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**SWP 43/89 CRANFIELD EXECUTIVE MBAs -
EDUCATION THROUGH MICROS**

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CRANFIELD EXECUTIVE MBAs - EDUCATION THROUGH MICROS

INTRODUCTION

Cranfield School of Management has just embarked on a large and innovative Personal Computer project. All students (59 in number) on the new intake of the Executive (part-time) MBA programme have been given portable microcomputers, software and printers. The 59 students will also be given communications equipment and electronic mail facilities on Telecom Gold so that they can communicate and pass documents between each other from home or from their offices. Additionally those administrative staff and faculty staff 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 likely to follow. The project is in the early stages of implementation and the paper covers the details of the project, the reasons why Cranfield decided to undertake it and the results to date.

OBJECTIVES OF THE PROJECT

The purpose of the project is to research the educational and management developmental consequences of providing personal computers to faculty, administration in the School of Management and students studying on the Executive MBA programme.

The project will also include an examination of the organisational implications of this innovation upon the Cranfield School of Management. The aim of the project will therefore include the identification of any training needs for students, staff and faculty that are a consequence of their "ownership" of personal computers for teaching, programme development and course work purposes.

This innovation to the programme was considered to provide an opportunity to further differentiate the Cranfield part-time course from other programmes offered by its competitors. It was also considered to be relevant to the future needs of business and therefore could provide a competitive edge in the market for MBA programmes.

ECONOMIC ANALYSIS

The costs of the project are very high. The costs of hardware and software were £330,000 at list price, although negotiations reduced this to about £194,000. The costs for usage of Telecom Gold were unknown but a provisional ceiling was put on it at £13,000. Above this figure the School would look at starting to charge students for usage.

The benefits are expected to be very significant but are impossible to quantify financially. In outline they can be summarised as,

Short Term :

- Improved communications of all parties involved.
- Improved levels of PC skills.
- Increased use of PCs on the programme.
- More effective use of faculty time.

Medium Term :

- Greater use of computer based learning packages.
- Use of software cases and alternative methods of teaching.
- Gaining experience in the use of PCs in management education.
- Establishing Cranfield as a leader in this area.
- Providing an incentive to encourage the development of PC based learning techniques.

SPECIFICATION

Compatibility

The Executive MBA students need to be able to use the same software when working remotely as they do when working in the School of Management's Computer Studio. In addition, they should be able to work with material created elsewhere in the School and it should be possible for any material they submit in electronic form, at least, to be printed anywhere in the School (including the Computer Studio).

To do this the personal computer provided must be compatible with the machines in the Computer Studio (Hewlett Packard) and the rest of the School (Zenith), that is IBM PC compatible and using the MS-DOS operating system.

While the software packages provided need not be compatible to the same extent as the computer they must be :

- Compatible in file format, so that spreadsheets and documents prepared on School computers can be used on the Exec MBAs' computers and vice versa;
- Compatible in the manner and style of use (ie have the same user interface to use the computer jargon), so that only one course of tuition is needed.

The principal software packages used in the School of Management are Lotus 1-2-3 and MS Word.

Communications

Previous work by Andrew Kakabadse and Chris Edwards [1] has identified three types of communication as important to Executive MBA students :

- Student to student's study group,
- Student to faculty,
- Student to administration.

Unfortunately this only identifies the parties involved not the mode and content of the communication.

The possible modes of a communication are :

- One to one,
- One to many (or many to one),
- Many to many.

However, many to many communication is relative rare. Cases of many to many communication usually consist of combinations of one to many communications.

Current electronic communication is well suited to handling one to one and one to many (or many to one) communications by using the electronic equivalent of a pigeonhole, usually referred to as a mailbox.

The possible contents of a communication are :

- Unformatted,
- Formatted in one format,
- Formatted in more than one format.

The software available for MS-DOS can handle unformatted communications (eg a note saying "Please see me") and some formats of formatted communication (ie document, spreadsheet and diagram) but not others eg hypertext, images (pictures or photocopies) or sound. It cannot process formatted communications of more than one format.

