SWP 10/92 "INFORMATION TECHNOLOGY FOR MANAGEMENT EDUCATION: THE BENEFITS AND BARRIERS"

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Abstract

Research suggests that information technology (IT) can be a very effective distance learning medium. Its use for postgraduate management development is both untested and insufficiently researched. This study was designed to evaluate the application of IT for this purpose. The paper is a report on the educational benefits that ensued the issue of an IT package designed specifically for use on a part-time MBA programme. The IT package consisted of wordprocessing, spreadsheet and communications software (via Telecom Gold) and a personal computer. Questionnaires were used to research the effect that the ownership of this IT system made to the final IT competence of the students and to the educational quality of the programme. The study results show that the students’ expertise with the use of IT was significantly increased. The study also found that the development of the students’ abilities to use IT for communication purposes perfectly fitted the IT competency needed by the general manager of the 1990s; this was also researched by questionnaire. These research findings show that the required breadth of expertise in IT, needed by the general manager of the 1990s, can only be partially developed by teaching methods limited to talk, chalk and computer studio training.
One of the most important elements of management education at Cranfield is learning by the case study method. The study findings show that learning by this method was enhanced by the creation of a communications network because the part-time students were able to use it for off-campus study group communications. The research also discovered that little use was made of the PCs by faculty to communicate with their students or as a tool to complement current teaching practices; more time, money and academic commitment will be required before such uses of this technology are practised.
Information Technology for Management Education:  
The Benefits and Barriers

Introduction

Information technology (IT) has significantly but not entirely overcome the barrier of distance. Previous research in using IT for distance learning purposes has shown that it can be a very effective learning medium. Maxey and Maxey found that students using computer technology in distant learning activities rated both the technique and the instructor higher than students in the same course with the same instructor using the traditional face-to-face approach. Subsequent similar research supports these initial findings. What, therefore, has inhibited a greater use of IT in part-time management education since the efficacy of IT to improve distance learning appears to have been proven?

One reason may be a paucity of good quality educational material for use with computers. Another reason may be a lack of incentive or a resistance to change. The explanation is probably a combination of all these reasons. What is clear is that further research is needed.

There is also an economic reason. Until very recently the use of IT as an instrument for individual learning has been prohibitively expensive. However, the reduced purchase price of the microcomputer has helped lower that barrier. It is therefore opportune to research the potential benefits of using microcomputers for individual learning purposes. If this technology can be used as an aid to distance learning, a designer of a management development programme would need to know the costs and the benefits that result from the use of IT for this purpose; the programme designer also needs to know whether such a use of IT will enforce a change to the
traditional course design and the effect that using a computer for distant learning activities has on the perceived quality of the programme?

This paper presents the results of a study designed to examine these issues. Its aim was to research the benefits of using microcomputers to facilitate distant learning activities. An important behavioural issue also of interest was whether any different methods of learning were practised by students linked by electronic mail to those practised by students without such a communications capability.

The findings detailed in this paper result from a two year study which focused on the 1989 Cranfield Executive MBA Programme. A total of 59 students attended this part-time Master in Business Administration programme.

The paper consists of four parts. In the first part, a theoretical model of the process of learning by the case study method is presented with a more detailed explanation of the study's research objectives and methodology. The theoretical model of learning by the case study method is presented to illustrate the types of communication that are so critical to learning by this method. The model has been used to help identify where an IT capability could improve the quality of communications between separated study group members. The second and third parts of the paper consist of the presentation of the study results and an explanation of the conclusions drawn from these findings. The final part of the paper is a description of the barriers to technological change that have been overcome and those that remain.
Background

Lord Franks, in his 1963 report on management education in the UK, recommended that the most critical educational need of that time was to increase the competence of managers to cope with a rapidly changing business environment, the accelerating pace of technological innovation and the growing international competition facing British firms. Since that time business problems seem to have changed little in type but significantly in intensity.

Lord Franks emphasized a need for increased managerial competence rather than the achievement of academic prowess, because he believed business management to be "an intelligent form of human activity; not intellectual, nor academic, but practical in nature".

To balance the theoretical and the practical, most business schools use a variety of methods to simulate "real world" problems. These include case studies, the use of business games and in-company project work on real business problems.

