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THE REALITIES OF INTRODUCING IT/CAD IN ARCHITECTURAL AND INTERIOR DESIGN EDUCATION: A CASE STUDY AT THE POLYTECHNIC OF NORTH LONDON

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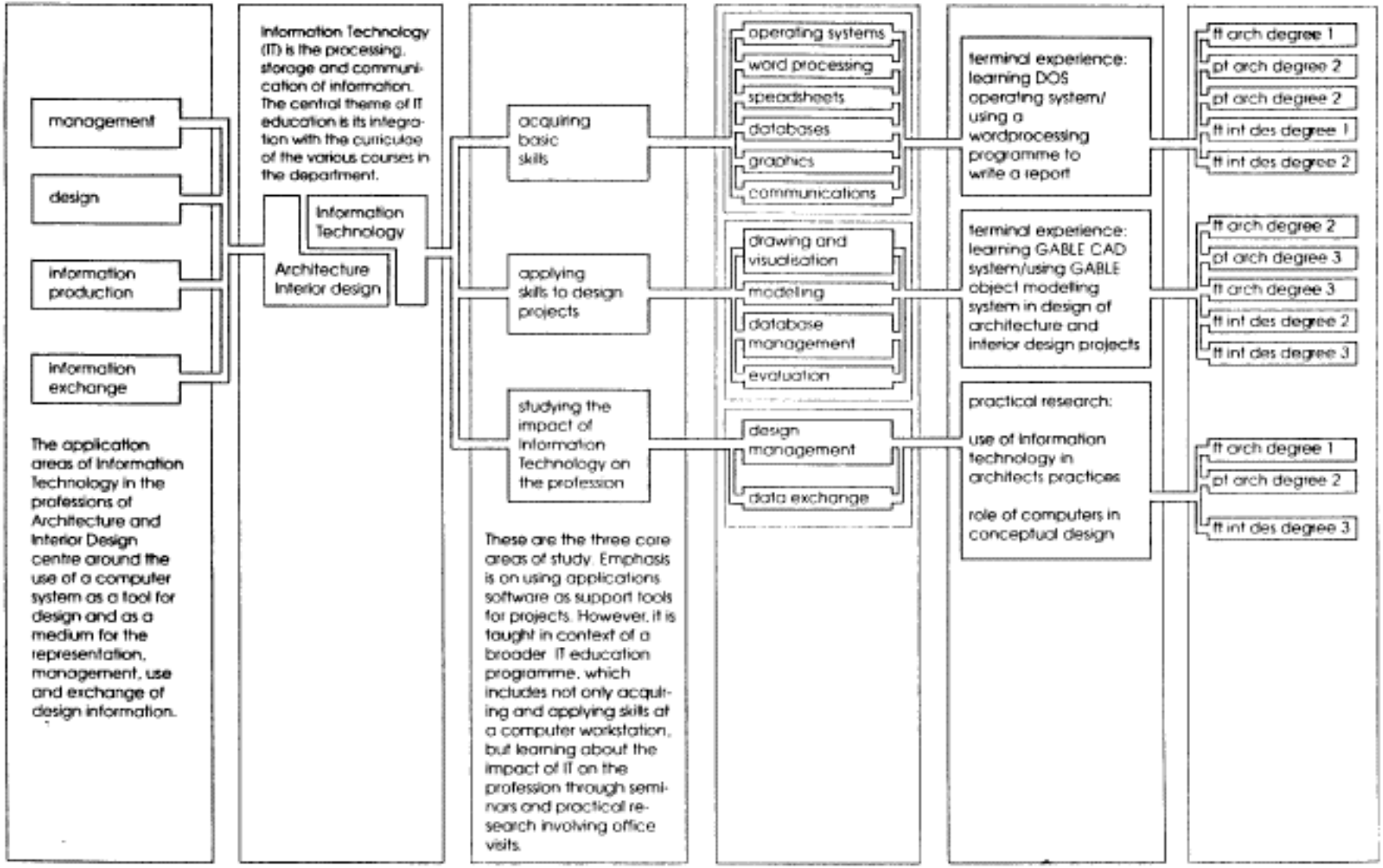
ABSTRACT

This paper is an attempt to Illustrate the realities of Introducing Information Technology at a school of Architecture and Interior Design. The department, under the auspicies of the Polytechnic of North London, comprises of 520 full/part time students working towards various professional and postgraduate degrees and diplomas in Architecture and Interior Design.

