516
KURTOSIS	-1.558	S E KURT	.618	SKEWNESS	-.251
S E SKEW	.314	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	156.000		

VALID CASES 58 MISSING CASES 0

STAFFRES

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	43	74	74	3	1	2	97				
2	12	21	95	4	2	3	100				

MEAN	1.345	STD ERR	.091	MEDIAN	1.000
MODE	1.000	STD DEV	.690	VARIANCE	.475
KURTOSIS	6.295	S E KURT	.618	SKEWNESS	2.415
S E SKEW	.314	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	78.000		

VALID CASES 58 MISSING CASES 0

METEKPLD

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	4	7	7	2	19	33	47	4	17	29	100
1	4	7	14	3	14	24	71				

MEAN	2.621	STD ERR	.155	MEDIAN	3.000
MODE	2.000	STD DEV	1.182	VARIANCE	1.397
KURTOSIS	-.361	S E KURT	.618	SKEWNESS	-.530
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	152.000		

VALID CASES 58 MISSING CASES 0

METSKILL

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	4	7	7	2	30	52	72	4	9	16	100
1	8	14	21	3	7	12	84				

MEAN	2.155	STD ERR	.141	MEDIAN	2.000
MODE	2.000	STD DEV	1.073	VARIANCE	1.151
KURTOSIS	-.098	S E KURT	.618	SKEWNESS	.121
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	125.000		

VALID CASES 58 MISSING CASES 0

METRECRU

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	7	12	12	2	19	33	55	4	2	3	98
1	6	10	22	3	23	40	95	5	1	2	100

MEAN	2.172	STD ERR	.148	MEDIAN	2.000
MODE	3.000	STD DEV	1.126	VARIANCE	1.268
KURTOSIS	.039	S E KURT	.618	SKEWNESS	-.429
S E SKEW	.314	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	126.000		

VALID CASES 58 MISSING CASES 0

METRAIN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	2	3	3	2	39	67	93	4	3	5	100
1	13	22	26	3	1	2	95				

MEAN	1.328	STD ERR	.099	MEDIAN	2.000
MODE	2.000	STD DEV	.752	VARIANCE	.566
KURTOSIS	2.741	S E KURT	.618	SKEWNESS	.554
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	106.000		

VALID CASES 58 MISSING CASES 0

METEFF

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	3	5	5	2	28	48	83	4	5	9	100
1	17	29	34	3	5	9	91				

MEAN	1.862	STD ERR	.126	MEDIAN	2.000
MODE	2.000	STD DEV	.963	VARIANCE	.928
KURTOSIS	.418	S E KURT	.618	SKEWNESS	.529
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	108.000		

VALID CASES 58 MISSING CASES 0

UNDEQUIP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	49	84	84	3	3	5	98				
2	5	9	93	4	1	2	100				

MEAN	1.241	STD ERR	.083	MEDIAN	1.000
MODE	1.000	STD DEV	.630	VARIANCE	.397
KURTOSIS	7.780	S E KURT	.618	SKEWNESS	2.820
S E SKEW	.314	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	72.000		
VALID CASES	58	MISSING CASES	0		

STAFSKIL

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	35	60	60	3	5	9	93				
2	14	24	84	4	4	7	100				

MEAN	1.621	STD ERR	.120	MEDIAN	1.000
MODE	1.000	STD DEV	.914	VARIANCE	.836
KURTOSIS	1.068	S E KURT	.618	SKEWNESS	1.412
S E SKEW	.314	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	94.000		
VALID CASES	58	MISSING CASES	0		

INTROSYS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	1	44	76	78	2	13	22	100

MEAN	1.207	STD ERR	.059	MEDIAN	1.000
MODE	1.000	STD DEV	.450	VARIANCE	.202
KURTOSIS	.342	S E KURT	.618	SKEWNESS	.868
S E SKEW	.314	RANGE	2.000	MINIMUM	.000
MAXIMUM	2.000	SUM	70.000		
VALID CASES	58	MISSING CASES	0		

UNDYST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	1	29	50	52	2	28	48	100

MEAN	1.466	STD ERR	.070	MEDIAN	1.000
MODE	1.000	STD DEV	.537	VARIANCE	.288
KURTOSIS	-1.227	S E KURT	.618	SKEWNESS	-.211
S E SKEW	.314	RANGE	2.000	MINIMUM	.000
MAXIMUM	2.000	SUM	85.000		
VALID CASES	58	MISSING CASES	0		

ANXSYST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	2	14	24	98				
1	42	72	74	3	1	2	100				

MEAN	1.259	STD ERR	.068	MEDIAN	1.000
MODE	1.000	STD DEV	.515	VARIANCE	.265
KURTOSIS	1.301	S E KURT	.618	SKEWNESS	1.099
S E SKEW	.314	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	73.000		

VALID CASES 58 MISSING CASES 0

CONTRIB

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	2	34	59	98				
1	22	38	40	3	1	2	100				

MEAN	1.603	STD ERR	.074	MEDIAN	2.000
MODE	2.000	STD DEV	.560	VARIANCE	.314
KURTOSIS	-.357	S E KURT	.618	SKEWNESS	-.425
S E SKEW	.314	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	93.000		

VALID CASES 58 MISSING CASES 0

INCOMP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	1	29	50	52	2	28	48	100

MEAN	1.466	STD ERR	.070	MEDIAN	1.000
MODE	1.000	STD DEV	.537	VARIANCE	.288
KURTOSIS	-1.227	S E KURT	.618	SKEWNESS	-.211
S E SKEW	.314	RANGE	2.000	MINIMUM	.000
MAXIMUM	2.000	SUM	85.000		

VALID CASES 58 MISSING CASES 0

EXTERN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	2	34	59	97				
1	21	36	38	3	2	3	100				

MEAN	1.638	STD ERR	.077	MEDIAN	2.000
MODE	2.000	STD DEV	.583	VARIANCE	.340
KURTOSIS	-.111	S E KURT	.618	SKEWNESS	-.291
S E SKEW	.314	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	95.000		

VALID CASES 59 MISSING CASES 0

RETRAIN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	56	97	97	3	2	3	100				

MEAN	1.069	STD ERR	.048	MEDIAN	1.000
MODE	1.000	STD DEV	.368	VARIANCE	.136
KURTOSIS	26.355	S E KURT	.618	SKEWNESS	5.259
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	62.000		

VALID CASES 58 MISSING CASES 0

INDEMP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	35	60	60	2	22	38	98	3	1	2	100

MEAN	1.414	STD ERR	.070	MEDIAN	1.000
MODE	1.000	STD DEV	.531	VARIANCE	.282
KURTOSIS	-.723	S E KURT	.618	SKEWNESS	.721
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	82.000		

VALID CASES 58 MISSING CASES 0

LEA

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	23	40	40	2	29	50	90	3	6	10	100

MEAN	1.707	STD ERR	.085	MEDIAN	2.000
MODE	2.000	STD DEV	.649	VARIANCE	.421
KURTOSIS	-.669	S E KURT	.618	SKEWNESS	.371
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	99.000		

VALID CASES 58 MISSING CASES 0

UNION

VALUE	FREQ	PCT	CUM PCT
1	2	3	3
2	21	36	40
3	23	40	79
4	8	14	93
5	4	7	100

MEAN	2.845	STD ERR	.125	MEDIAN	3.000
MODE	3.000	STD DEV	.951	VARIANCE	.905
KURTOSIS	.032	S E KURT	.618	SKEWNESS	.575
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	165.000		

VALID CASES 58 MISSING CASES 0

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MSC

VALUE	FREQ	PCT	CUM PCT
1	17	29	29
2	23	40	69
3	12	21	90
4	4	7	97
5	2	3	100

MEAN	2.155	STD ERR	.137	MEDIAN	2.000
MODE	2.000	STD DEV	1.040	VARIANCE	1.081
KURTOSIS	.402	S E KURT	.618	SKEWNESS	.943
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	125.000		

VALID CASES 58 MISSING CASES 0

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COMBIN

VALUE	FREQ	PCT	CUM PCT
0	1	2	2
1	17	29	31
2	24	41	72
3	13	22	95
4	2	3	98
5	1	2	100

MEAN	2.017	STD ERR	.124	MEDIAN	2.000
MODE	2.000	STD DEV	.946	VARIANCE	.894
KURTOSIS	.659	S E KURT	.618	SKEWNESS	.609
S E SKEW	.314	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	117.000		

VALID CASES 58 MISSING CASES 0

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OTHER

VALUE	FREQ	PCT	CUM PCT
0	37	64	64
1	4	7	71
2	10	17	88
3	6	10	98
4	1	2	100

MEAN	.793	STD ERR	.153	MEDIAN	.000
MODE	.000	STD DEV	1.166	VARIANCE	1.360
KURTOSIS	-.172	S E KURT	.618	SKEWNESS	1.107
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	46.000		

VALID CASES 58 MISSING CASES 0

EDINSERV

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	33	57	57	4	1	2	67	10	3	5	93
1	3	5	62	5	2	3	71	13	1	2	95
2	1	2	64	6	5	9	79	21	3	5	100
3	1	2	66	9	5	9	88				

MEAN	3.500	STD ERR	.727	MEDIAN	.000
MODE	.000	STD DEV	5.539	VARIANCE	30.675
KURTOSIS	3.148	S E KURT	.618	SKEWNESS	1.841
S E SKEW	.314	RANGE	21.000	MINIMUM	.000
MAXIMUM	21.000	SUM	203.000		

VALID CASES 58 MISSING CASES 0

EAVTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	33	57	57	2	13	22	84	4	3	5	95
1	3	5	62	3	3	5	90	5	3	5	100

MEAN	1.121	STD ERR	.200	MEDIAN	.000
MODE	.000	STD DEV	1.523	VARIANCE	2.319
KURTOSIS	.399	S E KURT	.618	SKEWNESS	1.179
S E SKEW	.314	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	65.000		

VALID CASES 58 MISSING CASES 0

EDMET

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	33	57	57	2	10	17	98				
1	14	24	81	4	1	2	100				