So, those modes and content that can be supported by electronic mail and MS-DOS are :

- A one to one unformatted communication, eg a note from one student to another;
- A one to many unformatted communication, eg a memo from administration to all Executive MBA students;
- A one to one formatted communication in one format, eg the text of a project report from a student to a faculty member (or secretary) for review;
- A one to many formatted communication in one format, eg a spreadsheet from a student to a study group.

These support the types of communication previously identified as important except for distribution of case material and submission of written analysis of case (WAC) reports.

THE DESIGN OF THE TRAINING PROGRAMME

Menu Approach

The training programme is based around a menu concept. The menu consists of a variety of opportunities to build PC skills. The student is left with responsibility for selecting the parts of the menu he/she needs. To ensure that the students are motivated to acquire the skills they were advised by the Course Director that within 5-6 months they would be required to use their PCs for their WACS (written analysis of cases).

The advantage of this menu approach is that the student chooses as many "courses" from the menu as is appropriate for his/her current skill level.

Structure of Menu

The menu has four components :

1. **Formal lectures on the subjects of :**
 - Introduction to Microcomputing (1 lecture x 2 hours),
 - Word-Processing (2 lectures x 2 hours),
 - Spreadsheets (2 lectures x 2 hours),
 - Communications (1 lecture x 2 hours).

With the exception of Communications, the lectures were planned to be the usual historical format of a short demonstration of the software followed by a practical session using the software.

The "Introduction to Microcomputing" was to take place in the Computer Studio. For the Word-Processing and Spreadsheet lectures the students would have their own portable PCs, so the practical sessions could use their own machines. This was planned to take place in the lecture room equipped to take PCs. Although the room would not take all 59 students it was expected that the experts would opt for self-teaching and not attend these elementary sessions.

Communications was to be a lecture without any supervised practical session. This was because the students have to be connected to the network to practice using communications. No facility exists at Cranfield for connecting a large group of students to the telephone system simultaneously. The practical session would have to take place at home.

2. **Written Exercises** were distributed to all students. These covered elementary MS-DOS commands, word-processing and spreadsheets. Students could use the exercises in three ways :

- Those new to microcomputing could bring them along to the lectures and undertake them in the supervised practical sessions.
- Those with some experience could undertake them at home at their own convenience.
- Those who were expert users could simply scan the exercises to get a feel for the level of skill required and decide whether they needed to do any more work or not.

These exercises were developed for use during supervised practical sessions in the computer studio. They were not designed for use as distance learning exercises and there was some debate amongst IS faculty as to how well suited they were for this use.

3. **Other self-teaching options.** Two more vehicles for self-teaching were made available.

For Word-Processing the package MS-Word comes with its own interactive tutorial. This was included on the portable micros and appears as an option on the main menu.

For Spreadsheets the Twin manual contains a comprehensive tutorial which students could work through. This is the classical "press this button and then press that button" type of tutorial.

4. **One-to-one tutorials.** For those students who experienced difficulties, tutorial sessions were scheduled in the computer studio with MIS lecturers. Unlike the lectures these tutorials were viewed as being run for as long as the students required them.

5. **A telephone help line.**

6. **A selection of Videos** were to be shown at lunch-times over the first three months of the programme.

How Structure Relates to Skill Levels

Broadly the training programme addresses the problem of dealing with widely differing skill levels by requiring the student to assess his/her own needs and build a training strategy from the menu. The menu allows the various skill levels to satisfy their needs as follows :

- **Experts.** These need undertake no training at all. They are not forced to attend irrelevant lectures.

- **Highly experienced.** These might typically choose to scan the exercises to see the skill level required and find that no training is necessary on spreadsheets but that they need to convert from their current word-processing package to MS-Word. This they might achieve by using MS-Word's disk-based tutorial.

- **Some experience.** These students might attend the lectures as a means of building on their current skills. They would be expected to work through the exercises relatively quickly and might finish them during the practical part of the lectures.

- **Novices.** These students would need to attend the lectures but would also find it necessary to undertake some work at home on the exercises in addition to working on them during the practical part of the lectures. Whilst working at home they might encounter major problems requiring them to use the telephone help line. Since they are new to micro-computing they might also want to broaden their knowledge by watching some or all of the videos.