For the last 18 months, the department has undertaken a rapid IT/CAD implementation programme. This has involved developing a strategy, formulating resource needs and Implementing teaching. The strategy is based on the concept of application of IT as a tool for design and a medium for representation, management, use and exchange of design information. A course outline has been developed suggesting what could be taught and who could be taught what, how, when and for how long. At the same time, different types of teaching methods are being experimented upon. On the basis of these factors, attempts are being made to meet resource needs for software, hardware, teaching and technical support.

Various issues and problems have been brought to light eg. overcoming cost of hardware and software, lack of teaching and technical support, finding time slots In overloaded curriculums, changing existing attitudes towards IT, etc. We have approached these problems in various ways. We liaise closely with architects' offices, and try to use student skills and expertise within the polytechnic. We try to overcome time-slot problems by joint teaching and assessment with other subjects and try to Integrate IT/CAD with studio-based design projects by locating computing facilities Inside studios.

This paper is a story of how we have set for ourselves a path to follow. This path Is by no means rigid and will continuously change with new experiences and the demands of a volatile Industry. We have only just begun.


management
design
information production
information exchange
The application areas of Information Technology in the professions of Architecture and Interior Design centre around the use of a computer system as a tool for design and as a medium for the representation, management, use and exchange of design information.
Information Technology (IT) is the processing, storage and communication of information. The central theme of IT education is its integration with the curriculae of the various courses in the department.
Information Technology
Architecture Interior design
acquiring basic skills
applying skills to design projects
studying the impact of Information Technology on the profession
These are the three core areas of study. Emphasis is on using applications software as support tools for projects. However, it is taught in context of a broader IT education programme, which includes not only acquiring and applying skills at a computer workstation, but learning about the impact of IT on the profession through seminars and practical research involving office visits.
operating systems
word processing
spreadsheets
databases
graphics
communications
drawing and visualisation
modeling
database management
evaluation
design management
data exchange
terminal experience: learning DOS operating system/ using a wordprocessing programme to write a report
terminal experience: learning GABLE CAD system/using GABLE object modelling system in design of architecture and interior design projects
practical research:
use of information technology in architects practices
role of computers in conceptual design
ft arch degree 1
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STRUCTURE AND OBJECTIVES OF INFORMATION TECHNOLOGY EDUCATION IN DEPARTMENT OF ARCHITECTURE AND INTERIOR DESIGN AT THE POLYTECHNIC OF NORTH LONDON
CORE AREAS OF STUDY AND THEIR BREAKDOWN
PROJECTS UNDERTAKEN IN SESSION 1988-89

PAPER

This paper is an attempt to illustrate the realities of introducing Information Technology in architectural and interior design education through a case study at the Department of Architecture & Interior Design at the Polytechnic of North London The department, within the Faculty of Environment, has, in addition to various research units and the PNL/RIBA Continuing Professional Development Centre, 25 full-time academic staff and 520 students working on 3 main types of courses:

1. Those leading to professional qualifications in Architecture
   full/part time BSc Hons/BSc degree (RIBA part 1)
   full/part time diploma (RIBA part 2)
   mixed mode professional studies (RIBA part 3)
2. Access courses in Architecture and MA Health Facility Planning
3. full-time BA Hons degree in Interior Design

In January 1988, we began a rapid IT/CAD Implementation programme. Having identified the necessity to implement IT in education, research and administration, we singled out education as our first and major target area. We set 3 parallel paths to follow each of which influenced and was influenced by the other:

1. Developing a strategy
2. Formulating resource needs
3. Implementing teaching

1. DEVELOPING A STRATEGY

This meant answering the questions- what is the objective of IT education, what will be taught, how is this going to be achieved, which group of students will be taught what, when and for how long. The objective is education of students in Information Technology ie. processing, storage and communication of Information as applied to architecture and Interior design. The central theme is integration with the curriculae of various courses through 4 application areas within the professional boundaries of architecture and interior design:

1. management
2. design
3. information production
4. information exchange

There are 3 core areas of study:

1. acquiring basic computer skills and using IT as a business tool
2. applying skills to design projects and using IT as a tool for design and a medium for the representation, management, use and exchange of design Information or Computer aided design (CAD)
3. studying the impact of IT on the profession.