MEAN	.655	STD ERR	.117	MEDIAN	.000
MODE	.000	STD DEV	.890	VARIANCE	.791
KURTOSIS	1.946	S E KURT	.618	SKEWNESS	1.369
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	38.000		

VALID CASES 58 MISSING CASES 0

EDRATE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	33	57	57	2	17	29	97				
1	6	10	67	4	2	3	100				

MEAN	.828	STD ERR	.142	MEDIAN	.000
MODE	.000	STD DEV	1.078	VARIANCE	1.163
KURTOSIS	.442	S E KURT	.618	SKEWNESS	1.052
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	48.000		

VALID CASES 58 MISSING CASES 0

SMINSERV

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	21	36	36	5	6	10	72	13	4	7	95
1	1	2	38	6	5	9	81	21	2	3	98
2	9	16	53	9	3	5	86	22	1	2	100
3	5	9	62	10	1	2	88				

MEAN	4.259	STD ERR	.727	MEDIAN	2.000
MODE	.000	STD DEV	5.533	VARIANCE	30.616
KURTOSIS	2.854	S E KURT	.618	SKEWNESS	1.760
S E SKEW	.314	RANGE	22.000	MINIMUM	.000
MAXIMUM	22.000	SUM	247.000		

VALID CASES 58 MISSING CASES 0

SMAVTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	21	36	36	2	10	17	55	4	7	12	84
1	1	2	38	3	10	17	72	5	9	16	100

MEAN	2.138	STD ERR	.248	MEDIAN	2.000
MODE	.000	STD DEV	1.887	VARIANCE	3.560
KURTOSIS	-1.420	S E KURT	.618	SKEWNESS	.151
S E SKEW	.314	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	124.000		

VALID CASES 58 MISSING CASES 0

SMRATE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	21	36	36	2	20	34	97	5	1	2	100
1	15	26	62	4	1	2	98				

MEAN	1.103	STD ERR	.141	MEDIAN	1.000
MODE	.000	STD DEV	1.071	VARIANCE	1.147
KURTOSIS	1.946	S E KURT	.618	SKEWNESS	1.030
S E SKEW	.314	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	64.000		

VALID CASES 58 MISSING CASES 0

TECHDEV

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	47	81	81	2	11	19	100				

MEAN	1.190	STD ERR	.052	MEDIAN	1.000
MODE	1.000	STD DEV	.395	VARIANCE	.156
KURTOSIS	.664	S E KURT	.618	SKEWNESS	1.626
S E SKEW	.314	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	69.000		

VALID CASES 58 MISSING CASES 0

SECON

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	32	55	55	2	26	45	100				

MEAN	1.448	STD ERR	.066	MEDIAN	1.000
MODE	1.000	STD DEV	.502	VARIANCE	.252
KURTOSIS	-2.025	S E KURT	.618	SKEWNESS	.214
S E SKEW	.314	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	84.000		

VALID CASES 58 MISSING CASES 0

EDMETH

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	11	19	19	2	45	78	97	3	2	3	100

MEAN	1.845	STD ERR	.059	MEDIAN	2.000
MODE	2.000	STD DEV	.451	VARIANCE	.204
KURTOSIS	1.158	S E KURT	.618	SKEWNESS	-.669
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	107.000		

VALID CASES 59 MISSING CASES 0

ADMIN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	6	10	10	2	40	69	79	3	12	21	100

MEAN	2.103	STD ERR	.073	MEDIAN	2.000
MODE	2.000	STD DEV	.552	VARIANCE	.305
KURTOSIS	.327	S E KURT	.618	SKEWNESS	.059
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	122.000		

VALID CASES 58 MISSING CASES 0

AREA

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	51	88	88	1	2	3	91	2	5	9	100

MEAN	.207	STD ERR	.077
MODE	.000	STD DEV	.585
KURTOSIS	5.576	S E KURT	.618
S E SKEW	.314	RANGE	2.000
MAXIMUM	2.000	SUM	12.000
VALID CASES	58	MISSING CASES	0

MEDIAN	.000
VARIANCE	.342
SKEWNESS	2.664
MINIMUM	.000

MAGS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	15	26	26	3	12	21	86	5	5	9	100
2	23	40	66	4	3	5	91				

MEAN	2.310	STD ERR	.154
MODE	2.000	STD DEV	1.173
KURTOSIS	.268	S E KURT	.618
S E SKEW	.314	RANGE	4.000
MAXIMUM	5.000	SUM	134.000
VALID CASES	58	MISSING CASES	0

MEDIAN	2.000
VARIANCE	1.376
SKEWNESS	.915
MINIMUM	1.000

PERIOD

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	12	21	21	3	18	31	88				
2	21	36	57	4	7	12	100				

MEAN	2.345	STD ERR	.124
MODE	2.000	STD DEV	.947
KURTOSIS	-.851	S E KURT	.618
S E SKEW	.314	RANGE	3.000
MAXIMUM	4.000	SUM	136.000
VALID CASES	58	MISSING CASES	0

MEDIAN	2.000
VARIANCE	.897
SKEWNESS	.145
MINIMUM	1.000

TEXT

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	32	55	55	2	23	40	95	3	3	5	100

MEAN	1.500	STD ERR	.079
MODE	1.000	STD DEV	.600
KURTOSIS	-.358	S E KURT	.618
S E SKEW	.314	RANGE	2.000
MAXIMUM	3.000	SUM	87.000
VALID CASES	58	MISSING CASES	0

MEDIAN	1.000
VARIANCE	.360
SKEWNESS	.758
MINIMUM	1.000

EXHIB

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
2	10	17	17	4	16	28	91				
3	27	47	64	5	5	9	100				

MEAN	3.276	STD ERR	.112	MEDIAN	3.000
MODE	3.000	STD DEV	.854	VARIANCE	.730
KURTOSIS	-.410	S E KURT	.618	SKEWNESS	.302
S E SKEW	.314	RANGE	3.000	MINIMUM	2.000
MAXIMUM	5.000	SUM	190.000		
VALID CASES	58	MISSING CASES	0		

STAF

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	13	22	22	3	14	24	84	5	3	5	100
2	22	38	60	4	6	10	95				

MEAN	2.379	STD ERR	.145	MEDIAN	2.000
MODE	2.000	STD DEV	1.105	VARIANCE	1.222
KURTOSIS	-.130	S E KURT	.618	SKEWNESS	.640
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	138.000		
VALID CASES	58	MISSING CASES	0		

CHAT

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	13	22	22	3	13	22	79	5	2	3	100
2	20	34	57	4	10	17	97				

MEAN	2.448	STD ERR	.148	MEDIAN	2.000
MODE	2.000	STD DEV	1.127	VARIANCE	1.269
KURTOSIS	-.721	S E KURT	.618	SKEWNESS	.400
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	142.000		
VALID CASES	58	MISSING CASES	0		

STUDE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	1	2	2	3	28	48	64	5	3	5	100
2	8	14	16	4	18	31	95				

MEAN	3.241	STD ERR	.108	MEDIAN	3.000
MODE	3.000	STD DEV	.823	VARIANCE	.678
KURTOSIS	.189	S E KURT	.618	SKEWNESS	-.091
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	188.000		
VALID CASES	58	MISSING CASES	0		

LIAIS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	4	7	7	3	14	24	47	5	12	21	100
2	9	16	22	4	19	33	79				

MEAN	3.448	STD ERR	.156	MEDIAN	4.000
MODE	4.000	STD DEV	1.187	VARIANCE	1.410
KURTOSIS	-.661	S E KURT	.618	SKEWNESS	-.425
S E SKEW	.314	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	200.000		

VALID CASES 58 MISSING CASES 0

RESEAR

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
2	2	3	3	4	6	10	28				
3	8	14	17	5	42	72	100				

MEAN	4.517	STD ERR	.113	MEDIAN	5.000
MODE	5.000	STD DEV	.863	VARIANCE	.745
KURTOSIS	1.236	S E KURT	.618	SKEWNESS	-1.580
S E SKEW	.314	RANGE	3.000	MINIMUM	2.000
MAXIMUM	5.000	SUM	262.000		

VALID CASES 58 MISSING CASES 0

OTHAREA

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	42	72	72	2	3	5	79	4	2	3	100
1	1	2	74	3	10	17	97				

MEAN	.776	STD ERR	.174	MEDIAN	.000
MODE	.000	STD DEV	1.325	VARIANCE	1.756
KURTOSIS	-.112	S E KURT	.618	SKEWNESS	1.273
S E SKEW	.314	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	45.000		

VALID CASES 58 MISSING CASES 0

SOUNIT

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	50	86	86	2	3	5	91	3	5	9	100

MEAN	1.224	STD ERR	.078	MEDIAN	1.000
MODE	1.000	STD DEV	.594	VARIANCE	.352
KURTOSIS	4.832	S E KURT	.618	SKEWNESS	2.505
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	71.000		

VALID CASES 58 MISSING CASES 0

APRAIS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	9	16	16	2	49	84	100				

MEAN	1.845	STD ERR	.048	MEDIAN	2.000
MODE	2.000	STD DEV	.365	VARIANCE	.133
KURTOSIS	1.839	S E KURT	.618	SKEWNESS	-1.956
S E SKEW	.314	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	107.000		
VALID CASES	58	MISSING CASES	0		

NOAPRAIS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	49	84	84	4	2	3	91	7	1	2	97
2	2	3	88	6	2	3	95	9	2	3	100

MEAN	.845	STD ERR	.292	MEDIAN	.000
MODE	.000	STD DEV	2.223	VARIANCE	4.940
KURTOSIS	6.359	S E KURT	.618	SKEWNESS	2.694
S E SKEW	.314	RANGE	9.000	MINIMUM	.000
MAXIMUM	9.000	SUM	49.000		
VALID CASES	58	MISSING CASES	0		

EFAPRAIS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	49	84	84	1	5	9	93	3	4	7	100

