

THE MIP REPORT

VOLUME 2

1996 MOTIVATIONAL SURVEY

OF IT STAFF

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1. INTRODUCTION

1.1 Background to the report

Since 1987, we have been helping individual organisations to improve staff motivation, and have seen localised problems. We were hearing anecdotal evidence of significant problems with work motivation in IT. The only way to find out what was happening was to perform industry surveys.

In 1994 we performed the first industry survey of this kind, that focused on the problems of quality practitioners. The detailed results of this survey were published separately (reference 19 in the Bibliography).

Following the very positive response to this survey we completed a motivational survey in 1996 of five major software disciplines; developers, maintainers, infrastructure staff, quality practitioners and testing staff. The aim was to understand the current motivational situation of IT staff across a wide range of jobs and functions.

We thank the Quality Forum, IT Infrastructure Management Forum, British Computer Society Software Testing SIG and Durham Systems Management Ltd for their support and co-operation. Above all we thank the organisations and individuals who participated for their time and interest.

Statistical analyses were produced using SPSS for Windows, © SPSS Inc. The report was produced using Word for Windows © Microsoft Corporation.

1.2 Structure of the report

The report has the following structure:

- section 2 is the management summary
- section 3 describes the methods we use
- section 4 describes the findings
- section 5 interprets the findings and discusses the problems
- section 6 contains recommendations
- section 7 contains a glossary of motivational measures
- section 8 is a bibliography.

1.3 Getting the most from this report

If you have never been involved in motivational work you may be unfamiliar with the terminology. This is described in the Method section. All the measures are described in the Glossary (page 87). We recommend that you make sure you understand the Job Characteristics Model on page 15 before looking at the detailed findings.

We present data obtained from the 1996 survey in the Findings section. You may wish to think how you would explain such results in your own organisation before you see how other people interpreted them.

The Interpretation section explains the results. It is based on our experience of working on motivation improvement within individual organisations, and on insightful comments made at meetings of the professional associations.

It is all very well to detect problems and suggest why they exist. The more important task is to improve the motivational situation for people working in IT and thereby to improve productivity, quality, profitability and the quality of working life. The Recommendations section outlines the opportunities for improvement and suggests some things you might try. It is important to know about the local situation before implementing such general suggestions.

For readers who wish to know about the background to the methods we use, and about the work of others, there is a list of references in the Bibliography (page 91).

1.4 Next steps

1.4.1 Feedback

Motivational surveys of IT staff in the UK has never been performed before. We welcome your feedback. Some suggestions are:

- Share this report with colleagues and discuss the findings with them.
- Send us your comments or questions by post, fax, phone or via email sent to our web site
- If there are points that interest you that are not covered in this report, please let us know. We may have the answers; this report is not an exhaustive description of all that we have learnt about motivation in IT. Alternatively, you may have found new questions that we can address in future surveys.

1.4.2 Follow on

We have received requests from survey participants asking whether we can perform motivational surveys for their organisations. The answer is yes.

Our web site (<http://www.softwarefutures.ltd.uk>) summarises the commercial services we offer.

1.4.3 Participation in surveys

Our plans for future industry surveys are guided by the feedback we receive from you. One of our aims is to conduct major surveys at regular intervals where the change over time can be assessed. From them we can see what progress the IT industry is making to improve staff motivation. If there are severe problems in specific areas of IT we will consider additional focused surveys, e.g. the 1994 survey on quality practitioners.

If your organisation would like to take part in future surveys, let us know and we will contact you when they are started.

Taking part is straightforward. You decide the people from your organisation you wish to participate, typically between 1 and 50. We send you the appropriate number of Job Diagnostic Survey questionnaires. They take about 30 minutes for each individual to complete, and you return them to us. You receive complementary copies of the survey report and we provide phone support for any questions you have. We apply strict confidentiality rules so that no organisation or individual can be identified.

2. MANAGEMENT SUMMARY

More than half of IT staff suffer from work motivation problems that affect their performance. Furthermore, the problems are spread through all IT disciplines - software development, infrastructure management, software maintenance, testing and quality management. These problems cause staff to under-perform, reducing the return on investment in people. If these problems can be minimised, this represents a major opportunity for organisations to improve staff performance.

The major problem is that staff have jobs that do not meet their motivational needs. We call this poor job-person match. If organisations were designing jobs effectively we would expect to find a positive relation between the growth needs of the people and the motivational content of their work. No such relationship was found suggesting that attempts to match people to jobs are not successful.

Managers, employees and the literature all suggest that jobs are designed around work content. Managers then seek people to fill these jobs, i.e. match the people to the jobs. Psychometric testing and related techniques reinforce the idea of finding square pegs for square holes. This approach is failing because it does not consider the easier alternative of improving the motivating potential of jobs (changing the shape of the hole).

When people start doing the jobs there are many interactions between individuals and groups that can change a job's motivational content.

Job design is a two phase process. In phase one jobs are created according to best practice and staff are allocated. The phase that is being overlooked is the second phase which happens after all the jobs and staff are in place, and the dynamics of motivation are in play. Phase two requires an analysis of whether each job is effective in practice. At this stage motivational and practical problems can be identified and resolved. The emphasis here is on re-designing existing jobs.

Job re-design has strong factors in its favour. Many motivational problems are quite tractable, so they can be solved in relatively short timescales. Improving a job does not usually require additional expenditure, so most improvements can be made within existing budgets. So many IT staff suffer from motivational problems there are many opportunities for individuals and groups to work together.

Many of the motivational problems we found were caused by practical problems that should be fixed anyway.

There are widespread concerns about pay and job security. These are far less tractable. Pay is difficult to change in a climate where more money has to be balanced by higher productivity. Job insecurity is an even greater problem which affects the whole IT industry. Both problems can be eased by telling individuals how well they are performing, and how their work influences the success of the organisation.

The outstanding motivational problem in IT is poor feedback. Individuals lack information about how well they are doing and how they can improve. This raises a wider issue. If senior managers also lack this information it must be difficult for them to make judgements about the success of their IT strategies.

In order to exploit the opportunities for improvement, managers need to know:

- the nature of the problem in their own organisation,
- how to discover the underlying causes,
- what actions to take,
- how to measure the effect of their actions.

This report is an example of how to investigate problems and determine causes. We recommend actions for the most common problems. The job diagnostic survey described here can be re-applied after an improvement program, to determine its effectiveness. The real cost of poor motivation shows up in low productivity and quality, high absenteeism and staff turnover, so the primary measure of success is the extent to which these figures change after motivation has been improved. Given the high cost of human resources, this opportunity to improve effectiveness should be more widely adopted.

Work outcomes are expressed in terms of quality, productivity, absenteeism and staff turnover. The cost of poor motivation is difficult to calculate. Increases of 30 to 70% are claimed. We suggest that you make a much more conservative estimate to see what sort of benefits can be gained from a moderate improvement in work motivation.

The challenge is to move from negative circles of demotivation, that appear widespread and continue to decrease motivation, to positive circles that enable staff to give of their best.

3. METHOD

3.1 Background to Motivation

Staff motivation has always been a major factor affecting productivity and quality in the workplace. Historically, the IT industry placed great emphasis on technological solutions for improving effectiveness. The 1980s was a decade of technology led initiatives, starting with structured methods that led to IPSEs and CASE and finishing with reverse engineering and re-engineering.

However new trends started during this time that are maturing in the 1990s, and that have significant motivational implications. The most important of them has been the move to customer-focused services. The concerns of the IT department gave way to the real needs of customers and business. IT infrastructures have developed that put many IT staff in greater contact with users or customers. The relationship between the IT service provider and the customer is now increasingly dependent on human relationships.

Human interactions play a vital role in motivation. While every IT job has technical aspects that may motivate or demotivate, some of the most important aspects depend on successful human relationships. A good example is the growth of outsourcing and facilities management. A team supplying IT services has to work very closely with client managers and their staff. The motivation of the team can be affected greatly by the client's behaviour. From field assignments we have identified a new range of problems that flow from this - cross organisational motivational issues. While they are seen most clearly in outsourcing arrangements, they apply also to internal arrangements based on a formal supplier/client relationship.

The recession has had profound effects on the IT industry, and on motivation. From the seller's market for IT services in the 1980s we moved rapidly to a buyer's market. IT organisations were forced to reduce staff numbers, while providing higher quality customer-oriented services - to produce more with less staff. This has created pressures that affect motivation. The slimming down of IT organisations has placed greater responsibility and workloads on the remaining individuals. Companies that were viewed as having a 'job for life' culture have made staff redundant, and by doing so changed their culture. IT staff no longer feel they have a secure job. Job insecurity is a powerful demotivator.

The change in job security is reflected throughout industry, and not just in the UK. While there is debate about whether this change is cyclical or structural, this report is not the place to discuss that issue. What is of greater concern to IT staff is learning how to cope with their feelings of insecurity.

Technology has continued to develop at an almost exponential rate, and with it has come much change. Client/server architectures are today's business, with high power networked PCs linked to mainframes, with companies building data warehouses, using Windows, OOD, Visual Basic, SQL, RAD and other technologies.

What is the effect of this on motivation?

- how are developers motivated to take up these changes?
- how do maintainers feel about supporting new systems they may understand little about?
- what problems do testers encounter when validating these systems?
- how do infrastructure staff cope with providing IT services that use them?
- how should quality practitioners adapt standards and procedures so that certification criteria are still met?

These are just some of the questions that face IT staff.

IT staff and managers have been concentrating on an entirely different type of problem. As well as identifying the problems and discussing causes, this report recommends practical things which can be done to improve the situation.

3.2 The Job Characteristics Model of Motivation

In 1974 Hackman and Oldham developed a comprehensive model of motivation which incorporates the insights of the traditional theories, the Job Characteristics Model. The strength of this model is that it is simple enough to be used effectively while being comprehensive enough to detect a wide range of different motivational problems.

The Hackman and Oldham model concentrates on the fit between each person and their job. Figure 3-1 shows the five main areas and their relationships.

1. Six measures describe the motivating features of a job; they are called core job dimensions. These are aggregated into a single measure called the motivating potential score (MPS) of the job.
2. Two measures describe the person's motivational preferences, and they are aggregated into a single measure called the growth needs strength (GNS) of the individual. The relationship between MPS and GNS is called the job-person match. Ideally, the motivating potential of a job should be well matched to the growth needs of the person doing it. If the match is good, then the individual is likely to be highly motivated.
3. Every person has internal psychological states (three measures) that reflect how the person feels about doing the job. They are influenced by the job-person match, and in turn affect both the personal and work outcomes.
4. The personal outcomes are expressed as eight satisfaction measures. They are influenced by the job-person match and the internal psychological states. They affect the work outcomes.
5. Work outcomes which are directly related to motivation include productivity, quality absenteeism and staff turnover. A motivational survey need not measure work outcomes directly because this information is collected for other purposes. In order to assess the benefits obtained from a motivation improvement program, before and after figures should be compared.

The individual measures are defined in the Glossary (page 87).

The job characteristics model is a process model of motivation in that it accounts for the dynamics of motivational situations. Measurements are made by asking individuals to complete the Job Diagnostic Survey (JDS) questionnaire. The JDS was formally designed and each measure calibrated against thousands of people across the full range of working situations, see Bibliography (page 91).

The JDS should not be confused with attitude surveys or psychometric tests which measure the internal state of the person, rather than their relationship to the job they are doing. Measuring people inevitably implies assessment of the people. The JDS looks at work-groups and provides confidentiality of individual responses. People are encouraged to respond honestly but constructively, focusing on how they can improve their work situation. The JDS is not used for staff selection or appraisal, but for job enrichment. Because people prefer to work effectively, the JDS will also detect practical problems which interfere directly with performance.

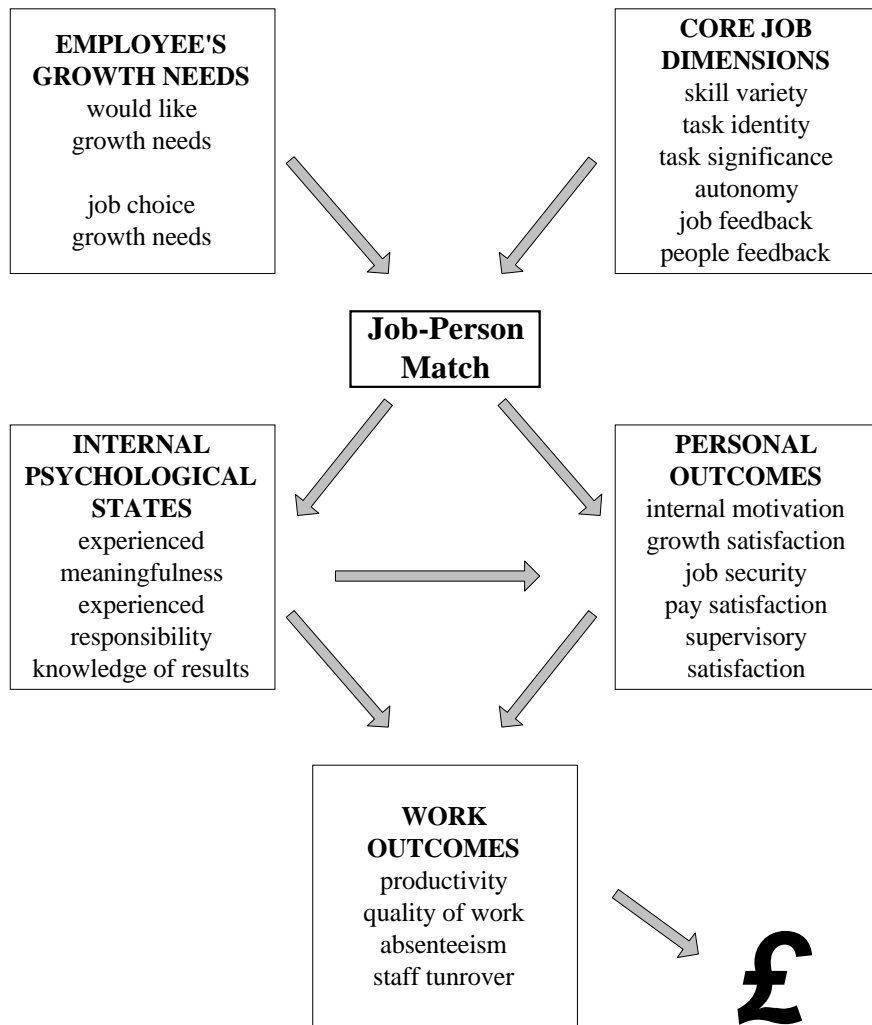


Figure 3-1 Job Characteristics Model of Motivation

Do not be too concerned about understanding all the relationships, as the important point is that the model provides a comprehensive description of a motivational situation:

- Employee Growth Needs - what the person needs from the job.
- Motivating Potential - the degree to which a job provides motivational stimuli.

- Internal Psychological States - how the person feels about doing their job.
- Personal Outcomes - the degree of satisfaction that person gets from doing it.
- Work Outcomes - the outcomes for the business which depend on good motivation.

3.3 Stages in the Method

The survey is a special case of a motivation improvement programme. The normal programme consists of at least six stages:

1. Obtain agreement from managers and participants.
2. Participants complete the JDS questionnaire.
3. The JDS data is analysed and presented (section 4).
4. We discuss our analysis with participants.
5. Report on causes and recommend solutions (sections 5 and 6).
6. Implement solutions.

During stage one, respondents are cynical about the ability of a questionnaire to resolve problems which seem to be intractable. People want to be well motivated so they have already fixed any problems they can fix. They usually worry about confidentiality so there must be some mechanism for ensuring that it is not possible for individual responses to be identified by managers. Confidentiality is essential because otherwise people will not respond honestly.

It takes about thirty minutes to complete the questionnaire. Analysis should be complete and sent to participants within two weeks (for a survey of one organisation, not a more complex industry survey).

Every respondent should attend the discussion. The motivational terminology used in the questionnaire and the analysis enables people to raise tricky issues in a constructive way. There is no need to focus on past faults because solution strategies are available for each problem. The discussion concentrates on checking and identifying causes, and working out how solutions can be implemented.

A final report is produced including detailed advice on how to implement solutions. It is important to realise that each situation is different. The interpretations given in this report have not been checked out within your organisation. This does not mean that do not apply, but that we can only make general recommendations about what sort of solutions may be ineffective.

In practice we find that some problems are resolved even before the final report is published. These are problems which seemed intractable because there was a barrier preventing people from raising the right issue with the right person. Other solutions require a little management backing to shift an external problem. If any more expensive solutions are proposed, they should be subject to cost-benefit analysis in the ordinary way.

3.4 Interpreting the Charts

3.4.1 Measurement Scales

All of the motivational measures, except one, are measured on scales of 1 to 7. The exception is motivating potential score, which is measured on a scale of 0 to 343.

Here are some rules for interpreting measurement scales:

- Growth needs strength should be high, representing people capable of a high degree of work performance. Good values are in the 4.5 to 6.5 range. A person with a value less than 4.5 is probably quite cautious about their work, and less willing to take decisions and risks. However, lower GNS people are required to perform jobs that lack the motivating potential that stimulates high GNS people.
- For core job dimensions, the higher the value the stronger that dimension is present in a job. For people with high growth needs we would expect to see values of 5 or more. Values less than 5 indicate a dimension that is causing problems, and less than 3.5 a major problem. Values that are very high (approaching 7) can also cause problems because the job may be too difficult for anyone to do well.
- Motivating potential score should normally be in the range of 120 to 180 for IT staff. See section 4.3.1 for more detail.
- As internal psychological states measure how a person feels while doing their job, they should be as high as possible, preferably 5 or more.
- Satisfaction measures, also, should be as high as possible, with values of 5 or more.

