

# SECEE Working Groups and Change

## MITs 90 project

The MITs 90 Research Group, based at the Massachusetts Institute of Technology, modelled the extent of IT integration within organisations in relation to its effects and benefits. The MITs 90 model identified five levels of development in the application of information technologies, ranging from the 'speculative' to the 'totally planned' and 'wholly integrated'. The MIT90s research suggests that IT-enabled business reconfiguration is an evolutionary process.

Figure 1 shows the business transformation levels. Levels 1 and 2 are primarily concerned with improving current practice and can, therefore, be realised by adapting existing processes. Levels 3, 4 and 5, on the other hand, require a redefinition of function and purpose. They cannot easily, if at all, be achieved without establishing new processes. Note, the combination of stages 1 and 2 is the springboard for the three remaining stages: stages 3, 4 and 5 are not necessarily sequential.

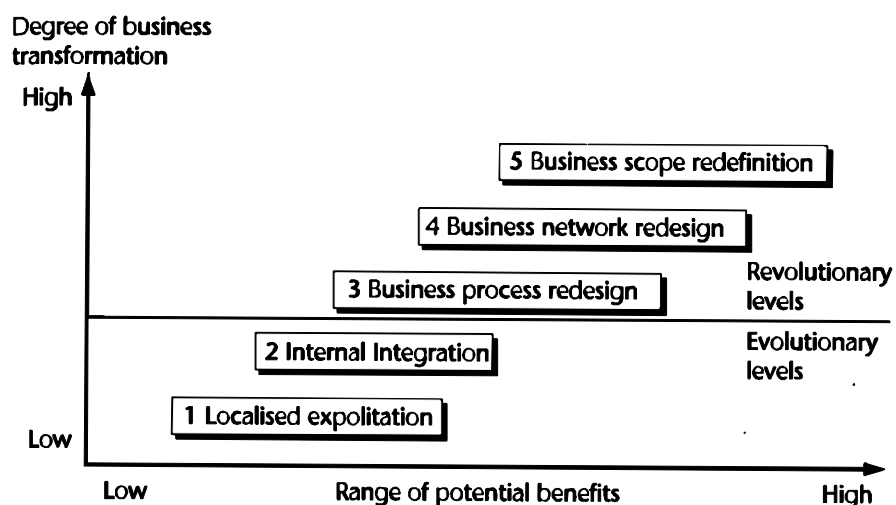


Figure 1 Business transformation levels (Source Ford et al 1996; based on MIT/ Sloan 1990: 107)

## The NCET Project

The MITs 90 model identified five levels of development in the application of information technologies. These five levels were transferred into the educational context by the NCET Educational Technology Project.

The NCET project indicated that, 'in education as in business, the more transformation that occurred through the five levels, the greater were the benefits that accrued from Information Technology. It follows that, to achieve maximum gains, a correspondingly deep commitment is required, the aim being not merely to apply IT to existing practice, but to integrate IT fully within education. The first levels of development are evolutionary, and do not require structural changes. In later stages they can be regarded as *revolutionary* because they produce significant changes in the processes of education'. Figure 2 identifies the relationship between the range of potential benefits acquired and the degree of transformation related to IT.

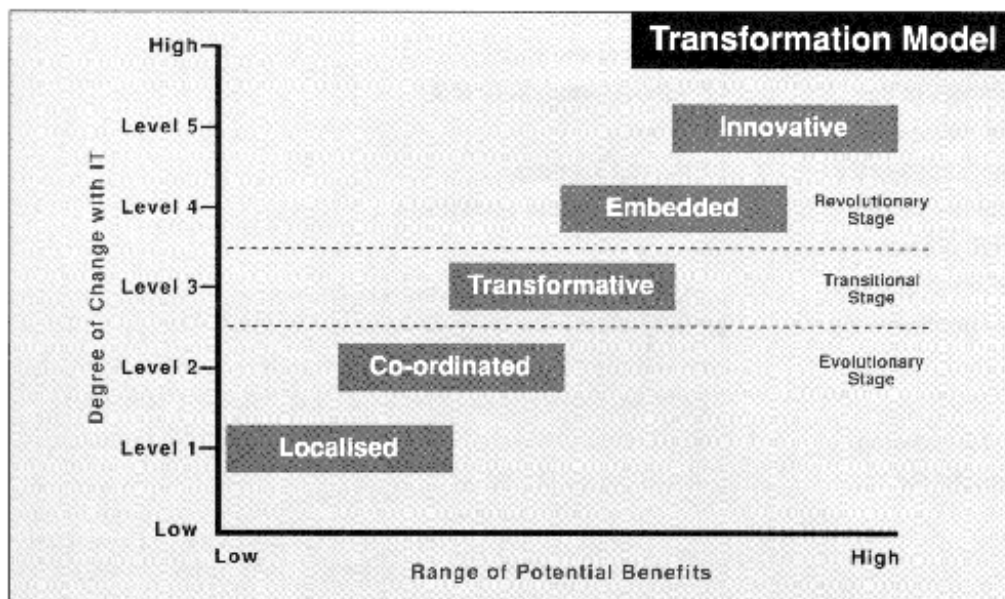


Figure 2: The NCET Transformation Model (Source: NCET 1995).