MEAN	.293	STD ERR	.104	MEDIAN	.000
MODE	.000	STD DEV	.795	VARIANCE	.632
KURTOSIS	7.398	S E KURT	.618	SKEWNESS	2.889
S E SKEW	.314	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	17.000		
VALID CASES	58	MISSING CASES	0		

BEENCON

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	31	53	53	2	27	47	100				

MEAN	1.466	STD ERR	.066	MEDIAN	1.000
MODE	1.000	STD DEV	.503	VARIANCE	.253
KURTOSIS	-2.052	S E KURT	.618	SKEWNESS	.142
S E SKEW	.314	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	85.000		

VALID CASES 58 MISSING CASES 0

CONIND

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	29	50	50	2	29	50	100				

MEAN	1.500	STD ERR	.066	MEDIAN	1.500
MODE	1.000	STD DEV	.504	VARIANCE	.254
KURTOSIS	-2.073	S E KURT	.618	SKEWNESS	.000
S E SKEW	.314	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	87.000		

VALID CASES 58 MISSING CASES 0

EMPCON

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	53	91	91	3	5	9	100				

MEAN	1.172	STD ERR	.074	MEDIAN	1.000
MODE	1.000	STD DEV	.566	VARIANCE	.321
KURTOSIS	7.420	S E KURT	.618	SKEWNESS	3.027
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	68.000		

VALID CASES 58 MISSING CASES 0

SATLIAIS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	25	43	43	2	16	28	71	3	17	29	100

MEAN	1.862	STD ERR	.111	MEDIAN	2.000
MODE	1.000	STD DEV	.847	VARIANCE	.717
KURTOSIS	-1.562	S E KURT	.618	SKEWNESS	.271
S E SKEW	.314	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	108.000		

VALID CASES 58 MISSING CASES 0

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 3 FEB 88    SPSS-X RELEASE 2.1   FOR IBM VM/MTS
14:45:06     University of Durham

PRECEDING TASK REQUIRED        0.48 SECONDS CPU TIME;        2.85 SECONDS ELAPSED.

  16   0           RECODE GRADE (2,3=1) (4=2) (5,7=3) /
  17   0                  EDINSERV (01,02,03,04,05,06,09,10,13,21=1) /
  18   0                  SMINSERV (01,02,03,05,06,09,10,13,21,22=1) /
  19   0                  LIAIS (1,2=1) (3=2) (4,5=3) / METEMPLD (1,2=1) (3=2) (4=3) /
  20   0                  METSKILL (1,2=1) (3=2) (4=3) / METRECRU (1,2=1) (3=2) (4,5=3) /
  21   0                  METRAIN (1,2=1) (3=2) (4=3) / METEFF (1,2=1) (3=2) (4=3) /
  22   0                  SATLIAIS (2,3=2)
  23   0           CROSSTABS TABLES=AGE BY GRADE / NOINST BY GRADE / EDINSERV BY GRADE /
  24   0                  SMINSERV BY GRADE / TECHDEV BY GRADE / SECON BY GRADE /
  25   0                  EDMETH BY GRADE / ADMIN BY GRADE / LIAIS BY GRADE / APRAIS BY GRADE /
  26   0                  BEENCON BY GRADE / CONIND BY GRADE /METEMPLD BY SMINSERV /
  27   0                  METSKILL BY SMINSERV / METRECRU BY SMINSERV / METRAIN BY SMINSERV /
  28   0                  METEFF BY SMINSERV / SATLIAIS BY GRADE
  29   0           OPTIONS 3,4,5,9
  30   0           STATISTICS 1,2,4,11

THERE ARE     59776 BYTES OF SPSS MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS     59776 BYTES.
SPSS IS USING     65536 BYTES OF SYSTEM MEMORY
THERE ARE AT LEAST  2031616 BYTES OF SYSTEM MEMORY AVAILABLE.

 ***** GIVEN WORKSPACE ALLOWS FOR  4177 CELLS WITH     2 DIMENSIONS FOR CROSSTAB PROBLEM *****

 3 FEB 88    SPSS-X RELEASE 2.1   FOR IBM VM/MTS
14:45:10     University of Durham
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AGE — CROSSTABULATION OF AGE BY GRADE

AGE	GRADE 1	2	3	ROW TOTAL
2		2 33.3 12.5 3.4	4 66.7 20.0 6.9	6 10.3
3	5 29.4 22.7 8.6	5 29.4 31.3 8.6	7 41.2 35.0 12.1	17 29.3
4	12 52.2 54.5 20.7	4 17.4 25.0 6.9	7 30.4 35.0 12.1	23 39.7
5	5 41.7 22.7 8.6	5 41.7 31.3 8.6	2 16.7 10.0 3.4	12 20.7
COLUMN TOTAL	22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
8.92381	6	0.1773	1.655	7 OF 12 (58.3%)

STATISTIC	SYMMETRIC	WITH AGE DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.09859	0.02857	0.16667

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.27752	
PEARSON'S R	-0.30273	0.0104

NUMBER OF MISSING OBSERVATIONS = 0

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CROSSTABULATION OF NOINST BY GRADE

NOINST	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
1		18 36.0 81.8 31.0	13 26.0 81.3 22.4	19 38.0 95.0 32.8	50 86.2
2		2 33.3 9.1 3.4	3 50.0 18.8 5.2	1 16.7 5.0 1.7	6 10.3
3		1 100.0 4.5 1.7			1 1.7
4		1 100.0 4.5 1.7			1 1.7
COLUMN TOTAL		22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
5.22527	6	0.5153	0.276	9 OF 12 (75.0%)

STATISTIC	SYMMETRIC	WITH NOINST DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.04545	0.0	0.05556

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.21224	
PEARSON'S R	-0.21106	0.0559

NUMBER OF MISSING OBSERVATIONS = 0

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EDINSERV — CROSSTABULATION OF EDINSERV BY GRADE

EDINSERV	GRADE 1	2	3	ROW TOTAL
0	12	7	14	33
	36.4	21.2	42.4	56.9
	54.5	43.8	70.0	
	20.7	12.1	24.1	
1	10	9	6	25
	40.0	36.0	24.0	43.1
	45.5	56.3	30.0	
	17.2	15.5	10.3	
COLUMN TOTAL	22	16	20	58
	37.9	27.6	34.5	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
2.57741	2	0.2756	6.897	NONE

STATISTIC	SYMMETRIC	WITH EDINSERV DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.06557	0.03000	0.05556

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.21080	
PEARSON'S R	-0.12849	0.1682

NUMBER OF MISSING OBSERVATIONS = 0

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University of Durham

SMINSERV — CROSSTABULATION OF — BY GRADE

SMINSERV	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
0		7 33.3 31.8 12.1	7 33.3 43.8 12.1	7 33.3 35.0 12.1	21 36.2
1		15 40.5 68.2 25.9	9 24.3 56.3 15.5	13 35.1 65.0 22.4	37 63.8
	COLUMN TOTAL	22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.59021	2	0.7445	5.793	NONE

STATISTIC	SYMMETRIC	WITH SMINSERV DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.10183	
PEARSON'S R	-0.03055	0.4099

NUMBER OF MISSING OBSERVATIONS = 0

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University of Durham

CROSSTABULATION OF TECHDEV BY GRADE

TECHDEV	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	GRADE 2	GRADE 3	ROW TOTAL
1	COUNT	18	14	15	47
	ROW PCT	33.3	29.8	31.9	81.0
	COL PCT	81.8	87.5	75.0	
	TOT PCT	31.0	24.1	25.9	
2	COUNT	4	2	5	11
	ROW PCT	36.4	18.2	45.5	19.0
	COL PCT	18.2	12.5	25.0	
	TOT PCT	6.9	3.4	3.6	
COLUMN TOTAL		22	16	20	58
		37.9	27.6	34.5	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.91788	2	0.6320	3.034	3 OF 6 (50.0%)

STATISTIC	SYMMETRIC	WITH TECHDEV DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.02128	0.0	0.02778

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.12580	
PEARSON'S R	0.07134	0.2973

NUMBER OF MISSING OBSERVATIONS = 0

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SECON CROSSTABULATION OF SECON BY GRADE

SECON	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
1		14 43.8 63.6 24.1	7 21.9 43.8 12.1	11 34.4 55.0 19.0	32 55.2
2		8 30.8 36.4 13.8	9 34.6 56.3 15.5	9 34.6 45.0 15.5	26 44.8
COLUMN TOTAL		22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
1.48153	2	0.4767	7.172	NONE

STATISTIC	SYMMETRIC	WITH SECON DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.04839	0.07692	0.02778

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.15982	
PEARSON'S R	0.07733	0.2820

NUMBER OF MISSING OBSERVATIONS = 0

EDMETH CROSSTABULATION OF EDMETH BY GRADE

EDMETH	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
1		4 36.4 18.2 6.9	4 36.4 25.0 6.9	3 27.3 15.0 5.2	11 19.0
2		17 37.8 77.3 29.3	12 26.7 75.0 20.7	16 35.6 80.0 27.6	45 77.6
3		1 50.0 4.5 1.7		1 50.0 5.0 1.7	2 3.4
COLUMN TOTAL		22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
1.27744	4	0.8652	0.552	6 OF 9 (66.7%)

STATISTIC	SYMMETRIC	WITH EDMETH DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.10494	
PEARSON'S R	0.03127	0.4079

NUMBER OF MISSING OBSERVATIONS = 0

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University of Durham

CROSSTABULATION OF ADMIN BY GRADE

ADMIN	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
1		3 50.0 13.6 5.2	1 16.7 6.3 1.7	2 33.3 10.0 3.4	6 10.3
2		14 35.0 63.6 24.1	15 37.5 93.8 25.9	11 27.5 55.0 19.0	40 69.0
3		5 41.7 22.7 8.6		7 58.3 35.0 12.1	12 20.7
	COLUMN TOTAL	22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
7.90744	4	0.0950	1.655	6 OF 9 (66.7%)

STATISTIC	SYMMETRIC	WITH ADMIN DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.05556	0.0	0.08333

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.26109	
PEARSON'S R	0.11880	0.1872

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/HTS
14:45:11 University of Durham