3.4.2 Chart Types

We use four types of chart:

- Pie charts are used to show how many of each type of person responded to the survey. In Figure 4-1 (page 26) the width of each segment shows how many survey participants belong to that discipline.
- Histograms are used to show the distribution of a measurement. In Figure 4-7 (page 29) the height of each bar shows the number of people with that level of growth needs.
- Scatterplots show the relationship between two measures. In Figure 4-11 (page 33) each point represents one person. The position of the point on the graph shows the values of that person's MPS and GNS. By looking at the group as a whole we can see the pattern of MPS/GNS pairs.
- Box plots are used to compare different groups or classes. Boxplots were not commonly used until recently, so we explain them in more detail using the example in Figure 3-2.

Boxplots are very good at answering important comparative questions, e.g. how do software developers' growth needs compare with other disciplines. (See Figure 4-8 for the answer.) Apart from comparing people we can compare attributes, e.g. how do job dimensions compare (see Figure 4-14 for the answer).

The example shows how job security varies for each discipline. The X axis shows the discipline. The Y axis shows the scale on which we measure job security. As the plots span the whole range of possible values, the axis has been expanded from 1-7 to 0-8 so you can see the extremes clearly. Remember that values > 7 and < 1 are not possible.

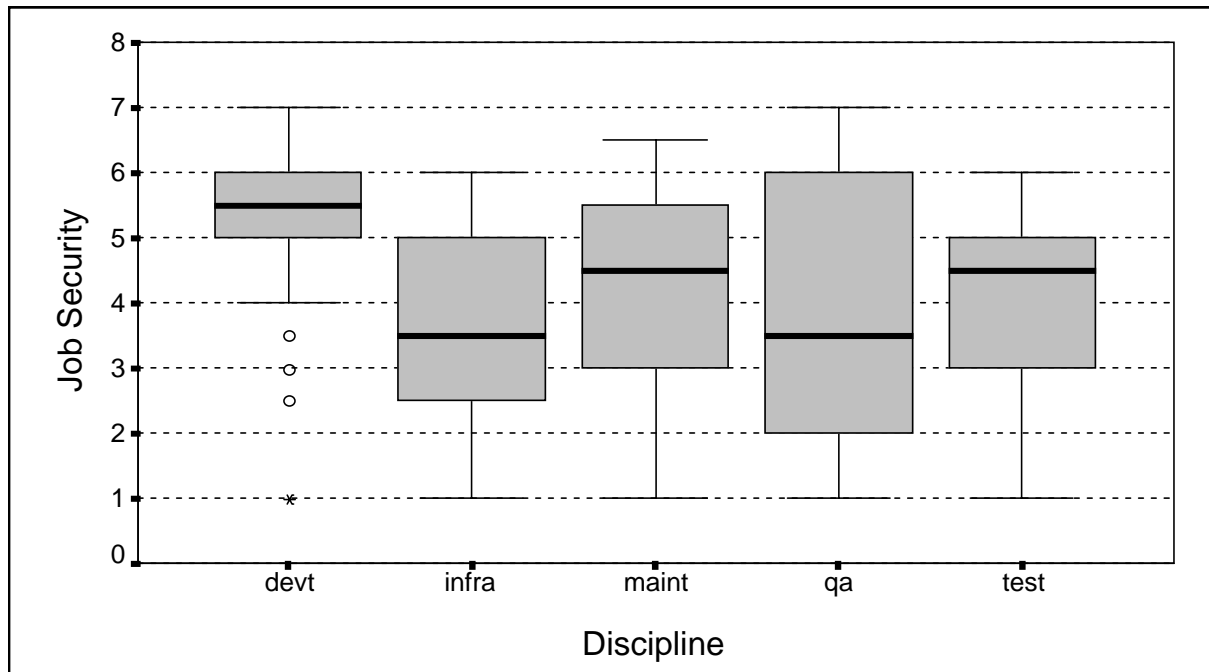


Figure 3-2 Box plot of job security by discipline

Each box represents one group of people (or one measure). Each box has five characteristics:

- a top whisker that represents the highest quartile (top 25%) of the people
- a shaded box that represents the inner quartiles (50%) of the people
- and a bottom whisker that represents the lowest quartile
- the black line across each box is the median value, i.e. half the people are above it and half below
- individual points show people who fall well outside the normal range for that group, with circles indicating outliers and asterisks denoting extremes.

In this example we see that only developers show a good degree of job security. The other disciplines show a very wide range of values. These disciplines have a median lower than 5, with more than 50% of the people scoring less than 5 and 25% less than 3.5. Immediately we can see that job security is a major problem for the majority of IT staff.

In more detail, we see that infrastructure staff and quality practitioners are most affected, with 50% or more of staff (represented by the median lines) having values ≤ 3.5 .

3.5 Motivational Circles

During the interpretation phase we often find a conglomerate of interconnecting causes which conspire to prevent people from resolving the problem without help.

Motivational problems rarely exist in isolation. The key to identifying workable solutions is to understand the interactions between problems. We use a representation that presents interconnecting problems as vicious circles. Figure 3-3 is the example we used in the 1994 survey.

This circle was constructed by identifying several motivational problems from the JDS data, and discussing the reasons behind them with quality practitioners. Most people were facing the same pattern of problems, which suggests that there is a tendency for this pattern to appear. Isolated efforts to change one part of the pattern are confounded because the pattern tends to re-establish itself.

When we asked 'Why?', a number of key situations were identified:

- the poor feedback was due to hostility from other IT groups, and lack of information from managers
- the hostility was due to Quality Management Systems (QMSs) being imposed before their benefits had been sold to these groups
- the benefits had not been sold because senior managers did not know how to promote quality within their organisations
- lack of feedback meant that practitioners neither knew the degree of support or resistance, nor the effects of the QMS
- not knowing the effects meant that practitioners could not demonstrate success
- not knowing the effects meant that practitioners did not know whether they were making good or bad decisions
- lack of visible success fuelled further resistance from groups who said the QMS was not for them.

So we continue round the circle, with the situation degrading.

These effects are interconnected as shown in Figure 3-3. As they follow the reasoning round the three circles, quality practitioners can see why their situation was deteriorating and why it was so difficult to resolve their problems piecemeal.

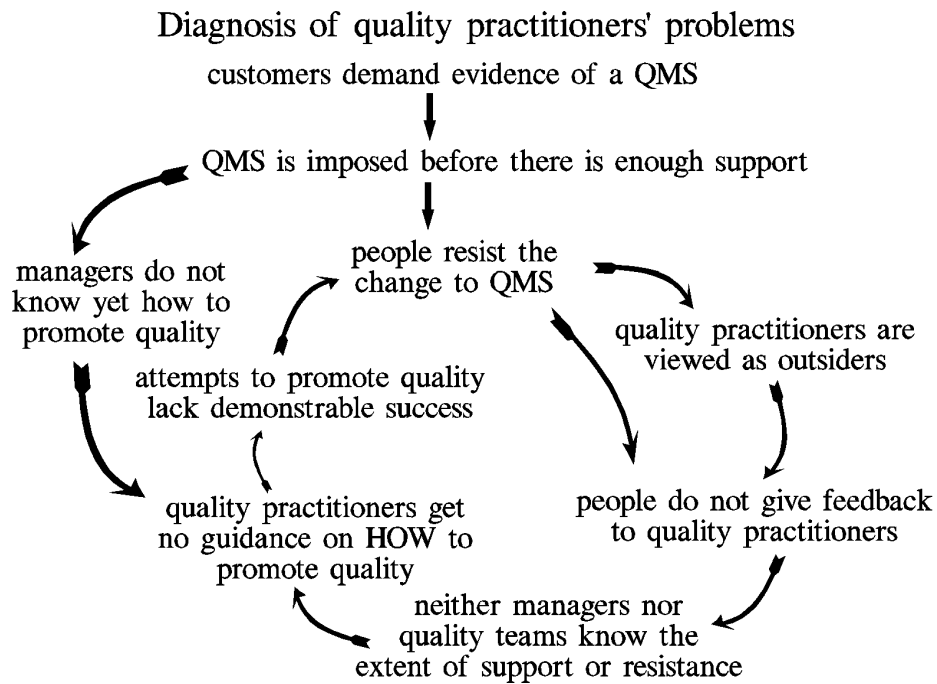


Figure 3-3 Motivational vicious circles

In this example a number of corrective actions were recommended, such as:

- education of senior managers about quality management and its promotion
- meetings with other IT groups to discuss the goals and aims of QMS, and allow these staff greater participation
- inclusion of other IT staff in key decisions about QMS implementation
- implementation of specific goals and measures that practitioners could use to assess their performance.

A circle is very useful because:

- it sets out the problems in a structured way that all staff can understand
- it explains without being critical of any group or person
- by defining the interactions it can explain past failures
- it helps identify actions that will work.

The key principle is to break each circle at several points simultaneously. It is no use trying to solve one element of the circle, as all the others will tend to mitigate against the change, and cause a reversion back to the former pattern of behaviour.

4. FINDINGS

4.1 The Survey Sample

4.1.1 Sampling Effects

Previous surveys obtained their data mostly from organisations where senior managers invited researchers to investigate their motivational situation. These managers believed that their staff had motivational problems, or that motivation was particularly important. This survey was carried out differently. Members of several professional interest groups asked their colleagues to complete the JDS questionnaire.

Neither type of sample can be entirely representative of all IT staff, because organisations which do not participate in either type of survey are missing. How might these samples differ from the ideal of describing all IT staff?

- If the senior managers who invited researchers into their organisations really did have staff with more problems, then previous surveys would present a more pessimistic picture.
- If the senior managers who invited researchers into their organisations were themselves more interested in motivating staff, then previous surveys would present a more optimistic picture.
- If the people who belong to professional associations come from organisations which invest more in human resources, then this survey would present a more optimistic picture.

This survey located more problems than previous surveys, indicating that managers who worry about motivation are more likely to have well motivated staff.

Although there were some differences between the different disciplines, this was a surprisingly homogenous group. The only group described above which was noticeably different from any of the others was people over 50 years old, see section 5.1.

4.1.2 Demographics

Sixty six organisations took part, and 255 staff provided detailed motivational information. A wide range of jobs were studied in five major disciplines, shown in Figure 4-1 below.

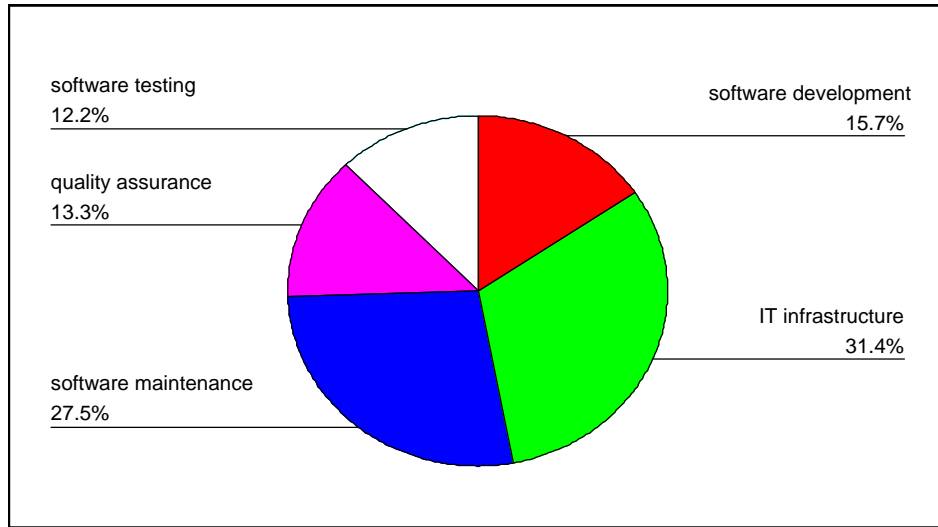


Figure 4-1 Distribution of survey participants by discipline

The main market sectors covered are shown in Figure 4-2. Differences in motivation were not well discriminated by different market sectors, so this analysis is not reported here.

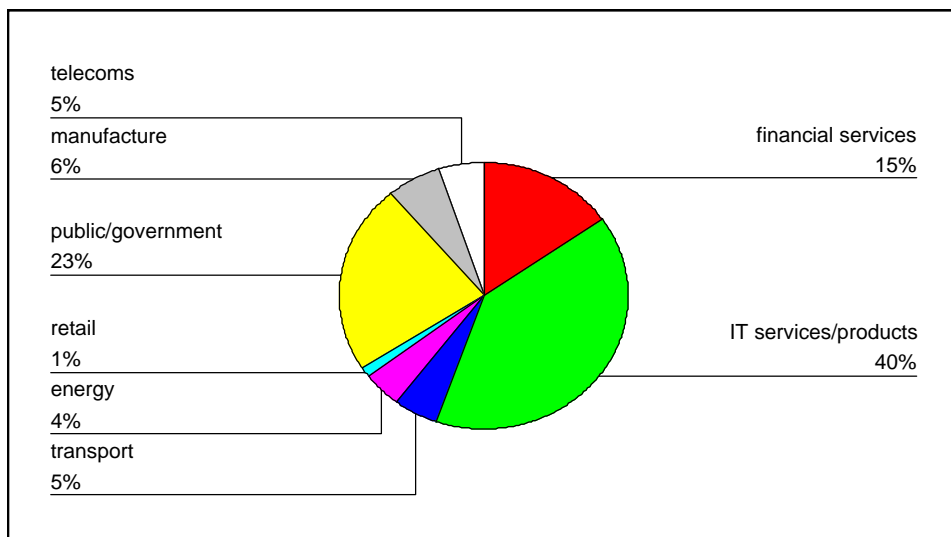


Figure 4-2 Distribution of survey participants by market sector

Job types ranged from the most junior posts to IT directors. Figure 4-3 shows the breakdown of the most common functions. The all managers category includes managers of functions, department heads and directors.

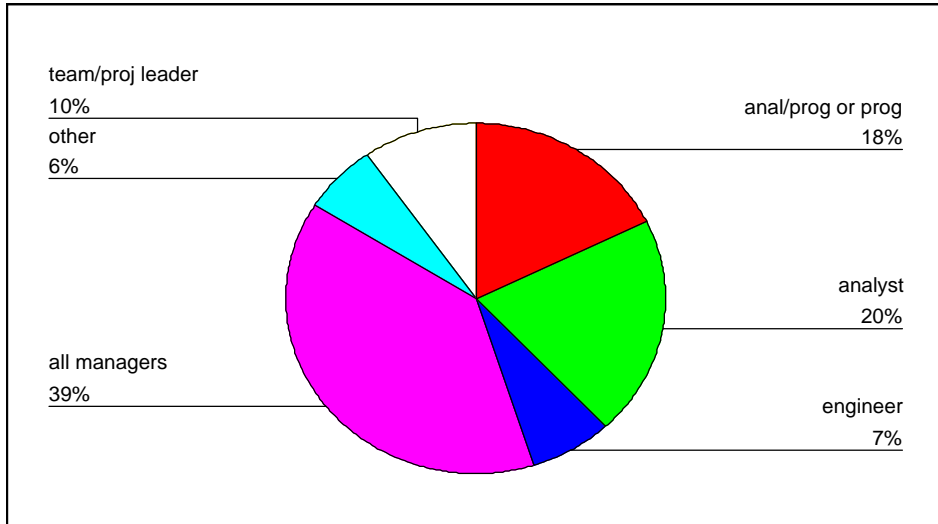


Figure 4-3 Distribution of job types

The distribution of job functions shows that more than half of the staff surveyed work on software or systems, see Figure 4-4, with 23% involved with all aspects of IT, and 14% where involvement with the customer was the primary function.

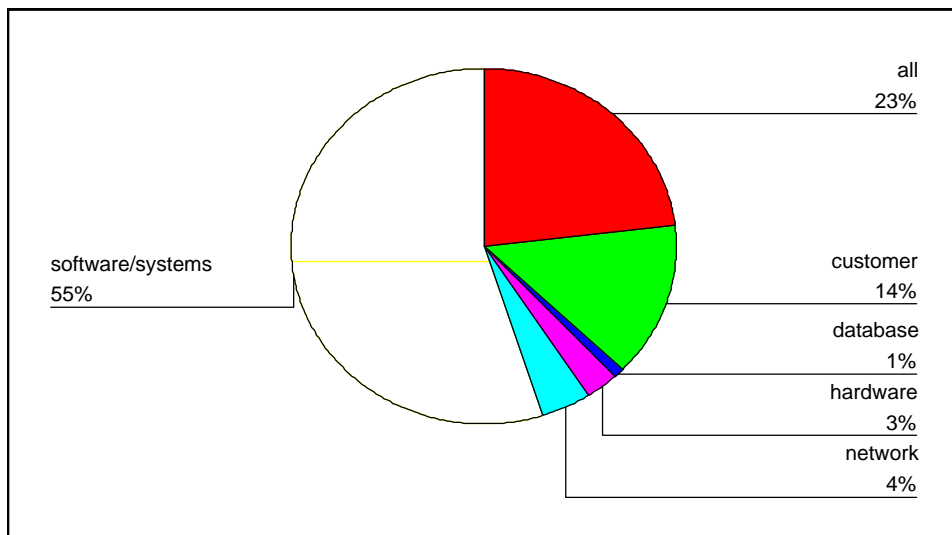


Figure 4-4 Distribution of job functions

The distribution of participants by age is shown at Figure 4-5. The distribution shows a maturing IT population, with few in the 20-29 group. There were no significant differences between 20 and 49, but the over fifties were different on almost every measure, having better jobs, feeling better while doing them and more satisfied with personal outcomes. Section 5.1 suggests possible reasons for this.

