SWP 9/90 MANAGING LEARNING THE NEED TO CHANGE - SOME GENERAL FINDINGS FROM A STUDY OF APPLYING INFORMATION TECHNOLOGY TO AID LEARNING IN A BUSINESS SCHOOL

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ABSTRACT

It is generally accepted that an important business school objective is to equip its students with the skills and knowledge required by practising managers in the business world. However, the definition of what constitutes the development needs of a general manager is constantly changing and it is the rate of this change that creates problems not only for the practising manager but also for the business school.

The manager and the business school have to learn to change in order to satisfy the expectations of their 'masters'. It is the management of this rate of change which is critical to their performance in their respective roles. Business schools can become outdated and behind the times as managers can.

This paper details a study of the problem of coping with managing the rate of change in a business school and its strategy for accelerating that change rate. The focus of the study is the use of information technology for learning purposes. In particular, the study investigated the potential of the use of information technology for learning purpose on a general management course such as a Master in Business Administration (MBA) programme or its equivalent.

The course members on the part-time MBA programme were supplied with a laptop computer, modem and printer. The study performed was an investigation of the student's, faculty's and the business world's view on the relevance of providing these data processing and communications capabilities to the general management development needs of today. There is a difference of opinion which has demonstrated that the business school may have a problem with managing learning the need to change.

INTRODUCTION

Education and training methods used on postgraduate management development courses must change in the 1990's because they can be made to be more effective through the application of information technology. They must also change because information technology is being used by companies to gain competitive advantage. Its various uses have changed the role of managers in companies and therefore new skills and knowledge must be gained.

However, there is very little evidence to demonstrate that UK business schools have modified their MBA course designs to meet the changing needs of the business world, except that students are taught how to use personal computers for word processing and for using financial modelling packages.

During 1989 the Cranfield School of Management decided to implement and evaluate a change to its approach to the use of information technology for learning purposes on the part-time Executive MBA programme. Each Executive MBA programme participant (59 in total) was supplied, by the School of Management, with a Hewlett-Packard laptop personal computer, modem and printer. Each student was provided with software to assist with course work and a communications capability to all other course members and the School of Management. The communications network is detailed in Appendix 1.

The electronic mail facilities on Telecom Gold were arranged so that students can communicate and pass documents between each other from home or from their offices. In addition, administrative staff and faculty who need to be in contact with the students have also been given machines and communications equipment. This gives the students fast remote access to faculty and administration and vice versa. Communications links directly into the library for the ordering or reservation of books are also established and links into external on-line business databases are under investigation.

In this paper, an evaluation of this change to using information technology to aid learning on the MBA course is presented. The findings derive from questionnaires completed by the participating students, their sponsoring managers and the faculty of the Cranfield School of Management. Some general conclusions are also made on the issue of managing learning the need to change.

PROJECT BACKGROUND AND OBJECTIVES

The Cranfield School of Management is a business school which offers both full-time and part-time MBA courses. At Cranfield the part-time or Executive MBA programme is a two year course and it is the use of information technology on this course which is the subject of this research project. The School of Management is a part of the Cranfield Institute of Technology, a University for post-graduate study only. The School has however, considerable autonomy in terms of operational management and strategic development.

The established approach to managing the learning of personal computing skills on the part-time MBA course has consisted of introductory lectures on word-processing and financial

modelling followed by "hands-on" experience using the School of Management's computing facilities. Experiential learning using personal computers was not designed into the programme because this would need to be performed on campus. It is also time consuming and there is very little spare time available for this during the limited time that part-time students spend in Cranfield.

Consequently the knowledge and skills of personal computing learnt whilst on the programme were very limited and the opportunities to practice them were very restricted.

For these reasons the Cranfield School of Management began an investigation of the potential benefits to learning of providing the Executive MBA programme participants with a personal computer (PC) and communications software. The investigation[1] found that a major learning benefit to be gained would be improved communication between each individual student and his/her study group colleagues. The activities for which improved communications would be most beneficial were stated to be "preparing work for class discussion and work that would be submitted for marking as part of the continuous assessment element of the degree".

This original research provided the evidence on the desirability of providing a means to improve student communications with each other but the major obstacle was to decide how this should be implemented. Further research would be required to ascertain any additional learning benefits because the case for requiring the purchase of a PC, by each course participant, could not be made on a communications benefit alone. The sceptic would ask "What is wrong with the telephone?"

RESEARCH DESIGN

It was agreed that a pilot study should be made of what the effects of supplying a PC and communications capability would have on the quality of the Executive MBA programme. The School of Management, in the first instance, would purchase and supply the information technology package to each course participant, the course administrative staff and a selected number of faculty.

The research objectives were as follows:

(a)   To evaluate the full range of potential education benefits to be gained from supplying a microcomputer and a communications capability to each student on the Executive MBA programme.

(b)   To research the opinions of both the management of the sponsoring companies, their student employees and the School of Management Faculty on the significance of this innovation. Also, to ascertain their views on its relevance to the needs of business today and in the future.

RESEARCH HYPOTHESES

The hypotheses to be tested were:

(a)   Innovative pedagogical methods will be adopted to improve the management education process. This will be observed more in the medium term (3-5 years) than during the first year of experimentation.

(b)   The "ownership" of a personal computer will stimulate self-development in the use of this technology generally away from the University campus. It will act as the substitute for the computer studio in the Cranfield School of Management. Thus the attainment of a higher level of expertise in the application of personal computers to business management activities will be achieved.