CROSSTABULATION OF LIAIS BY GRADE

LIAIS	GRADE 1	2	3	ROW TOTAL
1	7 53.8 31.8 12.1	5 38.5 31.3 8.6	1 7.7 5.0 1.7	13 22.4
2	4 28.6 18.2 6.9	4 28.6 25.0 6.9	6 42.9 30.0 10.3	14 24.1
3	11 35.5 50.0 19.0	7 22.6 43.8 12.1	13 41.9 65.0 22.4	31 53.4
COLUMN TOTAL	22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
5.57412	4	0.2333	3.586	5 OF 9 (55.6%)

STATISTIC	SYMMETRIC	WITH LIAIS DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.06349	0.0	0.11111

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.21921	
PEARSON'S R	0.21480	0.0527

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
14:45:11 University of Durham

APRAIS - C R O S S T A B U L A T I O N O F APRAIS BY GRADE

APRAIS	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
	1	6 66.7 27.3 10.3	3 33.3 18.8 5.2		9 15.5
	2	16 32.7 72.7 27.6	13 26.5 81.3 22.4	20 40.8 100.0 34.5	49 84.5
	COLUMN TOTAL	22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
6.12013	2	0.0469	2.483	3 OF 6 (50.0%)

STATISTIC	SYMMETRIC	WITH APRAIS DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.08889	0.0	0.11111

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.32484	
PEARSON'S R	0.31865	0.0074

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 14:45:11 SPSS-X RELEASE 2.1 FOR IBM VM/NTS
University of Durham

BEENCON — CROSSTABULATION OF BEENCON BY GRADE

BEENCON	GRADE 1	2	3	ROW TOTAL
1	16	10	5	31
	51.6	32.3	16.1	53.4
	72.7	62.5	25.0	
	27.6	17.2	8.6	
2	6	6	15	27
	22.2	22.2	55.6	46.6
	27.3	37.5	75.0	
	10.3	10.3	25.9	
COLUMN TOTAL	22	16	20	58
	37.9	27.6	34.5	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
10.31867	2	0.0057	7.448	NONE

STATISTIC	SYMMETRIC	WITH BEENCON DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.30159	0.37037	0.25000

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.42179	
PEARSON'S R	0.40372	0.0009

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 14:45:11 SPSS-X RELEASE 2.1 FOR IBM VM/CMS
University of Durham

CONIND CROSSTABULATION OF BY GRADE

CONIND	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	2	3	ROW TOTAL
1		13 44.8 59.1 22.4	9 31.0 56.3 15.5	7 24.1 35.0 12.1	29 50.0
2		9 31.0 40.9 15.5	7 24.1 43.8 12.1	13 44.8 65.0 22.4	29 50.0
	COLUMN TOTAL	22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
2.77727	2	0.2494	8.000	NONE

STATISTIC	SYMMETRIC	WITH CONIND DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.15385	0.20690	0.11111

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.21382	
PEARSON'S R	0.20278	0.0634

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
14:45:11 University of Durham

CROSSTABULATION OF METEMPLO BY SMINSERV

METEMPLO	COUNT / ROW PCT / COL PCT / TOT PCT	SMINSERV 0	SMINSERV 1	ROW TOTAL
0		1	3	4
		25.0	75.0	6.9
		4.8	8.1	
		1.7	5.2	
1		5	18	23
		21.7	78.3	39.7
		23.8	48.6	
		8.6	31.0	
2		6	8	14
		42.9	57.1	24.1
		28.6	21.6	
		10.3	13.8	
3		9	8	17
		52.9	47.1	29.3
		42.9	21.6	
		15.5	13.8	
COLUMN TOTAL		21	37	58
		36.2	63.8	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
4.63099	3	0.2009	1.448	2 OF 8 (25.0%)

STATISTIC	SYMMETRIC	WITH METEMPLO DEPENDENT	WITH SMINSERV DEPENDENT
LAMBDA	0.08929	0.11429	0.04762

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.28257	
PEARSON'S R	-0.26524	0.0217

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 14:45:12 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
University of Durham

CROSSTABULATION OF METSKILL BY SMINSERV

METSKILL	COUNT / ROW PCT / COL PCT / TOT PCT	SMINSERV 0	SMINSERV 1	ROW TOTAL
0		2 50.0 9.5 3.4	2 50.0 5.4 3.4	4 6.9
1		13 34.2 61.9 22.4	25 65.8 67.6 43.1	38 65.5
2		2 28.6 9.5 3.4	5 71.4 13.5 8.6	7 12.1
3		4 44.4 19.0 6.9	5 55.6 13.5 8.6	9 15.5
COLUMN TOTAL		21 36.2	37 63.8	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.83614	3	0.8408	1.448	5 OF 8 (62.5%)

STATISTIC	SYMMETRIC	WITH METSKILL DEPENDENT	WITH SMINSERV DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.12007	
PEARSON'S R	-0.01726	0.4488

NUMBER OF MISSING OBSERVATIONS = 0

METRECRU — CROSSTABULATION OF METRECRU BY SMINSERV

METRECRU	COUNT / ROW PCT / COL PCT / TOT PCT	SMINSERV 0	SMINSERV 1	ROW TOTAL
0		3 42.9 14.3 5.2	4 57.1 10.8 6.9	7 12.1
1		6 24.0 28.6 10.3	19 76.0 51.4 32.8	25 43.1
2		11 47.8 52.4 19.0	12 52.2 32.4 20.7	23 39.7
3		1 33.3 4.8 1.7	2 66.7 5.4 3.4	3 5.2
COLUMN TOTAL		21 36.2	37 63.8	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
3.10193	3	0.3762	1.086	4 OF 8 (50.0%)

STATISTIC	SYMMETRIC	WITH METRECRU DEPENDENT	WITH SMINSERV DEPENDENT
LAMBDA	0.09259	0.15152	0.0

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.23126	
PEARSON'S R	-0.09581	0.2372

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/NTS
14:45:12 University of Durham

METRAIN CROSSTABULATION OF METRAIN BY SMINSERV

METRAIN	COUNT / ROW PCT / COL PCT / TOT PCT	SMINSERV 0	SMINSERV 1	ROW TOTAL
0		1 50.0 4.8 1.7	1 50.0 2.7 1.7	2 3.4
1		18 34.6 85.7 31.0	34 65.4 91.9 58.6	52 89.7
2		1 100.0 4.8 1.7		1 1.7
3		1 33.3 4.8 1.7	2 66.7 5.4 3.4	3 5.2
COLUMN TOTAL		21 36.2	37 63.8	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
1.99439	3	0.5736	0.362	6 OF 8 (75.0%)

STATISTIC	SYMMETRIC	WITH METRAIN DEPENDENT	WITH SMINSERV DEPENDENT
LAMBDA	0.03704	0.0	0.04762

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.18543	
PEARSON'S R	-0.01358	0.4597

NUMBER OF MISSING OBSERVATIONS = 0

METEFF — C R O S S T A B U L A T I O N O F METEFF BY SMINSERV

METEFF	COUNT / ROW PCT / COL PCT / TOT PCT	SMINSERV 0	SMINSERV 1	ROW TOTAL
0		1 33.3 4.8 1.7	2 66.7 5.4 3.4	3 5.2
1		17 37.8 81.0 29.3	28 62.2 75.7 48.3	45 77.6
2		2 40.0 9.5 3.4	3 60.0 8.1 5.2	5 8.6
3		1 20.0 4.8 1.7	4 80.0 10.8 6.9	5 8.6
COLUMN TOTAL		21 36.2	37 63.8	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.65855	3	0.8829	1.086	6 OF 8 (75.0%)

STATISTIC	SYMMETRIC	WITH METEFF DEPENDENT	WITH SMINSERV DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.10656	
PEARSON'S R	0.07274	0.2937

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
14:43:12 University of Durham

SATLIAIS — CROSSTABULATION OF SATLIAIS BY GRADE

SATLIAIS	COUNT / ROW PCT / COL PCT / TOT PCT	GRADE 1	GRADE 2	GRADE 3	ROW TOTAL
1		9 36.0 40.9 15.5	7 28.0 43.8 12.1	9 36.0 45.0 15.5	25 43.1
2		13 39.4 59.1 22.4	9 27.3 56.3 15.5	11 33.3 55.0 19.0	33 56.9
COLUMN TOTAL		22 37.9	16 27.6	20 34.5	58 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.07526	2	0.9631	6.897	NONE

STATISTIC	SYMMETRIC	WITH SATLIAIS DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
CRAMER'S V	0.03602	
PEARSON'S R	-0.03530	0.3963

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
14:45:12 University of Durham

CROSSTABULATION INDEX

PAGE	TABLE
6	AGE BY GRADE
7	NOINST BY GRADE
8	EDINSERV BY GRADE
9	SMINSERV BY GRADE
10	TECHDEV BY GRADE
11	SECON BY GRADE
12	EDMETH BY GRADE
13	ADMIN BY GRADE
14	LIAIS BY GRADE
15	APRAIS BY GRADE
16	BEENCON BY GRADE
17	CONIND BY GRADE
18	METEMPLO BY SMINSERV
19	METSKILL BY SMINSERV
20	METRECRU BY SMINSERV
21	METRAIN BY SMINSERV
22	METEFF BY SMINSERV
23	SATLIAIS BY GRADE

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
14:45:12 University of Durham

PRECEDING TASK REQUIRED 0.59 SECONDS CPU TIME; 4.45 SECONDS ELAPSED.