Any student might want to bring a problem to the one-to one tutorials. For novices the problems they bring along might be relatively low-level, whereas an expert user might bring along a technically more demanding problem.

Since virtually all students are novices when it comes to the communications package, all would be expected to attend the lecture. No distance learning vehicle was put in place for communications (except reading the manuals).

Resourcing

The design for the training programme was fairly resource intensive. Aside from using 59 machines and peripherals, it requires 14 hours of lecture room time and approaching 40 hours of lecturer time. Additionally there is an unknown amount of help line time committed and the complexity of the design means relatively high effort.

Whilst this does not seem excessive when viewed against the level of money invested in equipment, the lecturer commitment must also be viewed against the backdrop of general staff shortages in business schools, particularly of IS staff.

RESEARCH FROM THE PROJECT

A feature of the project is that it will be monitored throughout by formal research.

The first stage of this research was divided into two sections:-

- (i) Level of computing (hardware and software) and telecommunications skills possessed by students;
- (ii) The attitude of students and staff to the introduction of microcomputers and electronic communications to the course.

It was decided to use a structured questionnaire to elicit responses from students so that we can make comparisons over time.

The questionnaire was piloted and modified to suit the requirements of the 59 students attending the course. Each student filled in the questionnaire during the first week of the course - before receiving the computers. The findings will now be discussed.

Similarly a questionnaire has also been given to faculty to measure their experience and attitudes.

RESEARCH RESULTS

Level of skill

At work

In the work place a high proportion (80%) of Executive MBAs, before coming to Cranfield, either have access to a PC for their own personal use or share one with

colleagues (see figure 1). The majority of these PCs are IBM compatible - the IBM being the one most frequently used.

At work the PC is mainly used for spreadsheet work (29 respondents), for example budgeting, planning, forecasting etc., and/or word processing (25 respondents), for example, report writing etc. - experience which will be beneficial whilst studying at Cranfield. Fifteen respondents indicated that they used a PC for database work and 12 respondents stated that they used a PC for graphics and presentation material. Interestingly, 15 respondents had used an electronic mail system.

Eighty per cent of students had used spreadsheet software before (see figure 2). Thirty two respondents from 59 had used Lotus 1-2-3, higher than expected, 7 had used Lotus Symphony. Fifteen respondents had used Supercalc and/or Visicalc with a further 4 using Microsoft Excel. Experience of spreadsheet software ranges from a few weeks to 9 years, with an average length of usage of just over 3 years.

About two thirds of the students on this years programme have used a word processing package before (see figure 2). Word processing experience tends to be on average a lot longer (4 years) than that of spreadsheet experience. Experience ranges from just a few months to 10 years. The majority of respondents using word processing packages have used either Wordstar (19 respondents), Word Perfect (8 respondents), or Microsoft Word (5 respondents).

If we exclude spreadsheet work and word processing we find that the majority of respondents, 45, do use a computer at work for other tasks. The computers are largely used for: software development; database management; graphics/presentations; running technical programmes; the analysis of data; and, for on-line database work.

In terms of electronic mail systems, about half of the students (29 respondents) stated that their employer had installed such a system for company communications and about half of these students (15 respondents) have had previous experience of using the system. For those who have used the system we find that it has mainly been used for internal company communications (7 respondents). Others have used it for international communications, telex and fax operations and links to Telecom Gold.

In terms of a computer telecommunications network for company communications 52%, a large proportion, stated that their company had installed such a system.

At home

Computers at home are not as common place as computers at work. Seventy three per cent of the course members do not possess a personal computer at home. Those who do use IBM compatible machines mainly - the Amstrad being the most popular.

If we exclude spreadsheet work and word processing we find that, like at work, the computers are used mainly for: software development; database work; and, graphics/presentations.

Four respondents have used telecommunications software and a modem before in the home to send and receive messages - 2 have used Prestel, 1 person has used it as a business 'pigeon-hole', and 1 has used it as a means of communicating with work.

