Institutional readiness for implementing network technology

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Experience from TLTP and FDTL projects increasingly indicates that the institutional change associated with the integration of learning technologies requires leadership, vision and a clear sense of direction from all levels of senior management. The embedding of technologies within an institutional framework is also characterised by a high degree of ownership of that change by the department directly responsible for the teaching (Mayer, 1997). Whilst developments need to meet the immediate needs of staff or departments they should at the same time should be 'top down' and demonstrate a clear vision of the role of ICT within the institutions strategic plan.

One strategy which can support strategic planning is the use of an institutional audit which seeks to elicit the current situational context and identifies the strengths and weaknesses across a number of critical success factors.

TALENT(Teaching And Learning using Network Technology) is a TLTP 3 funded project which collects knowledge and experience of using the web for teaching and learning institution wide, and shares this knowledge within a community of collaborating universities. Access to the TALENT materials and membership of the community of TALENTed universities is available without cost. TALENT's prime objective is to evaluate tools, support structures and strategies that will support HEIs implementing ICT in teaching and learning.

The four founding HEIs felt they had a range of different experience, strategies and tools which could be consolidated to provide a 'TALENTed' approach to institutional change with ICT. The programme proposed working with a further 8-10 joining institutions who would avail themselves of the TALENT resources and support, pledging evaluation data to inform the dissemination of the transferable approach to a wider audience.

At an early stage in the TALENT project it became apparent that an institutional audit was required. Initially it would enable the project team to benchmark the current status of the institution and subsequently to evaluate its implementation progress in the course of the project. It should also enable an action plan to be developed which would identify possible areas for development and identify places where TALENT tools or approaches would be useful.

The development of the audit tool

The audit TALENT developed had its roots in work that was undertaken by one of the TALENT team when working for the National Council for Educational Technology (NCET). Based on an extensive evaluation of a number of technology rich institutions . Capstick & Poole (1994) proposed that changes observed in educational institutions with ICT could be mapped onto a model of change developed by the MIT90s project (ICL 1992) within a commercial context. The model describes five levels of development which can be observed in institutions as they progressively integrate ICT within their organisational structure.

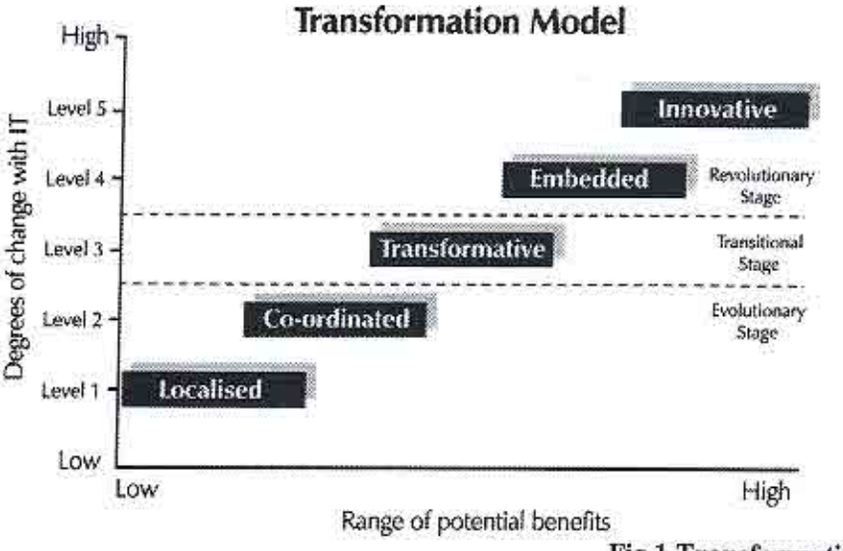

Fig.1 Transformation model

Levels of Development

Five levels of development in the use of ICT were established in the MITs 90 model, ranging from the speculative to the totally planned and wholly integrated. In an educational context, these were converted into five specific levels: *localised, co-ordinated, transformative, embedded and innovative.*

Localised
At the localised level of development we will expect to see largely uncoordinated activity but with pockets of good practice.

Co-ordinated
Many universities made substantial moves into this level when they moved responsibility for ICT deployment away from user-departments and placed it in the hands of an ICT committee or manager.