31 0 FINISH

31 COMMAND LINES READ.
0 ERRORS DETECTED.
0 WARNINGS ISSUED.
2 SECONDS CPU TIME.
13 SECONDS ELAPSED TIME.
END OF JOB.

Job number QEDR1 NUMAC Computing Service at Durham - Michigan Terminal System 15:02:51 GMT

User: EDR1 Project: DEDO

Obtained at 15:02:51 Wed Feb 03/88
Released at 15:02:54 Wed Feb 03/88

Lines printed 2331
Pages printed 40

..END JOB 1860 15:10 3 FEB 88 ********** NUMAC (GROUND)
..END JOB 1860 15:10 3 FEB 88 ********** NUMAC (GROUND)
..END JOB 1860 15:10 3 FEB 88 ********** NUMAC (GROUND)
..END JOB 1860 15:10 3 FEB 88 ********** NUMAC (GROUND)
..END JOB 1860 15:10 3 FEB 88 ********** NUMAC (GROUND)

QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******
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APPENDIX VII

DATA AND STATISTICAL ANALYSIS OF MANAGER QUESTIONNAIRES

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QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ********
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QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ******** QEDR1 ********

START JOB 2680      11:33   4 FEB 88          ********************************   NUMAC  (BASEMENT)
START JOB 2680      11:33   4 FEB 88          ********************************   NUMAC  (BASEMENT)
START JOB 2680      11:33   4 FEB 88          ********************************   NUMAC  (BASEMENT)
START JOB 2680      11:33   4 FEB 88          ********************************   NUMAC  (BASEMENT)
START JOB 2680      11:33   4 FEB 88          ********************************   NUMAC  (BASEMENT)

 JOB STATISTICS :  1214 CARDS,    1214 LINES,     0 CARDS PUNCHED, ENTERED FROM DUR.MTS  AT 11:21


  3 FEB 88    SPSS-X RELEASE 2.1  FOR IBM VM/MTS
17:54:31      University of Durham

For                     University of Durham                License Number 1247

   1  0        FILE HANDLE TOM2SPSS / NAME="MANEL"
   2  0        SET LENGTH=NONE
   3  0        DATA LIST FILE=TOM2SPSS / id1 1-2 id2 3-4 sex 5 age 6 grade 7 yremploy 8
   4  0          status 9 yrjob 10 staff 11 jobqual 12 profinst 13 othqual 14 newtech 15
   5  0          newmach 16 compmach 17 metemplo 18 metskill 19 metrecru 20 metrain 21
   6  0          meteff 22 undequip 23 stafskil 24 introsys 25 undsyst 26 anxsyst 27
   7  0          contrib 28 incomp 29 extern 30 skilpers 31 inserv 32 corscomp 33 indemp 35
   8  0          lea 36 union 37 msc 38 combin 39 other 40 incors 41 inmet 42 avtim 43
   9  0          ratecors 44 excors 45 exnumb 46 extim 47 exrate 48 fecors 49 fenumb 50
  10  0          fetim 51 ferate 52 baencon 53 empcon 54 satliais 55

THE ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE TOM2SPSS.
```

VARIABLE	REC	START	END	FORMAT	WIDTH	DEC
ID1	1	1	2	F	2	0
ID2	1	3	4	F	2	0
SEX	1	5	5	F	1	0
AGE	1	6	6	F	1	0
GRADE	1	7	7	F	1	0
YREMPLOY	1	8	8	F	1	0
STATUS	1	9	9	F	1	0
YRJOB	1	10	10	F	1	0
STAFF	1	11	11	F	1	0
JOBQUAL	1	12	12	F	1	0
PROFINST	1	13	13	F	1	0
OTHQUAL	1	14	14	F	1	0
NEWTECH	1	15	15	F	1	0
NEWMACH	1	16	16	F	1	0
COMPMACH	1	17	17	F	1	0
METEMPLO	1	18	18	F	1	0
METSKILL	1	19	19	F	1	0
METRECRU	1	20	20	F	1	0
METRAIN	1	21	21	F	1	0
METEFF	1	22	22	F	1	0
UNDEQUIP	1	23	23	F	1	0
STAFSKIL	1	24	24	F	1	0
INTROSYS	1	25	25	F	1	0
UNDSYST	1	26	26	F	1	0
ANXSYST	1	27	27	F	1	0
CONTRIB	1	28	28	F	1	0
INCOMP	1	29	29	F	1	0
EXTERN	1	30	30	F	1	0
SKILPERS	1	31	31	F	1	0
INSERV	1	32	32	F	1	0
CORSCOMP	1	33	33	F	1	0
INDEMP	1	35	35	F	1	0
LEA	1	36	36	F	1	0
UNION	1	37	37	F	1	0
MSC	1	38	38	F	1	0
COMBIN	1	39	39	F	1	0
OTHER	1	40	40	F	1	0
INCORS	1	41	41	F	1	0
INMET	1	42	42	F	1	0
AVTIM	1	43	43	F	1	0
RATECORS	1	44	44	F	1	0
EXCORS	1	45	45	F	1	0
EXNUMB	1	46	46	F	1	0
EXTIM	1	47	47	F	1	0
EXRATE	1	48	48	F	1	0
FECORS	1	49	49	F	1	0
FENUMB	1	50	50	F	1	0
FETIM	1	51	51	F	1	0
FERATE	1	52	52	F	1	0
BEENCON	1	53	53	F	1	0
EMPCON	1	54	54	F	1	0
SATLIAIS	1	55	55	F	1	0

```
END OF DATALIST TABLE.

  11  0          LIST

THERE ARE    61312 BYTES OF SPSS MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS    61224 BYTES.
SPSS IS USING    65536 BYTES OF SYSTEM MEMORY
THERE ARE AT LEAST  2031615 BYTES OF SYSTEM MEMORY AVAILABLE.

     1956 BYTES OF MEMORY REQUIRED FOR LIST PROCEDURE.
      240 BYTES HAVE ALREADY BEEN ACQUIRED.
     1716 BYTES REMAIN TO BE ACQUIRED.
```

ID 1	ID 2	SEX	AGE	GRADE	YREMPLOY	STATUS	YRJOB	STAFF	JOBQUAL	PROFINST	OTHQUAL	NEWTECH	NEWMACH	COMPMACH	METEMPLD	METSKILL	METRECRU	METRAIN	METEFF	UNDEQUIP	STAFFSKIL	INTROSYS	UNDSYST	ANXSYST	CONTRIB	INCOMP	EXTERN	SKILPERS	INSERV	CORSCOMP	INDEMP	LEA	UNION	MSC	COMBIN
0	1	1	3	3	5	9	5	2	1	2	1	1	1	1	4	3	3	3	2	1	2	1	2	1	1	1	2	1	2	2	4	4	2	3
0	2	1	4	7	5	1	6	2	1	2	2	1	1	1	3	2	3	2	1	1	1	1	1	1	1	2	2	1	2	2	1	2	3	3
0	3	1	3	7	5	5	1	6	2	1	2	2	1	1	4	3	2	3	2	2	0	1	1	1	1	2	1	1	1	2	1	3	1	1
0	4	1	4	8	5	3	5	1	9	6	2	2	1	1	3	4	2	2	2	0	2	1	1	2	1	2	2	1	1	2	3	5	2	2
0	5	1	3	7	4	9	4	2	1	2	2	1	1	1	3	2	3	2	2	2	1	2	1	1	1	1	2	1	1	2	3	4	3	3
0	6	1	2	7	4	9	5	2	2	2	1	1	1	1	3	2	3	3	2	1	1	1	2	1	1	1	2	1	1	2	2	3	2	2
0	7	1	3	2	3	9	2	3	2	2	1	1	1	1	4	2	3	3	1	1	4	1	1	1	1	2	3	1	1	1	3	5	3	2
0	8	1	3	9	4	8	7	1	1	2	2	1	1	2	0	2	3	0	2	1	1	1	1	1	2	2	1	0	2	3	3	3	3	2
0	9	1	3	9	4	2	8	2	1	2	2	1	1	3	0	3	0	0	0	1	1	1	1	2	1	2	3	1	2	3	1	2	2	1
0	10	1	3	7	4	4	8	2	1	2	2	1	1	1	3	2	3	3	2	1	1	1	1	2	2	2	2	1	2	2	1	1	3	1
0	11	1	3	8	4	4	8	2	1	2	2	1	1	1	3	2	3	3	2	1	1	1	1	2	2	2	2	1	2	2	1	2	3	1
0	12	1	4	8	5	4	9	6	2	2	1	1	1	1	2	2	3	2	2	1	1	1	1	2	1	2	2	1	2	2	1	2	3	1
0	13	1	2	9	4	1	4	2	1	2	2	1	1	1	3	3	3	2	2	1	2	1	1	2	2	3	3	1	2	3	4	3	2	2
0	14	1	2	9	3	9	3	2	1	2	2	1	1	1	3	2	2	2	2	1	2	1	1	2	2	3	2	1	2	2	4	2	3	2
0	15	1	2	9	3	9	3	2	1	2	2	1	1	1	3	2	2	2	2	1	2	1	1	1	2	2	2	1	2	2	4	2	3	2
0	16	1	2	9	4	9	2	2	1	2	2	1	1	1	3	2	2	2	3	1	1	1	1	2	2	2	2	2	1	2	2	3	3	2	2
0	17	1	3	7	4	9	2	1	1	2	1	1	1	1	3	2	1	2	2	1	1	1	1	2	2	2	2	3	1	2	2	1	3	3	1
0	18	1	2	9	2	9	3	2	1	2	2	1	1	1	3	2	2	1	2	1	1	1	2	2	2	2	2	3	1	2	2	1	3	3	1
0	19	1	2	8	4	9	2	2	1	2	2	1	1	1	4	2	3	2	2	1	1	1	1	2	2	2	1	3	1	1	2	1	3	3	1
0	20	1	4	3	5	2	5	4	1	2	2	1	1	1	2	2	2	2	2	1	2	1	1	2	2	2	1	3	1	1	1	2	4	2	2
0	21	1	3	7	3	9	3	1	1	2	2	1	1	1	3	2	3	2	2	1	4	2	1	2	2	2	1	3	2	1	1	4	2	2	2
0	22	1	5	5	4	5	5	3	1	2	2	1	1	1	1	2	2	2	2	1	3	2	1	3	1	2	2	1	2	1	3	4	2	2	2
0	23	1	5	6	5	5	3	2	2	2	1	1	1	1	3	2	3	2	2	1	2	1	1	1	1	1	2	1	1	1	3	4	2	2	2
0	24	1	3	9	1	4	5	2	3	2	2	1	1	1	4	2	3	2	2	1	2	1	1	1	1	1	2	1	1	1	2	2	3	2	2
0	25	1	5	8	4	5	9	6	2	1	2	2	1	1	1	2	2	3	2	2	1	1	1	1	2	1	2	1	1	1	1	2	3	2	2
0	26	1	2	1	3	5	2	2	2	2	1	1	1	1	2	2	3	2	2	1	1	2	1	2	2	2	2	1	1	2	2	1	3	3	1
0	27	1	3	9	5	9	3	1	1	2	2	1	2	0	3	1	3	3	2	2	1	1	1	2	1	2	2	1	2	2	1	1	2	3	1
0	28	1	4	8	5	9	7	2	1	2	2	1	1	1	4	2	3	2	2	1	1	1	1	1	2	3	2	1	1	2	1	1	3	4	2
0	29	1	2	9	4	1	4	5	1	2	2	1	1	1	3	2	3	2	2	1	1	2	1	1	1	2	1	1	1	2	1	2	2	3	1
0	30	1	4	9	5	1	4	5	1	2	2	1	1	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1	1	2	1	2	2	3	1
0	31	1	2	9	4	1	2	2	1	1	2	1	1	1	2	1	1	2	1	1	1	1	1	2	1	1	1	1	1	2	1	2	2	3	1
0	32	1	2	9	4	9	1	2	1	1	1	1	1	1	2	3	2	3	1	1	2	1	2	3	2	2	2	1	1	2	2	2	3	1	1
0	33	1	3	9	3	3	2	6	2	1	1	1	1	1	2	2	3	2	2	1	1	2	1	2	2	2	2	2	1	2	2	2	3	3	1
0	34	1	2	8	4	8	3	3	1	2	2	1	1	1	3	3	3	2	2	1	2	1	1	2	3	2	2	2	1	2	0	2	2	3	2
0	35	1	2	9	2	1	3	1	1	2	2	1	1	1	3	2	2	2	2	1	1	1	2	1	2	2	2	3	3	1	1	1	4	2	2
0	36	1	3	7	4	1	4	3	1	2	2	1	1	1	3	2	3	2	2	2	2	1	1	2	1	1	1	2	1	1	1	2	2	2	2
0	37	1	3	3	4	1	2	3	2	2	2	1	1	1	3	2	3	2	2	1	2	1	2	2	1	2	1	2	1	1	1	2	3	1	2
0	38	1	3	8	4	4	3	1	1	2	2	1	1	1	4	2	2	2	2	1	2	2	1	2	1	1	2	3	2	1	1	2	4	1	2
0	39	1	2	3	2	2	1	2	2	2	2	1	1	1	3	2	2	2	1	1	4	2	1	1	1	2	2	1	1	1	1	2	3	1	1
0	40	1	2	9	4	2	2	1	2	2	2	1	1	1	2	1	3	0	2	1	1	2	1	1	1	2	2	2	1	1	2	1	3	1	1
0	41	1	3	9	3	1	3	2	2	2	2	1	1	1	3	2	3	2	2	1	2	1	1	2	2	2	2	1	2	2	1	2	5	1	2
0	42	1	3	9	3	2	2	1	2	2	2	1	1	1	3	1	2	3	2	2	3	1	1	1	2	2	1	2	2	0	2	4	5	3	2

NUMBER OF CASES READ = 42 NUMBER OF CASES LISTED = 42

PRECEDING TASK REQUIRED 0.14 SECONDS CPU TIME; 1.09 SECONDS ELAPSED.