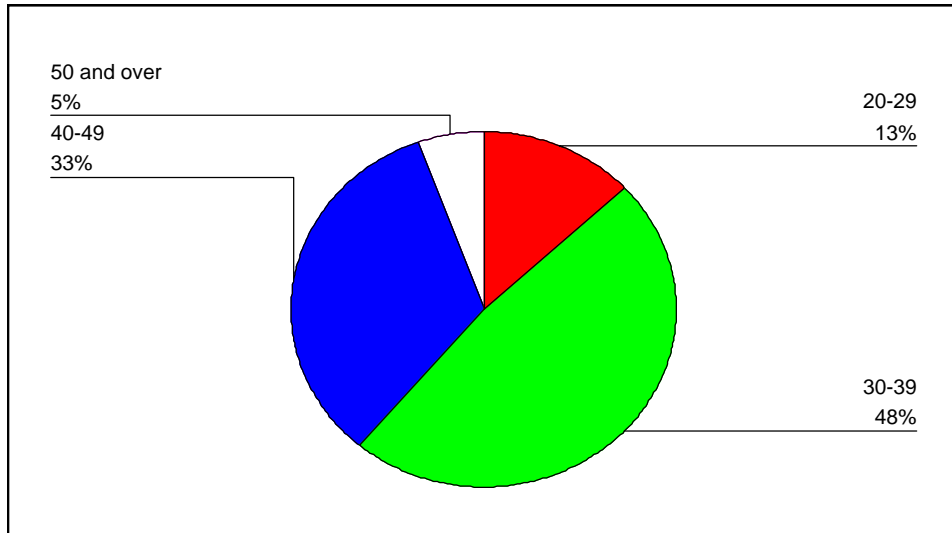


Figure 4-5 Distribution by age

The distribution of participants by education is shown at Figure 4-6.

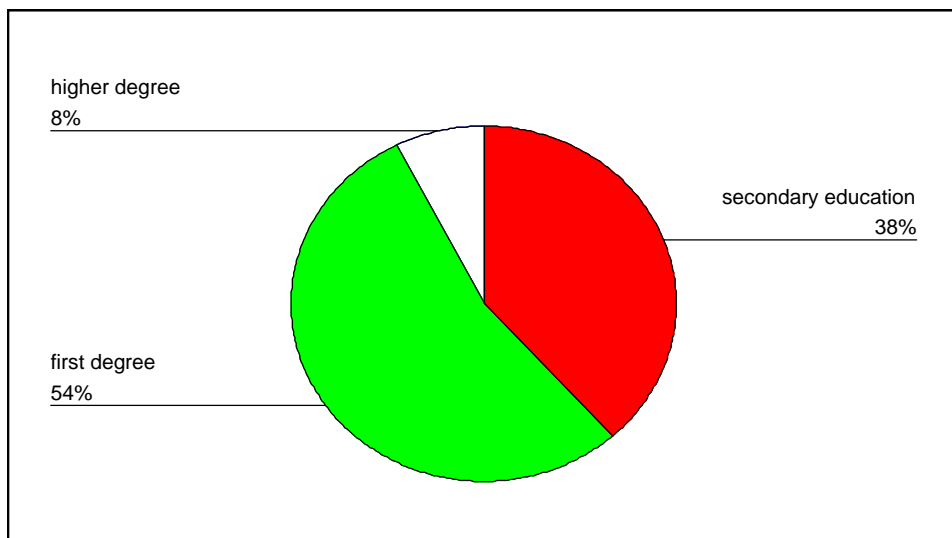


Figure 4-6 Distribution by education

In terms of gender, 71% of participants were male and 29% female. In general women would be expected to differ in the social aspects of motivation but the differences were very slight.

4.2 Growth Needs of the People

4.2.1 Growth Needs for all disciplines

Terms like growth needs are described in the Glossary (page 87).

Growth needs strength (GNS) is measured on a scale of 1 to 7. Figure 4-7 shows the distribution of GNS for all disciplines.

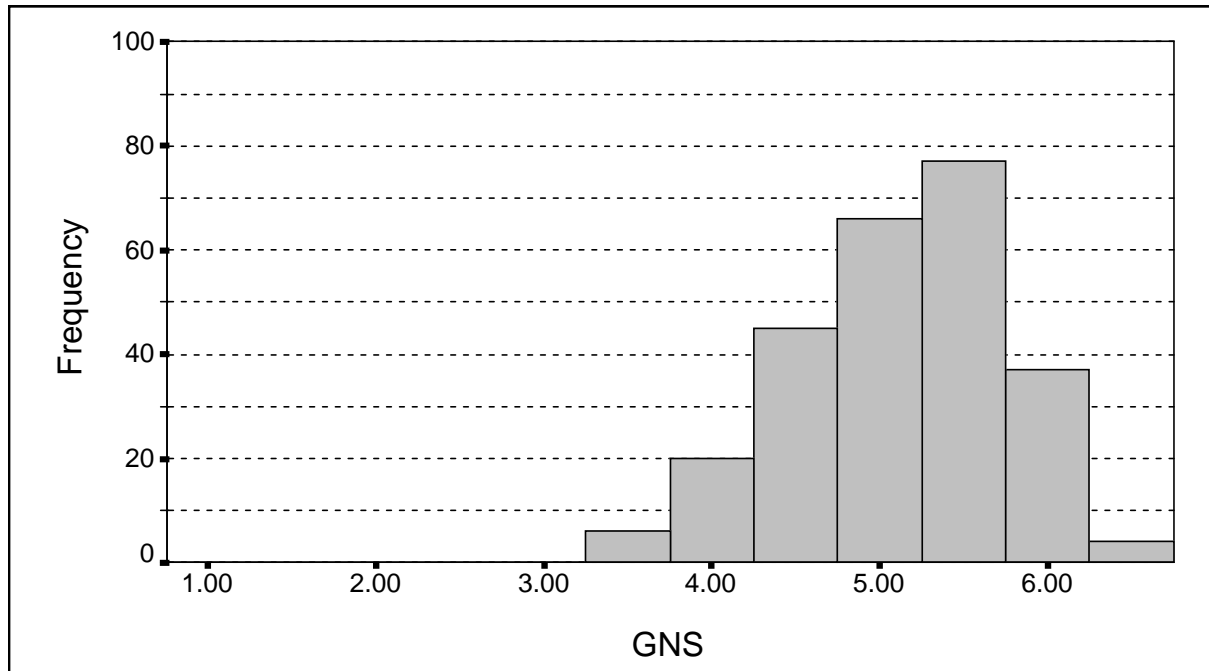


Figure 4-7 Growth Needs Strength for all disciplines

The average GNS is 5.12, which is high. IT staff, generally, have very strong growth needs and the survey group is no exception. For their organisations, this is good, as high GNS people are capable of delivering high performance levels in complex situations.

Historically, most GNS values have been in the 5 to 6 range. However we are seeing a broadening with more staff having values in the range 3.5 to 4.5. This represents the recruitment of a wider range of staff into IT.

There are both positive and negative aspects to this situation:

- The number of different IT jobs has increased, so the variation in motivating potential will be higher. Staff with a good range of growth needs are required to do them.
- However, this larger range of GNS increases the risk that staff will be given jobs that do not meet their growth needs.

4.2.2 Growth Needs for individual disciplines

Figure 4-8 shows GNS for each discipline using a boxplot. If you are not used to reading boxplots please see Interpreting the Charts at page 19.

The figure shows that there is a remarkable consistency of growth needs across all disciplines. While there are some minor variations all disciplines show high GNS values with low ranges. A small number in each discipline do have GNS below 4, which is low for IT staff.

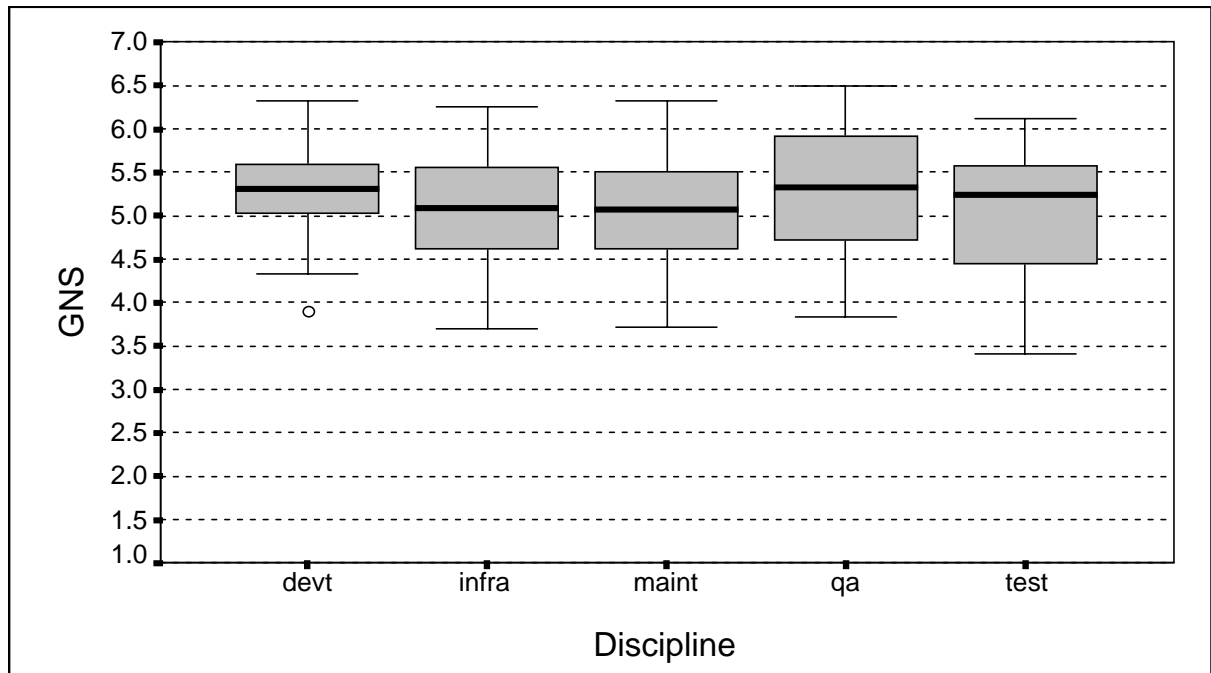


Figure 4-8 Growth Needs Strength by discipline

4.3 Motivating Potential of the Jobs

4.3.1 Motivating Potential for all disciplines

Motivating potential score (MPS) is measured on a scale of 0 to 343. Figure 4-9 shows the distribution of MPS for all disciplines.

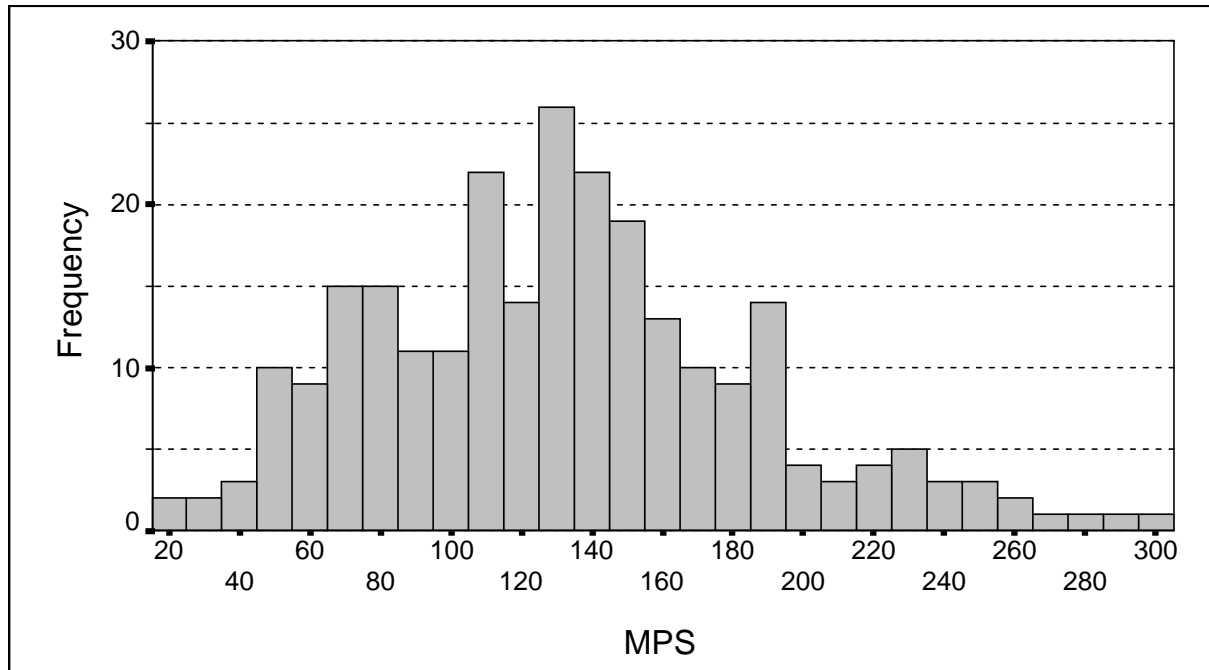


Figure 4-9 Motivating Potential Score for all disciplines

For a group with high GNS values, we would expect to find MPS values in the range of 120 to 180. Instead there is a remarkably wide range, spanning nearly all possible values. Jobs with MPS values less than 100 lack motivational content, and demotivate high growth needs people. Jobs with MPS values over 200 are so demanding, motivationally, that they may be impossible to perform effectively. Values outside the 60-240 range are really exceptional.

At both ends we are seeing some very strange jobs indeed. How can we explain how unusual these extreme values are? How were such jobs specified in the first place? Why were people willing to take them on? How could anyone believe:

- that a job below MPS=60 could keep the simplest human being occupied?
- that a job above MPS=240 could possibly be done by any one person?

We attempt to answer these questions in section 5.3 (page 53).

4.3.2 Motivating Potential for individual disciplines

The boxplot at Figure 4-10 shows how the disciplines compare.

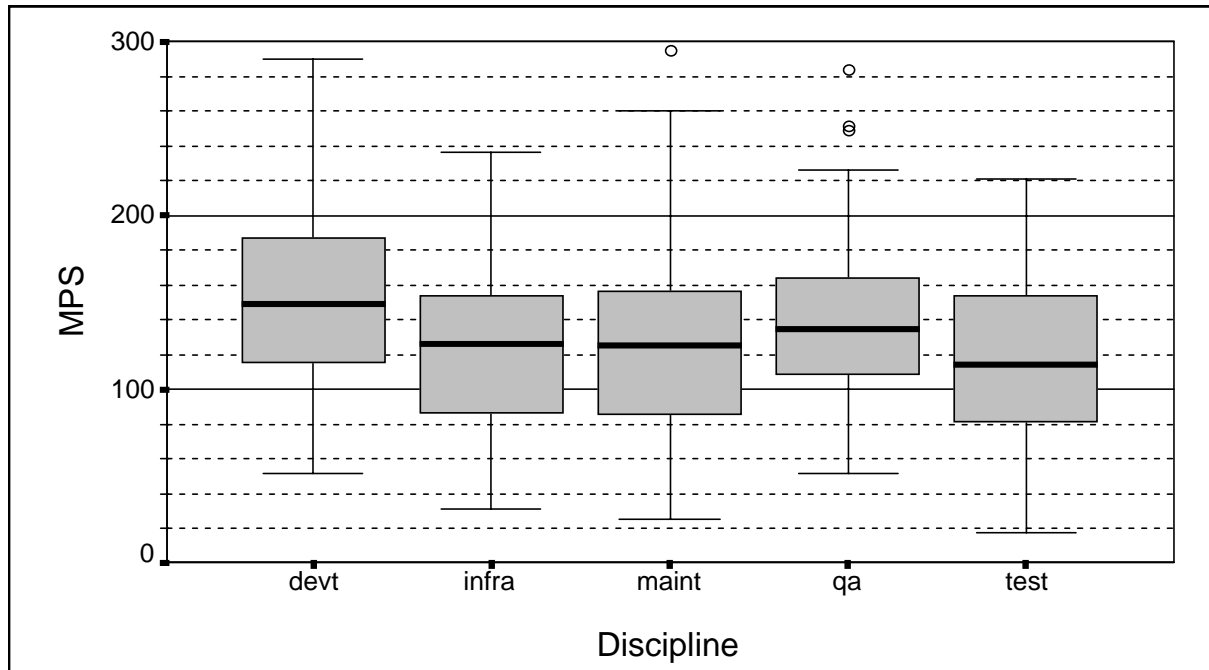


Figure 4-10 Motivating Potential Score by discipline

There are a number of important findings from this figure.

- all disciplines show wide ranges of MPS values
- each discipline suffers from problems with jobs that have either high or low MPS
- jobs at the extremes are creating very severe motivational problems.

Clearly there is a problem with the motivating potential of many jobs in each discipline. To examine this in more detail the next sections discuss job-person match and issues of job design. Section 5.3 suggests reasons for this.