Transformative
The key to this stage is a recognition that the application of ICT to learning and to the business functions of the institution has the power to change processes - to alter the way that people go about the business of learning and the functions which support that learning.

Embedded
Staff and students will use ICT as a natural part of their day-to-day activity. At this stage staff will think nothing of consulting administrative systems for vital up-to-date information on students, courses and so on. ICT will play a large part in both the preparation for and delivery of lectures and electronic communication will play a significant part in tutorial support, along with internal and external links that were previously maintained by other means. Innovation in teaching and learning strategies may be accompanied by innovation in approaches to timetabling and resource allocation to ensure maximum use of ICT and other facilities.

The original work identified a number of 'critical success factors' which appeared to be influential on the progress of educational institutions. These covered areas such as:

- Management
- Staff development
- Curriculum/Administration
- Resources
- External links
- Evaluation

The factors exhibited a continuum which was mapped against each stage of development.

	1 LOCALISED	2 CO-ORDINATED	3 TRANSFORMATIVE	4 EMBEDDED	5 INNOVATIVE
Strategic Management	C&IT planning is left to local departments and individuals	Encourages a co-ordinated approach to C&IT development at Department level.	The value of C&IT is seen as a key feature of the institution and there are moves to integrate it into the environment	At an institutional level C&IT is a vital feature of its ethos	Strategic commitment to C&IT in learning

Fig.2 Critical success factor mapped against stages of development

The critical success factors and the stages of development with ICT were arrayed against each other to form a matrix. When used with staff in an institution the matrix would provide a profile of an institution recorded as a bar chart.

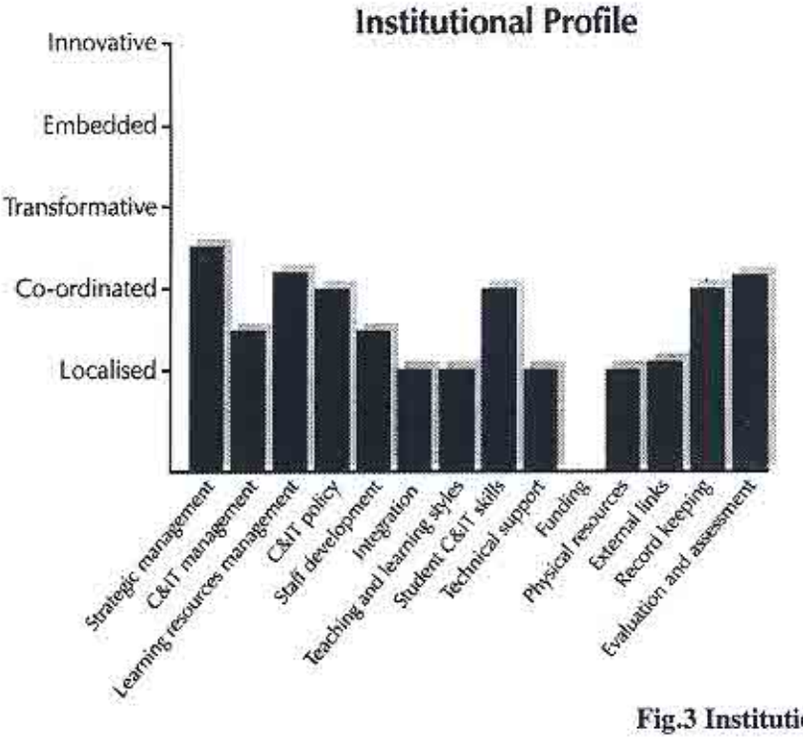

Fig.3 Institutional profile

Subsequently NCET devised a matrix for an FE/HE context. The TALENT project, using experience from the four founding institutions, updated and validated the matrix for HE institutions in the current climate. This matrix can be found at: http://www.le.ac.uk/TALENT/book/c2p5.htm

As part of the TALENT programme the matrix has been tested in a further eight 'joining institutions' who have affiliated themselves to TALENT. The diversity of institutions in which the matrix has now been tested provides a degree of confidence with regard to its transferability to the wider HE sector.