<b>MIT levels</b>	<b>MIT90s Report</b>	<b>NCET levels and example</b>
<i>Localised exploitation</i>	The MIT90s report (p. 108) defines stage 1 as 'characterised by localised exploitation. In this stage IT is exploited within existing, isolated business activities, normally within one function.' As is to be expected, this is the most widespread form of adaptation since it requires only a slight adaptation to current processes.	<i>Localised</i> Individuals or departments use IT for simple record-keeping e.g. word processed student lists or simple databases.
<i>Internal integration</i>	MIT90s (p. 111) suggests that stage 2 'can be thought of as building the internal electronic infrastructure that permits the integration of tasks, processes and functions. Stage 2 is a necessary condition if the investments in stage 1 are ever to be exploited'.	<i>Co-ordinated</i> A co-ordinated approach to record keeping across the school. Data entered by an administrative assistant.
<i>Business process redesign</i>	MIT90s (p. 115) suggests that stage 3 'results from a fundamental rethinking of the most effective way to conduct business'.	<i>Transformative</i> Individual teachers begin to take responsibility for entering data into, and retrieving from, a central database.
<i>Business network redesign</i>	MIT90s (p. 119) defines stage 4 as 'the use of IT by the organisation to include suppliers, customers or any other trading partner to contribute to the organisation's effectiveness. In a sense one is moving from the traditional, formal organisation, to a 'virtual" or 'networked" organisation that works together to accomplish a particular purpose'.	<i>Embedded</i> Data entry and retrieval becomes a natural part of every teacher's practice.
<i>Business scope redefinition</i>	MIT90s (p. 123) defines stage 5 as 'where an organisation decides to break out and exploit the new technology in the marketplace. The aim is to explain the logic underlying the composition of the organisation's portfolio of businesses, identify differential strategic thrusts and develop criteria for allocation of scarce resources among the businesses. Considerations of business scope dictate major strategic activities such as diversification, divestment, consolidation and mergers and acquisitions.'	<i>Innovative</i> Diagnostic assessment and guidance on demand.

Table 1:Shows the use of the MITs90 model and the NCET equivalent levels.

The NCET educational technology project conducted a survey to identify significant factors in developing the use of IT. From the returns, a small number of schools which had taken significant steps in their development of IT, were visited. Along with the results of the visits, wider reading, and further consultation, 15 significant factors were identified under the broader headings of:-

- management(Head /Senior Management Team, IT Co-ordinator, Library Resources Manager, IT Policy, Integration of Curriculum and Administration Data),
- staff development(staff development),
- curriculum administration(Teaching and Learning Styles, IT Skills (pupils)),
- resources(IT Technical Support, Funding, Physical Resources),
- external links(School/ Community Links),
- evaluation( ethos, Record Keeping, Evaluation and Assessment).

These factors were then mapped against the five stages of implementation, to produce a matrix. Schools were then recommended to plot their own profile i.e. significant factors against implementation stages, and use it as a basis (via SWOT analysis) to identify ways to move up the stages.

### **Use of the model for SECEE**

- For any area of change, identify the significant factors and then map them against the 'levels' (a first attempt is made below for IT in SECEE).
- The factors can then be plotted on a spreadsheet (below) to find the School's position/profile.
- As with the NCET project, an analysis (e.g. SWOT) is recommended, to see how further development can take place etc.
- The benefit of this approach is to show the present position in the context of the degree of change that could be envisaged and to make appropriate plans for the amount of change recommended as appropriate.