4.4 Job-Person Match

While GNS and MPS, individually, provide useful information, what is most important is the match between the growth needs of the person and the motivating potential of their job. This is known as the Job-Person match.

4.4.1 Signs of job design?

If organisations were making successful efforts to design jobs to meet people's needs, we would expect to see a relationship between motivating potential and growth needs. Figure 4-11 is a scatterplot of motivating potential and growth needs for each individual. The dashed line shows the optimum match between MPS and GNS. The further an individual is from this line, the greater their motivational problems. The line is derived from the original calibration of the Job Diagnostic Survey instrument.

Analysis shows no evidence of successful attempts to match MPS with GNS.

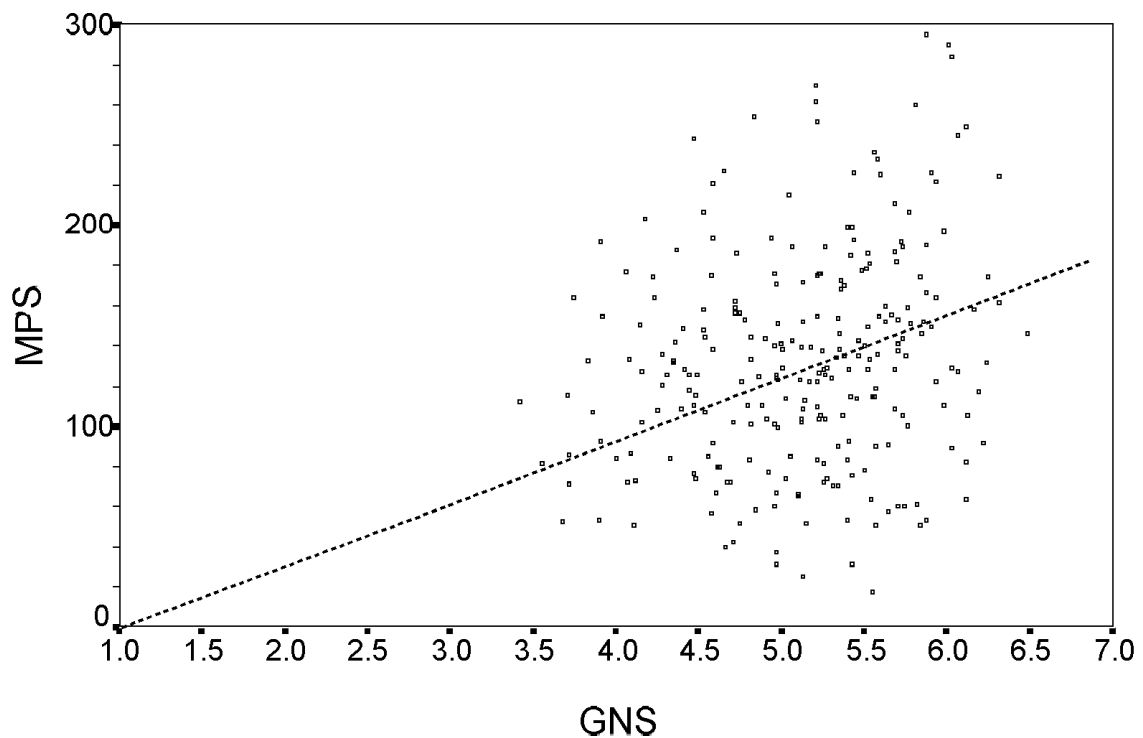


Figure 4-11 Scatterplot of MPS against GNS

When the individual's growth needs are met by the motivating potential of their job, that person should be highly motivated. When there is an imbalance, motivational problems arise, the greater the imbalance the more severe the problems. There are three situations:

- The motivating potential of the job is about right for the person doing it, so the outcomes should be good.
- The motivating potential of the job is too low to meet the person's growth needs. In this case the job is demotivating because it lacks the motivational stimuli the person needs in order to develop.
- The motivating potential of the job is too high. It exceeds the person's growth needs. In this case the job is demotivating because it contains too many motivational stimuli, with which the person cannot cope. This is a different situation, as the person may feel that the job is a very good one, but finds aspects of it very difficult or impossible to do.

As the optimum relationship between MPS and GNS is known, we can determine how MPS values vary from the ideal. Figure 4-12 shows how much each job varies from the ideal.

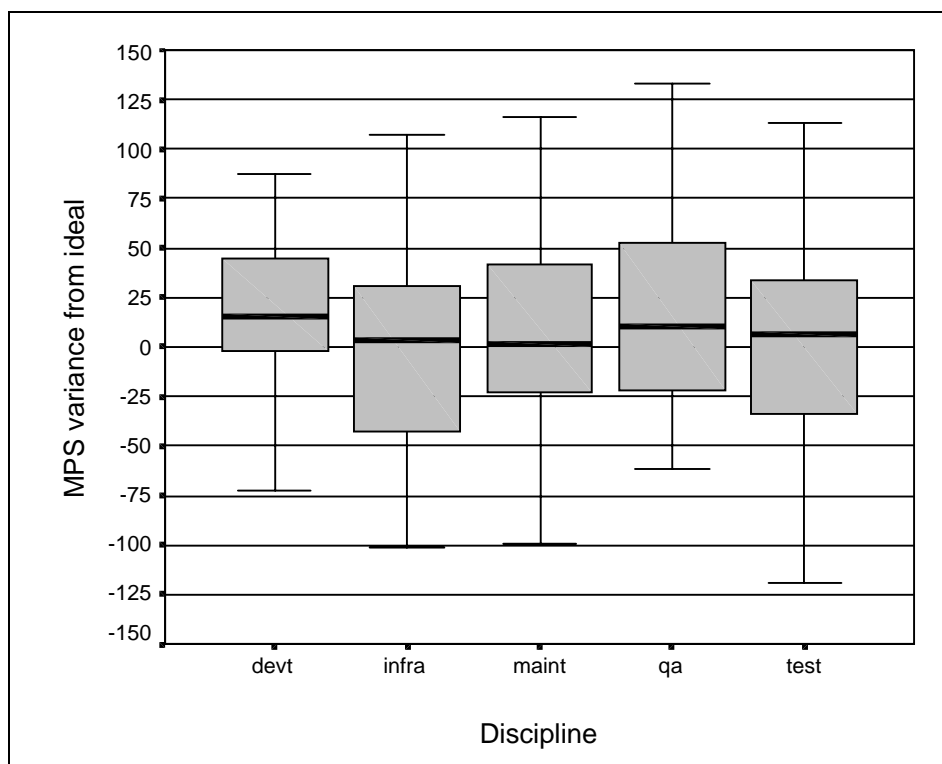


Figure 4-12 MPS Variance by discipline

The further a person is away from the ideal point (0), the more severe their motivational problems. We can classify the job-person match into the three bands using cut-off points derived from field work.

Figure 4-13 shows this classification. Each bar shows the percentage of people with a good match in white. Above and below are the proportions where the mismatch is due to MPS being too high or too low respectively.

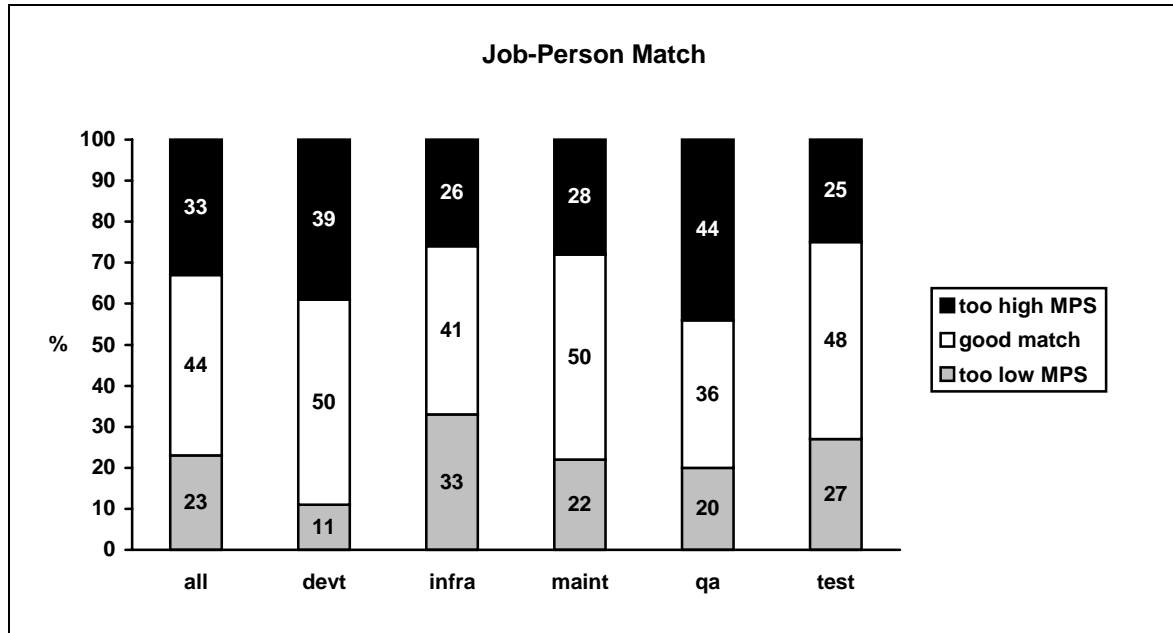


Figure 4-13 Job Person Match for all staff and by discipline

Less than half of all IT staff have a good job-person match. The majority, with a poor match, are likely to have motivational problems that detract from their work performance. While quality practitioners face the severest problems, all disciplines are affected. Problems are endemic throughout IT.

From this chart we can see that, overall, there is a greater problem with jobs that have too high a Motivating Potential for the people doing them. The disciplines most affected are quality practitioners, developers and, to a lesser extent, maintainers. Testers have about an even split, while infrastructure staff are the only group where low Motivating Potential is the dominant case.

This is a very important finding. Historically, the main problem with IT jobs has been that they lacked Motivating Potential. As IT staff have high Growth Needs, intuition suggests that this situation is the more likely. What we now see are many more jobs that are difficult or impossible to do.

Section 5.6 suggest reasons for this and section 6.2 explains how job-person match may be improved.

4.5 Job Content

Section 4.3 described a wide range of jobs, from the trivial to the impossible. This section looks in more detail at which aspects of motivation are most problematical for the majority, whose jobs fall within the normal range.

To do this we examine the core job dimensions (explained in the Glossary, page 87). Figure 4-14 shows them for all disciplines. The summary findings are:

- Skill variety is very strong, indicating that this is not a problem in general.
- Task identity is a problem for half the group.
- Task significance is a problem for one-third of the group.
- Autonomy is generally strong.
- Job feedback is a problem for half the group.
- People feedback is a problem for nearly two-thirds of the group.

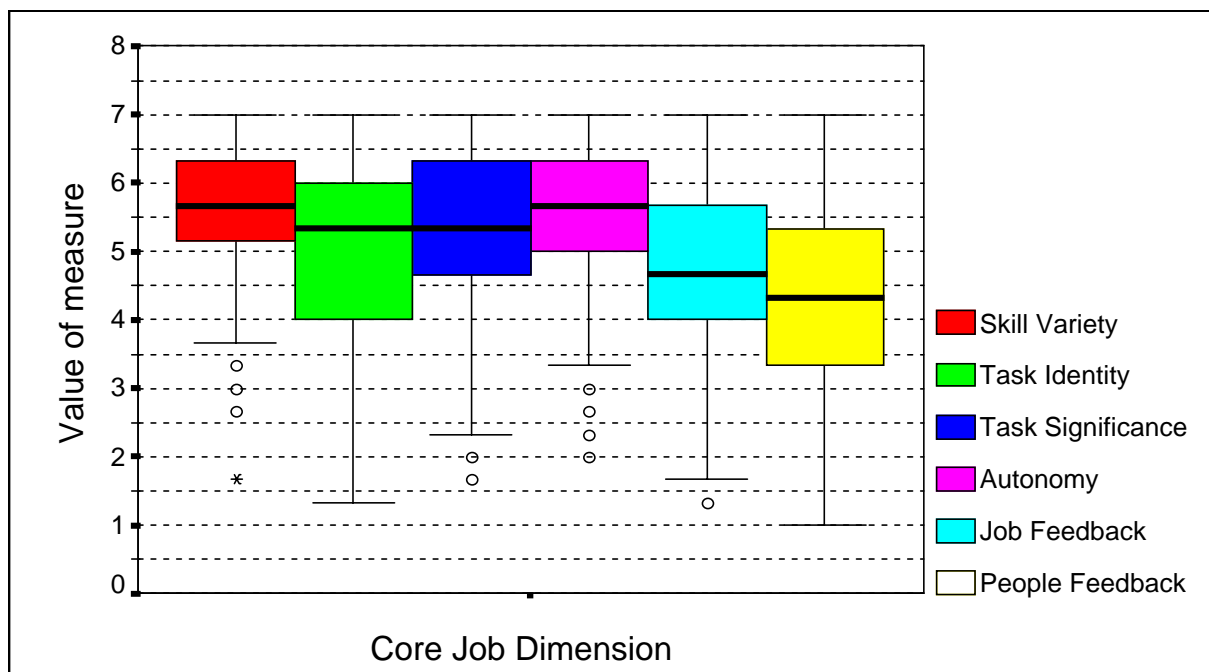


Figure 4-14 Core Job Dimensions for all disciplines

Table 1 shows how each discipline is affected.

Table 1 Core Job Dimensions by discipline - strengths and weaknesses

	all	devt	infra	maint	qa	test
skill variety	strong	strong	average	strong	strong	weak
task identity	weak	weak	weak	weak	average	weak
task significance	average	average	strong	weak	average	strong
autonomy	average	strong	average	weak	strong	weak
job feedback	weak	average	weak	weak	weak	weak
people feedback	weak	weak	weak	weak	weak	weak

4.6 Motivational Outcomes

The motivational outcomes are discussed under three headings:

- internal psychological states
- satisfaction measures
- work outcomes.

The internal psychological states (IPSs) represent how a person feels while working in the job. They influence satisfaction and work outcomes. While the IPSs are themselves influenced strongly by the degree of job-person match, they are also influenced by the individual's personal view of their job.

For example, many quality practitioners have a poor job-person match that causes many motivational problems. While this would be expected to make them feel quite dissatisfied, their IPSs show a much better picture. The reason seems to be that quality practitioners have a personal belief and enthusiasm in the potential of quality management. They feel good about the potential of their jobs, despite the problems they face from day to day.

The quality practitioners gave us such good reasons for their willingness to feel good (even heroic) about their unpleasant job that we expected others in a similar situation to feel worse. In fact all disciplines show the same effect. Most IT staff are not feeling too bad while actually doing their jobs, despite the many problems with jobs and with job-person match.

Satisfaction measures describe what the individual likes or dislikes about their job. High satisfaction will lead to high motivation, positive attitudes and good work outcomes. Low satisfaction will lead to disaffection and resentment. Employees gradually learn that their personal interests do not necessarily correspond to their employer's interests. As attitudes deteriorate productivity and quality fall, absenteeism and accidents increase.

The individual measures used in the following pages are explained in the Glossary (page 87).

4.6.1 Internal Psychological States

Two of the three psychological states of the people are high despite a poor job-person match. This is a very important finding. All disciplines show a similar pattern.

Figure 4-15 shows experienced meaningfulness for all disciplines. The mean value of 5.25 is high. Considering that half of IT staff have a poor job-person match, this is a remarkable result. It means that IT staff, personally, feel that their work is very important and meaningful despite the motivational problems.

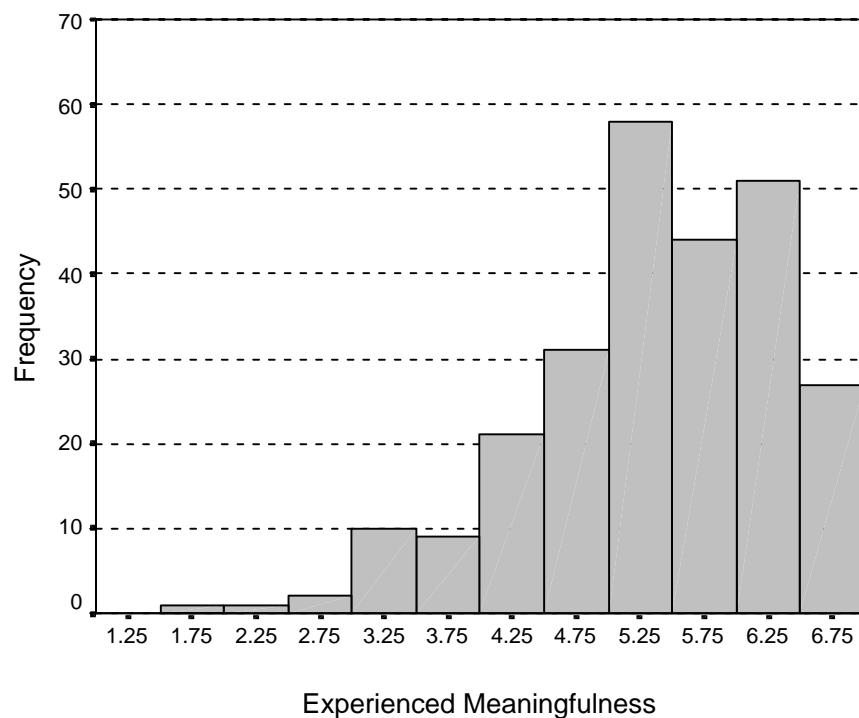


Figure 4-15 Experienced Meaningfulness for all disciplines

Figure 4-16 shows experienced responsibility for all disciplines. The result is even more remarkable than for the previous measure. The mean of 5.70 is very high, with few people scoring less than 5.00. So IT staff feel a high degree of personal responsibility for their work, even though many of their jobs may not allow them to exercise this.