Using the audit tool

Profiling the use of ICT with the audit tool should be a planned process. The first step is to select a group of staff from different areas of the institution, and with different levels of involvement in ICT. This group should include stakeholders. The role of the participating staff is to examine current practice in ICT usage, management, support, training and other activities, and to evaluate current practice. It should be recognised that staff will see the situation differently depending on their individual views and their position within the organisation. It is, therefore, sensible to have a balanced contribution from senior managers, administrative staff, academics and those from support departments.

The matrix could be given to members of the group in advance so that proper consideration is taken before completing the matrix. It will be more productive if the group is informed of the aims of the profiling exercise and how the results are to be used. Using the matrix to construct a profile can be done in group(s) or individually.

Each area of the matrix can be discussed by stakeholders in a group session. Areas of confusion could also be identified and cleared through discussion. A consensus, or as near as possible to it, should be agreed for each stage the institution has reached. This should be noted on a master copy of the matrix. The discussion and analysis that is engendered by this audit is valuable in itself.

The next step is to interpret the results collated from the exercise. The profile of the institution which emerges can locate strengths and weaknesses among the 14 areas. The individual responses may also raise some issues that are worth noting. People working in one area of the institution may rate all aspects of ICT consistently low while others may rate them consistently high. This could indicate an uneven distribution of facilities and/or support within the institution. People working at different levels may use different parts of the ICT system, which could also result in different ratings.

A SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis can alert senior management working in areas that need development and also inform other departments of staff development priorities. If the profiling is to assist changes in ICT use within an institution it should be integrated into the institution's strategic planning process or a ICT review. After the institution is able to identify strengths and weaknesses in ICT through the use of matrix profiling, the weaknesses should be noted and then used to inform priority areas that need attention. At the same time many institutions may not be in a position to address weak areas immediately, and it is more appropriate to make the best of the strengths to assist where possible.

The final step is to write a summary and distribute the summary result to the members of the audit group as feedback and to prepare the ground for forthcoming action within the institution. The

profile can be a useful basis for devising strategies and planning actions on how to move the institution forward to the next phase.

It is also valuable to provide data in subsequent evaluation of the effectiveness of implementation strategies and the progress of the institution.

From the audit reports, it was possible to produce the following case studies.