However, business schools continue to be criticized for the disproportionate amount of effort spent on the development of some practical skills. A commonly quoted criticism of the products of MBA programmes is that they are excellent analysts and team-workers but gain little from the MBA programme on managing and using technology and managerial leadership. The search for new methods to develop a better understanding of the management and use of Information Technology was stimulated by this criticism of MBA programmes.

The solution proposed was to create an IT network designed to enable the creation, transfer, receipt and storage of educational information. It was assumed that using the network to facilitate education management would increase a student's
understanding of how to use similar technologies for business management. Experience with its use should also increase confidence.

These are not the only benefits to be gained from a higher level of competence with using IT. This technology may also have a part to play in the educational process itself. The combination of its potential to overcome the problems of distance and its effectiveness as a learning medium qualify it to be an educational aid that should be used for part-time management education. However, the benefits that may result from the use of IT for part-time management education are unknown and require investigation.

These were the reasons for researching the use of IT for management education. Each student on the part-time or Executive MBA programme at Cranfield was supplied with an IT package consisting of a microcomputer and printer, software designed for communication and business management uses and a modem.

A Model of the Case Study Learning Method

The limited use, by UK business schools, of information technology as an aid to learning may be explained by an uncertainty about its effectiveness when compared with the time-honoured method of face-to-face instruction. The cause of this conservatism may be a satisfaction with the status quo, or perhaps it is a concern that the use of technology impersonalizes education, rendering it less effective than the traditional method.

Hashway describes communicating as the "process of moving ideas from one mind to another mind". Such a definition could also define the act of teaching when the ideas transferred are of an educational nature. Such an exchange of views about a business problem is an accepted form of action learning. For such an exchange to be
educationally beneficial, the discussion must be focused and founded upon a clear understanding of the problem. This is one reason for using case studies for management development.

Figure 1 shows how action learning using the case study method should be practised to obtain the maximum educational benefit. Also shown is the sequence of the action learning tasks and how they are carried out by the full-time MBA students at Cranfield. Figure 1 also shows the learning objectives of each stage of the case study method of action learning.

The foundation for the whole learning process is the student’s initial examination of the case study problem. This analysis must therefore be thorough. To help the student with the case analysis, readings are also provided on a management theory or practice pertinent to the problem described in the case. On occasion, it may also be helpful to obtain clarification about some information given in the case. This may be sought from fellow students or from the faculty. It is also sometimes useful to seek guidance on the method of problem analysis to use. All of these forms of assistance are conveniently available to the full-time student. Unfortunately, the opportunity to obtain any help or support of this type is very limited for the part-time student, which is one of the disadvantages of part-time education.

A survey was carried out in 1987 to investigate the potential benefit that electronic mail could provide to participants on the Executive MBA programme. The students reported that they thought that a communications link would establish a capability for a better exchange of ideas on a case problem which should improve their preparation of case studies. In the Cranfield School of Management, the case study method of learning remains central to the MBA teaching philosophy. It is clear from figure 1 that the case study method of management development may require a
variety of communications to take place in order to maximise learning. These could be some or all of the following:

1. Student to Student
2. Student to Study group
3. Student to Study group supervisor (Academic assigned to support the group)
4. Student to faculty
5. Student to Administration

The survey was therefore designed to determine which of these five forms of communication were the students' greater needs, the reasons why these contacts were important and their assessment of the value of electronic mail to meet their communication needs.

The results of this initial survey\textsuperscript{12} showed that the greatest communication need was between the individual student and his/her study group colleagues. This need is greatest when "preparing work for class discussion and work that will be submitted for marking"\textsuperscript{13}. The students also thought that the communication link could provide the highway for giving and receiving the personal and emotional support that many of them need to overcome the feeling of isolation created by distance from the campus and each other.

The survey results, using the 1-7 Likert Scale, were as follows\textsuperscript{14}:

<table>
<thead>
<tr>
<th>Communication Line</th>
<th>Mean Source (1-7 Scale)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student to Student</td>
<td>4.00</td>
</tr>
<tr>
<td>Student to Student's Study Group</td>
<td>5.44</td>
</tr>
</tbody>
</table>
This survey has therefore, provided some initial data on how a communications network could facilitate action learning for participants on an Executive MBA programme. To be able to communicate with fellow students about case analysis problems is a very important element of the action learning process. However, distance tends to isolate the part-time student and consequently, it can inhibit communication of the types previously described or other similar forms of support. Technology could help overcome this barrier to communication. An electronic mail facility to enable the transfer of documents and messages between the students, the faculty and the course administrators would enable the convenient exchange of ideas to take place. Such a communication capability could increase the students' opportunities to learn because messages sent via the electronic mail facility could substitute for the informal face-to-face exchanges that take place during the residential periods at Cranfield.