<b>Staff Development</b>	Individual training for personal development is provided on a first-come-first-served basis.	A co-ordinated approach to generic IT Staff Development training e.g. spreadsheets, word processing, databases.	Relevant (School focussed) IT training for the majority of staff by internal and external trainers. Portables (loan equipment) available for staff development.	IT becomes integrated intuitively into all areas of teachers' work. Focussed staff development for individual & School's need, is identified systematically and undertaken as a priority.	Staff trained in tutoring and timely teacher intervention
<b>Teaching and Learning Styles</b>	Individuals explore IT in the classroom.	IT used to support and enhance existing practice e.g., software packages made available and students encouraged to use them.	New, IT-supported approaches to traditional teaching and learning styles are incorporated into planning and policy e.g., self paced worksheets made available on Network.	Lecturers recognise the power of IT to, encourage higher order skills, e.g. problem solving, self analysis etc. Appropriate uses are incorporated into learning strategies e.g. multimedia. Also notes available via web, student discussion groups (forums) and encouraged (email etc.).	Flexible course delivery using IT appropriately. Distance learning possibilities
<b>IT Skills (students)</b>	A few teachers make use of students' basic IT with little assessment.	Curriculum areas provide contexts for the development of IT skills and their assessment. Generic skills may be developed through IT courses.	New teaching situations demand new skills above and beyond the basics. Use of email for peer problem support. Email used to communicate with module leaders.	The use of IT across the curriculum enables new learning skills to be used in a more intelligent way. Better identification of learning outcomes at the planning stage helps teachers to assess students and plan progression. Also enables students to assess their own needs and plan accordingly	Flexible (personalised) course delivery using IT appropriately
<b>IT Technical Support</b>	No on-site technician. Technical support from IT Co-ordinator.	Technician appointed to support IT.	Technicians contribute to the teaching process during class time and to IT development e.g., producing simulation examples and aid the staff development process.	Technician's role evolves into that of academic support/partnership, promoting the use of a wide range of technologies and taking on running of e.g., computer testing.	<u>Efficient,</u> <u>customer-driven</u> <u>resource</u> <u>deployment</u> e.g. students all own portables, which they connect to Network (IR link). Only specialist PC equipment needed.
<b>Funding</b>	IT is funded in an arbitrary way.	IT is funded to reflect priorities identified by PMC/ Research Committee in consultation with staff.	Higher percentage of funding allocated for staff development. Co-ordination of funding between research/admin/teaching.	Commitment to IT development requires the exploration of innovative ways of increasing funding. School manages applications for University initiatives.	
<b>Physical Resources</b>	Individual teachers/ groups seek control of IT resources to explore potential.	Potential of machines, networks, and a range of generic applications is considered, along with the implications for wider curriculum use.	A mixed economy of provision means that open access (14 hours/day) rooms and specialist (restricted) areas are developed.	Networks are increasingly used for independent learning. Portables, digital cameras etc. are available for loan. PC as an engineering tool i.e., technical data access(CD's via network) and integrated measurement tools e.g., oscilloscope and function generator cards, linked to Excel etc.	

<b>Community/ Business /Research Links</b>	Informal links developed by individual lecturers /groups which exploit IT resources e.g. of local commerce, industry, other institutions.	The School's links with the community, reviewed and considered for mutual benefit e.g., via Industrial Liaison Committee and Univ. External Partnership.	Schools links begin to have an impact on curriculum focus. The community provides support, e.g. industry gives expertise and equipment.	Planned liaison and development with the community influences the development of the Schools thinking on educational and research. Special projects started e.g., making network information available to schools and business.	Focus on community/ industry collaboration through partnership e.g., work based learning.
<b>Agencies/ Professional Bodies etc.</b>			Targeted information requirements etc.		
<b>University Links (initiatives)</b>		Ad hoc take up of initiatives e.g., EDS	Focused team responses to initiatives on identified key areas (e.g., areas to be at the forefront and weakness areas)	Partnership arrangements with library, Computer Services. Automated targeted information updates from units e.g., External Development and European Union initiatives.	
<b>Ethos</b>	Individuals motivated by IT, share expertise with others.	Staff begin to work collaboratively within the School to develop an IT policy.	Staff committed to delivery of integrated IT policy across the curriculum with input from research.	'Quality Management' is applied to the use of IT within the School. Lessons are drawn from external networking.	Staff collaborative team working (not just in Plymouth) in teaching & research via group ware (Lotus Notes). Staff manage and facilitate student work groups.  <u>Diagnostic assessment and guidance on demand</u>  i.e., available through open access and expected to be used as essential to student development.
<b>Academic Ethos</b>	Individual lecturers, motivated by IT, share expertise with others.	Staff begin to work collectively using email and transferring data (documents, data files)	Staff regularly update (student cohorts, other staff, staff groups) using distribution lists. Memos, typing drafts etc. always sent by attachments. Computer testing, and student learning support material, developments.	Students (modules) managed via IT. Regular use of computer feedback enables: weak student to be identified early and directed to support material, and module approach to be varied effectively.	
<b>Record Keeping</b>	Individuals or groups use IT for simple record-keeping e.g. word processed student lists or simple databases.	A co-ordinated approach to record keeping across the School/ Faculty. Data entered by an administrative assistant.	Individual teachers begin to take responsibility for entering data into, and retrieving from, a central database. School systems aligned with Faculty /University.	Data entry and retrieval becomes a natural part of every teacher's practice.	
<b>Evaluation and Assessment</b>	School reacts to external pressure, e.g., Quality & Enhancement unit	Looks outwards e.g. to other University's for examples of good practice.	Uses IT for assessment and student profiling and reporting.	IT records used to inform curriculum development and planning. Students record their own development and use assessment tools to aid their own profession planning/ development.	

### SECEE IT Planning Matrix: Example