Case Studies

Institution A

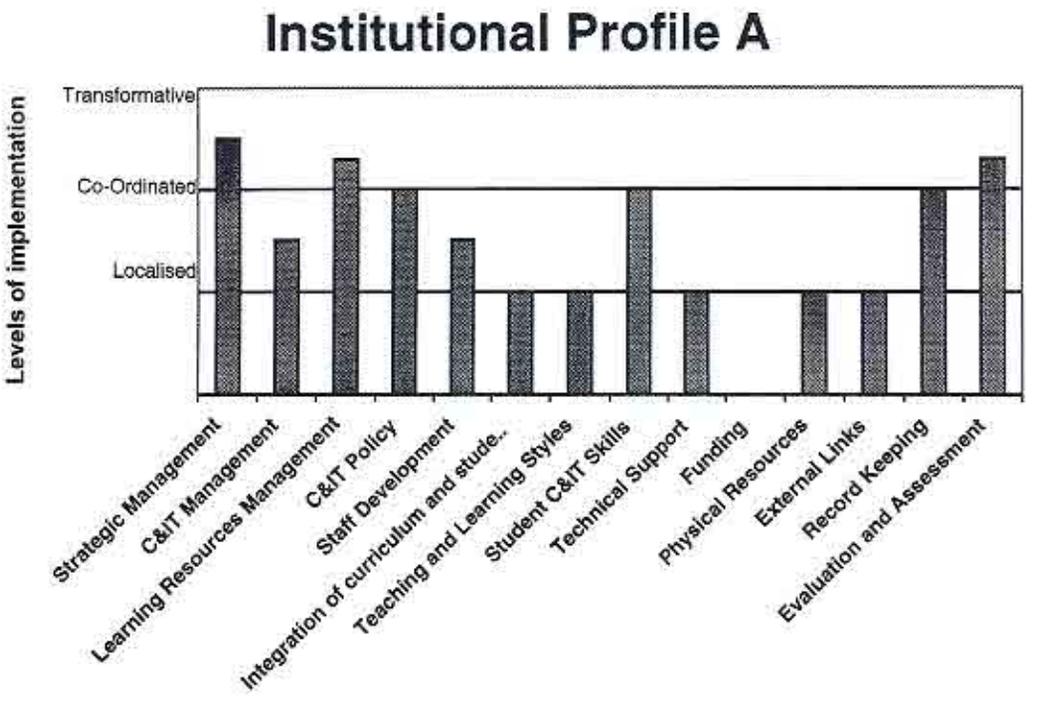

Fig 4 Profile A

At the commencement of the project in Institution A, there was a wide ranges of practice in the use of ICT in teaching and learning. A few departments have very active members of staff in supporting ICT and use it effectively in teaching activities. Some even design and develop their own software to pursue online activities. A few newly designed courses have ICT embedded in the delivery of teaching. However, there are courses and staff who prefer not to use any electronic resources in their teaching. At the commencement of the TALENT project, there were no teaching & learning strategies in place. Instead, there were two parallel provisions of ICT, centralised and departmental.

Staff development was organised for two weeks a year. There was no efficient help desk arrangements, The staff help desk system was still under development, although a student experimental help desk was in place. In house software was being developed for the purpose.

Events were organised to promote the use of ICT and other teaching technologies, but a significant part of teaching staff could not take part, because of different academic calendars. The institution was planning to introduce the Netskills materials for staff training. Limited materials were available online.

The institution has a common type of network infrastructure and access to the Internet was standardised throughout the campus. Students have access to all facilities. There are open access areas for computing provided in the library and in computer rooms within faculties where standard MS Office application software is supported by a central unit. Limited CBT/CAL is available on the network.

Students' ICT skills were partly embedded in the curriculum, but there was no central initiative to support the trend. Activities tend to be "bolt-on" and not fully integrated.

Technical support was limited and patchy, with acute staff shortages in the area. Currently, there are limited resources in supporting the use of ICT. The central IT service had approximately nine personnel.

Links with external institutions were mainly through personal contract by individual staff. There was only limited access to MIS information by a very few designated staff. There was a clear need for more integration of curriculum and student data, with the appropriate training for staff.

Coinciding with the start of the project, a new Principal circulated a paper entitled *Meeting the Information Needs* which he circulated to all staff. The vision was of an Internet based information system with the main emphasis towards supporting learning and teaching. Following on from this, an Assistant Director of Learning Resources was appointed . Her responsibilities include staff training and developing educational use of the Internet. In addition, the new unit of 12 existing people are now responsible for audio visual equipment, web development, and have helped to produce a learning & teaching strategy that is now in place.

At the time of audit , this institution was mainly at a localised level of development with largely uncoordinated activity, and pockets of good practice. Nevertheless, there was a strong transformative approach in the areas of Strategic Management and Learning Resources Management, produced by the vision of senior management and the appointment of the Assistant Director of Learning Resources . Network technology is now being used to transform processes, and the way the institution goes about its business.