Attitude of students

In terms of the relevance of supplying a PC to the achievement of educational and developmental needs course members felt mainly that:-

- (i) It would improve communication with course members and Cranfield
"I am confident that the supply of a PC with communications software will improve communications between group members, particularly for assignments and thereby raising the general analytical ability of the individuals, hence the group. It should enable us to go into greater detail when this might not have been otherwise possible."
- (ii) It is now an essential part of the business world
"Many tasks can now be accomplished in a fraction of the time using a microcomputer and I believe it has and will continue to represent a significant part of one's development at work. I therefore believe it is very relevant in today's business environment to have access to and knowledge of the use of a microcomputer and the appropriate application programs."
- (iii) It is an efficient and effective tool
"I estimate a 500% increase in efficiency of processing and accessing management information."
- (iv) It will increase skills in computing and telecommunications
"I have had very little exposure to the use of PCs and IT in general. The supply of a PC will assist me in improving my skills and knowledge in the use and application of PCs in general."

In terms of the relevance of supplying a PC to the management educational needs of the business world course members in general felt that:-

- (i) An effective manager of the future will have to have the ability to use computers
"I believe the new generation of laptops will mean computers become as common place as calculators and therefore any manager who is not computer literate will be at a disadvantage when a decision is required in a short time frame."
- (ii) It is an effective and efficient way of running the business
"The efficient running of a business will require more and more personnel to be proficient in the use of a PC."
- (iii) It increases awareness of the usefulness of modern technological advances
"The increased awareness of applications, application packages, their ease of use etc. will potentially result in greater confidence when discussing PC applications in my own company and the possibility of introducing the company to more obscure uses."
- (iv) The efficiency of accessing information
"Most managers have a great deal of information to handle and manipulate. Any device which enables a manager to perform this task quickly and easily frees his time so that he can be more creative."

The effects on the development of MBAs, through the provision of a PC and telecommunications link whilst on the course were seen mainly in two areas:-

- (i) The benefits of access to other group members/tutors
"The ability to communicate with other course members in general and study groups in particular will, I am convinced, prove invaluable in co-ordinating all aspects of our work. It will break down

the barrier of 'it is Cranfield this weekend' and allow the course work to be tackled continuously and kept just a phone call away from one's everyday business activities."

- (ii) The experience in using software/communications link
"Having had little experience to date in the use of a PC, the spreadsheet and word processing facility, it will be of tremendous benefit in bringing me up to date."

See figure 3 for the levels of response associated with the above comments.

IMPLICATIONS OF THE RESEARCH RESULTS

Training

There should be little difficulty in training students to use spreadsheet software - many of the packages are similar both in appearance on the screen and control.

There may, however, be problems arising in the training of students for the use of the word processing package. Only 5 respondents have used Microsoft Word before - word processing packages tend to differ a great deal when it comes to using function keys and screen menus.

There will be further difficulty in training 9 of the course members - neither of whom have had spreadsheet or word processing experience. Care will have to be taken that these respondents do not get 'left behind' when participating on the programme.

In relation to the telecommunications links only 4 respondents have experience in using such a link in the home. Training in this area could be a slow process. Students should, however, learn from the experience of others.

Attitude

A large majority of students have a favourable attitude towards the introduction of PCs on to the course.

Cranfield must ensure that:-

- (i) Whilst communications between study group members may be good that communications between faculty/administrative staff and students also should be good - i.e. communicating when required to do so;
- (ii) Students reach the same level of skill and use the software/hardware in the most efficient and effective way;
- (iii) Tasks performed on the Executive MBA programme are related to the business world and that the students when they leave Cranfield can continue using such equipment.

PROBLEMS ENCOUNTERED TO DATE

Several problems have already been encountered.

The late delivery of machines was probably the most annoying, resulting in last minute changes to the training programme.

The "Introduction to Microcomputing" lecture was designed to be a short demonstration followed by some practical experience in the computer studio. In the event the demonstration took longer than anticipated and the level of questions about the machines and the project in general, (as well as the level of questions about MS-DOS commands), was much higher than anticipated. The result was that the demonstration finished too late to allow a practical session, which was not ideal.

This is a problem which seems to be a characteristic of the lecture which is structured as a demonstration followed by practical. Since the allotted time is 2 hours the demonstration must be limited to 30-40 minutes to allow a meaningful practical session to take place. The amount that can be covered in such a short time is small and limited to basics only.