However, the decision to insist that students should possess the technology required to enable such communications to take place would depend upon a study of the actual extent that students did communicate in the ways described and the perceived educational value of these exchanges.

The Study Objectives

The main objective of this study was to discover what educational benefits were realized by using a microcomputer for both communication and distance learning purposes. Within this broad objective there were three main issues to be examined:
1. Whether the ownership and the use of the issued IT package increased a part-time MBA student's understanding and use of IT. The evidence sought was that of additionality, i.e. the skills and knowledge gained were additional to those learnt by purely practical exercises performed in a computer studio. Any additional skills or knowledge gained must also be considered to match those that are forecast to be needed by a business manager of the 1990s.

2. If the communications network was used to exchange knowledge and to facilitate study group working. If evidence of the transfer of electronic communications was found, whether the students found that such communications enhanced their learning.

3. Whether supplying PCs to the students will stimulate an increased use of computer based learning methods and the adoption of innovative pedagogical methods.

The main research issue was a study of the extent that individual distant learning activities were supplemented "by a little help from your friends". The full-time MBA programme is designed to promote learning through the sharing of experience but the opportunity for study groups to learn by this method on a part-time MBA programme is very limited. It was therefore hoped that IT would become the means for part-time MBAs to continue their exchange of experiences when they were off-campus. Such exchanges are fundamental to learning by the case study method.

**Study Method**

Four questionnaires were used for this study. The first was completed by the students during the first residential week of the Executive MBA programme, i.e.
during the last week of January 1989. This was approximately four weeks before the portable personal computers, peripherals and software were distributed to them.

The first student questionnaire was designed to answer the following questions:

1. The extent of the personal computing experience that each student had gained prior to joining the part-time MBA programme and their experience with the use of the more common forms of the business applications software, i.e. wordprocessing, electronic mail and spreadsheet packages.

2. What specific business education and management development objectives they thought they could personally achieve through the use of a PC and its applications software, if any?

3. What general business education and management development benefits they thought could be gained from using the PC and the software supplied whilst attending the MBA programme, if any?

The purpose of this questionnaire was therefore to establish a benchmark on the personal computing experience of the group. It was also to ascertain the students' expectations about any additional benefits that they thought could result from the opportunities created by ownership of a PC and its applications software. The objective for seeking the latter information was to try to measure any change to the perceived quality of the MBA programme. If the students, at the end of the programme, reported that their expectations for IT management development had actually been exceeded then such a finding would substantiate an improvement to programme quality. The validity of this conclusion would obviously be dependent upon proof that some of the benefits gained were additional to those obtainable from previous programmes.
The second questionnaire was designed to be completed by the faculty and to obtain answers to the following questions:

1. **Their level of computing experience**

2. **Their knowledge of computer aided learning packages**, both in terms of the existence of software appropriate for use on a MBA programme and their experience with the development or use of such software.

3. **Their assessment of the educational or the developmental benefits to be gained by supplying a PC and business application software to each student.**

4. **Whether the ownership of this IT package would induce any change to the way that they currently teach on the MBA programme and their assessment of the potential benefits to be gained by using the computer as a learning medium.**

This questionnaire was therefore designed to assess the resources of the School of Management to design, develop or use computer based training or computer based learning methods. In addition, the attitude of the faculty to the value of using computers for management education was researched because the rate of change to using alternative methods of teaching is primarily determined by them. The rate of change to the use of such methods will also be determined by the resources that are available to seek, test or develop computer aided learning software. For this reason, faculty was asked to assess the timescale for any future changes to teaching methods that they would make if all Executive MBAs were required to own a PC.
The third questionnaire was designed to be completed by a senior manager of each company sponsoring a student on the programme. The questionnaire was sent to the manager who authorized the sponsorship. The objective was to survey senior managers from all functions of a business in order to obtain a general management view. Thirty eight completed questionnaires were returned and only two were completed by IT departmental managers.