```
  12  0          FREQUENCIES VARIABLES=SEX TO SATLIAIS /
  13  0                      FORMAT=CONDENSE / STATISTICS=ALL

THERE ARE    62416 BYTES OF SPSS MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS    62416 BYTES.
SPSS IS USING    65536 BYTES OF SYSTEM MEMORY
THERE ARE AT LEAST  2031616 BYTES OF SYSTEM MEMORY AVAILABLE.

***** MEMORY ALLOWS A TOTAL OF   5816 VALUES, ACCUMULATED ACROSS ALL VARIABLES.
      THERE ALSO MAY BE UP TO   1454 VALUE LABELS FOR EACH VARIABLE.
```

SEX

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	42	100	100								

MEAN	1.000	STD ERR	.000	MEDIAN	1.000
MODE	1.000	STD DEV	.000	VARIANCE	.000
RANGE	.000	MINIMUM	1.000	MAXIMUM	1.000
SUM	42.000				

VALID CASES 42 MISSING CASES 0

AGE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	1	2	2	3	19	45	81	5	2	5	100
2	14	33	36	4	6	14	95				

MEAN	2.857	STD ERR	.134	MEDIAN	3.000
MODE	3.000	STD DEV	.872	VARIANCE	.760
KURTOSIS	.284	S E KURT	.717	SKEWNESS	.521
S E SKEW	.365	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	120.000		

VALID CASES 42 MISSING CASES 0

GRADE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	1	2	2	4	1	2	19	8	8	19	60
2	1	2	5	5	1	2	21	9	17	40	100
3	5	12	17	7	8	19	40				

MEAN	7.143	STD ERR	.365	MEDIAN	8.000
MODE	9.000	STD DEV	2.364	VARIANCE	5.589
KURTOSIS	.312	S E KURT	.717	SKEWNESS	-1.261
S E SKEW	.365	RANGE	8.000	MINIMUM	1.000
MAXIMUM	9.000	SUM	300.000		

VALID CASES 42 MISSING CASES 0

YREMPLOY

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	1	2	2	3	8	19	31	5	10	24	98
2	4	10	12	4	18	43	74	6	1	2	100

MEAN	3.833	STD ERR	.163	MEDIAN	4.000
MODE	4.000	STD DEV	1.057	VARIANCE	1.118
KURTOSIS	.249	S E KURT	.717	SKEWNESS	-.561
S E SKEW	.365	RANGE	5.000	MINIMUM	1.000
MAXIMUM	6.000	SUM	161.000		

VALID CASES 42 MISSING CASES 0

STATUS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	11	26	26	4	1	2	40	9	17	40	100
2	4	10	36	5	3	7	48				
3	1	2	38	8	5	12	60				

MEAN	5.571	STD ERR	.550	MEDIAN	8.000
MODE	9.000	STD DEV	3.562	VARIANCE	12.690
KURTOSIS	-1.825	S E KURT	.717	SKEWNESS	-.282
S E SKEW	.365	RANGE	8.000	MINIMUM	1.000
MAXIMUM	9.000	SUM	234.000		

VALID CASES 42 MISSING CASES 0

YRJOB

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	3	7	7	4	5	12	74	7	2	5	100
2	14	33	40	5	4	10	83				
3	9	21	62	6	5	12	95				

MEAN	3.381	STD ERR	.252	MEDIAN	3.000
MODE	2.000	STD DEV	1.696	VARIANCE	2.876
KURTOSIS	-.658	S E KURT	.717	SKEWNESS	.656
S E SKEW	.365	RANGE	6.000	MINIMUM	1.000
MAXIMUM	7.000	SUM	142.000		

VALID CASES 42 MISSING CASES 0

STAFF

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	10	24	24	3	7	17	92	5	1	2	98
2	22	52	76	4	1	2	95	6	1	2	100

MEAN	2.143	STD ERR	.162	MEDIAN	2.000
MODE	2.000	STD DEV	1.049	VARIANCE	1.101
KURTOSIS	4.237	S E KURT	.717	SKEWNESS	1.696
S E SKEW	.365	RANGE	5.000	MINIMUM	1.000
MAXIMUM	6.000	SUM	90.000		

VALID CASES 42 MISSING CASES 0

JOBQUAL

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	29	69	69	2	13	31	100				

MEAN	1.310	STD ERR	.072	MEDIAN	1.000
MODE	1.000	STD DEV	.468	VARIANCE	.219
KURTOSIS	-1.335	S E KURT	.717	SKEWNESS	.855
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	55.000		

VALID CASES 42 MISSING CASES 0

PROFINST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	6	14	14	2	36	86	100				

MEAN	1.857	STD ERR	.055	MEDIAN	2.000
MODE	2.000	STD DEV	.354	VARIANCE	.125
KURTOSIS	2.606	S E KURT	.717	SKEWNESS	-2.118
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	78.000		
VALID CASES	42	MISSING CASES	0		

OTHQUAL

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	16	38	38	2	26	62	100				

MEAN	1.619	STD ERR	.076	MEDIAN	2.000
MODE	2.000	STD DEV	.492	VARIANCE	.242
KURTOSIS	-1.831	S E KURT	.717	SKEWNESS	-.509
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	68.000		
VALID CASES	42	MISSING CASES	0		

NEWTECH

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	42	100	100								

MEAN	1.000	STD ERR	.000	MEDIAN	1.000
MODE	1.000	STD DEV	.000	VARIANCE	.000
RANGE	.000	MINIMUM	1.000	MAXIMUM	1.000
SUM	42.000				
VALID CASES	42	MISSING CASES	0		

NEWMACH

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	41	98	98	2	1	2	100				

MEAN	1.024	STD ERR	.024	MEDIAN	1.000
MODE	1.000	STD DEV	.154	VARIANCE	.024
KURTOSIS	42.000	S E KURT	.717	SKEWNESS	6.481
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	43.000		
VALID CASES	42	MISSING CASES	0		

COMPMACH

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	2	2	5	98				
1	38	90	93	3	1	2	100				

MEAN	1.071	STD ERR	.063	MEDIAN	1.000
MODE	1.000	STD DEV	.407	VARIANCE	.166
KURTOSIS	13.920	S E KURT	.717	SKEWNESS	2.864
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	45.000		
VALID CASES	42	MISSING CASES	0		

METEMPLO

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	2	5	5	2	8	19	29	4	8	19	100
1	2	5	10	3	22	52	81				

MEAN	2.762	STD ERR	.152	MEDIAN	3.000
MODE	3.000	STD DEV	.983	VARIANCE	.966
KURTOSIS	1.521	S E KURT	.717	SKEWNESS	-1.109
S E SKEW	.365	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	116.000		
VALID CASES	42	MISSING CASES	0		

METSKILL

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	2	5	5	2	30	71	86				
1	4	10	14	3	6	14	100				

MEAN	1.952	STD ERR	.102	MEDIAN	2.000
MODE	2.000	STD DEV	.661	VARIANCE	.437
KURTOSIS	2.627	S E KURT	.717	SKEWNESS	-1.015
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	82.000		
VALID CASES	42	MISSING CASES	0		

METRECRU

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	3	7	7	2	12	29	40				
1	2	5	12	3	25	60	100				

MEAN	2.405	STD ERR	.137	MEDIAN	3.000
MODE	3.000	STD DEV	.885	VARIANCE	.783
KURTOSIS	1.901	S E KURT	.717	SKEWNESS	-1.580
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	101.000		

VALID CASES 42 MISSING CASES 0

METRAIN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	3	7	7	2	30	71	95				
1	7	17	24	3	2	5	100				

MEAN	1.738	STD ERR	.103	MEDIAN	2.000
MODE	2.000	STD DEV	.665	VARIANCE	.442
KURTOSIS	1.780	S E KURT	.717	SKEWNESS	-1.221
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	73.000		

VALID CASES 42 MISSING CASES 0

METEFF

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	3	7	7	2	28	67	93				
1	8	19	26	3	3	7	100				

MEAN	1.738	STD ERR	.108	MEDIAN	2.000
MODE	2.000	STD DEV	.701	VARIANCE	.491
KURTOSIS	1.164	S E KURT	.717	SKEWNESS	-.927
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	73.000		

VALID CASES 42 MISSING CASES 0

UNDEQUIP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	40	95	95	2	2	5	100				

MEAN	1.048	STD ERR	.033	MEDIAN	1.000
MODE	1.000	STD DEV	.216	VARIANCE	.046
KURTOSIS	18.296	S E KURT	.717	SKEWNESS	4.408
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	44.000		

VALID CASES 42 MISSING CASES 0

STAFSKIL

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	22	52	52	3	2	5	93				
2	15	36	88	4	3	7	100				

MEAN	1.667	STD ERR	.135	MEDIAN	1.000
MODE	1.000	STD DEV	.874	VARIANCE	.764
KURTOSIS	1.591	S E KURT	.717	SKEWNESS	1.414
S E SKEW	.365	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	70.000		
VALID CASES	42	MISSING CASES	0		

INTROSYS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	31	74	74	2	11	26	100				

MEAN	1.262	STD ERR	.069	MEDIAN	1.000
MODE	1.000	STD DEV	.445	VARIANCE	.198
KURTOSIS	-.777	S E KURT	.717	SKEWNESS	1.124
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	53.000		
VALID CASES	42	MISSING CASES	0		

UNDSYST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	31	74	74	2	11	26	100				

MEAN	1.262	STD ERR	.069	MEDIAN	1.000
MODE	1.000	STD DEV	.445	VARIANCE	.198
KURTOSIS	-.777	S E KURT	.717	SKEWNESS	1.124
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	53.000		
VALID CASES	42	MISSING CASES	0		

ANXSYST

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	28	67	67	2	13	31	98	3	1	2	100

MEAN	1.357	STD ERR	.082	MEDIAN	1.000
MODE	1.000	STD DEV	.533	VARIANCE	.284
KURTOSIS	.255	S E KURT	.717	SKEWNESS	1.119
S E SKEW	.365	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	57.000		
VALID CASES	42	MISSING CASES	0		

CONTRIB

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	15	36	36	2	25	60	95	3	2	5	100

MEAN	1.690	STD ERR	.087	MEDIAN	2.000
MODE	2.000	STD DEV	.563	VARIANCE	.316
KURTOSIS	-.549	S E KURT	.717	SKEWNESS	.642
S E SKEW	.365	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	71.000		
VALID CASES	42	MISSING CASES	0		

INCOMP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	22	52	52	2	20	48	100				

MEAN	1.476	STD ERR	.078	MEDIAN	1.000
MODE	1.000	STD DEV	.505	VARIANCE	.256
KURTOSIS	-2.092	S E KURT	.717	SKEWNESS	.099
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	62.000		