(c)   The electronic communications network established will provide a better medium for communication between Students, Faculty and course administration. This will be considered by all involved with the programme to have facilitated the achievement of the educational and developmental goals of the course.

PROJECT COSTS

The capital expenditure costs of the project were very high. The costs of hardware and software were £330,000 at list price, although negotiations reduced this to approximately £194,000. The costs for usage of the electronic mail system, Telecom Gold, were unknown but the provision made is £13,000. Current usage is costing approximately £800 per month and usage is growing.

The School of Management now owns sixty five laptop PCs which will be available for use by its staff and faculty in eighteen months time. The students will be offered the chance to purchase their machines at the end of the course and so some recovery of this investment may be obtained.

However, on purely financial terms this is a high cost project.

RESEARCH RESULTS

To date three surveys have been carried out by questionnaire, that is to research the views of the students, the faculty and the sponsoring companies.

The Student Questionnaire

The first survey was carried out to investigate the computing experience of the students attending the course and in particular, their personal computing experience. In addition, the questionnaire was also designed to investigate their views on the relevance of supplying a personal computer to their personal developmental needs and the needs of the business world.

The questionnaire was completed by the students during the first week of the course and before a PC was supplied to them.

The results, which are shown in Appendix 2, were both unexpected and useful as they indicated a need for a different approach to the teaching of information technology.
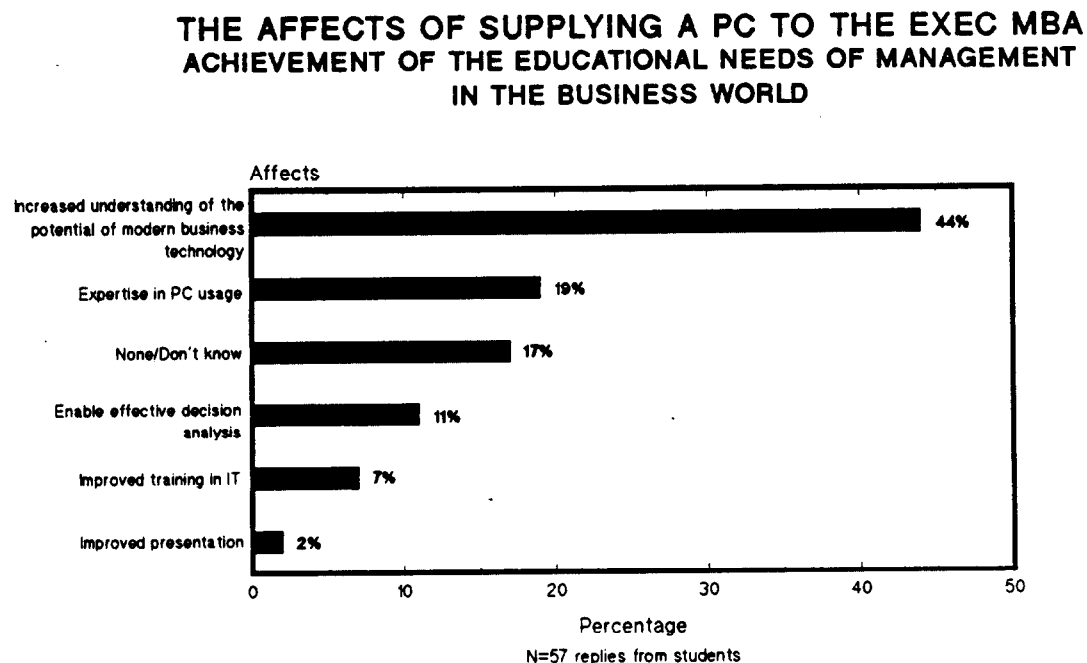
The results show that our traditional approach to teaching personal computing would have only had the maximum benefit to nine of the course participants, that is those without any previous experience of word processing or spreadsheet analysis experience. The provision of a PC has enabled these students to gain this necessary expertise at their own speed and without duplicating the training given to the remainder of the course participants. This permitted the course design to be changed and more time allocated to other academic subjects studied on the course.

To manage the learning of personal computing skills it was decided that a tutorial programme should be established outside the normal timetable for the programme and the students would be given the option to attend or not. A tutorial timetable was prepared and distributed. Also a help line was established for any operating or hardware problems experienced at home.

The students have a very positive attitude to this course design innovation, that is they believe that it will improve their expertise in information technology so that they will be able to be more efficient and effective managers in the modern business world. They also stated that this innovation would give them a better understanding of the potential of modern business technology and therefore, was very relevant to the needs of business in general.

Their responses to the question: what relevance does supplying you with a PC have, if any, to the management educational needs of the business world (N = 57) are shown in Appendix 2 and Figure 1 below:

Figure 1

THE AFFECTS OF SUPPLYING A PC TO THE EXEC MBA
ACHIEVEMENT OF THE EDUCATIONAL NEEDS OF MANAGEMENT
IN THE BUSINESS WORLD

Affects

Increased understanding of the potential of modern business technology	44%
Expertise in PC usage	19%
None/Don't know	17%
Enable effective decision analysis	11%
Improved training in IT	7%
Improved presentation	2%

Percentage

N=57 replies from students

These were their views at the end of January 1989 and therefore, their expectations may not have been satisfied, met or exceeded. It is too early to test at this time because during September to December 1989 the first trials with distance learning using the computer will take place. At the end of this period the student body will be attitude surveyed again.