The results obtained from this questionnaire are of special interest because they represent the views of practising managers who have the responsibility for the development of their company's future senior management. Of particular interest is the expertise they consider will be needed by the senior general managers of the 1990s.

The questionnaire was designed to obtain answers to the following questions:

1. The nature and size of the company and the extent of its use of IT.

2. The types of IT applications that are already available for use by management in the company and those planned or expected to be available for general use in the future.

3. The information technology expertise needed by the company's middle management now and in the future.

4. The relevance of supplying the PC and the selected applications software to the development of the current and future management development needs of the business.
If this study confirms that the supply of a PC, with the applications software selected, has helped the development of the skills and knowledge that are needed by the sponsoring firms now and in the future, then the case will have been made for each Executive MBA student to possess this IT capability on future programmes.

The final questionnaire used was one again designed for the students but this time distributed at the end of the two year programme. The objective for the use of this questionnaire was to obtain answers to these questions:

1. The actual use made of the PC and the selected applications software during the two year programme.

2. The extent that computer based learning methods had been used with them and their evaluation of this approach to management education.

3. Their assessment of their level of expertise at the end of the programme with the use of the applications software provided.

4. What personal management development benefit they had gained from ownership of the IT system, if any, and whether they consider this to be relevant to the management development needs of the future.

Study Results

Each student was supplied with a Hewlett Packard LS/12 portable computer with a 20MB hard disc and MS-DOS 3.3 operating system. In addition, a modem and a printer were provided.
The portfolio of applications software supplied consisted of Word, Twin (a spreadsheet software package similar to Lotus) and Chitchat (the communications software). Telecom Gold was used for the management of electronic mail. The communications network linked students, faculty and the administration in the School of Management. It should be noted that eight study group supervisors, i.e. those member of faculty assigned to each study group to provide support to its membership, were also supplied with the capability to connect into this communications network. All these members of faculty taught on the part-time MBA programme.

A. Communication Network Use

The use of the communications network was monitored not only to assess the frequency of use but also to discover the type of communications that were made, i.e. student to study group, student to all students on the course etc. An analysis of these findings is shown in figure 2. In order to gauge the students' assessment of the significance of this communications capability to them, they were asked to indicate on the questionnaire how frequently they checked their electronic mailbox. Their answers to this questionnaire are shown in figure 3.

Figure 2 shows clearly that considerable use has been made of the communications network. The research findings also show that the most frequent forms of communication were between student and study group (see figure 2) and the Administration to the Students (see figure 4). An analysis of the transfers of information made between study group members, which were monitored over a four week period, showed that their purpose was both educational and organizational. The types of exchanges that were observed were as follows:
(a) Individually prepared precis of lengthy recommended readings as a brief for other study group members and for retention to use for revision.

(b) The exchange of case analysis material for comment and individual use in the preparation of a written analysis of a case.

(c) The transfer of information pertinent to study group preparation of a joint project report.

(d) Communications concerning problems both academic and organizational.

(e) Communications on the sharing of case preparation activities in readiness for group discussion during the residential periods in Cranfield.

The data shown in Figure 3 indicates that not all students were working together as closely as those who were communicating in all the ways detailed previously. In fact, only 58% of the students who completed the questionnaire (N=48) exchanged WORD documents via the network and 48% file transferred spreadsheets. However none of these exchanges of educational information could have been as easily made by students on previous Executive MBA Programmes.

B. Expertise in the Use of IT for Business Management Activities

A course design problem, common to many business schools, is the planning of a training programme on the use of personal computers for a group of students who possess a wide range of previous computing experience. Previously the approach adopted by the Cranfield School of Management was to include in the MBA programme a training course of approximately fifteen hours on personal computing in the school’s computer studio. For those with previous computing experience these
training sessions were of no value because the training was designed to give a novice a basic understanding of a range of applications software. For the novice it was of limited value because further practice was always needed but, in many cases, could not be attained because a PC was unavailable at work or at home.