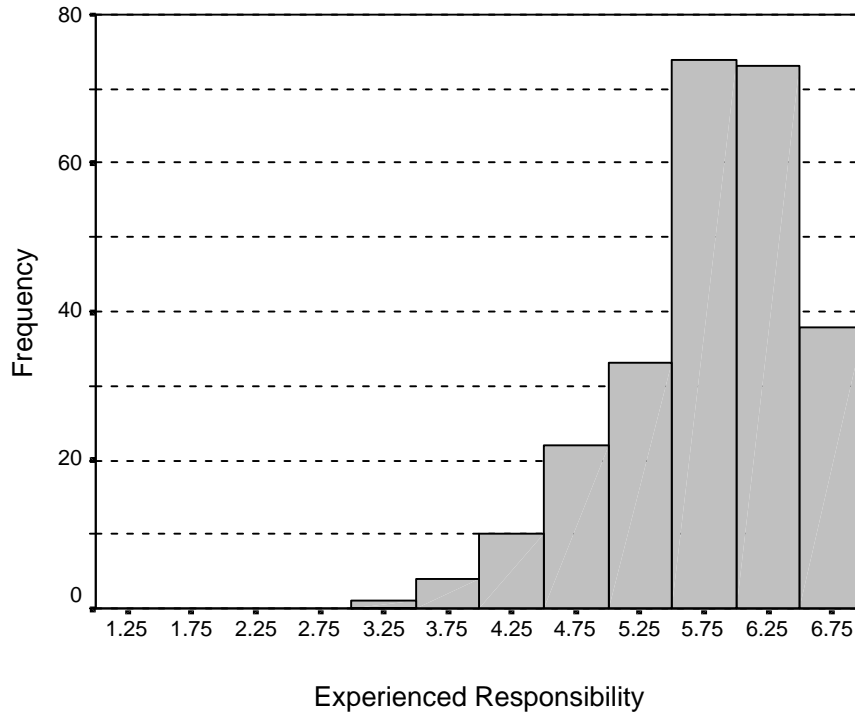


Figure 4-16 Experienced Responsibility for all disciplines

Figure 4-17 shows knowledge of results for all disciplines. While the previous two states hold up well despite the degree of job-person mismatch, this chart reflects the problems staff have with lack of feedback. Despite personal and professional enthusiasm, feedback problems are affecting the way many staff feel while doing their jobs. This is an important finding because knowledge of results is related strongly to satisfaction measures, specifically job security and pay satisfaction.

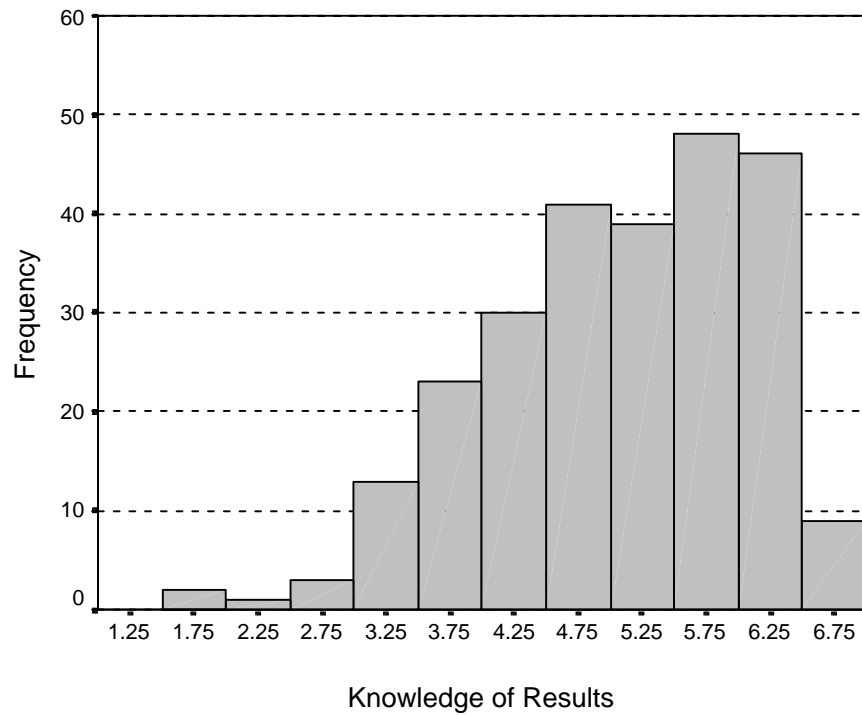


Figure 4-17 Knowledge of Results for all disciplines

4.6.2 Satisfaction Measures

Figure 4-18 shows the satisfaction measures for all disciplines aggregated together.

- General satisfaction is higher than one would expect with the number of problems outlined above. This could be due to low expectations from the job, to effective strategies for coping with motivational problems and/or to internal motivation.
- Growth satisfaction is holding up remarkably well despite poor job-person match.
- Internal motivation is indeed generally satisfactory.
- Social satisfaction and dealings with others were much less problematical than one would expect with such low people feedback.
- Supervisory satisfaction could be better but it is still not as bad as the low levels of feedback would indicate.
- Pay satisfaction and job security are major problems. In previous decades such levels would have led to very high staff turnover. In a difficult job market people do not expect job mobility so they may not even try to find another job. Fortunately for employers, they seem to be keeping these concerns quite separate from their satisfaction with the job itself.

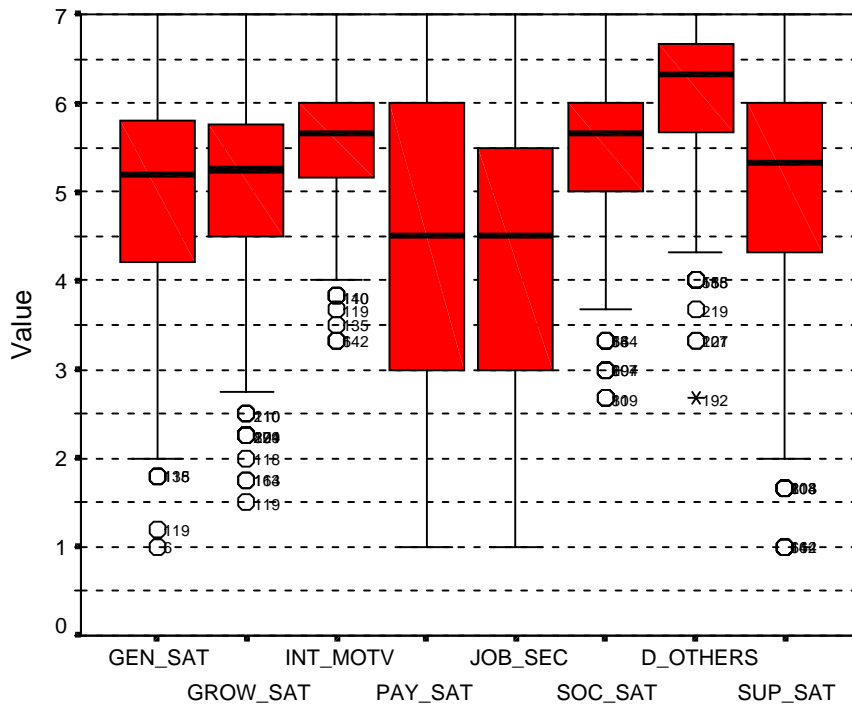


Figure 4-18 Satisfaction Measures for all disciplines

4.6.3 Work Outcomes

This survey does not measure work outcomes. During motivation improvement programs, the figures for productivity, quality, absenteeism and staff turnover are normally made available from existing data.

Many researchers have confirmed that improving work motivation improves work outcomes. At presentations, the professional groups indicated that the concerns we describe here did indeed prevent them from performing as well as they might. In particular:

- infrastructure staff cannot get developers to take more account of users,
- quality practitioners often do not know how to improve attitudes to quality,
- testers feel undervalued, as their effect on success is difficult to measure.

The data confirms the general message from these groups which is:

lack of feedback is preventing us from performing effectively.

Section 5 looks at the various reasons why these problems might exist and section 6 indicates what can be done to improve the situation.

4.7 Detailed Findings

Further analysis revealed some interesting detail which we summarise below. In this case we have included interpretation alongside the findings. If you want to continue thinking through your own interpretation before you read ours, you should cover up the right hand column.

Table 2 Detailed findings by job type

Finding	Interpretation
Skill variety falls to lower levels in functions involving customer service.	Interpersonal skills are not appreciated even by those who are using them regularly.
Job feedback is lowest for staff in customer related functions, and people feedback is not much higher than it is in technical jobs.	Customers complain about software quality over which these staff have no control.
Pay dissatisfaction has wide ranges within different functions, with little variation between them.	Pay satisfaction is determined by discipline, rather than by function.
Supervisory dissatisfaction is similar across all functions and all disciplines.	Supervisors in all areas could benefit from management training to improve their skills for dealing with staff.
Only 15% of those concerned with software were managers.	Software managers, generally, do not attend conferences on software maintenance, testing, infrastructure development and quality assurance.
Programmers have significantly higher task identity than others.	Designing and building code is a construction activity with more tangible deliverables than from other lifecycle stages.
People feedback and social satisfaction is quite low for analysts, although their dealings with other people is OK.	Analysts get plenty of contact with people but they find dealing with users unsatisfying. People feedback is low because although they know there are problems, they do not get enough information on how to improve the situation.
Programmers' job choice growth needs are particularly low.	They prefer work governed by the disciplines imposed by programming languages and standards, rather than less well defined work that attracts greater risk.
Pay satisfaction is low for all job types, particularly for analysts.	Analysts believe their work involves a management element, so they expect higher pay.

Table 3 Detailed findings by discipline

Finding	Interpretation
Skill variety is lowest for testers.	Many testers are involved with more routine test running and fault location, rather than wider aspects of test design and problem diagnosis.
Skill variety skews low for QA staff.	They perform too many control tasks and not enough that create improvements.
Autonomy is (too) high for QA staff.	Quality practitioners do not get enough direction from management.
Job feedback is lowest for testers.	Testers do not get to see the effects of correcting faults they locate. They feel there should be more satisfied users out there, but cannot be sure.
Job feedback is low for QA staff.	Control tasks lack feedback; improvement is difficult to achieve and long term; deep change is difficult to detect/prove.
People feedback is low for QA staff.	Criticism is attributed to people resisting the implementation of a quality management system.
People feedback is low for infrastructure staff.	Criticism is attributed to poor quality systems or software over which they have no control.
People feedback is low for testers.	Testers are criticising developers so this contact is hostile. They do not hear from satisfied users.
Growth needs and psychological states do not differ significantly across disciplines.	No evidence of a job-person match across disciplines. People in different disciplines feel much the same.
High average for experienced responsibility in all disciplines.	No shortage of jobs requiring responsibility.
Testers experienced responsibility is skewed high.	Most testers are concerned about the effect of poorly tested software on users, c.f. lack of feedback.

Table 3 Detailed findings by discipline (continued)

Internal motivation is high for all development staff.	Developers are motivated by the challenge of technology.
Pay satisfaction is often very low, with a wide range.	Relative pay levels for IT have fallen faster than expectations. Some people chose IT for the money.
Pay satisfaction falls lowest for infrastructure and testing staff, but not correlated with internal motivation.	Lower pay levels than for developers and maintainers.
Pay satisfaction is higher for QA.	They are much more concerned with job security, so they would not want unduly high pay levels.
Job security is often very low, with a very wide range.	Most are concerned that the stagnant job market makes them less mobile. Many are concerned about outsourcing.
Job security is particularly low for infrastructure staff.	Best practice like the IT Infrastructure Library recommends major reorganisation of the infrastructure. The implications for individuals are not fully understood.
Job security is low for QA.	Once accreditation has been achieved less effort may be needed. Management support is in short supply.
Social satisfaction is lower for testers.	Testers do not see satisfied users, but they see plenty of software developers who resent the criticism implied by finding faults in the software.

Table 4 Detailed findings by education

Finding	Interpretation
Skill variety is not affected by education.	Employers do not expect education to increase skill.
Autonomy is higher for people with a second degree.	Employers assume that MSc/PhDs know how to do the work.
Task significance and people feedback are higher for people with a first degree only.	People with standard educational qualifications tend to do mainstream jobs which are less difficult to define and better supported.
Job choice growth needs are higher with more education.	Education increases expectations OR people undertake education to satisfy growth needs.
General and growth satisfaction are higher with more education.	Confirms that people undertake education to satisfy growth needs, rather than education increasing expectations.
Pay satisfaction is higher with more education.	Graduates are paid more. Graduates are more concerned in personal growth and hence less concerned about pay.
Job security is lower for people without a degree.	People without a degree worry more about not being mobile in the job market OR about not being valued in their existing job.

Table 5 Detailed findings by age

Finding	Interpretation
Skill variety increases with age.	No shortage of tasks requiring much experience.
Task significance rises after 50.	Only people in significant jobs are retained after 50.
Only the young lack autonomy.	People learn to get autonomy for themselves.
Growth needs and general satisfaction decline until after 50.	Expectations rise before 50 then fall OR only satisfied people stay beyond 50.
Growth satisfaction rises after 50.	Older people who are not stretched leave.
Experienced responsibility tends to increase with age.	Expected result.
Job security declines until after 50.	After 50 people need less job security OR those who are going are shed before they reach 50.
Supervisory satisfaction does not change with age.	As resentment of younger managers increases, expectations about managers decrease.
All three psychological states rise after 50.	Only people who are well matched to their job survive beyond 50.
Younger staff have higher qualifications.	Entry qualifications have increased over time.
After 50 there are more second degrees.	People who are willing to retrain are more likely to be retained after 50.
Quality practitioners tend to be older.	It is/appears to be more appropriate for older people to tell colleagues how to improve their work.

Table 6 Detailed findings by gender

Finding	Interpretation
There are no significant differences between male and female measures.	Gender-typical women do not apply for or get jobs in IT.
The percentage of women decreases after age 40.	Fewer women were recruited in the 1970s.
There are more women in testing and maintenance.	Women are allocated to less prestigious jobs, perhaps because they are more willing to accept such jobs.
Fewer women have higher degrees.	Women cannot easily fit in two career breaks, one for family and one for higher education.
More women are analysts.	Women prefer and are selected for jobs that involve more contact with people.

4.8 Summary of Findings

The main findings are:

- Although IT staff have a distinctive profile when compared with other professions, there is not much difference among the individual disciplines within IT.
- IT staff have high growth needs, which means they are capable of a high degree of work performance.
- The jobs show a remarkable range of motivating potential that is completely out of balance with the growth needs of the staff.
- Job-person match analysis shows that over half the staff have a job that does not meet their growth needs. This affects all disciplines.
- Where there is a poor match, the problems are due to jobs with too high (over 180) a motivating potential as well as jobs which are too low (under 120).
- There is no evidence that organisations are effectively designing jobs to meet staff's individual needs.
- Staff feel better about their jobs than the poor job-person match would suggest. This indicates they have strong personal views about the value of their work, and use them to help cope with the problems.
- Despite the use of coping strategies, the satisfaction measures show real problems with job security and pay satisfaction.
- Each discipline suffers from between two and four weak core job dimensions.

The overall finding is that more than half of the IT staff surveyed have potential for motivation improvement. Given the investment that organisations make in their staff, this represents a major opportunity for improving the quality and productivity of their IT services.

5. INTERPRETATION

5.1 The Job Market

Compared with previous surveys, this survey was taken in a different economic climate and at a time when there is much reorganisation of IT infrastructure and an increase in outsourcing. This may explain the much lower levels of job security.

The age profile of IT staff is levelling off somewhat. Staff over 50 were particularly well motivated. This may be due to the combined effects of voluntary retirement and selective shedding of staff over 50.

The most noticeable feature of IT staff in the past has been their extremely high growth needs. The average is still fairly high (mean 5.12) but six percent of those surveyed this time had quite low growth needs (below 4). The growth needs of people were highest in training and lowest in software maintenance. However this range is smaller than one might expect for jobs which are so very different. It would seem that all IT jobs still attract people with high growth needs.

Might there be a market for people who are interested in IT but would be content with a less demanding job? There are already many jobs which are not demanding enough for IT staff. As the technology becomes more user friendly we should be able to reduce the complexity of other jobs. The vicious circles described in section 5.3 show other negative effects of such a high GNS work force.

5.2 The Increase in Very Difficult Jobs

The wide range of jobs described in section 4.3 includes many jobs with such a very high motivating potential that they are virtually impossible to do well. This contrasts with reports from previous decades which emphasise the severe lack of motivating potential in maintenance. What has happened to increase motivating potential in maintenance and elsewhere?

Quality practitioners explained that they were trying to get people to change their attitudes to quality. They had not been trained for such tasks and lacked enough feedback to learn from experience. They were given so much autonomy that they felt managers neither knew nor cared how they did the job.

The same increase is found in all disciplines so we must look for a more general industry-wide explanation. The possible causes combine into vicious circles as described in section 3.5. The vicious circles in Figure 5-1 might explain why jobs are becoming more complex despite the technology becoming more usable.