The Faculty Questionnaire

The second survey carried out was a study of the attitude of the faculty to this innovation to the Executive MBA programme design. The questionnaire was distributed before the PCs were supplied to the students.

The objectives of the Faculty Questionnaire were, first, to also investigate the experience and expertise of Faculty in information technology. In addition, the Faculty were asked to record what computer aided learning packages they had developed, used or know about. The extent that appropriate teaching material is available for use with a PC is an important consideration because it will determine how quickly the potential of the PC can be exploited to the maximum educational effect.

Finally, the Faculty were asked whether they considered there are any educational benefits to be gained by supplying a PC to each student and would this induce any change in the teaching methods that they currently use.

The results show that there are very little differences between the computing expertise profiles of students and faculty [see Appendix 3 points 1 to 7]. However, they also show a very limited source of computer aided learning material [see Appendix 3 points 8 to 14]. However, for those familiar with computers, the results show a willingness to introduce the use of this material in the short term, that is during the next 12 months to 2 years [see Appendix 3 points 15 and 17]. Those wishing to exploit information technology for teaching purposes constitute 59% (N = 24) of those who completed the questionnaire All of these members of faculty stated how they thought this would improve the quality of the MBA programme. Their replies to how the use of a PC could improve the quality of the students' learning and development whilst on the Executive MBA Programme are shown in Appendix 3, point 16.

However, the most significant results are those that derive from questions answered by both faculty familiar with IT and those who did not think that it would affect their teaching method in the future. A significant polarisation of views is evident. There is a significant body of opinion which evidences a negative or neutral attitude to the possibility that any benefits could be gained from providing a PC and telecommunications capability to the part-time students. The most surprising result of this survey is the number of Faculty that have a totally negative or neutral attitude to the use of information technology for educational purposes on the Executive MBA programme. This is not just limited to its application for teaching purposes or the achievement of the development needs of the course members but, more significantly, it also directed towards the meeting of the educational needs of management in the business world. These results are detailed in Appendix 3 and they are also shown on Figures 2, 3 and 4.

Figure 2

THE AFFECTS OF SUPPLYING A PC TO THE EXEC MBA
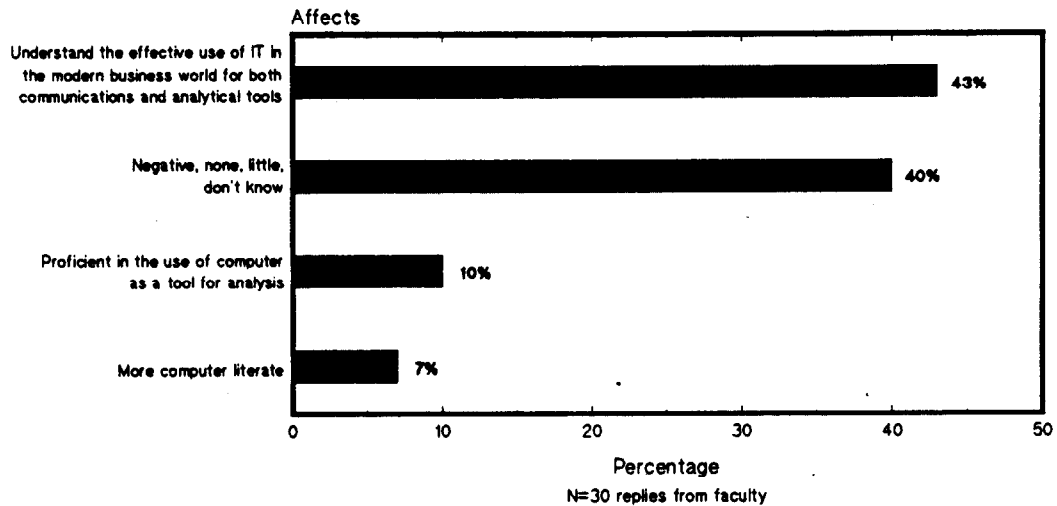### ACHIEVEMENT OF THE EDUCATIONAL NEEDS OF MANAGEMENT
IN THE BUSINESS WORLD

Affects

Affects	
Understand the effective use of IT in the modern business world for both communications and analytical tools	43%
Negative, none, little, don't know	40%
Proficient in the use of computer as a tool for analysis	10%
More computer literate	7%