The group of students who joined the Executive MBA in 1989 were typical of those who had attended previous programmes. 42% were supplied with their own PC at work, 20% did not have access to one and the remainder shared a PC at work. The previous experience of this group with the use of wordprocessor and spreadsheet software was also mixed (see figure 5). As a consequence a menu of tutorials for training on different software package was organized and each student could then select the tutorials that he/she needed to attend. The advantage that this group of students had over previous courses was the unlimited opportunity to practise in the risk free environment of the home. Previous research has shown that an individual's attitude to IT, for example, a fear of the technology or the loss of status when faced with a PC, can be the barrier to learning to become an efficient user of this technology. Therefore, home use with support from the School of Management or the study group is a low risk means of overcoming this barrier to personal development.

Figure 5 shows how the ownership of the microcomputer, with the stimulus that all assessed course work must be prepared using the wordprocessor, has produced an almost universal gain in expertise with the use of the information technology supplied.

The significance of these improvements can only be assessed objectively by investigating whether the students placed any value on the development of this particular expertise. Another measure must be whether their sponsors consider this
form of education and training to be appropriate to their employees' current or future needs as managers in their businesses.

The sponsoring companies were requested to report their views on this issue in mid 1989, i.e. about six months after the programme had started and a short while after the students had been supplied with their PCs and software. Their responses to an enquiry about the relative importance of the range of IT expertise needed by a general manager now and in the future are shown on figure 6. Their replies confirm the views of Drucker\(^\text{17}\) and Coulson-Thomas\(^\text{18}\). Drucker's view of the future is one where there is an increased onus on the individual to take 'information responsibility'. The managers surveyed seem to confirm this view by an almost unanimous agreement that the manager of the future must be able to access and manipulate data obtained from a remote source. Coulson-Thomas adds an additional dimension to this view of the future. "As work is increasingly being undertaken by multi-disciplinary, multi-national and multi-organisational teams there is an increasing requirement for information technology that can facilitate multi-location group working\(^\text{19}\). Therefore, individual responsibility for information may not be limited to only the use of information generated inside the firm.

The creation of the communications network and its use for educational purposes has prepared the MBA students for working in an environment where an individual manager must take 'information responsibility'. The use of the communications network to prepare a written analysis of a case or to produce text for a study group project report is a simulation of a manager working in Drucker's new organisation. It is however, not a comprehensive simulation because the capability to access remote databases was not available to the students.

The students' view of the developmental benefits gained from their ownership of the PC and the use of the communication network are as follows:
90% of those who completed the questionnaire reported that they benefitted from the use of the IT system. The benefits consisted of either improved skill in using the technology or enhanced learning through the assistance of others. The research results also show that 56% of the students obtained a greater educational benefit than a skill development and that almost all students improved their ability to use the PC (see figure 5). These findings are shown on figure 7.

Of that fifty six percent, for 38% or 18 students the greatest benefit was the assisted learning gained from the exchange of ideas and experiences communicated through the electronic mail facilities. An analysis of these message exchanges (shown in figure 2) shows that a significant number of students sent electronic messages of an educational kind, i.e. 58% of the course membership sent word documents to others in their study group and 48% sent spreadsheet analyses. These statistical results are however misleading because they probably underestimate the extent of the educational benefit gained from improved study group communications.

The statistics quoted do not provide data on the total quantity of the educational messages sent. It is therefore difficult to measure the total educational benefit of these exchanges and it can only be estimated by canvassing the students' evaluation of their worth.

Conclusion

The study data show that the electronic linking of MBA students to each other and the Cranfield School of Management has provided the opportunity for the students to improve their expertise with the use of the supplied software and to improve inter-
group communications. It has also been frequently used by the course administration to facilitate the management of the programme.

Figure 1 shows the three action learning activities performed when practising the case study learning method. It also details the learning objective of each stage and how learning occurs. The survey data, shown in figure 3 and in figure 7, demonstrates that the desired transfer of information by electronic mail did actually take place and that those exchanges which were carried out for academic reasons were claimed subsequently to be educationally beneficial. Therefore, the process of learning appears to have been assisted by using the network for the exchange of ideas and further information. This has enabled a more thorough case analysis to be made off-campus.

In addition, the data shown in figure 7 and in figure 5, provides evidence of the participants' belief that their expertise in the use of the supplied business applications software has markedly improved. The sponsoring companies' views on the IT expertise required by their management now and in the future is illustrated in figure 6. It is clear from figure 5 that the most of the students on the part-time MBA programme have the desired expertise. The communications network has been instrumental with the development of the skills needed by the manager with information responsibility.