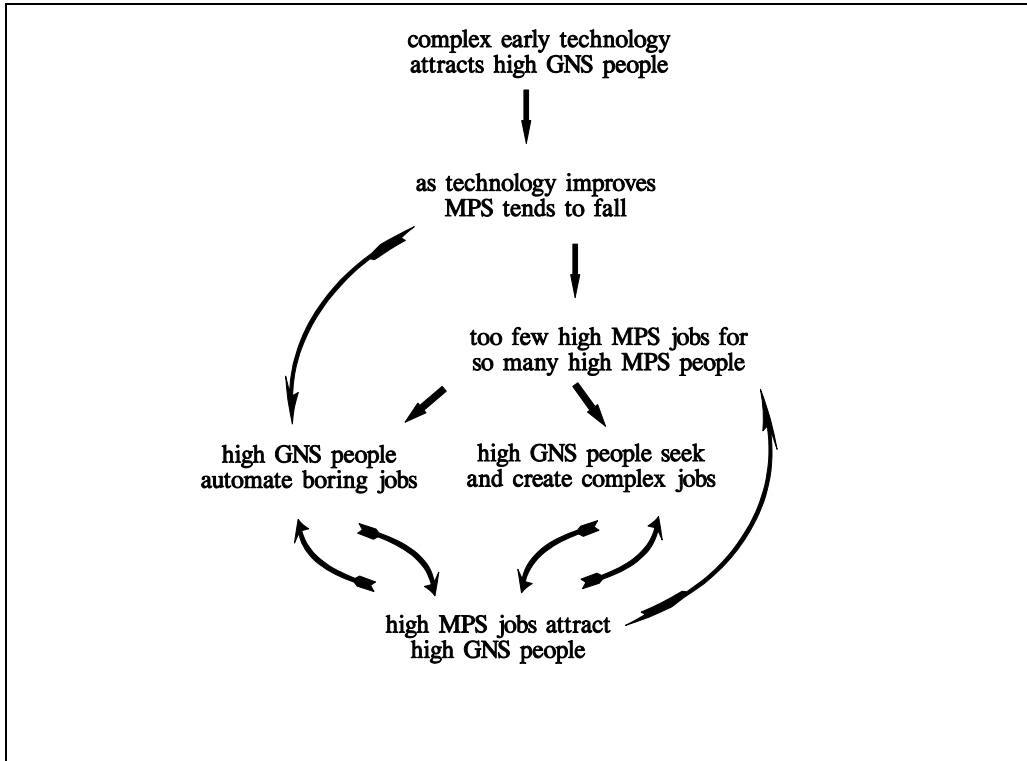


Figure 5-1 The vicious circle of increasing MPS

Other vicious circles (Figure 5-2) reduce managers' determination to work on the problem of job design.

5.3 Job Design

The problems with job-person match are described in section 4.4.

During the survey some managers asked 'What is job design?'. So the issue is not simply that organisations are unsuccessful at it, but individuals lack awareness of the need to do it. For example, many may think they can design jobs using best practice guides. These guides outline what tasks must be done. They also indicate some groups of tasks which might form a viable job description. The combination of tasks which forms a meaningful, viable job in one organisation may be too difficult, too easy or too fragmented in a different organisation. Managers may try to adjust the recommended job descriptions but they often lack information about how the various tasks combine to form a whole job. They also lack understanding of how people carve meaning out of their jobs. When a new job is created, they compare it with existing jobs to guess a suitable job description which will also be reviewed by human resources managers.

IT managers normally attempt to define a job so that they can reasonably expect the right person to be fully occupied for the time available. They also wish to avoid people becoming unduly bored or over-stretched. Most of the time a manager will only be making adjustments to existing jobs.

Anecdotal evidence suggests that many IT managers are not convinced that they can go much beyond these general ideas when they define job responsibilities. They are aware that one person may deliver a lot more or less than another so they may adjust jobs accordingly. Most IT managers have had a sophisticated technical education, topped up with short courses on the basic management skills. They learn more management from experience, so if a problem is well hidden they will not realise that it is important. Their staff have similar education, probably less training. Even if they know why things are going wrong, they may not know how to explain themselves. Also the IT profession has a widespread taboo against discussing psycho-social issues.

Previous surveys found many jobs which were not demanding enough. Many jobs still lack motivating potential, but we found a significant group of jobs where motivation is poor because the job is too difficult. 17% are doing jobs which are too demanding even for people with the highest growth needs. Five percent are doing jobs with motivating potential over 240. These jobs could be described as being impossibly difficult.

Where staff have high growth needs they prefer to automate any job which is too easy to be interesting. This is more likely in IT because moderately 'intelligent' technology is readily available.

5.4 Internal Psychological States

Section 4.6.1 describes how good IT staff feel while doing their work, despite the problems described above. IT staff have an inherent belief, enthusiasm, personal or professional interest in their work. These personal views and attitudes enable them to cope with significant problems with their jobs. However, the emphasis is on the word 'cope'.

High GNS staff with motivational problems will develop coping strategies to try and overcome them. In the short term these strategies work fairly well, but they require personal effort to sustain. In the long term, staff may reach a point where they are no longer willing to make this extra effort, and leave.

High GNS people may enthusiastically undertake challenging jobs. In the short term they are well motivated. As time passes they find that even their best efforts do not achieve success. High GNS people are used to succeeding in whatever they do, so the stress experienced when they fail can be debilitating. We would expect to see various attempts to renegotiate job specifications or otherwise to withdraw from the problem. Eventually high levels of disaffection, sickness and high turnover will appear. This may take several years to show through and will be particularly damaging in a climate of limited job mobility.

The caution for managers is to be aware that although staff may appear to be well motivated, if they are running on coping strategies a larger problem is developing. Therefore managers should not be complacent, but should investigate whether this is happening with their staff and take remedial action now. We have every reason to believe that well motivated IT staff are willing to deliver high work outcomes. There is no need to live with a disappointing IT performance.

5.5 Feedback

Feedback tended to be low, from the job (50% under 5.0) and from people (61% under 5.0). Introducing a quality management system ought to provide such feedback. These results confirm the views expressed at the BCS Quality Management SIG about the immaturity of software quality management.

Jobs may be created or changed individually, but they do not exist in isolation. When staff are doing them there are many interactions between people, and groups of people, that can change the motivational content of jobs. As new specialisms appear, the chain of people involved in the delivery of a particular item of service becomes longer. For example, resolving a software problem may start at the help desk, going through problem management, software support, change management, configuration management and other functions. This long chain may ensure that every aspect of the job is completed, but people want to see the effect of what they do. Each person in that chain needs information on how their contribution has improved the service to the user and the work of others in the chain. The time and effort required to provide adequate feedback grows, so the cost-benefit ratio for providing feedback deteriorates. There will be an optimum length for such a chain which is calculated by a trade-off between:

- the costs of communication along the chain, need for more feedback, lower skill variety, less autonomy and less task significance
- the benefits of specialisation and specific responsibilities.

IT is not alone in failing to give adequate feedback. Every industry in the UK had to change in order to obtain accreditation for their QMS. A QMS may collect and store the necessary information. Representatives may meet at quality circles. Neither of these measures ensures that the right information will be available in the right form for every member of staff.

Anyone who has looked at management information systems will appreciate what is involved in making the right information available to a few managers. The cost of extending this sort of information to every employee will often be prohibitive. A less formal, simpler approach is required, which is not the style that IT staff are accustomed to. Section 6.5 discusses what can be done to provide more informal feedback. This section includes a discussion of the barriers which prevent such feedback from occurring naturally.

5.6 Job-Person Match

The evidence in section 4.4 suggest that job person match is generally poor. People with higher growth needs prefer jobs with higher motivating potential. If a person's growth needs are well matched to the motivating potential of their job, they will be better motivated, more effective and less likely to leave that job, or to be absent from work. Clearly it pays both employer and employee to match the person with the job.

A perfect match may be difficult to obtain in IT because

- few IT staff have low growth needs, so it is difficult to find people to match low MPS jobs
- some IT jobs are so difficult (high MPS) that even people with the highest growth needs would not be well matched

Job-person match should be improved by:

- The jobs which people with high or low GNS choose to apply for. This is influenced by their view of what different jobs will entail, however this effect may be undermined by the status of different jobs and the salary attached to them.
- The extent to which people who are now in the job adjust its motivating potential to their preferences, by attending to the more or less difficult tasks associated with their job. This is influenced by the amount of autonomy they have and by the maximum variety of skills and tasks the job could require.
- Managers' attempts to allocate tasks to the people who are best suited to perform them. This is influenced by how much information managers have about the jobs and the people and by the extent to which they believe they can or should try to match jobs to people.

Each of these influences has its limitations but each does tend to improve the match between jobs and people. At present there are three influences which may be undermining this tendency towards a good match:

- The set of available jobs does not match the set of available people. The people have growth needs which require a much narrower range of motivation than that which is offered by the available jobs.
- Jobs are being redefined due to outsourcing and other facilities management agreements. New managers know less about their staff. Staff may be presenting an unrealistic picture because they are concerned about long term effects on salary, working conditions and job security.

- Jobs are being redefined on the basis of advice about best practice, for example from the IT Infrastructure Library. Such sources take little account of the motivational impact of new jobs.

Developers show some evidence of better matching. This may be due to some extent to greater autonomy and skill variety which enables people to adjust their job to suit their preferences. For infrastructure staff there is no evidence of any matching effect.

5.7 Infrastructure Staff

Quality practitioners, software testers, developers and maintainers were surveyed separately, so this section concentrates on the infrastructure staff. Their profile was generally similar to that of software testers, except that skill variety was not so much of a problem.

Dealings with others were particularly good. Also infrastructure was the only area where there was a limit to how difficult the jobs might be. There were some demanding jobs but none of the wildly over-taxing jobs found in other areas. This indicates that managers were succeeding in designing jobs which were not impossibly difficult to do. Since infrastructure staff have a reasonable amount of autonomy this also suggests that they use this freedom wisely, not over-reaching their capacity to deliver.

The motivating potential of these jobs was not exceptional for IT staff, but they reported the lowest levels of feedback from the job itself (mean = 4.4) and from people (mean = 4.0). This is somewhat surprising for a group who seem to be more customer oriented than other IT staff.

This report will appear before we get feedback from the ITIMF so we can only guess at the reason for this. Perhaps a customer orientation encourages more need for feedback. The generally poor relationship between infrastructure staff and development staff is well documented. Infrastructure staff claim they cannot deliver a better service until the quality of software improves. Does most of their feedback criticise something over which they have no control? That would explain why they report insufficient feedback about their job. How can they disentangle the negative effects of poor quality software from the positive effects of their attempts to keep the service going despite the software?

Personal outcomes were not good. They had the lowest pay satisfaction (mean = 3.7) and job security (mean = 3.5). This may reflect the real situation for infrastructure staff in a more competitive job market.

Supervisory satisfaction was also the lowest (mean = 4.6). This is not so easy to explain because this is the only group who are not being given impossibly difficult jobs to do. One suggestion might make sense of it. Students taking a part-time computing MSc (who share long and broad experience of IT) suggest that people who go into computing are not unduly demanding about what job they do. *"As long as they work with recent technology and with other people who are interested in that technology they are happy."* Perhaps this effect is diminishing for infrastructure staff. Their general satisfaction and growth satisfaction were low (means = 4.5 & 4.7).

As mentioned above, the match between the person and the job was particularly poor for infrastructure staff. This may be due to the recent tendency to redesign infrastructure jobs. Benefits from implementing best practice may be lost if detrimental effects on motivation are not removed.

5.8 Quality Practitioners

Like software developers, quality practitioners have even higher growth needs than other IT staff. On average their jobs have higher motivating potential, but the range is very wide, with eighteen percent of the jobs being too difficult for anyone and 20% too straightforward for the people who were doing them.

It is possible to distinguish two quite different jobs:

- a controller who uses an existing QMS to detect problems
- an agent of change who implements the QMS and tries to move the organisation on towards total quality management.

The controller's job is likely to lack motivating potential, both because it is simpler and because adversarial situations make it difficult ever to receive positive feedback from people. The job of change agent is likely to be impossibly difficult if people have plenty of reasons to resist the change and management support is lacking. Despite low levels of people feedback these jobs scored among the highest values for motivating potential.

Members of the Quality Forum were surveyed in two consecutive years. Little had changed. Most quality practitioners were enthusiastic about their job, but they found too much autonomy was a problem because they did not get enough feedback to be able to judge how to use that autonomy to improve their performance.

5.9 Software Testers

Software testers had more moderate growth needs. None of them reported exceptionally high growth needs while some reported the lowest growth needs of all IT staff. Their growth needs were generally sufficient to the task they did 25% were doing a job which was unduly demanding for their growth needs, while 27% were doing jobs where the motivating potential was too low for them.

Despite this mismatch, there was some evidence that people tended to be matched to tasks. This indicates that the main problem for software testing is a lack of motivating potential in jobs which are already being given to people who are not so demanding.

Skill variety was lower than for other IT staff (mean = 4.9), task identity poor (mean = 5.0). Task significance was the highest of all IT staff, yet feedback was low. In this situation we would expect moderate improvement in feedback to be most effective. Several metrics have been suggested to us as suitable feedback, including projected costs for each fault had it been released into production.

People feedback may be problematical because an adversarial situation between testers and developers means that the people whom testers see from day to day tend to resent their efforts. The fact is that testers help developers to avoid releasing their faults, but developers still hear criticism of their work. Testers see little or nothing of the customers and users who might appreciate their efforts.

5.10 Software Maintainers

In the earlier surveys, software maintainers had significantly more motivational problems than other IT staff. Now we are finding more problems among software testers and other infrastructure staff.

The distinction between development and maintenance becomes blurred as the number of entirely new application areas declines and the amount of adaptive maintenance increases. The results of previous surveys indicated that maintenance had low status so there may also be a tendency to include more maintenance tasks under the heading of development.

The nature of maintainers' problems has changed so now that many of their jobs contain too many motivational stimuli. In the 1980s maintainers' jobs were noted for their low Motivating Potential - cases where it was too high were uncommon. At that time maintenance was considered by many as a second rate occupation. Maintainers often had to clear up the problems the developers left behind, in a culture that did not really understand or value their work.

In outsourcing and FM situations, involving a client-supplier relationship, maintainers may be in the front line. Instead of making backroom changes to software they are very close to service delivery, and their work can have a significant effect on the quality of IT services. Consequently maintenance work carries much greater responsibility. However these jobs have not been designed to enable the staff to cope with these demands.

Section 5.2 discusses the tendency for MPS to rise across all disciplines. Figure 4-13 on page 35 shows that 22% of maintainers suffer from low MPS. However maintenance is no longer noticeable for exceptional problems with MPS. Indeed their situation seems to be improving while others are falling behind.

5.11 Conflict within the IT Profession

A recurring theme during feedback sessions was the refusal of developers to pay attention to users' needs. Developers have higher internal motivation so they may not need much feedback from people. They also tend to discount people who lack their specialist knowledge, so they listen only to their colleagues, to colleagues who also ignore the users.

Poor software quality is often blamed on this lack of concern for users. Other undesirable outcomes include:

- Users are so busy criticising software quality that they give less feedback to infrastructure staff on the quality of their service.
- Infrastructure staff are demotivated because they have no control over this source of complaints.
- Interpersonal relations between infrastructure staff and their clients deteriorate.
- Testers are demotivated because development staff do not value their help in detecting problems prior to release.

Quality practitioners also complain of hostility from software developers and lack of senior management support. They are responsible for the quality management systems which might give higher priority to feedback from users and customers.

The results of this survey lend no support to the idea that software developers are very different from other IT staff. Section 6.2 describes effects which might account for the growth of inter-group rivalry. Perhaps the other groups learned to pay attention to users because they were forced to speak with them. Systems analysts mediate communication between users and programmers. This may be better when they are trying to define requirements, but the effect on programmers is that they are able to ignore users altogether.

Relationships among other disciplines are also somewhat strained. A summary of these relationships is given in Table 7. The columns show who is commenting while the rows shows who is being commented on.

HOW >>> VIEW v v v	DEVELOPERS	INFRA- STRUCTURE	MAINTAINERS	MANAGERS	QUALITY	TESTERS	USERS
DEVELOPERS	We're OK	Don't listen. Poor quality	Will not document	No business awareness or interpersonal skills	Resist change. A law unto themselves	Resent criticism	Computers are difficult to use and unreliable We don't want to know about technology
INFRA- STRUCTURE	Always complaining	We're OK	Should filter requests	Better customer orientation	Understand	Understand	
MAINTAINERS	unpleasant job low status	Long delays	We're OK	Long delays	Resist change	Resent criticism	
MANAGERS	Want delivery too soon to get quality	Should force developers to attend to users	Want delivery too soon to get quality	We're OK	No interest. No support Don't understand.	Don't know the cost of letting bugs through.	
QUALITY PRACTITIONERS	Waste time. Unrealistic. Don't understand.	Understand	Waste time. Unrealistic. Don't understand	A luxury. Only if customers demand it.	We're OK	Understand	
TESTERS	Unnecessary We do that.	Understand	Unnecessary We do that.	Little skill needed.	Understand	We're OK	
USERS	Don't know what they want	Complain to us about software	Ask for trivial changes.	Will not pay for quality, but expect it.	Will not pay for quality, but expect it.	Understand	

Table 7 How different disciplines view each other

5.12 Human V Technical Tasks

In IT, technical skills are better understood and more highly valued than skills relating to people. For example, staff involved in customer support claim less skill variety. When IT staff describe their motivational frustrations, relationships with people are a recurring theme so we cannot assume that IT staff find them trivially easy.