Institution B

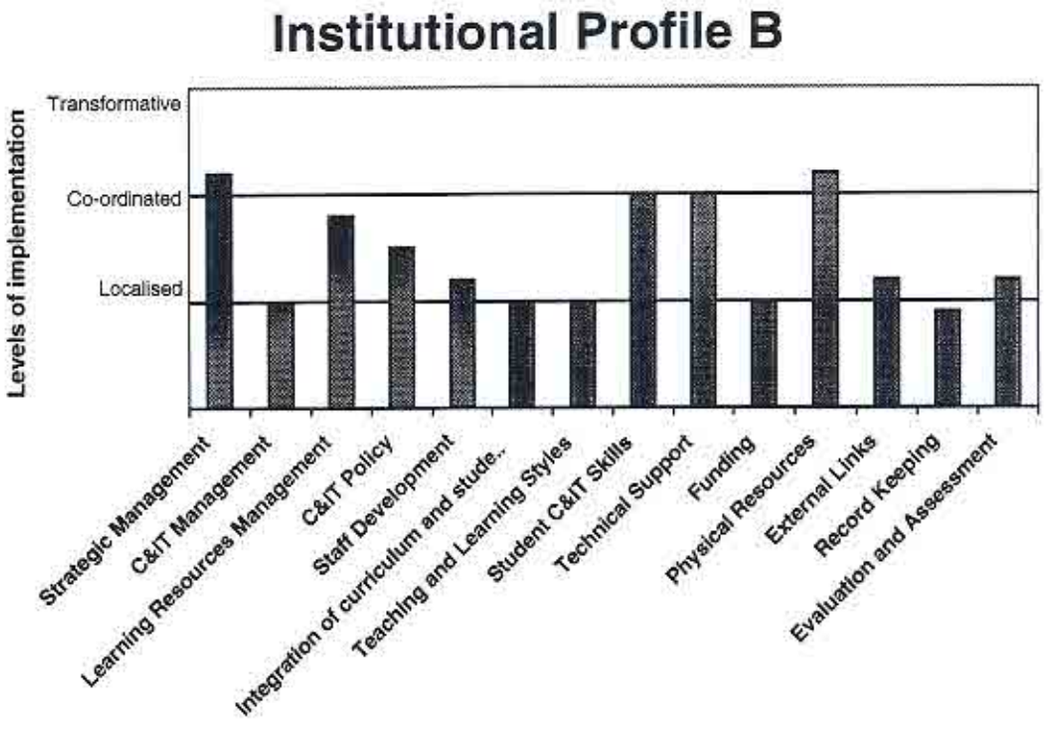

Fig 5. Institutional profile B

At the time of the TALENT audit, Institution B was just putting a Teaching and Learning Strategy in place.

As with Institution A, technical support was limited and patchy, with acute staff shortages in this area. The Institution had reached a level of standardisation of ICT provision in terms of hardware and software. Network facilities were being upgraded in the near future, but there was no strategic approach to the use and management of ICT, as yet. A working group was set up to develop a Strategy for Information and Communication, which had reached the final draft stages.

There was no overall Learning Resources Strategy. Instead there were two parallel provisions of ICT, centralised and departmental. There was currently a central move towards changing the curriculum to take account of ICT use, and a unit within the institution had been identified as having the remit for Staff Training and Development in this area. Lack of resources was identified as the major obstacle for implementing this brief, for which a programme was already in place. A previous IT Unit was lost and had not been replaced. There was a serious lack of computer training for staff. There are little or no teaching resources available. Students' ICT skills were partly embedded in the curriculum, but there was no central initiative to support this trend. There is excellent practice within the organisation, with a need for dissemination and implementation.

Student management data had been out of reach to academic for historic reasons. There was a clear need for more integration of curriculum and student data, with the appropriate training for staff. There is a mixed provision of departmental resources and open access areas.

Institution B is set clearly at the co-ordinated level. The development of the college LAN will clearly come into question, and its development will be seen as a mechanism for improving curriculum provision.