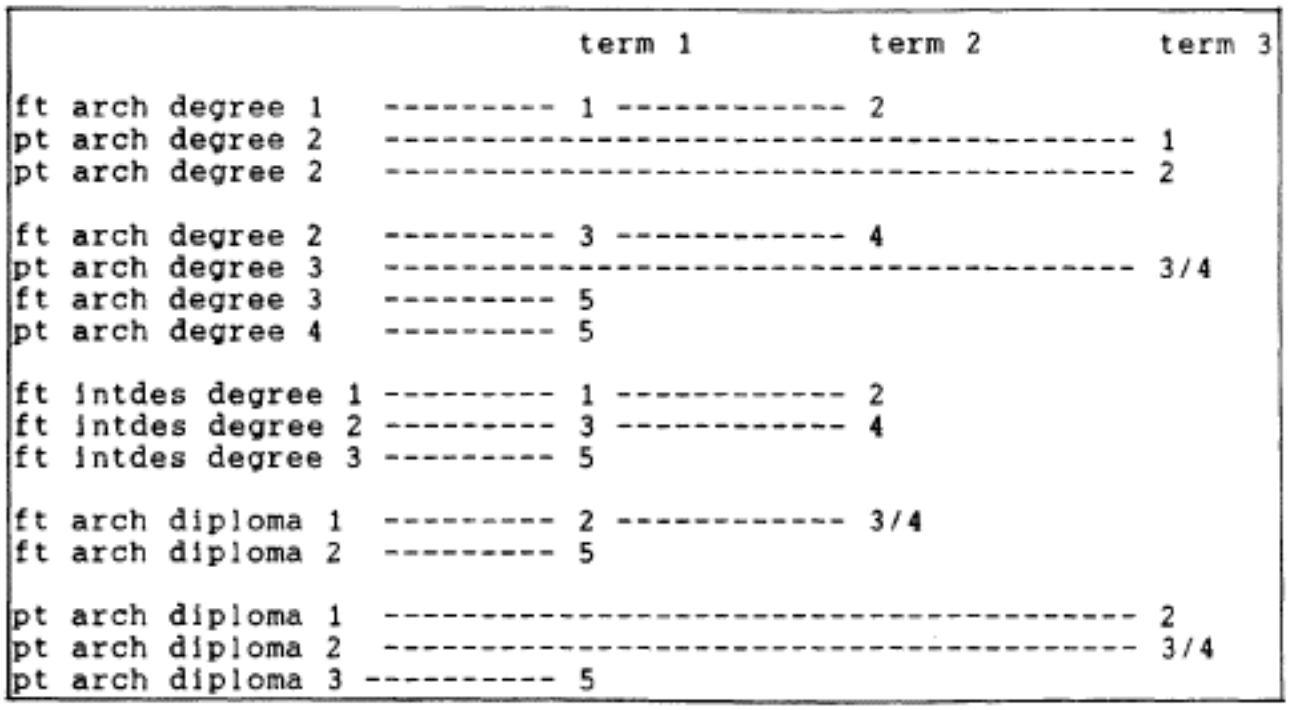
Emphasis is on using software as support tools for projects. However, our ultimate aim is 'computer education', not simply training to use particular packages. Therefore, this training is imparted in context of a broader IT education programme, which includes not only acquiring and applying skills at a computer workstation, but learning about the Impact of IT on the profession through seminars and practical research.