Percentage

N=30 replies from faculty

Figure 3

THE AFFECTS OF SUPPLYING A PC TO THE EXEC MBA
ACHIEVEMENT OF THEIR EDUCATIONAL AND DEVELOPMENTAL OBJECTIVES

Affects

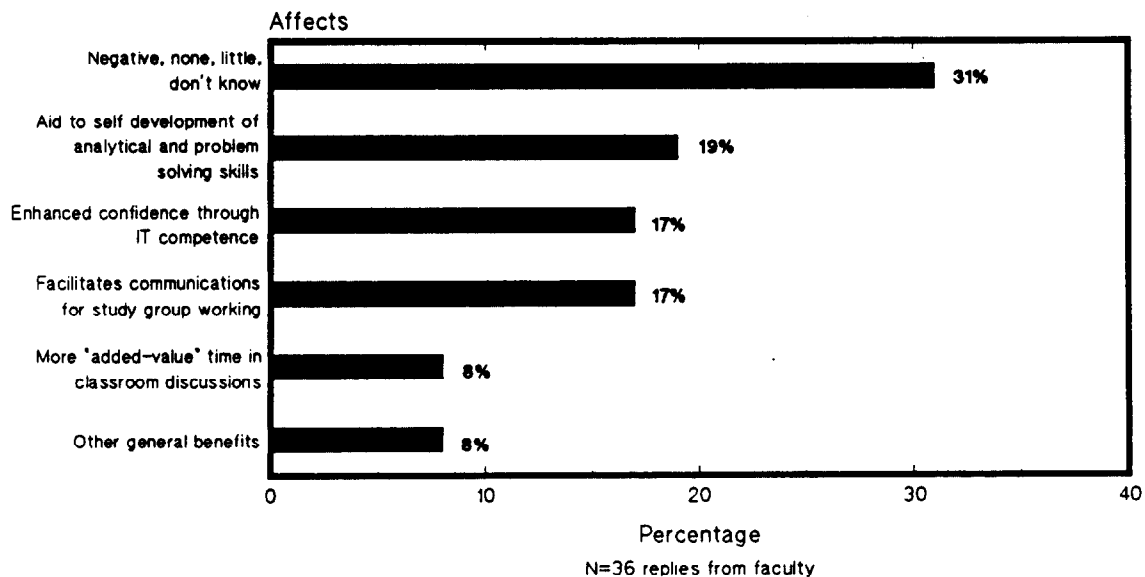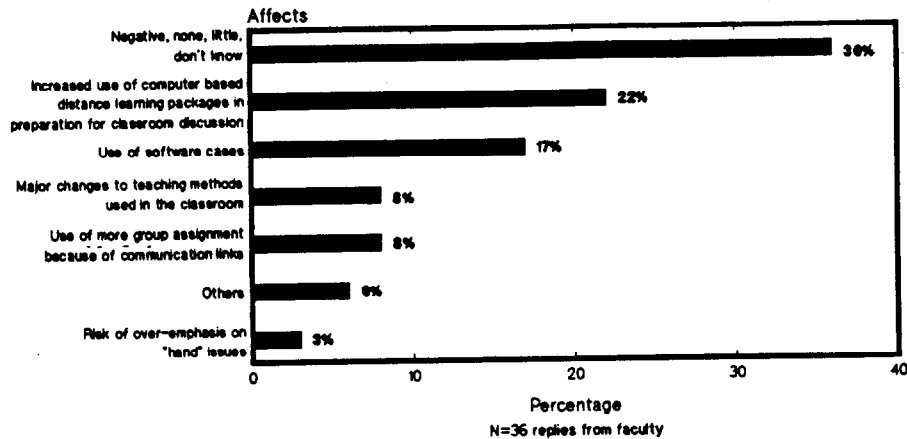| Affects	
Negative, none, little, don't know	31%
Aid to self development of analytical and problem solving skills	19%
Enhanced confidence through IT competence	17%
Facilitates communications for study group working	17%
More 'added-value' time in classroom discussions	8%
Other general benefits	8%

Percentage

N=36 replies from faculty

Figure 4

THE AFFECTS OF SUPPLYING A PC TO THE EXEC MBA
UPON THE DESIGN OF FUTURE PART-TIME POSTGRADUATE PROGRAMMES
AND THE TEACHING METHODS USED FOR THEM

Affects

	Percentage
Negative, none, little, don't know	38%
Increased use of computer based distance learning packages in preparation for classroom discussion	22%
Use of software cases	17%
Major changes to teaching methods used in the classroom	8%
Use of more group assignment because of communication links	8%
Others	6%
Risk of over-emphasis on "hard" issues	3%

Percentage
N=36 replies from faculty

Overall the results were positive in the sense that a majority of the Faculty considered that the quality of the Executive MBA programme could be enhanced by using the supplied Information technology package for distance learning purposes and for developing computer usage skills.

However, these results could also be interpreted as a sign that there is a considerable lack of understanding within the business school of the developmental needs of the general manager in the business world. If these requirements are more than a basic understanding of word processing and the ability to use a financial modelling package then this would confirm that there is a need for the School to re-examine the changes that are taking place in the business world and their impact upon the teaching methods used and the academic content of its MBA programme.

The Sponsoring Company Questionnaire

The third survey carried out was to ascertain the reaction of the business world to this innovation to the design of the Executive MBA programme. This obviously had to be a random sample of companies but ones that are users of part-time MBA programmes. Consequently the sponsoring companies of the students on the programme were selected as the target group for the questionnaire. The questionnaire was distributed to the companies during June 1989, approximately three months after the IT package had been supplied to the students.

A total of 58 companies were sent questionnaires and 34 (59%) participated in the study. The business types ranged from manufacturing (38%) and services (26%) to one public sector, one distribution and two construction companies.

The sizes of the firms were also varied. The questionnaires were completed by a wide range of functional directors and managers, the largest individual groups consisting of managing directors and general managers.

The objectives of the company questionnaire were, first, to investigate the extent of the use of information technology in each participating company. Two further important issues were to be examined, that is what each company's future development plans are for the application of IT and what expertise would be required by the managers in the company if these developments are to be fully exploited.

Each company manager was then asked to give his/her opinion on the relevance of providing the PC and telecommunications capability to the current and future needs of his/her business.