VALID CASES	42	MISSING CASES	0		

EXTERN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	9	21	21	2	29	69	90	3	4	10	100

MEAN	1.881	STD ERR	.085	MEDIAN	2.000
MODE	2.000	STD DEV	.550	VARIANCE	.303
KURTOSIS	.376	S E KURT	.717	SKEWNESS	-.077
S E SKEW	.365	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	79.000		
VALID CASES	42	MISSING CASES	0		

SKILPERS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	1	2	2	2	22	52	81				
1	11	26	29	3	8	19	100				

MEAN	1.881	STD ERR	.114	MEDIAN	2.000
MODE	2.000	STD DEV	.739	VARIANCE	.546
KURTOSIS	-.236	S E KURT	.717	SKEWNESS	-.186
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	79.000		
VALID CASES	42	MISSING CASES	0		

INSERV

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	34	81	81	2	7	17	98	3	1	2	100

MEAN	1.214	STD ERR	.073
MODE	1.000	STD DEV	.470
KURTOSIS	4.213	S E KURT	.717
S E SKEW	.365	RANGE	2.000
MAXIMUM	3.000	SUM	51.000
VALID CASES	42	MISSING CASES	0

MEDIAN	1.000
VARIANCE	.221
SKEWNESS	2.154
MINIMUM	1.000

CORSCOMP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	8	19	19	2	20	48	93				
1	11	25	45	3	3	7	100				

MEAN	1.429	STD ERR	.137
MODE	2.000	STD DEV	.887
KURTOSIS	-.768	S E KURT	.717
S E SKEW	.365	RANGE	3.000
MAXIMUM	3.000	SUM	60.000
VALID CASES	42	MISSING CASES	0

MEDIAN	2.000
VARIANCE	.787
SKEWNESS	-.323
MINIMUM	.000

INDEMP

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	27	64	64	3	4	10	98				
2	10	24	88	4	1	2	100				

MEAN	1.500	STD ERR	.119
MODE	1.000	STD DEV	.773
KURTOSIS	1.640	S E KURT	.717
S E SKEW	.365	RANGE	3.000
MAXIMUM	4.000	SUM	63.000
VALID CASES	42	MISSING CASES	0

MEDIAN	1.000
VARIANCE	.598
SKEWNESS	1.497
MINIMUM	1.000

LEA

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	15	36	36	3	7	17	93				
2	16	38	74	4	4	10	100				

MEAN	2.000	STD ERR	.149	MEDIAN	2.000
MODE	2.000	STD DEV	.963	VARIANCE	.927
KURTOSIS	-.406	S E KURT	.717	SKEWNESS	.689
S E SKEW	.365	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	84.000		
VALID CASES	42	MISSING CASES	0		

UNION

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	1	2	2	3	19	45	69	5	5	12	100
2	9	21	24	4	8	19	88				

MEAN	3.167	STD ERR	.152	MEDIAN	3.000
MODE	3.000	STD DEV	.986	VARIANCE	.972
KURTOSIS	-.269	S E KURT	.717	SKEWNESS	.291
S E SKEW	.365	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	133.000		
VALID CASES	42	MISSING CASES	0		

MSC

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	10	24	24	3	13	31	98				
2	18	43	67	4	1	2	100				

MEAN	2.119	STD ERR	.124	MEDIAN	2.000
MODE	2.000	STD DEV	.803	VARIANCE	.644
KURTOSIS	-.780	S E KURT	.717	SKEWNESS	.074
S E SKEW	.365	RANGE	3.000	MINIMUM	1.000
MAXIMUM	4.000	SUM	89.000		
VALID CASES	42	MISSING CASES	0		

COMBIN

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	10	24	24	3	19	45	95	5	1	2	100
2	11	26	50	4	1	2	98				

MEAN	2.333	STD ERR	.147	MEDIAN	2.500
MODE	3.000	STD DEV	.954	VARIANCE	.911
KURTOSIS	-.039	S E KURT	.717	SKEWNESS	.151
S E SKEW	.365	RANGE	4.000	MINIMUM	1.000
MAXIMUM	5.000	SUM	98.000		
VALID CASES	42	MISSING CASES	0		

OTHER

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	30	71	71	2	10	24	98				
1	1	2	74	3	1	2	100				

MEAN	.571	STD ERR	.145	MEDIAN	.000
MODE	.000	STD DEV	.941	VARIANCE	.885
KURTOSIS	-.361	S E KURT	.717	SKEWNESS	1.168
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	24.000		

VALID CASES 42 MISSING CASES 0

INCORS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	15	36	36	3	8	19	81	7	2	5	100
2	11	26	62	4	6	14	95				

MEAN	2.357	STD ERR	.231	MEDIAN	2.000
MODE	1.000	STD DEV	1.495	VARIANCE	2.235
KURTOSIS	2.563	S E KURT	.717	SKEWNESS	1.463
S E SKEW	.365	RANGE	6.000	MINIMUM	1.000
MAXIMUM	7.000	SUM	99.000		

VALID CASES 42 MISSING CASES 0

INMET

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	15	36	36	2	15	36	86	4	2	5	100
1	6	14	50	3	4	10	95				

MEAN	1.333	STD ERR	.186	MEDIAN	1.500
MODE	.000	STD DEV	1.203	VARIANCE	1.447
KURTOSIS	-.773	S E KURT	.717	SKEWNESS	.369
S E SKEW	.365	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	56.000		

VALID CASES 42 MISSING CASES 0

AVTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	17	40	40	2	20	48	90	4	1	2	100
1	1	2	43	3	3	7	98				

MEAN	1.286	STD ERR	.178	MEDIAN	2.000
MODE	2.000	STD DEV	1.154	VARIANCE	1.331
KURTOSIS	-1.131	S E KURT	.717	SKEWNESS	.104
S E SKEW	.365	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	54.000		

VALID CASES 42 MISSING CASES 0

RATECORS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	17	40	40	2	16	38	95	4	1	2	100
1	7	17	57	3	1	2	98				

MEAN	1.095	STD ERR	.163	MEDIAN	1.000
MODE	.000	STD DEV	1.055	VARIANCE	1.113
KURTOSIS	-.506	S E KURT	.717	SKEWNESS	.457
S E SKEW	.365	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	46.000		

VALID CASES 42 MISSING CASES 0

EXCORS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	25	60	60	2	17	40.	100				

MEAN	1.405	STD ERR	.077	MEDIAN	1.000
MODE	1.000	STD DEV	.497	VARIANCE	.247
KURTOSIS	-1.932	S E KURT	.717	SKEWNESS	.403
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	59.000		

VALID CASES 42 MISSING CASES 0

EXNUMB

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	17	40	40	3	4	10	93	7	2	5	100
2	18	43	83	4	1	2	95				

MEAN	1.571	STD ERR	.262	MEDIAN	2.000
MODE	2.000	STD DEV	1.699	VARIANCE	2.885
KURTOSIS	3.188	S E KURT	.717	SKEWNESS	1.471
S E SKEW	.365	RANGE	7.000	MINIMUM	.000
MAXIMUM	7.000	SUM	66.000		

VALID CASES 42 MISSING CASES 0

EXTIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	17	40	40	2	14	33	79	4	3	7	93
1	2	5	45	3	3	7	86	5	3	7	100

MEAN	1.571	STD ERR	.246	MEDIAN	2.000
MODE	.000	STD DEV	1.595	VARIANCE	2.544
KURTOSIS	-.458	S E KURT	.717	SKEWNESS	.678
S E SKEW	.365	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	66.000		

VALID CASES 42 MISSING CASES 0

EXRATE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	17	40	40	2	15	36	98				
1	9	21	62	5	1	2	100				

MEAN	1.048	STD ERR	.167	MEDIAN	1.000
MODE	.000	STD DEV	1.081	VARIANCE	1.168
KURTOSIS	2.493	S E KURT	.717	SKEWNESS	1.118
S E SKEW	.365	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	44.000		

VALID CASES 42 MISSING CASES 0

FECORS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	5	12	12	2	37	88	100				

MEAN	1.881	STD ERR	.051	MEDIAN	2.000
MODE	2.000	STD DEV	.328	VARIANCE	.107
KURTOSIS	4.153	S E KURT	.717	SKEWNESS	-2.441
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	79.000		

VALID CASES 42 MISSING CASES 0

FENUMB

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	36	86	86	2	4	10	98				
1	1	2	88	3	1	2	100				

MEAN	.286	STD ERR	.114	MEDIAN	.000
MODE	.000	STD DEV	.742	VARIANCE	.551
KURTOSIS	5.089	S E KURT	.717	SKEWNESS	2.487
S E SKEW	.365	RANGE	3.000	MINIMUM	.000
MAXIMUM	3.000	SUM	12.000		

VALID CASES 42 MISSING CASES 0

FETIM

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	37	88	88	4	1	2	90	5	4	10	100

MEAN	.571	STD ERR	.244	MEDIAN	.000
MODE	.000	STD DEV	1.579	VARIANCE	2.495
KURTOSIS	4.392	S E KURT	.717	SKEWNESS	2.475
S E SKEW	.365	RANGE	5.000	MINIMUM	.000
MAXIMUM	5.000	SUM	24.000		

VALID CASES 42 MISSING CASES 0

FERATE

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
0	37	88	88	2	1	2	98				
1	3	7	95	4	1	2	100				

MEAN	.214	STD ERR	.111	MEDIAN	.000
MODE	.000	STD DEV	.717	VARIANCE	.514
KURTOSIS	19.942	S E KURT	.717	SKEWNESS	4.243
S E SKEW	.365	RANGE	4.000	MINIMUM	.000
MAXIMUM	4.000	SUM	9.000		

VALID CASES 42 MISSING CASES 0

BEENCON

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	6	14	14	2	36	86	100				

MEAN	1.857	STD ERR	.055	MEDIAN	2.000
MODE	2.000	STD DEV	.354	VARIANCE	.125
KURTOSIS	2.606	S E KURT	.717	SKEWNESS	-2.118
S E SKEW	.365	RANGE	1.000	MINIMUM	1.000
MAXIMUM	2.000	SUM	78.000		

VALID CASES 42 MISSING CASES 0

EMPCON

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	37	88	88	2	1	2	90	3	4	10	100

MEAN	1.214	STD ERR	.094	MEDIAN	1.000
MODE	1.000	STD DEV	.606	VARIANCE	.368
KURTOSIS	5.362	S E KURT	.717	SKEWNESS	2.631
S E SKEW	.365	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	51.000		

VALID CASES 42 MISSING CASES 0

SATLIAIS

VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT	VALUE	FREQ	PCT	CUM PCT
1	8	19	19	2	12	29	48	3	22	52	100

MEAN	2.333	STD ERR	.121	MEDIAN	3.000
MODE	3.000	STD DEV	.786	VARIANCE	.618
KURTOSIS	-1.030	S E KURT	.717	SKEWNESS	-.680
S E SKEW	.365	RANGE	2.000	MINIMUM	1.000
MAXIMUM	3.000	SUM	98.000		

VALID CASES 42 MISSING CASES 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
17:54:39 University of Durham

PRECEDING TASK REQUIRED 0.43 SECONDS CPU TIME; 4.36 SECONDS ELAPSED.