BREAKDOWN INTO MODULES

These core areas are studied in the form of 6 distinct modules:

	Description	Teaching method
Module 1:	General IT applications *introduces the basic concepts of Information Technology by a) learning to use a computer-hardware/operating system b) using business packages eg. wordprocessing, spreadsheet, database, desktop publishing	*terminal experience alongside lectures
Module 2:	CAD -Drawing, visualisation and presentation *introduces CAD & is concerned with skilling in drawing, visualisation & presentation.	*terminal experience
Module 3:	CAD -Design and modelling *focuses on 3D design and modelling	*terminal experience
Module 4:	Design information management and use *handles management and use of design information through databases, building modelling and expert systems	*terminal experience
Module 5:	Computer applications in architecture & interior design *deals with role of computers in architecture/interior design and impact on professional practice and information exchange.	*seminars/lectures plus practical research
Module 6:	Design appraisal *deals with use of specialised software for environmental modelling,structures,services,etc.	*terminal experience

A plan for integration of these modules with the various courses in the department is outlined. This rough framework suggests which course could take wich module, when and for how long. It is built around the concept of introducing IT at the beginning of a course and then continuing to teach it in short successive stages. This is so that towards the latter part of a course, sufficient time is available for experimentation, application and development of the skills gained. This initial period of formal IT education is compulsory for every student and is assessed in its own right. The degree and content depends on various factors like objectives of the course, its length, attendance patterns, etc.



PLAN OF INTEGRATION WITH COURSES IN DEPARTMENT
module 1 :general IT applications
module 2 :drawing, visualisation & presentation
module 3 :design & modelling
module 4 :design Information management & use
module 5 :computer applications/ Impact on professional practice
module 6 :specialised applications (taught as a component of specialist subjects and not included above)

TEACHING METHODS

Finally there is the issue of identification of suitable methods of teaching ie. how these modules can best be taught taking into consideration learning needs, student-teacher ratios and availability of hardware and software resources.
IT teaching gives rise to the need for workstation/ student and consequently multiple computer facilities to allow large group teaching. At the same time, a learning environment that Is conducive to the way designers work Is needed for successful integration of IT In the curriculum. The concept of design education is based on a flexible and open student centred learning activity. Teaching support is mainly through studio based individual and small group tutorials. This brings in the need for location of at least 1 complete set of computer facilities within each studio.

2.FORMULATING RESOURCE NEEDS

While developing a strategy, we were at the same time, analysing existing resources, conducting market research as to what software and hardware were available and in the light of our educational needs, attempting to identify how best to use what was existing and what new facilities to acquire.

Analysis of existing resources revealed that in early 1988, the department had little in the way of organized IT education or resources. The only programs in use were structural and environmental calculations programs, a colour program and some general business packages. The hardware was out of date. In some cases, it had to be shared with the polytechnic and was located at a different site. There were no microcomputer based CAD packages nor any microcomputers capable of supporting them. However, the GABLE CAD system was shortly to be installed on the polytechnic's VAX mainframe and was to be made available for use on 5 Tektronix terminals. These were located in a central computer room and shared with the rest of the polytechnic.
In addition to the lack of hardware and software facilities, there was little technical or teaching support. The department was handicapped by its dependence on the central PNL Computing Services for management of the computer system. PNLCS had neither the staff nor the time to devote to the needs of such a specialised applications area.

This analysis revealed in particular, a shortage of CAD software and suitable hardware. On the basis of educational needs established, market research was undertaken to identify suitable software and hardware. It was decided that GABLE would be retained for design and sophisticated modelling. However it would be made available on 3 Apollo workstations in studios in addition to the existing 15 Vax linked Tektronix terminals. To fill the need for a microcomputer based basic drawing and visualisation package, AUTOCAD would be acquired. AUTOCAD, along with general business software would be available on 3 Nimbus microcomputers in studios in addition to a central shared computer room consisting of a network of 16 Nimbus microcomputers. Each Apollo workstation, Nimbus microcomputer, peripherals and software would form a complete self-contained core of computer facilities located inside a studio.

Initially these bids were unsuccessful on the grounds of cost. Any attempt to recruit technical staff also proved a failure. However we have finally been successful in being able to acquire these resources and are currently equipping our studios.