The results show that the participating companies are almost equally split between companies with a central processor and terminal links only to users and those with computer networks established.

However, the key activities for developing their systems in the future consists of:

(a)   To continue developing systems with a central processor and database to allow data access and examination for decision making purposes.

(b)   For the network type of information processing system, the future development is to expand data transmission and manipulation capabilities for decision making purposes.

The results also show that companies are seriously considering expanding company networks to the homes of the managers and employees.

In Figures 5 and 6 are the companies' views on what management skills and knowledge developments are required in the future for their business. These data consistently indicate that data manipulation and the use of telecommunications software are the needs of the future. In addition, knowledge of expert systems, their potential and limitations are matters of growing importance for the business world.
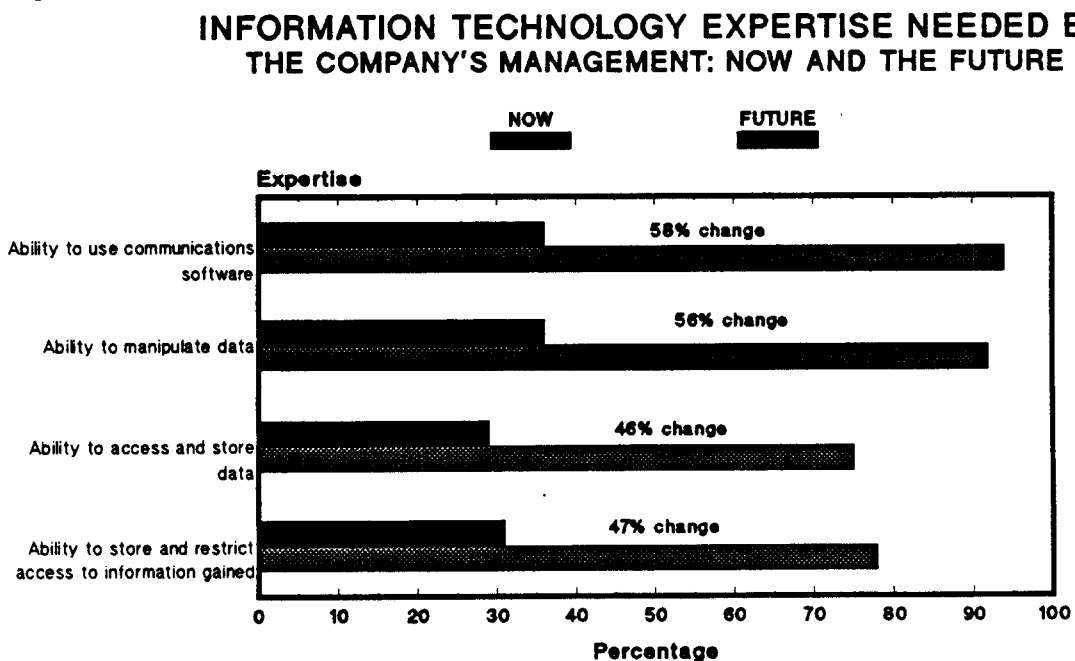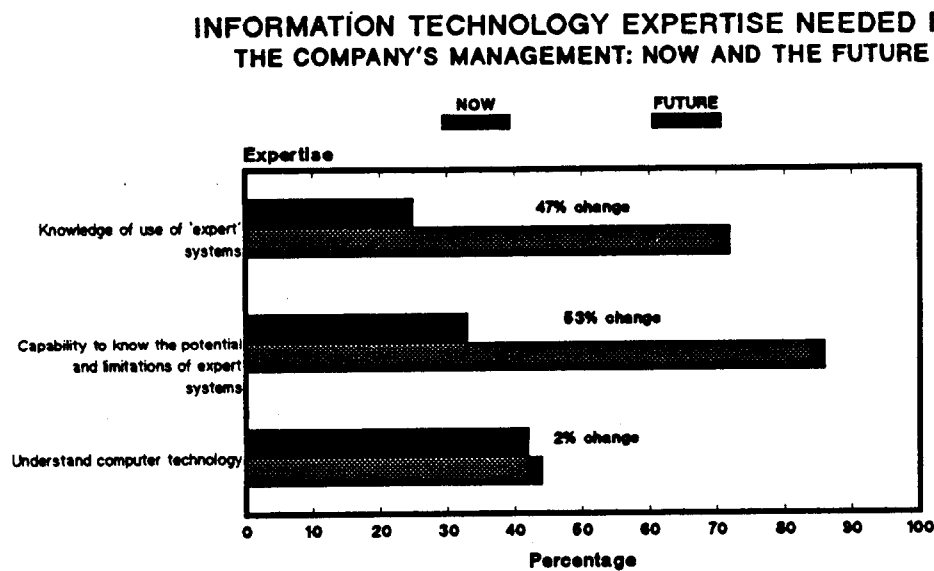
Figure 5

INFORMATION TECHNOLOGY EXPERTISE NEEDED BY THE COMPANY'S MANAGEMENT: NOW AND THE FUTURE

Figure 6

INFORMATION TECHNOLOGY EXPERTISE NEEDED BY
THE COMPANY'S MANAGEMENT: NOW AND THE FUTURE

NOW   **FUTURE**

Expertise

Knowledge of use of 'expert' systems — 47% change

Capability to know the potential and limitations of expert systems — 53% change

Understand computer technology — 2% change

Percentage (0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

These results are confirmed by results which show the frequency of the classification of IT skills that are stated to be required by each business. Again data and text manipulation using network system is the most frequently quoted. The knowledge of the potential and limitations of spreadsheet systems is the next most important computing expertise required by businesses.