```
  14  0          RECODE GRADE (1,2,3,4,5=1) (6,7,8,9=2) / EMPCON (2,3=2) / SATLIAIS (2,3=2)
  15  0          CROSSTABS TABLES=BEENCON BY GRADE / EMPCON BY GRADE / SATLIAIS BY GRADE
  16  0          OPTIONS 3,4,5,9
  17  0          STATISTICS 1,2,4,11
```

THERE ARE 61880 BYTES OF SPSS MEMORY AVAILABLE.
THE LARGEST CONTIGUOUS AREA HAS 61880 BYTES.
SPSS IS USING 65536 BYTES OF SYSTEM MEMORY
THERE ARE AT LEAST 2031615 BYTES OF SYSTEM MEMORY AVAILABLE.

***** GIVEN WORKSPACE ALLOWS FOR 4247 CELLS WITH 2 DIMENSIONS FOR CROSSTAB PROBLEM *****

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
17:54:42 University of Durham

BEENCON — CROSSTABULATION OF BEENCON BY GRADE

BEENCON	GRADE 1	GRADE 2	ROW TOTAL
1	1 16.7 11.1 2.4	5 83.3 15.2 11.9	6 14.3
2	8 22.2 88.9 19.0	28 77.8 84.8 66.7	36 85.7
COLUMN TOTAL	9 21.4	33 78.5	42 100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.0	1	1.0000	1.286	2 OF 4 (50.0%)
0.09428	1	0.7588	(BEFORE YATES CORRECTION)	

STATISTIC	SYMMETRIC	WITH BEENCON DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
PHI	0.04738	
PEARSON'S R	-0.04738	0.3829

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
17:54:43 University of Durham

EMPCON — CROSSTABULATION OF EMPCON BY GRADE

EMPCON	GRADE 1	GRADE 2	ROW TOTAL
1	7	30	37
	18.9	81.1	88.1
	77.8	90.9	
	16.7	71.4	
2	2	3	5
	40.0	60.0	11.9
	22.2	9.1	
	4.8	7.1	
COLUMN TOTAL	9	33	42
	21.4	78.6	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.24767	1	0.6187	1.071	2 OF 4 (50.0%)
1.16265	1	0.2809	(BEFORE YATES CORRECTION)	

STATISTIC	SYMMETRIC	WITH EMPCON DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
PHI	0.16638	
PEARSON'S R	-0.16638	0.1462

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
17:54:43 University of Durham

SATLIAIS CROSSTABULATION OF SATLIAIS BY GRADE

SATLIAIS	GRADE 1	GRADE 2	ROW TOTAL
1	COUNT 2	6	8
	ROW PCT 25.0	75.0	19.0
	COL PCT 22.2	18.2	
	TOT PCT 4.8	14.3	
2	COUNT 7	27	34
	ROW PCT 20.6	79.4	81.0
	COL PCT 77.8	81.8	
	TOT PCT 16.7	64.3	
COLUMN TOTAL	9	33	42
	21.4	78.6	100.0

CHI-SQUARE	D.F.	SIGNIFICANCE	MIN E.F.	CELLS WITH E.F.< 5
0.0	1	1.0000	1.714	1 OF 4 (25.0%)
0.07487	1	0.7844	(BEFORE YATES CORRECTION)	

STATISTIC	SYMMETRIC	WITH SATLIAIS DEPENDENT	WITH GRADE DEPENDENT
LAMBDA	0.0	0.0	0.0

STATISTIC	VALUE	SIGNIFICANCE
PHI	0.04222	
PEARSON'S R	0.04222	0.3953

NUMBER OF MISSING OBSERVATIONS = 0

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
17:54:43 University of Durham

- C R O S S T A B U L A T I O N I N D E X

PAGE	TABLE
6	BEENCON BY GRADE
7	EMPCON BY GRADE
8	SATLIAIS BY GRADE

3 FEB 88 SPSS-X RELEASE 2.1 FOR IBM VM/MTS
17:54:43 University of Durham

PRECEDING TASK REQUIRED 0.20 SECONDS CPU TIME; 2.35 SECONDS ELAPSED.

18 0 FINISH

18 COMMAND LINES READ.
0 ERRORS DETECTED.
0 WARNINGS ISSUED.
1 SECONDS CPU TIME.
13 SECONDS ELAPSED TIME.
END OF JOB.

Job number QEDR1 NUMAC Computing Service at Durham - Michigan Terminal Sys

User: EDR1 Project: DED0

Obtained at 11:22:02 Thu Feb 04/88
Released at 11:22:03 Thu Feb 04/88

Lines printed 1233
Pages printed 27

..END JOB 2680 11:34 4 FEB 88 **********
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