Institution C

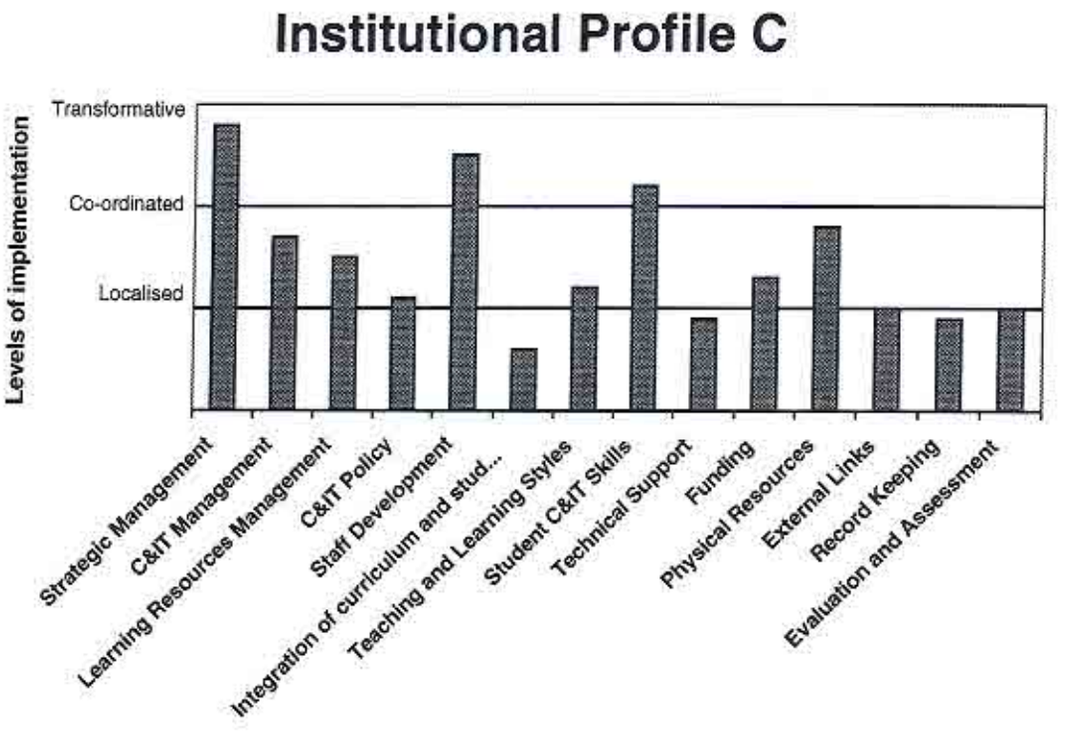

Fig 6 Institutional Profile C

From the audit, it became clear that members of senior management at Institution C were developing a clear vision, which was to be embedded in various strategy documents. These were to be led by an Information Strategy, of which a draft was currently being approved. Other strategies, such as those on Learning and Teaching and Learning Resources are being developed and are aimed to be coherent and complementary to each other. However, there was a lack of clear practical policies to follow these strategic visions. Lack of communication within theInstitution, meant staff and students were not fully aware of the strategic vision that senior management were placing on the use of C& IT. There were pockets of good practice within Departments.

The strength of the Institution lies with a strong awareness and emerging strategic commitment by its senior management to develop networked learning by implementing ICT technologies. Institution exists as a closely knitted community that could move forward in this direction rapidly

and had the confidence to do so. However, implementation of network technology is largely being driven at a local level, with not enough strategic vision and communication from senior management.

Management of ICT facilities was co-ordinated by Heads of Service on an informal basis. Priority on support was driven largely according to external factors set by regulatory bodies. The Higher Education Institution's central networked facilities that support computing services and Internet access are open to all staff and students, but an integrated learning environment on the network was yet to be established. There was a perceived need of further up-take of ICT use at senior manager level. A staff development programme was in place and includes ICT content. Provision of students ICT training was course dependent and there was a common reliance on the use of facility guides and through peer help. Student access to computing facilities at peak day times was extremely limited at present resource level. This hampers the adoption and development of open and network-based curricula and learning styles.

Technical support of ICT facilities are provided by a relatively small team who operate mostly under their own initiatives and maintain the systems to the best of their ability at current staffing levels. There are no formal written working procedures or a helpdesk/fault-logging system and team experience plays an important role. This was not regarded as an efficient working practice, albeit with the very limited manpower that was available.

Like many other HE institutions, the institution's MIS systems are not integrated and are not at present used effectively to support curriculum development or automation of student management. The current system produces mainly hard copy records and provides very limited access to staff. The importance and usefulness of a unified MIS system was very much recognised, but the resource required to implement the systems fully excludes it from reality at the near future.

Analysis

There are common problems facing all three institutions in the implementation of network technology.

As a result of the auditing process some generalisations on the issues associated with implementing network technology in supporting teaching and learning can be drawn:

- technology support was patchy, dependent upon local circumstances;
- progress still depends upon availability of funding and the enthusiasm of particular educators;
- the learning environment in which technology was used remains fundamentally unchanged
- many academics lack confidence and skills in the full range of uses.
- development work was largely funded locally by schools and departments and there was no central fund for any such activities
- Students ICT activities are seen as "bolt-on" as opposed to embedded.
- Staff training was crucial
- Centralised implementation seems to be most effective

The future

In all three institutions, the importance of senior management's vision of developing network technology was a major factor. In Institution A, there was clear leadership and communication to all staff and students. This was done by the establishments of new roles/units for the purpose of developing educational technology for learning, and the development of a teaching & learning strategy. The Principal himself had recently obtained an ECDL. New structures had been set up, in spite of funding problems. Strategic initiatives had been organized. In this institution, the development of network technology was moving in a co-ordinated and cohesive manner. They have recently re-audited themselves and achieved substantial changes, as seen below