Finally, there is overwhelming evidence to support the relevance of management development activities implemented by supplying the IT package to the Executive MBA students. First, because the business world has indicated that this is the way IT systems will develop in the future. Secondly, because they have stated so.

Figure 7

THE AFFECTS OF SUPPLYING A PC TO THE EXEC MBA
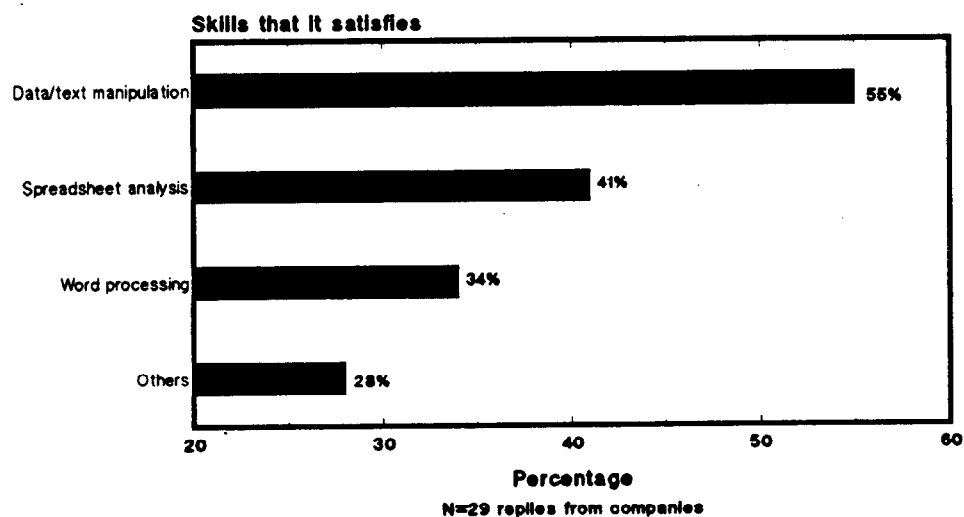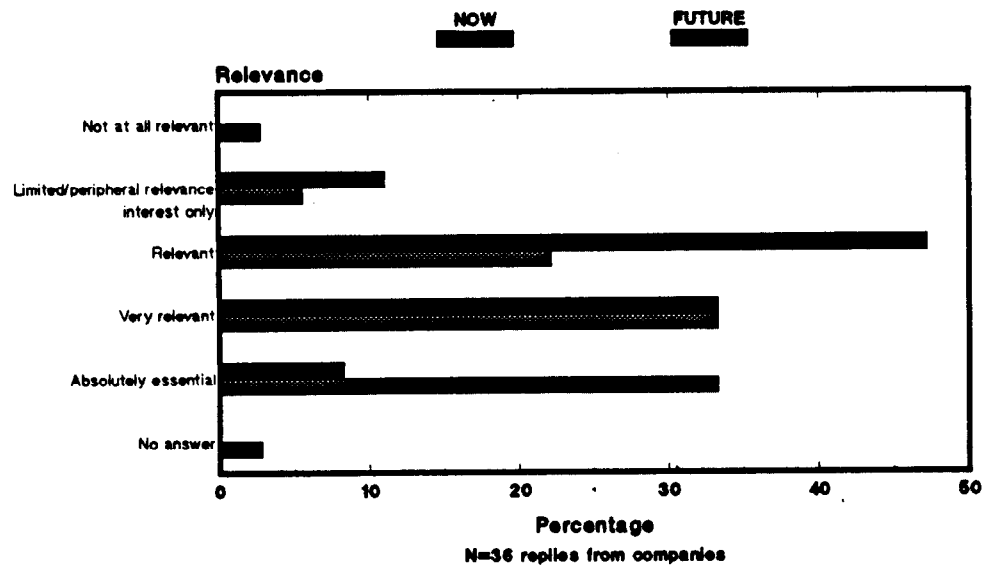## TO THE MANAGEMENT DEVELOPMENT NEEDS OF BUSINESS

Skills that it satisfies

Data/text manipulation — 55%

Spreadsheet analysis — 41%

Word processing — 34%

Others — 28%

Percentage (20, 30, 40, 50, 60)

N=29 replies from companies

Figure 8

THE AFFECTS OF SUPPLYING A PC TO THE EXEC MBA
TO THE NEEDS OF MANAGERS IN BUSINESS: NOW AND FUTURE

Percentage

N=36 replies from companies

CONCLUSIONS

The results of this study have clearly demonstrated that the view that the business world holds on the application of information technology in the future and how their forecast developments will effect the role of the general manager, is significantly different from that held by some member of Faculty in the business school world. In addition, technological developments have already taken place in the business world which have required the training to be provided there because these needs have not been satisfied by the business school. The business school is not keeping pace with the leaders of the business world and is therefore not fulfilling its expected role.

The results also show that one of the hypothesis selected for testing has been confirmed, that is that innovative pedagogical methods will be adopted by some Faculty and sooner than expected. It is still too early to evaluate the accuracy of the other two hypotheses because they still require more time before it is appropriate to carry out an attitude survey on these issues.