Figure 4 shows that there was very little communication between the study group supervisors and their students. It is still unclear whether this low level of communication is because little contact is necessary or whether an unfamiliarity with the technology or inertia is the explanation. The role is more a supportive and social one and therefore, it is peripheral to the mainstream objective of learning. Similarly, the data shown in figure 2 indicates the students' lack of need to send messages to
the study group supervisors and suggests that this communications link is not an essential requirement for the students.

Figure 4 also shows that the communications network appears to be an important communications channel for the administrators of the Executive MBA programme. Its major value is the increased degree of confidence that everyone receives a copy of messages sent.

For academic purposes, electronic tutorials are an obvious extension to the learning methods observed to date. The first trials have recently taken place. Two tutorials were given and consisted of a tutor request for the student body to electronically mail a discursive essay on a chosen academic topic. Once received, the tutor's own analysis of the issue was mailed to the students. Subsequent points of clarification were communicated by both telephone and electronic mail. The tutorials were considered to be a worthwhile extension to the range of teaching methods used on the programme. This is an ideal use of this technology for academic purposes and it is planned to organise more electronic tutorials in the future.

The Barriers

This study of the use of information technology in management education has demonstrated how the students have creatively used the technology supplied to them to their advantage. The study did not provide much evidence of the use by academics of computer aided learning methods. There are two reasons for the very limited benefit that students gained from computer based learning (see figure 7), i.e. the quantity of material available and the attitude of faculty.

A section of the faculty questionnaire was designed to research what computer based learning packages were known to faculty and their attitude to their use. The survey
results seem to show that the supply of appropriate material is very limited, a total of fourteen software packages were described and four of these had not been used previously by them. These were the findings from 42 questionnaires completed by the School of Management faculty.

This shortage of computer based learning material for management education is not unique to UK business schools. The findings of a similar survey in America\textsuperscript{20} identified that "faculty incentives for developing courseware" headed the list of issues that are challenging business schools in America. Their aim is to achieve a greater application of computer technology for instruction and an increased level of education on its management in the curriculum. This would also seem to be an appropriate objective for UK business schools.

To increase the use of computer based learning methods will require academics to either develop their own applications software or they must find and learn how to use others that are commercially available. Whatever approach is taken, IT for management education is not about saving money\textsuperscript{21}. Developing computer aided learning software will require time and scarce business school resources. To achieve any form of technological change, it is necessary to have the backing of senior management, the appointment of a champion to lead a team committed to the change and the financial resources needed to accomplish the change within the targeted time. However, the creation of computer based learning packages for management education cannot be achieved without an acceptance of their academic value to business schools in the UK and this is a real constraint on the rate of change.
Figure 1

Action Learning Using the Case Study Method in Management Education

Degree of Structure to the learning process

<table>
<thead>
<tr>
<th>Activity Descriptions and Learning Objectives</th>
<th>More Formal Face-to-Face Plenary Session for Discussion or other forms of action learning e.g. by role playing or business game playing etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Critical Examination of the case study problem and analysis</td>
<td>Group Discussion about the Case Study and the case assignments</td>
</tr>
<tr>
<td>2. To apply information contained in the textbook or readings and attempt to resolve the assignments set on the case study by</td>
<td></td>
</tr>
<tr>
<td>3. Applying the ideas and concepts formulated from the readings to the problem described in the case study</td>
<td></td>
</tr>
<tr>
<td>1. One group member presents a detailed analysis of the case and solutions to the assignments set.</td>
<td></td>
</tr>
<tr>
<td>2. Individual learning by each member of the study group is enhanced by the group discussion of the presented solutions to the case assignments set.</td>
<td></td>
</tr>
<tr>
<td>1. Examination of study groups' answers to the case assignments and their reasons for their answers.</td>
<td></td>
</tr>
<tr>
<td>2. Reinforcement of learning points that were the learning objectives for the use of the case study.</td>
<td></td>
</tr>
<tr>
<td>3. Explanation of any issues not understood.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>t = -2 days (EVENING)</td>
<td>t = -1 day (AFTERNOON)</td>
</tr>
<tr>
<td>Individual Reading of Case Study and Related Academic Readings</td>
<td></td>
</tr>
</tbody>
</table>
Figure 2
Analysis of Communication Types