3.IMPLEMENTING TEACHING

At the same time as developing a strategy and analysing resources, we were in the process of implementing teaching. What follows is a sampling of some of the major projects undertaken within the last 18 months.

1. Project topic: Introduction to computers through theory on computer concepts and terminal experience on learning to use the VAX operating system.
   - Taken by: full time architecture degree 1(35 students) full time Interior des degree 1(32 students)
   - Period: spring and summer 1988
   - Teaching method: The 2 groups had joint classes. Each student had 8 weekly meetings consisting of a 1 hour lecture followed by 2 hours terminal session.

2. Project topic: Introduction to computers through terminal experience on learning to use the MSDOS operating system on a Sperry microcomputer and using a wordprocessing program to produce a report.
   - Taken by: full time architecture degree 1(46 students) full time architecture degree 2(35 students) full time interior des degree 1(29 students) full time interior des degree 2(23 students)
   - Period: autumn 1988
   - Teaching method: Separate classes running in parallel were conducted for each of the 4 groups. Each group was divided into 2 subgroups with each subgroup attending 4 sessions on alternate weeks for 2 hours/week.

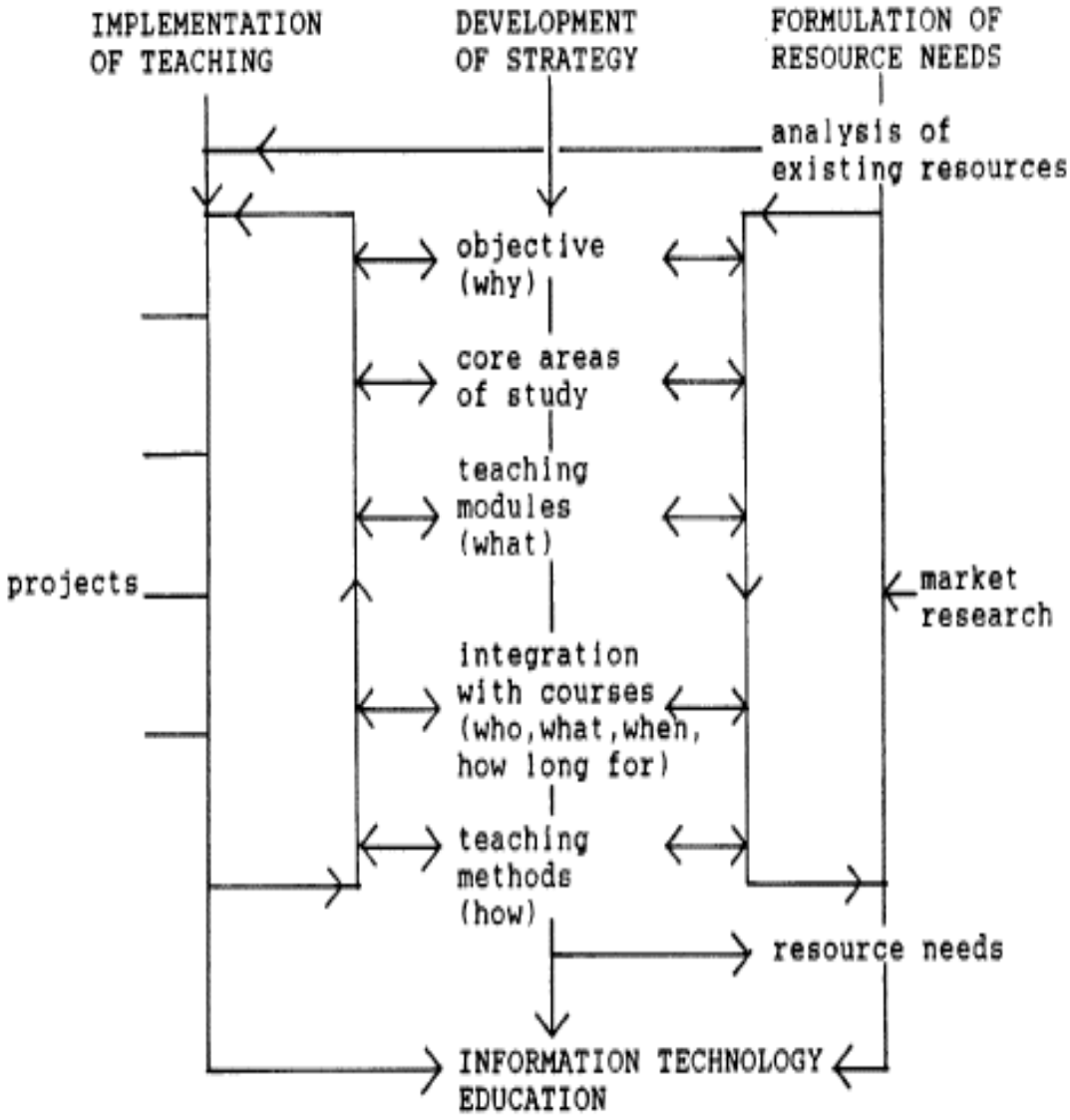
3. Project topic: Practical research on Computer Applications in Architecture and report using a wordprocessing program on how an architect might use Information Technology.
   - Taken by: full time architecture degree 1(46 students)
   - Period: Spring 1989
   - Teaching method: Lectures supported by a series of visits to different architects' offices in groups of 10