Some administration problems have arisen. For instance one of the lunch-time video sessions was scheduled for a day when exams were taking place in the morning and afternoon, so students who wanted to attend would not be able to do so because of last minute cramming for the afternoon exam.

These problems can generally be classed as minor but nevertheless highlight areas for review.

Andrew Myers, Ian Oram, Mike Sweeney, Alan Warr,
Cranfield School of Management.
March 1989.

References :

[1] Andrew Kakabadse and Chris Edwards, "Management 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.

Appendix 1

HAVE YOU BEEN PROVIDED WITH A PC AT WORK?

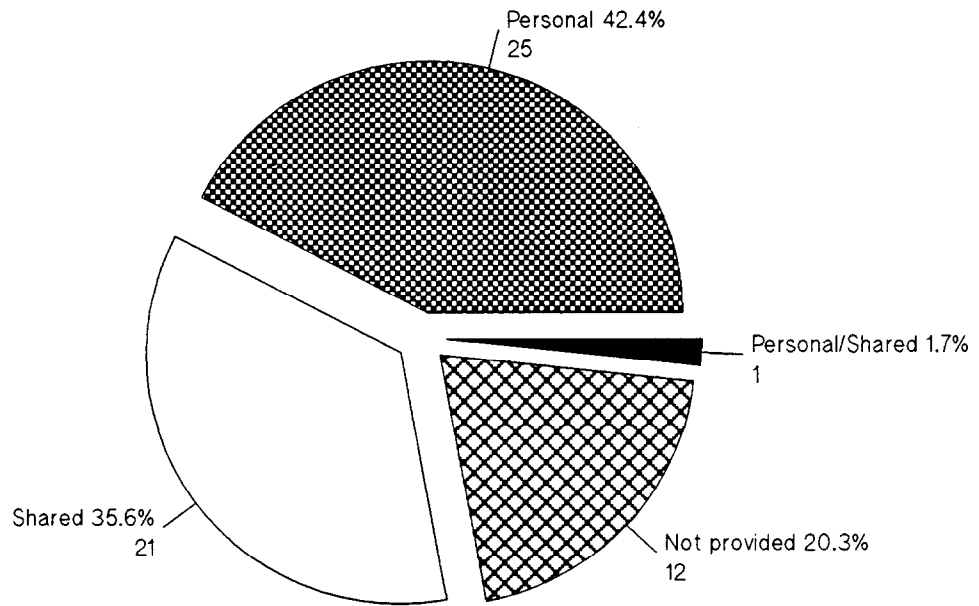


Figure 1

USED SPREADSHEETS AND/OR WP PACKAGES

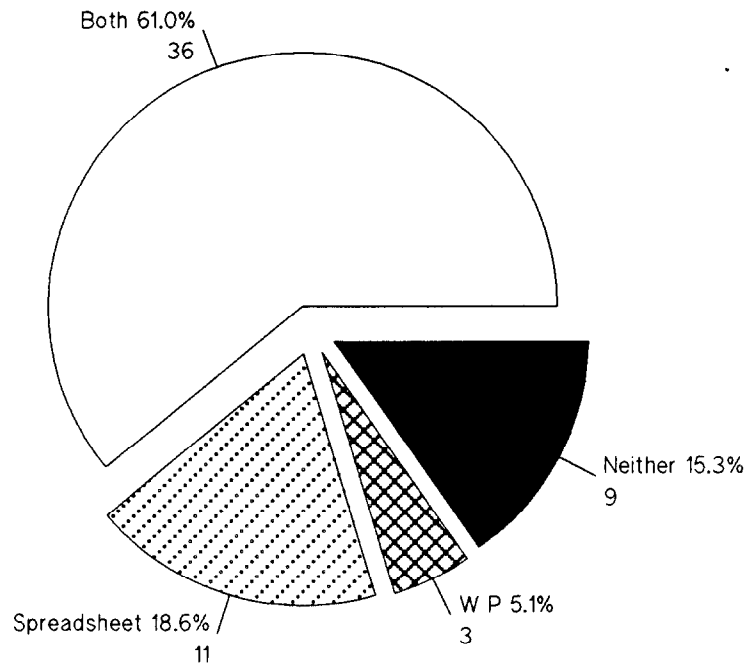


Figure 2

RELEVANCE OF SUPPLYING A PC TO THE ACHIEVEMENT OF EDUCATIONAL AND DEVELOPMENT NEEDS

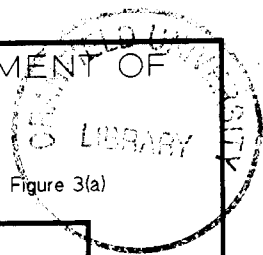
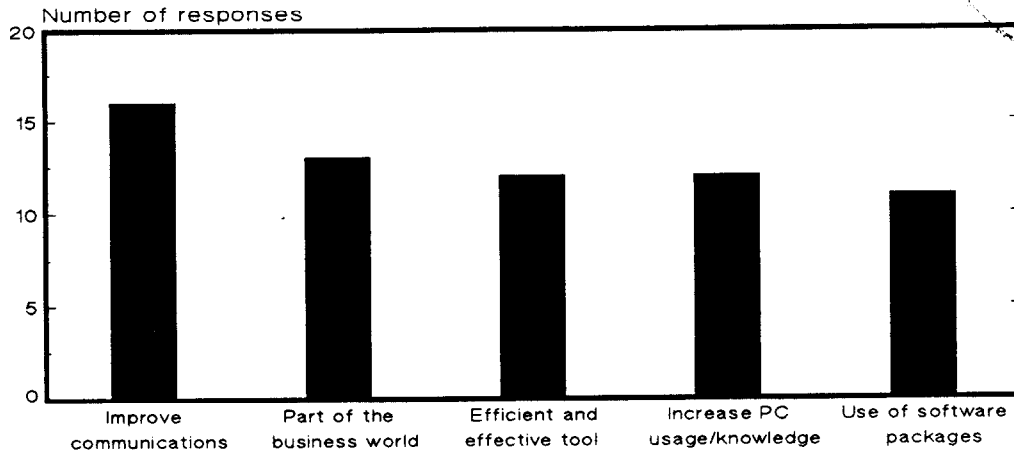
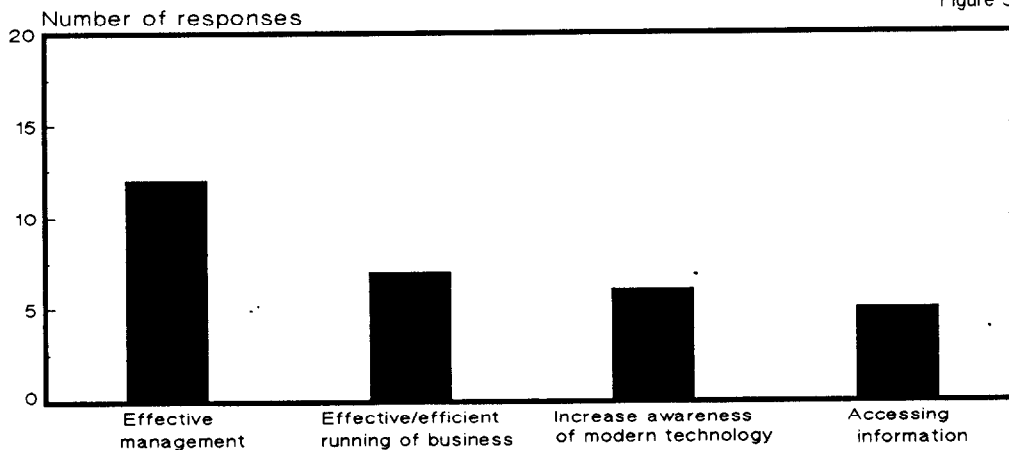


Figure 3(a)



RELEVANCE OF SUPPLYING A PC TO THE MANAGEMENT EDUCATIONAL NEEDS OF THE BUSINESS WORLD

Figure 3(b)



THE EFFECTS ON THE DEVELOPMENT ACHIEVED THROUGH SUPPLYING A PC AND TELECOMMUNICATIONS LINK

Figure 3(c)