However, the business world survey has ratified that this innovation to the part-time MBA programme is judged by them to be satisfying an essential training need for business now and in the future.
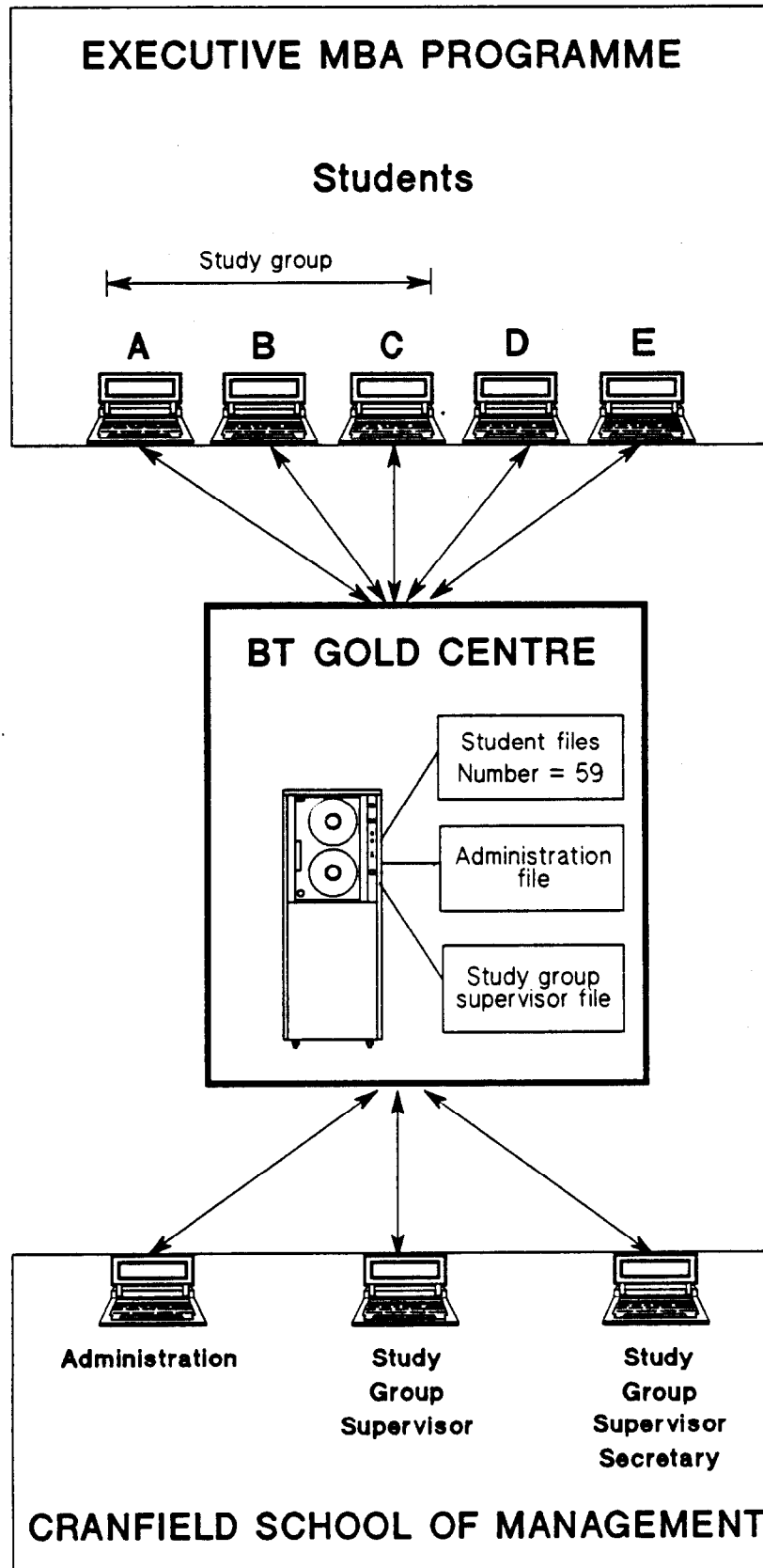
Why has it taken so long for this action to be taken and why is the business school not able to better manage its learning about its need to change? Are the conclusions on the business school's paradigm about the use of information technology in the business world and its effect upon the role of the general manager true also for other academic disciplines in the business school.

Learning the need to change could be managed better, it should become a formally resourced and a visible activity within the business school. For example, a small working party should be established to investigate and recommend, on an annual basis, the changes that need to be made to the MBA programme curriculum with the evidence to support the need for those changes. The team should also be interdisciplinary, in the academic sense, so that the non specialist does not become blind to the effects of changes taking in other business functions.

The MBA programme is a product and to remain competitive it must meet the changing needs of the customer. Some modifications may need testing before being designed into the product, as the sample described in this paper shows, which is another method of trying to learn the need for change.

REFERENCES

1. Kakabadse A and Edwards C, Managing Education at a Distance, presented at the United Nations Symposium on Management Training Programme and Methods, Implications of New Technologies, Geneva 17-19.11.87

EXECUTIVE MBA PROGRAMME

Students

Study group

A   B   C   D   E

BT GOLD CENTRE

Student files
Number = 59

Administration
file

Study group
supervisor file

Administration   Study
     Group
     Supervisor

Study
Group
Supervisor
Secretary

CRANFIELD SCHOOL OF MANAGEMENT

Results of the Student Questionnaire

1. 80% of the course participants use personal computers at work.