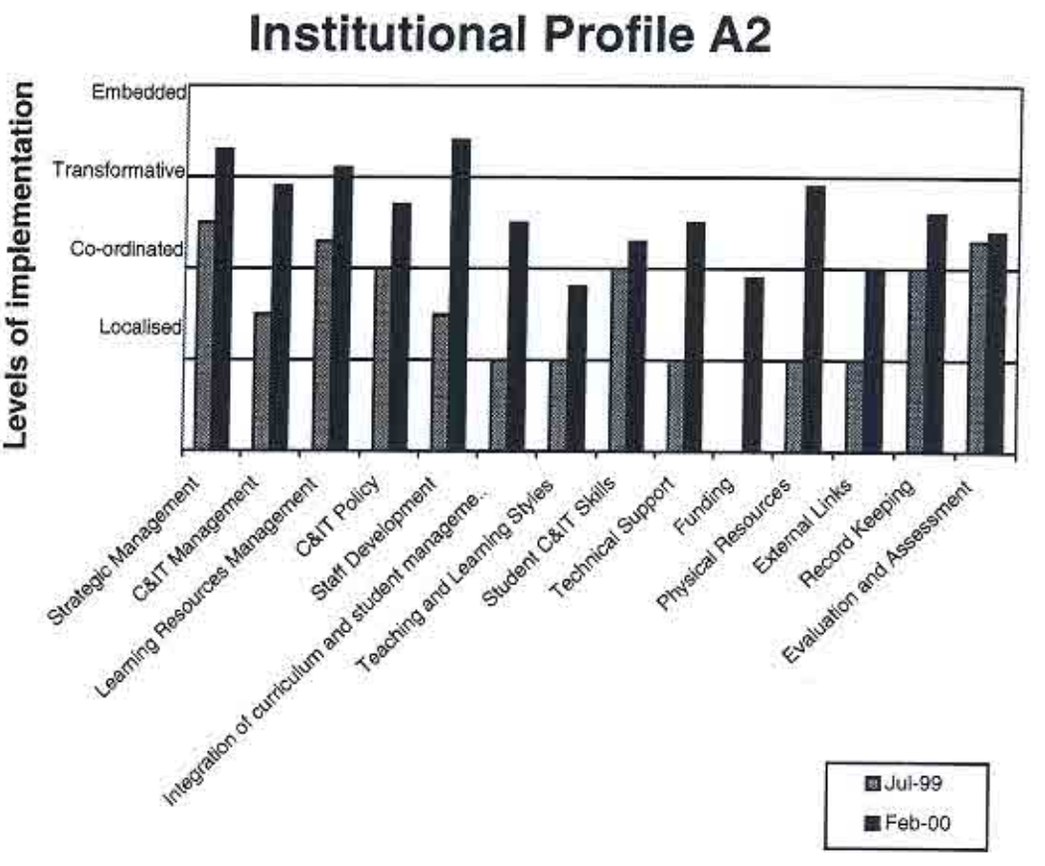

Fig 7 Institutional profile A2

Through this centralized, coordinated approach under proactive leadership, this institution is moving forward at a rapid rate in its development of networked technology for teaching & learning. It is limited mainly by resources.

In institution C, there was a clear need for a more effective approach to the development of Network technology. The Institution was seen to react to external forces, rather than moving ahead with its own priorities. There are no clear strategies in place. Staff are developing systems in a haphazard way, rather than in a prioritised organised manner.

Well organised staff development is also fundamental to network technology implementation, as is a Help Desk procedure. In Institution B, there is a clear need for more staff training to carry

forward staff development. Institution A has moved forward very quickly in this area. We found that a small percentage of educators at the institution may take to the technology very easily, provided it was made available. This was the most important step in the process, to be accomplished with administrative help. But the presence of a small but enthusiastic set of people will not ensure success, unless the introduction is accompanied by policies that will ensure the utilisation of network technologies. Motivating factors include release time to allow educators to prepare their resources to go online.

Summary

The experience of auditing institutions, undertaken within the TALENT programme, illustrates that this strategy can provide a valuable discussion forum for staff, at a number of levels within the organisation, to share their perception of its current status. The resulting profile has been shown to be useful at a planning level to identify strengths and weaknesses and to indicate target areas where resources and strategies are likely to be most effective. There is also increasing evidence that re-auditing is useful in evaluating progress and the effectiveness of particular strategies as implementation proceeds.

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