All other groups criticised software developers who were accused of being more interested in technical complexity than in user satisfaction. They attributed all problems with users to poor software. They did not expect any improvement in their relationships with users until the software improved. See section 6.5.3 for a discussion of such out-group attributions.

Despite these problems the survey did not reveal any dissatisfaction among IT staff about their dealing with others. This may be because:

- IT staff have very low expectations of their dealings with others.
- Dealings with colleagues in the same discipline are the ones which matter.

All groups spent time worrying about relationships with users so we assume that the second explanation is closer to the truth: all IT staff can manage quite happily despite poor relationships with users. Respect would seem to be the issue here. A person's job description may require them to relate well with users, so they will work at that. When it comes to their personal preferences, they respect users so little that users' bad opinions do not cause them personal discomfort.

6. RECOMMENDATIONS

This part of the report discusses what can be done to improve motivation. Firstly, there is a section giving guidelines on how to go about improvement. They are based on a range of field assignments performed for individual organisations. Secondly, there is detailed discussion of how to resolve specific problems with IT jobs. These are all things which have worked in the past.

6.1 Guidelines for Motivation Improvement

6.1.1 The Nature of Motivation

It is necessary to understand some facts of life about motivational problems. The quality of working life depends on being well motivated ourselves and on working with people who are also well motivated. So everyone has a vested interest in resolving motivational problems. Problems which persist despite this goodwill are usually of the type known as "wicked problems". Wicked problems have the following characteristics:

- They can be complex and contain many variables, so there is no set solution to them.
- Every organisation will have unique circumstances, so there are no general solutions.
- Problems contain conflicting elements, so there are no perfect solutions.
- Problems can change as we study them, so there are no static solutions.

Wicked problems also tend to settle into self-perpetuating vicious circles. Vicious circles are discussed in more detail in section 3.5.

This may sound daunting, but people do want to be well motivated, so the problems can be solved providing we do not forget what sort of problem we are dealing with.

To illustrate this point we look at systems analysis which is also a wicked problem. Systems analysis can be done and done well, but we can always think of something we might have done better. The short-comings in a systems analyst's performance are often resolved by users who make a poor information system work fairly well.

It is the same with motivation. Staff prefer to be well motivated and will paste over many cracks in job design. The cost is some loss of goodwill. Also we are tempted to become complacent because people make things look better than they really are.

The rewards for good job design are also similar to the rewards for good systems analysis. As managers improve quality of working life for their staff, the quality of their own working life improves. They experience a the feeling of mastery, knowing that most managers are not achieving these performance levels.

6.1.2 Lines of Attack

There are three lines of attack for solving motivational problems.

The first line is job design or re-design, that is to improve jobs and modify them to meet the people's growth needs. This is the solution most apt to the problems raised in this survey.

The second line is to reallocate staff to achieve a better job-person match. Jobs must be available with appropriate motivating potential to allow for reallocation. In our survey many of the jobs have too high or too low a motivating potential for this approach to work. Furthermore, when many staff have motivational problems, large scale reallocation will be very disruptive, entailing undue risks.

The third line is to recruit new people. Here the assumption is that the jobs are alright, but it is people that are the problem. As discussed earlier, IT staff have high growth needs, so it is not the people at fault, apart from which recruitment is an expensive and drastic solution.

The first approach, job design/re-design is the only realistic approach to most motivational problems.

6.2 Job Design

Responses to specific problems are discussed later. Here we look at the issues which are common to all attempts to design someone else's job.

In order to design a job we need to know:

- what tasks must be done to achieve the required output
- the skills and information needed to perform each task
- the information needed to monitor and improve performance
- how to encourage and support best practice
- workloads and their effect on the individual who undertakes them
- suitable personal attributes and management styles.

When we know what a job encompasses, there are five stages for creating the job and allocating a person to do it:

1. To specify tasks and responsibilities which cover everything that ought to be done and which encourage best practice.
2. To combine these tasks into meaningful jobs.
3. To make the best possible match between the available people and the jobs to be done.
4. To improve the motivating potential of these jobs by providing appropriate information, training, management and equipment.
5. To recruit new staff who have the skills, knowledge, potential and attitudes which will make them effective and keep them motivated.

Fortunately we rarely have to design an entirely new set of jobs from scratch. If you are ever asked to reorganise a department or set up an entirely new department, we recommend engaging the services of an expert. It takes a great deal of experience to spot the flaws in such a design. Once such a large change has been implemented, substantial redesign would cause too much disruption, so the cost of getting it wrong is extremely high and the opportunities for recovery are limited.

Here we discuss two of the more common situations:

- designing one new job
- improving existing jobs.

Designing an entirely new job is quite different from the many types of redesign and will be described separately.

6.2.1 Design a New Job

This situation is different because you have less information to work on. You cannot obtain job diagnostics so you have to fly 'by the seat of your pants'.

An entirely new task may appear to have no history. Such jobs are usually based on methods or technology which are already in use elsewhere. If you cannot buy in this experience, look for someone in-house. This person should contact those who already have the experience. You must rely on them during the crucial development period. It is worth putting some effort into finding the right person. Ask, "Who identifies problems and opportunities? Do they ask for new and difficult tasks? How does this person interact with other enthusiasts?"

The initial job specification should describe expected outcomes and a responsibility to learn from other organisations. It should specify the date by which a complete job specification will have been discussed and finalised.

Now you have a local expert. Like the original innovator, these people can be relied on to design delightful jobs for themselves. The organisation quickly grows to depend on the expert. This is best tackled early on. Emphasise the task of making sure that the innovation continues to thrive and grow after the expert has moved on to other things. The expert should not be left alone to design the job of the first assistant. Experts tend to retain every interesting or responsible task, leaving a very demotivating job for the assistant. The expert's job description should include training the assistant and gradually increasing the responsibilities which can be left to the assistant. The rate at which the assistant is given real responsibility should be closely monitored.

6.2.2 Re-Design Existing Jobs

More often than not we are redesigning existing jobs. There is plenty of knowledge around in the organisation about how the old jobs worked (or did not work). Workloads can be estimated and existing problems avoided, if we are able to capture and use a reliable version of this knowledge.

The most important factor in the success of such a change is the attitude of staff who will be affected by the change. In the ideal situation, job redesign is undertaken to:

- increase productivity and improve quality
- enhance the quality of working life for staff and managers.

A small budget is available for implementing the changes. All staff are fully involved in the redesign process.

The most difficult situations are down-sizing, cost-cutting and outsourcing. If staff fear redundancy or deteriorating conditions they can make a change very expensive. Industrial action may be less common now but this only conceals the cost of losing key staff, lost productivity, lower quality, accidents and sickness.

Any resistance to change is easier to avoid than to overcome. It is more difficult for a person to change their mind after they have expressed an opinion, so do not ask staff directly if they welcome the change.

The solution is to involve staff in designing their new jobs. This need not be as daunting or as expensive as it seems. The trick is to manage their involvement:

- Basing job design on knowledge of the existing situation.
- Acknowledging concerns without dwelling on the past.
- Encouraging constructive forward-looking discussion.

The best way to achieve this is to use a job diagnostic survey as part of a motivation improvement program. Such a program is described in section 3.3.

These programs act as a catalyst for change. Staff are initially sceptical about the program. They are surprised to find that the survey analysis does pin-point their major concerns. They often take the initiative and implement improvements which are under their control very quickly.

Staff learn how to ask managers for more feedback or autonomy without complaining or criticising. Managers may be pleasantly surprised by the diagnosis which often shows why they found it so difficult to remedy the problems on their own. Involvement of a more senior manager may be needed at this stage, especially with problems relating to other work groups.

There has recently been a significant increase in the number of problems caused by unhelpful contractual arrangements. A job diagnostic survey provides useful evidence in the argument for changing over to a motivationally sound contract.

Any job with an MPS exceeding 200 should be redefined. Distinguishing attainable targets from ambitious aspirations enables staff to live with their current performance while still giving them something very demanding to aim at. Any job with MPS of less than 80 should be redesigned. It may be necessary to spread a really boring task across more people. This need not spread the problem. When several boring tasks are combined, skill variety increases and there are more opportunities to provide autonomy.

6.3 Recruitment

Can we take advantage of the slow job market? We may expect long term improvements from recruiting staff who are naturally better motivated. This survey indicates that:

- most IT staff prefer demanding jobs
- most IT staff are reacting well to motivational problems.

There may be an argument for recruiting some staff with lower growth needs. These are difficult to assess while applicants are selling themselves in a competitive job market. Past work history is a better indicator of an individual's willingness to persevere with mundane tasks. Care should be taken not to underestimate the skills required in jobs which IT staff describe as less demanding. This is especially true of customer service, where even people who use sophisticated interpersonal skills do not value them as highly as technical skills.

There is not much room for improvement in the way staff cope with demotivating jobs. Indeed this tendency to put up with bad job design may be a disadvantage. The long term costs of putting up with stressful demotivation can be much higher than the cost of doing something to improve the job.

The next section includes more things we can do during recruitment to improve job-person match.

6.4 Job-Person Match

The people who are motivated by more demanding jobs should be doing these jobs. This survey revealed no evidence of either managers or employees achieving any match between the individual's growth needs and their job's motivating potential. Section 4.4 discusses why this might be so.

Neither IT staff nor their managers expect any success in this area (see Figure 5-2). We might try to break into this vicious circle in three places:

1. Increase managers' expectations about job-person match.
2. Encourage staff to swap tasks among themselves.
3. Seek to simplify the most demanding jobs (section 6.7).

A job diagnostic survey will draw attention to any mismatch and provide the necessary information. The problem is best fixed by swapping tasks among people. It is easier to make this work if the line manager allows plenty of autonomy (section 6.6.4).

6.5 Provide Feedback

Feedback should contain:

- information that can be used to improve performance
- information that can be used to encourage or censure.
- contact with people

Without feedback people cannot learn how to improve their performance. People who feel responsible for their performance (who have high task significance and experienced responsibility) find low feedback particularly stressful.

6.5.1 Job Feedback

Poor job feedback is caused by a lack of tangible points at which progress can be evaluated by the individual. Service jobs are more likely to suffer from this problem, as they are not construction activities with specified stages and deliverables.

To counter this, staff need the opportunity to specify themselves what sort of feedback they want from the job. They ought to be set goals or targets that are meaningful not just to them, but to the customers or end users of their services.

Where job feedback is lacking we should look first at the effectiveness of any existing quality management system. A QMS should provide all the mechanisms for collecting, analysing, disseminating, interpreting and acting on feedback information. Are all these processes working effectively?.

For some jobs it is more difficult to see what feedback information is needed and how it should be collected and interpreted. These jobs tend to be low on task identity: service jobs which involve working with people, implementing change, etc. In such cases we recommend that some time be spent obtaining a consensus on the metrics which should be used (Beckworth & Nicholson 1995).

If your QMS lacks funding or support from key groups, then the results of a job diagnostic survey can be used to demonstrate that extra benefits can be obtained from a better QMS. As well as improvements in quality of the service or product, improving feedback will improve motivation which in turn improves productivity, absenteeism and staff turnover.

6.5.2 People Feedback

The JDS also distinguishes the need for raw information (job feedback) from the need for feedback from people. It has long been recognised that a procedural QMS is not enough. The required cultural change to total quality management (TQM) has proved more elusive. If the results of a JDS in your organisation indicate that you have problems with both types of feedback, we would recommend that you start by addressing easier problems of job feedback. Once there is good job feedback, then you are ready to work towards improving people feedback.

People feedback occurs when people exchange information about the success or failure of each others' efforts. This is more than just an exchange of information. People can describe the effect of good or bad performance on themselves and on other people. When they express appreciation or dissatisfaction they show how this task is significant to them or to their organisation. This means that contact with people contributes to task significance as well as to people feedback.

This human contact also satisfies social needs and alters self esteem. If people feedback improves, it is not only performance that improves. Attitudes, feelings and behaviours also improve. The goodwill which makes people want to support their employers and to serve their customers is enhanced and past grievances are forgotten.

Interpersonal behaviours are learnt from experience. If IT staff get good people feedback, their interpersonal skills improve attitudes and relationships. Improving interpersonal skills plus improving attitudes improves relationships; within the IT profession, with employers, with managers and with customers. Improved attitudes and interpersonal skills also improve the quality of working life for everyone; customers, colleagues and especially managers.

6.5.3 Barriers To Feedback

It is clear to most people that their working lives will improve if they relate better to colleagues, managers and customers, so why are these problems with people feedback endemic in IT? The reasons can be seen as a set of barriers which must be overcome if people feedback is to work smoothly.

The first barrier is the difference between positive feedback which says we have done well and negative feedback which says we have not done well. Unless we are trained to give more positive feedback, we will give more negative feedback. A polite thank you is enough for good service. However if we see experience problems, we make the time and effort and put more effort into making a complaint.

We know what to do with positive feedback. We should repeat whatever it was that worked well this time. Negative feedback is asking us to change, but

- people are often reluctant to change,
- we may not know how to change,
- we may worry that a change will only make matters worse,
- we may resent criticism of our performance,
- we may concentrate on worrying about past faults.

We are more likely to alter long established practices if we see some success with a new method. If we fail with an existing method we tend to put in more effort, to give up, to blame others, anything but change a method which has worked for us in the past. This is not so much of a problem for job feedback, because most of us can work on the basis that when negative job feedback stops this is a positive experience. Our reactions to people feedback are very different. Negative people feedback arouses many negative emotions and defensive strategies which have nothing to do with the job at hand.

Information may be given:

- inadvertently or intentionally,
- formally or informally,
- intending to help or to attribute blame.

Information may be received:

- as the informed view of an expert or as some worthless biased opinion,
- as helpful advice or as offensive criticism.

IT is not a close-knit community of like-minded professionals. Many negative attributions are made about other groups lacking the motivation for quality. Senior managers are accused of paying lip-service to quality, while starving it of resources in pursuit of profit. Software developers are accused of focusing on technical excellence, completely disregarding customers need for a quality product. Customers are accused of demanding levels of quality which they are not prepared to pay for. These are among the most common criticisms but there are many others. Each group within the profession makes negative attributions about other groups.

Consider for example, the software development team which resists all attempts at improvement. They must be attributing all problems to people outside their team.

These biased attributions work as follows:

- If someone *in* my group behaves *well*,
 - I make a positive attribution.
 - I attribute their good behaviour to personal goodness
- If someone *outside* my group behaves *well*,
 - I look for a negative attribution.
 - I attribute their good behaviour to ulterior motives,
- If someone *in* my group behaves *badly*,
 - I struggle to make a positive attribution.
 - I make excuses for their bad behaviour.
- If someone *outside* my group behaves *badly*,
 - I make a negative attribution.
 - I attribute their bad behaviour to personal badness.

No matter how badly my group behaves or how well the other group behaves, I will see minor faults outside my own group before I see major faults within it. The other side is doing the same thing.

Each of these groups claims that they are motivated to improve performance. Its just that each has a different set of priorities for them.

These expectations mean that each side hears the other's views as if they were in direct opposition to their own. Infrastructure staff will hear all talk of technical excellence as an attack on quality. Meanwhile their talk of quality is heard by developers as a demand for more primitive technology. Both sides assume that the other's aspirations are equivalent to their fears. Hence more negative attributions are established.

Once all these negative attributions exist, the attributions themselves sustain and increase inter-group tensions. How can a healthy exchange of feedback flourish in such an atmosphere?

In the UK we are particularly susceptible to problems in people feedback. We tend to be more reticent about giving praise and we have cultural taboos against 'asking for a compliment'.

6.5.4 To Improve People Feedback

We have seen that good feedback improves quality, productivity, absenteeism, turnover and the quality of working life. Effective feedback would be factually correct, relevant to

customer needs, based on an understanding of the problems associated with the job and provided by a person whose opinion is respected and valued and who is not unduly critical.

Here the new role of client manager may be used to great effect. If your client manager clearly had excellent technical credentials and interpersonal skills, knew how to emphasise the positive aspects of any feedback and how to give constructive criticism when appropriate, then many of the above problems might be overcome. Of course this paragon must also keep a clear focus on business objectives, be a sharp negotiator, establish co-operative trust alongside competitive negotiation... How old will these people be by the time they have accumulated all the necessary skills, knowledge and experience?

Client managers who have a technical background are more likely to be taken seriously by technical staff but they are now outsiders to that group. We suspect their experience will be similar to that of quality managers who often still view themselves as part of their technical profession. UK quality practitioners felt hurt when developers treated them as out-group. They wanted to use their in-group status to explain why developers ought to change, but they were not heard and could not understand why.

An understanding of attribution theory (described above) has been successful in helping systems analysts to cope with hostility from users (Nicholson 1991), so it should also be useful as client managers and quality managers cope with hostility from technical experts. In their new role they also see the faults of their erstwhile in-group. An understanding of the need for more positive feedback would also help them to do the things which make people want to change.

We have seen improvements in individual systems analysts after learning about attribution theory and positive feedback. We have also seen improvements in entire teams after using the JDS. The process of completing the questionnaire and discussing the results opens up discussions about feedback. Some of the cultural barriers fall. They may rise again, but there will always be a way through. For substantial changes to an entire culture we recommend applying the JDS first and using that to discover where to apply specific measures as described above.

The JDS terminology avoids negative attributions and encourages people to look at recurring problems in a different light. People learn to raise social issues without attributing blame. We found some of the deepest changes were already starting during our first discussion of the survey results.