2. 80% of the students have used spreadsheet software before.

3. 66% have used a word processing package before.

4. 49% stated that their employer had installed an electronic mail system for company communications but only 25% have had previous experience of using such a communications system.

5. In response to the question: what relevance does supplying you with a PC have, if any, to the achievement of your educational and developmental needs (N = 58):-

    44%   stated that it would improve their IT expertise so that they could be more efficient and effective in the business world.

    24%   stated that they would have an opportunity to become proficient with telecommunications.

    24%   stated that this provided an opportunity to improve the understanding of IT (10%) and (14%) the others considered it would improve their capability to thoroughly analyse problems.

    8%   stated none or did not know.

6. In response to the question: what relevance does supplying you with a PC have, if any, to the management educational needs of the business world (N = 57).

    44%   stated that an increased understanding of the potential of modern business technology would be gained.

    19%   stated the gaining of expertise in the use of a personal computer.

    17%   stated none (10%) or they did not know (7%)

    20%   stated that it would enable effective decision analysis (11%), provide improved training in IT (7%) and help improve the presentation of data (2%).

7.   In response to the question: what effects on your development do you think will be achieved through the provision of a PC and telecommunications link whilst on the Executive MBA programme (N = 58).

     43%   stated that they would develop their expertise in networks and telecommunications

     28%   stated that expertise in the use of a personal computer and the software provided would permit the improved use of their time - thus they would be able to use it more effectively.

     22%   stated that this helped them develop an expertise in information technology and personal computing - similar to the majority view.

     7%   did not know.

Results of the Faculty Questionnaire

1.   The number of questionnaires distributed was 58 and 41 (71%) were returned completed.

2.   85% of the respondents (35) had previous experience of using a computer.

3.   73% of the respondents (30) had previous experience of using a personal computer.

4.   63% of the respondents (26) had used microcomputers in their home.

5.   63% of the respondents (26) had previous experience of using spreadsheet software.

6.   66% of the respondents (27) had previous experience of using a word processor.

7.   24% of the respondents (10) had previous experience of using an electronic mail system.

8.   54% of the respondents (22) stated that they had previous experience with developing and/or using computer aided learning packages.

9.   All of these respondents (22) stated that these computer aided learning packages can be used with a Personal computer.

10.   A total of 33 self development or distance learning computer packages had been used by the respondents.

11.   Of these 33 packages, 24 could be used for postgraduate management education purposes.

12.   After eliminating those listed more than once, the total number of computer aided learning packages that would be appropriate for postgraduate management education is 14. These are the packages that Faculty have used previously.

13.   In addition to the 14 computer aided learning packages previously used by the respondents, a further 16 packages were known about and were considered appropriate for the MBA programme.

14.   59% of the respondents (14) stated that the possession of a PC by the course participants would induce a change in their pedagogical method for the course.

15. In response to the question: how would your pedagogical method be modified by the School providing a PC to Executive MBA course participants (N = 24)

42%   stated that they would design the teaching material to take advantage of data analysis using the computer

38%   stated that they would plan for distance learning or problem analysis by the student as the prerequisite for a detailed discussion of learning issues in class session.

17%   stated other reasons such as this would promote the development of teaching material for use on a computer (8%) and it could provide a tutorial capability through telecommunications (8%)

3%   stated they did now know

16. In response to the question: how would adopting this approach affect the quality of the students' learning or development (N = 23)

35%   stated that this would allow the more effective use of time in the classroom following a detailed analysis of the case problem using a computer.

22%   stated that using analytical tools on the computer furthers the opportunities for self development

17%   stated the increased capability for a more comprehensive analysis of case problems.

13%   did not know

9%   stated that this increases the reality of case studies

4%   stated that this would allow access to additional related information from public databases.

17. In response to the question: when in your opinion, could the pedagogical method that you have previously described be adopted for the teaching of your subject (N = 22)

45%   stated that this would be possible during the next 12 months

50%   stated during the next 2 years

5%   stated during the next 3 years

0%   none stated that it would be unlikely to be changed.

18. In response to the question: what way(s), if any, could supplying a PC to the Executive MBA students effect the achievement of their educational and developmental objectives for attendance on the course (N = 36).

31% stated negative, zero or little effect or they did not know

19% stated that this development aids the self development of analytical and problem solving skills

17% stated that this would enhance confidence because of IT competence

17% stated that it facilitates communications for study group working

8% stated that it would provide more "added-value" time in classroom discussions

8% gave other general benefits (N = 3)

19. In response to the question: what way(s), if any, could supplying a PC to the Executive MBA students effect the achievement of the educational needs of management in the business world (N = 30)

43% stated that it would develop a better understanding of the effective use of IT in the modern business world for both communications and analytical tools.

40% stated zero or little effect or they did not know

10% stated that it would develop a proficiency in the use of computers as a tool for analysis.

7% stated that the students would become more computer literate

20. In response to the question: what effect, if any, will the provision of a PC and telecommunications link have upon the design of future part-time postgraduate programmes and the teaching methods used for them (N = 36)

36% stated negative, zero or very little effect, or they did not know

22% stated an increased use of computer based distance learning packages in preparation for classroom discussion

17% stated the use of software cases

8% stated more use of group assignments because of the telecommunications capability

8% stated major changes to teaching methods used in the classroom

3%   stated there is a risk of over-emphasis on "hard" issues.

6%   other reasons.