4. Project topic: Practical research on Role of Computers in Conceptual Design initiated by Royal Society of Arts competition plus visual presentation and report./ Terminal experience on GABLE.
   - Taken by: full time interior des degree 3(22 students)
   - Period: autumn 1988
   - Teaching method: Group was divided Into 3 subgroups of 5,8 &9 per subgroup. Each subgroup attended for 5 successive weeks. 5 students undertook this project as a studio option while the rest of the students were introduced to using GABLE.

5. Project topic: Use of GABLE Object Modelling System towards the design of a health centre, which was the current studio project, and its presentation through plots, photographs, slides & video.
   Taken by: full time architecture degree 2 (35 students) part time architecture degree 3 (22 students)
   Period: Summer 1989
   Teaching Method: 2 sets of classes were run in parallel for these 2 groups of students. Each group was divided Into 2 subgroups. Each subgroup had 1.5 hours/student/week terminal experience for 6 weeks.

These and other projects undertaken have raised several issues. Listed below are some of the conclusions that we have drawn as a result of this exercise.

1. Technical hardware/software, managerial and operational problems was the first obstacle to IT education. These had to be solved before any teaching could be Implemented.
2. For most of these projects, computer terminals were made available on a 1 workstation/student basis. This was seen as essential to allow first-hand experience to be gained.
3. Availability as, when and where needed was vital for a successful learning environment. Distributed facilities in studios rather than shared 'computer rooms' provided the answer.
4. Staff attitudes contributed greatly to success or failure. Existing attitudes were hard to change.
5. Low priority in the curriculum in terms of time available and assessment structure kept attendance poor, In spite of high student interest.
6. Flexibility In the course content was necessary to suit a wide range of learning needs.
7. The method of instruction called for a balance between theory and terminal experience. This is so that theoretical understanding through lectures becomes more meaningful while at the same time, work done at a terminal is understood in context.
8. Teacher/student ratios raised Issues of manageable teaching against economics of teaching time. Neither extreme worked. Small groups with teacher/student ratios of less than 1:10 proved most effective.
9. Frequency and duration of classes played an important role in holding student interest. Classes of longer duration for the same students within a shorter span of time proved most successful.
10. Lack of teaching support could be overcome by training staff and finding a channel to Implement this training, using student skills and expertise within the polytechnic and by working closely with offices.
11. Finally, the key to success must be in deep integration with the curriculum. If it is to succeed, Information Technology must be a part and parcel of design education.



The illustration above is a summary of the first phase of implementation of Information Technology In education, which has been the content of this paper.
From a much sounder resource base, we are today on the threshold of implementing the next phase of our teaching programme. At the same time, we are already looking at ways to adapt to suit the demands of a volatile industry.
We have only just begun.