Any actions to improve people feedback can benefit everyone if mutual advantages are sought. Every individual is in a position both to receive feedback from others and to give it. If a person lacks people feedback, they should consider what feedback they can give to others

in return. For example the hostility between testers and developers caused by the inherently critical nature of testing may be resolved by this approach. In this case:

- testers need feedback to show that their work is helping improve the quality of software
- developers want to perform better and need feedback in order to make progress
- testers can provide feedback that will help developers find areas for improvement
- developers can provide feedback to testers that underwrite the value of testing work.

This should be a win-win situation. To make it so, developers and testers need to determine the type of feedback they want from each other. When this has been identified, changes can be made to jobs and feedback mechanisms provided.

This is one case of a general approach to people feedback problems. The generic steps are:

- map out existing communication channels - who speaks to who about what, when and why
- individuals should specify the feedback they require
- problem areas of communication should be identified
- mutual improvements should be considered first.

6.6 Increase Motivating Potential

People's growth needs are fairly constant through time. We can only match individual people to appropriate jobs if the group of people matches fairly well with the group of jobs. This section discusses how we can increase the motivating potential of the less demanding jobs so they will motivate higher GNS people.

6.6.1 Increase Skill Variety

Skill variety will be low if the whole service has been split up into a series of simpler tasks. The best-practice manuals tend to encourage this. The manuals are describing everything that should be done and we tend to assume that we are more likely to perform well across the board if someone is made personally responsible (accountable) for each task. We therefore divide tasks up on functional lines. This will be the best solution if:

- the service is too complex for one person to do all tasks well
- the chain of people who act on any request is not too long.

Long chains have more communication links so they increase the risk of delay or misunderstanding. Long chains also make feedback more difficult and more expensive.

We should arrange the necessary tasks so we strike a balance between:

simple jobs which are demotivating

.v.

complex jobs which are impossible for one person to do well.

and between:

a long chain of people with too many links

.v.

relying on one individual to provide the whole service

If a job lacks skill variety it is often because the organisation does not fully appreciate the types and ranges of skills needed to perform it effectively. The first step is to review the job and revise the skill requirements, and then progress from there, possibly to training for staff.

A good example is software testing, where a common perception is that anyone can do it (ignoring the question of who can do it well). Best practice guides can help - the CCTA ITIL module 'Testing an IT Service for Operational Use' describes the range of analytical skills needed for effective testing. They are quite extensive and include the use of specific test design techniques.

Low skill variety can arise from a 'pigeon hole' job. A person is given a job the organisation deems them to be good at, but which only uses a small part of their skills sets. Ideally the job should be revised to allow the individual to make best use of their skills. If this is not possible, then it may be advisable to rotate staff in the job so that no one individual feels pigeon-holed.

6.6.2 Increase Task Identity

Task identity problems can occur in long chains. The solution is to reallocate tasks as described above.

Task identity may also suffer if two different tasks compete for a person's attention (as in the case of quality practitioners who work for higher capability levels while enforcing a newly accredited QMS).

There may be good reasons for giving both tasks to the same person. Perhaps the same complex of information and skills is needed for both tasks. Perhaps the best person to decide how to balance effort between the two tasks is the one who is doing them from day to day. If we give one responsible able person such a pair of tasks, they will need some help with sorting out their priorities. We recommend more frequent appraisal with a trained line manager.

Each appraisal should:

- identify ONE target for improvement in the next period,
- distinguish realistic expectations from ambitious aspirations,
- discuss of how to balance time and effort between tasks,
- identify what ACTIONS to take in pursuit of the aspirations.

Some jobs are inherently piecemeal, e.g. help desk and trouble shooting work, so it may be difficult to change this aspect. The best approach may be to look for staff who prefer this type of job. This is a situation where staff reallocation may be applicable.

Another approach for improving task identity is to remove inflexibilities in task organisation. For example, a team structure may contain analysts, programmers and testers, where the programmer does one slice of the work and cannot tell how their contribution affected the final success of the work. Many organisations have removed old structures and employ analyst/programmers. The task identity of their jobs is significantly broadened, and individuals are now responsible for a sizeable piece of work.

In addition to task re-allocation, task identity can be improved by widening the job description to include more self-analysis of the work outcomes. This gives the person doing the job greater say in suggesting ways to improve the tasks and how they are performed. The value of this is that it makes individuals much more responsible for their own quality management, i.e. not just fixing the product, but also fixing the process.

6.6.3 Increase Task Significance

Task significance problems may also occur due to long chains. The solution is to reallocate tasks as described in section 5.5.1

Even people who start off eager to do a highly significant task (like software testing) can become demotivated if the feedback they get does not reinforce the significance of their contribution to the whole. In such cases feedback should be positive (see section 5.4.3). Ideally there would be some personal contact with the service users (or their representatives).

Infrastructure staff often act as agents between developers and users. This arrangement is not working well. It may be fine on a day-to-day basis but limited (annual) contact with real users increases the credibility of feedback from agents. Managers in the customer organisation will view this as evidence of attention to customer's concerns.

When task significance is low it is often because the individual and others do not perceive that the job is very important to the organisation.

If there is a general perception that a job lacks significance one must be prepared to accept this may be true. The questions arise of whether the job really needs to be done, and if so, what is its real significance.

The wrong way to promote the significance of jobs is for managers to stand up in front of staff and tell them their work is important. At worst this is patronising and disaffected staff will not believe what they are told. The best solution is to find the strongest supporters of the work, i.e. those most affected by its outcome. For testers this may be the user community, who appreciate faults being found before systems go into production. Supporters should be encouraged to provide feedback to the people doing the jobs, and to other groups, about the value of the work. Only then will staff be most likely to accept that their jobs are of significance.

A similar situation arises with 'grudge jobs'. These are jobs that are commonly perceived as a necessary evil, i.e. we do not want to do them but we have to. While staff rotation is a possible solution for jobs with inherently low skill variety, it does not appear to work well for jobs with low task significance. Instead, staff may consider that the organisation is just spreading the evil. Again, the real solution comes from identifying the supporters of the work and enabling them to make their support well known.

6.6.4 Increase Autonomy

People feel better if they are trusted to organise their own work. Line managers who worry about performance may inadvertently make matters worse by assuming that they are the only person who can or will make changes for the better. If this moderate mistake persists over time a vicious circle may be established as shown in Figure 5-2. To escape this vicious circle we need to give the line manager the confidence to sit back and let group members make decisions themselves, even if these are quite different from what the line manager would have done. The line manager should also be provided with some way of saving face, because the change of management style is a clear admission that the previous style was wrong.

Face-saving opportunities include:

- training a responsible group member to deputise,
- slipping this change in quietly alongside another change.

This is one of several situations when it may not be helpful to highlight problems with supervisory satisfaction.

Line managers in IT often have an excellent technical education. They may have been given good management training, but (if their technical education did not encourage them to value such skills) their initial training may have done little to improve performance on the job. By the time they are in a vicious circle they would benefit more from the support of an experienced manager who makes time to discuss specific cases. The training manager should be consulted before deciding which individual can best give such support. Some managers make very good teachers. Others do not.

Experienced, able, confident staff can be given a great deal of autonomy but this should not be confused with denying them the reward of appreciation or the stimulation of an occasional criticism. The combination of high autonomy and low feedback indicates this problem.

People feel bad if they are left alone to cope with a job which no-one else seems to understand. They may also become concerned about pay and job security if they suspect that the organisation has no way of appreciating their contribution to the whole.

Autonomy without feedback is a significant problem with many jobs. Apart from improving feedback so individuals build an experience base to make good decisions, it is advisable to review who should be involved in the decision making process. This is particularly important for people who act as agents of change. Their decisions can affect many people, and key groups affected should be consulted about important decisions. This approach not only reduces what may be a too high level of autonomy with the decision-maker's job, but helps increase the commitment of those affected to implementing the decisions.

6.7 Making Difficult Jobs Easier

The motivating potential of a job describes the demands it places on a person. If the demands are too great, that person becomes demotivated because they cannot do the job to their satisfaction.

6.7.1 Decrease expectations

Section 5.3 describes how high achievers tend to expect more of themselves than anyone can hope to deliver. Because they are accustomed to success, they tend to react badly to failure. Their initial reaction is to put in more effort. More effort may be counter-productive. They may become tired > think less clearly > perform less well > feel guilty > put in even more effort > go round and round this vicious circle. By the time they realise what is happening they feel tired, frustrated, used, and resentful of criticism. In this state they are inclined to blame others. This in turn makes matters worse because achievers tend to rely heavily on relationships at work.

We should remember that this situation tends to arise from the best of intentions on both sides. Managers should set staff some tasks that stretch their abilities. It is reasonable to expect people doing a job to realise what level of achievement can be expected. It may be reasonable, but in the case of high achievers it may also be unrealistic. No matter how often managers explain that there is a limit to what can be done, achievers can still insist on expecting too much of themselves. The achievers' fault is that they have learned to be ideal employees. They land themselves in this mess because they are able and dedicated and nothing is too much trouble.

Once people are caught in this vicious circle they cannot be relied upon to limit the demands they place on themselves. This has to be done for them and it may have to be done repeatedly until the habit is broken.

The advice is simple:

- spend time agreeing that realistic targets are vital to success
- spend time recognising what has been achieved so far
- spend time discussing how to achieve the next bit
- spend time explaining why other people have different priorities
- spend time listening to over-ambitious schemes
- spend time waiting for the achiever to realise they are over-ambitious.

The cost is obvious. The manager will have to spend time on this person. About an hour a week for several weeks should suffice. Eventually achievers catch on to what is wanted and return to their previous high performance with minimum supervision. Occasional unobtrusive checks are advisable, for several months.

6.7.2 Too much skill variety

Very high skill variety can be extremely stimulating, presuming that the person has all these skills, that they know which to apply when and that the attendant mood changes are not too extreme or too frequent.

If staff turnover is low and adequate training is available there should be no need to reduce skill variety, but there may be other problems. Two very different skills may be required. Consider a person who has just complained yet again about a serious bug that has not been fixed. How can they immediately become patient and calm with a nervous new user? Such a mood change will take at least thirty seconds, probably more. Physical separation of such tasks allows a change of mood during the walking time. Such staff should be given as much autonomy as possible when it comes to deciding when to do the unpleasant tasks but sharing of task loads between people should be carefully monitored.

6.7.3 Too much task significance

The more task identity the better.

IT staff do not normally feel that they have too much task significance. Those who produce life-critical systems are accused of ignoring the implications of poor quality software, but our experience of the defence industry suggests otherwise.

This is a recurring problem in the caring professions where managers spend a lot of time on helping staff to cope with stress. If IT staff seem unduly worried, the remedies suggested in

section 6.7.1 should suffice. Are their concerns justified? Is something seriously wrong with quality? What can/should be done about it?

6.7.4 Too much autonomy

Quality practitioners are particularly prone to this problem. They would welcome plenty of autonomy if they believed that management trusted them to do a good job without supervision. This is not how they see their situation. They complain that managers neither know nor care how the job is done, just as long as they get accreditation.

High autonomy with low feedback is particularly disconcerting. If this happens managers are not spending too much time on directive tasks nor on providing feedback. Some of this time should be spent on listening to the concerns of those who are trusted with such a great deal of autonomy.

6.7.5 Too much feedback

We have not met this one yet! However we have come across different attitudes to feedback from different people. If your staff complain of excessive feedback, they may be objecting to the source rather than the information. Can you find a representative of the users who is also a computer buff? Some other technology may be respected, or some other interest. The aim is to find a spokesperson who will be accepted as in-group (or nearly so). See section 5.5 for a description of this concept. With IT staff this is usually a matter of respect for their technical proficiency.

Equally likely is that they are complaining about the nature of the feedback. Are they getting too much criticism? If so, look for what they do well. Occasionally a manager may take the advice about positive feedback too far. In such cases, a time of silence is needed before either positive or negative feedback will be heard.

6.8 Improve Outcomes

Outcomes depend on inputs, on the motivating potential of the job and the job-person match. The best way to improve outcomes is to improve inputs. The purpose of this section is to explain where you should look if your jobs and match seem fine but there are still problems with the satisfaction measures.

General satisfaction tends to be higher than the input measures would lead us to expect. If everything else looks alright but they still have low general satisfaction you are probably dealing with a group who have unrealistically high expectations. We have never come across this situation in IT, but other industries have fought long costly battles in an attempt to reduce expectations. If this really is your only problem, you're doing infinitely better than the rest of IT. We would advise that you leave well alone.

If growth satisfaction is low, look at skill variety and offer more training. This can happen with legacy systems where people have settled into comfortable working practises. The job is demanding enough from day to day but there are no new skills to be learned. Legacy systems are susceptible to staff turnover so it makes sense to train staff so that they can cover for each other. Training in different technologies is preferable to training in different applications. Some individuals may be motivated by making them responsible for training new-comers, others by allowing them to contribute adaptive maintenance or to designing the proposed replacement system.

Low internal motivation is unusual for IT staff. It indicates negative attitudes to the employer, so levels below 4.5 should be taken seriously, especially if staff turnover or absenteeism are also problematical. Usually there are problems with jobs or job-person match to account for this outcome. If you fix them, internal motivation should improve. If not, look at recruitment practices.

Pay satisfaction and job security are typically low in IT. This new phenomenon is symptomatic of the economic climate and the job market. You cannot change these external factors but you will still pay the price if you allow staff to become disaffected. What you can do is to provide feedback which convinces your staff that senior management understands the value of their contribution to success for the company as a whole,

Social satisfaction and dealings with others are not particularly important to most IT staff, or not consciously so. Since expectations tend to be low these measures are normally moderate to high. Where low values are found throughout a work group this is more likely to be due to arguments or resentments within the group than to negative comments from users or others who do not belong to the group. When the data analysis is presented to the work group they should be asked if there is some current temporary cause for dissension. If so, leave it to them to fix and measure again in three to six months. If there is a permanent problem within the team, it is best split up. If they or their line manager believe the problem can be solved they might be given a little time to try out their ideas. You cannot then take their word for it that everything has been fixed. Group dynamics are likely to re-establish a similar situation in the near future, so re-measurement is advised.

Supervisors are normally worried about this measure in advance, then pleasantly surprised when they see how it comes out. It is not normally helpful to focus on problems with this measure. Other indicators are a better way of encouraging a supervisor to make changes. If the supervisor inherited problems which make the group virtually impossible to supervise, this measure will be low across most of the group, with perhaps some individuals giving a high rating because they know the group is being unreasonable. In such circumstances accusations and threats will only make matters worse. If there is a history of problems with this group the most long-standing members should be re-deployed separately. The supervisor will benefit from some practical training in supervision skills before taking over another group. The trainer should be advised that this person will benefit from encouragement.

It really is not common to find problems with output which cannot be explained by problems with the job. We would always start by fixing the job and the job-person match. Output measures are more useful in before-and-after comparisons to establish the effectiveness of attempts to improve motivation.

7. GLOSSARY

7.1 Motivational Measures

7.1.1 Measures of Motivating Potential

Motivating Potential Score (MPS). A score reflecting the potential of a job for eliciting positive internal work motivation on the part of the employees. Motivating Potential Score is derived from the following six Core Job Dimensions:

Skill Variety. The degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of skills and talents of the employee.

Task Identity. The degree to which the job requires the completion of a "whole" and identifiable piece of work - that is, doing a job from beginning to end with a visible outcome.

Task Significance. The degree to which the job has a substantial impact on the lives and work of others - whether in the immediate organisation or in the external environment.

Autonomy. The degree to which the job provides substantial freedom, independence and discretion to the employee in scheduling his or her work and in determining the procedures to be used in carrying it out.

Feedback from the Job Itself. The degree to which carrying out the work activities required by the job results in the employee obtaining information about the effectiveness of his or her own performance.

Feedback from People. The degree to which the employee receives information about his or her performance effectiveness from supervisors or co-workers.

7.1.2 Measures of Growth Needs

Growth Need Strength (GNS). This scale taps the degree to which an employee has a strong versus weak desire to obtain growth satisfaction from his or her work. It is derived from the following two measures:

Would-like Growth Needs. An individual's preference for individual motivational elements in his or her work.

Job-choice Growth Needs. An individual's choice between different motivational elements.

7.1.3 Measures of Internal Psychological States

Experienced Meaningfulness. This scale is a measure of how worthwhile or important the work is to the employee.

Experienced Responsibility. This scale measures the employees' beliefs that they are personally accountable for the outcomes of their efforts.

Knowledge of Results. This scale measures the employee's beliefs that they can determine, on some fairly regular basis, whether the outcomes of their work are satisfactory.

7.1.4 Measures relating to the Outcomes and Satisfaction of a Motivational Situation

General Satisfaction. An overall measure of the degree to which the employee is satisfied and happy in his or her work.

Growth Satisfaction. The degree to which the organisation meets the needs of the employees to grow and develop as people.

Internal Motivation. The degree to which the employee is self-motivated to perform effectively on the job.

Pay Satisfaction. The degree to which the employee believes that his or her pay is equitable.

Job Security. The degree to which the employee feels secure in the organisation.

Social Satisfaction. The degree to which the organisation meets the needs of the employee to interact with other employees.

Dealings with Others. The degree to which the job requires the employee to work closely with other people, whether other organisation members or the organisation's clients.

Supervisory Satisfaction. The degree to which employees are satisfied with their supervisors.

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End of Report