1. Student use of Telecom Gold to send messages to other students

To Study Group

- Frequently: 10.5%
- Occasionally: 46.0%
- Rarely: 33.0%
- Never: 4.0%

To All Course Members

- Frequently: 21.0%
- Occasionally: 4.0%
- Rarely: 42.0%

N = 48

2. Student use of Telecom Gold to send messages to the School of Management

To Study Group Supervisor

- Frequently: 15.0%
- Occasionally: 6.0%
- Rarely: 79.0%

To the Programme Director and Course Administrator

- Frequently: 27.0%
- Occasionally: 40.0%
- Rarely: 29.0%

N = 48
Figure 3

1. Student use of Telecom Gold for File Transfer

<table>
<thead>
<tr>
<th></th>
<th>Word Documents</th>
<th>Spreadsheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently</td>
<td>22.9%</td>
<td>31.3%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>41.7%</td>
<td>16.7%</td>
</tr>
<tr>
<td>Rarely</td>
<td>27.1%</td>
<td>52.0%</td>
</tr>
<tr>
<td>Never</td>
<td>8.3%</td>
<td>0%</td>
</tr>
</tbody>
</table>

N = 48

2. Frequency of access to Telecom Gold mailbox

- Daily: 5
- Every other day: 15
- Once a week: 27
- Once a month: 1
- Never: 0
Figure 4
Analysis of Communications made by School of Management

Messages sent by Study Group Supervisor

- 83.0%
- 10.6%
- 4.3%
- 2.1%

Messages sent by Course Administrator

- 39.6%
- 52.0%
- 6.3%
- 2.1%

N = 47

N = 48

- Frequently
- Occasionally
- Rarely
- Never
Figure 5
Analysis of the Improvements in Expertise with IT

1. Expertise with the use of a Wordprocessor

<table>
<thead>
<tr>
<th>Level</th>
<th>Before Joining the MBA Programme</th>
<th>At the end of the Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>High</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Average</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Low</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Very Low</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

2. Expertise with the use of Spreadsheet software

<table>
<thead>
<tr>
<th>Level</th>
<th>Before Joining the MBA Programme</th>
<th>At the end of the Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>High</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Average</td>
<td>21</td>
<td>4</td>
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<tr>
<td>Low</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Very Low</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>
3. Expertise with the use of a PC for telecommunications

Before Joining

At the end

the MBA Programme

of the Programme

<table>
<thead>
<tr>
<th>Level</th>
<th>Before Joining</th>
<th>At the end</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very High</td>
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<td>5</td>
</tr>
<tr>
<td>High</td>
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<td>12</td>
</tr>
<tr>
<td>Average</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Very Low</td>
<td>1</td>
<td>24</td>
</tr>
</tbody>
</table>
Figure 6

Question: In your opinion, which of the following defines the information technology expertise needed by the company's management now and in the future? Your answer should be limited to the skills and knowledge needed by middle management (i.e. up to and including the first level of general management), for the effective performance of his/her role in the company

N = 33

(a) Word processing proficiency

(b) Simple computer programming expertise

(c) Complex programme development expertise

(d) Use of communications software for fast remote access to information stored centrally

(e) Ability to manipulate data obtained from a remote source to facilitate decision making

(f) Ability to access and store data obtained from a remote source for transfer to others in the department or other related functions in the company

(g) Ability to store and restrict access to information gained from a remote source

(h) How to use 'expert' systems to facilitate decision making

(i) Knowledge of the potential and limitations of 'expert' system for decision making

(j) Understand how computers work
Question: The most beneficial educational or developmental experience that I gained from using the information technology package provided for the Executive MBA Programme was:

- Ability to communicate with the study group through BT Gold to exchange information, ideas, etc.
- Practice using the word processor for report preparation
- Use of Spreadsheets for financial analysis
- To be able to practice and learn to use a PC at home
- Learning through computer based training

Figure 7

N = 48
References


4. FRANKS, op.cit, para 6


7. LEAVITT, op.cit, pg. 40


12. KAKABADSE, A. AND EDWARDS, C., op.cit, pg 8

13. KAKABADSE, A. AND EDWARDS, C., op.cit, pg.7

14. KAKABADSE, A. AND EDWARDS, C., op.cit, pg.8


19. COULSON-THOMAS, C., op.cit, pg.4.

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