

Change and Innovation We Expect of ICT Teaching Staff

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Abstract

Many governments are emphasizing the need to improve ICT skills, research and innovations, often making special reference to the role of higher education. At the 2003 conference of NACCQ, several authors reported on change and innovation in ICT teaching. Change in Higher Education in general continues, as was evident from some of the papers presented at the 2003 HERDSA conference in New Zealand. This paper explores the ITP sector (Institutes of Technology and Polytechnics) in New Zealand and selected literature on the management of change and innovation in higher education in order to formulate recommendations for managing change, innovation and improvement in the environments with high resource constraint that most ICT departments find themselves in. We first review the public exhibition of research in the ITP sector for indications of change and innovation. Then we consider job descriptions of staff at highly unionised ITP's in New Zealand as a worst-case scenario, again looking for emphasis on change and innovation. And finally do we use specific literature on the management of change and innovation in the ITP sector in order to formulate and explore initiatives that HOD's and ICT staff should be undertaking while working in the current environment of high resource constraints.

Keywords: Teaching, Change, Innovation

1 National expectations re ICT in Higher Education

At the 2001 conference of NACCQ (National Advisory Committee on Computing Qualifications) in Napier, New Zealand, Prof Ian Morrison presented the Australian perspective of government, higher education and ICT matters. A strong case was made for the need to review national and local policies to improve resource allocation for ICT teaching and research in higher education.

The 2002 report of the New Zealand ICT Taskforce emphasizes the necessity for tertiary education

institutions to increase their contribution to skills and knowledge development. Improvements in the number of skilled ICT staff, quality of teaching, continuous revision of curriculum and revised teaching approaches are implied by the report. In fact, it is continuously pointed out by many publications that more change and innovation will be required to overcome short-term problems with resource availability in higher education across the world.

At the 2003 conference of NACCQ, change and innovation in the ICT field was explored by several people. For example, Robertson & Ross indicated how ITP's changed the portfolio of IT qualifications they offer and especially what is planned. Potgieter et al reported two experiences related to change and innovation. In one case it was reported how the portfolio of offerings changed during the past two years with the introduction of several new ICT specialization degrees. Another paper reported on the development of a new Faculty of ICT. These papers indicate the changes that are under way internationally.

2 Change and Innovation published in the ITP sector

What are the changes and innovations that ICT departments at ITP's (Institutes of Technology and Polytechnics) are already involved in? A simple analysis of the proceedings of the NACCQ 2003 conference shows that about 40% of the papers focussed primarily on teaching, up to 45% on improved understanding of ICT (mostly for the purposes of teaching) and the rest on matters regarding practicing research and management. This is a rough breakdown and estimate, but it does indicate that ICT teaching staff members spend ample time working on the complexities of ICT itself. These outputs most often do not yet increase the richness of the ICT technology (the subject field for non-teaching) similar to the research outputs of other ICT researchers from universities.

ICT teaching staff at ITP's are actually challenged by many matters to change and innovate when teaching. Following below is an overview of the type of work ICT teaching staff members are involved with, with related examples from the proceedings of the 2003 conference of NACCQ:

- New ICT technologies to be covered in courses: The 18-month cycle for doubling of the capability of ICT is a well-known observation that impacts rather uniquely on ICT staff (eg.

Kennedy, Nisse et al, Roggio, Albertyn, Clark et al, Harvey, Jamieson, Wen, McLay, Pears et al, Robbins & Strode)

- New technologies to be used for teaching: ICT students increasingly demands that teaching staff use ICT in their teaching, especially to demonstrate how ICT works while also being flexible with room arrangements (eg. Young & Huggard)
- Increasing ICT proficiency of a group of students at entry levels: The number of students with highly advanced self-taught ICT skills increases each year, demanding changes from the tutor/lecturer (eg. Kearry & Skelton on teaching to students of the “Playstation era”)
- Increasing number of ICT students with low ability: We also have more students in class (due to financial and social reasons) that cannot always cope. They require extra teaching effort and activities not previously required, as well as special consideration of literacy (eg. Mann et el)
- Improving success rates (internationally problematic in ICT studies): Ministry of Education (MoE) indicated that they intend changing funding formulas to reduce funding for institutions where student pass rates are low. Improvements will require more effort from teaching staff many areas
- Changes to accommodate different learning styles: This does perhaps apply to many study fields, but studies by Burrell (2003) indicate that ICT teaching has its own challenges, that are increasing
- Increased portion of non-English speaking students in class: Internationalisation is experiences by many institutions worldwide, bringing its challenges regarding language and cultures (eg. Chamberlain & Hope, Connolly & Cleary)
- Adult learners in ITP environment hold their own challenges that should be considered and be adjusted to (eg. Hu, Li)
- Increased class sizes for institutional profitability: Reports from the Tertiary Advisory Monitoring Unit (TAMU, 2002) indicate that ITP’s are gradually increasing average class sizes, moving away from the niche for which staff were trained for many years
- Flexible teaching: The number of ICT students dropped at many ITP’s, resulting in classes that are half-full where innovative approaches are use to avoid overload of staff that must now teach more classes for institutional profitability

3 Further challenges re Change and Innovation

The changes and innovations are not limited to the well-known teaching duties. Pressures requiring change, innovation and improvement include many non-teaching duties:

- Doing research required while having a high number of class contact hours for teaching: ITP staff members generally have a high teaching load (12-16 hours per week for degree teaching, 20-24 hours for other), leaving little time for research. This implies that less time is available to create the environment from which they could benefit (eg. Bruce-Ferguson, 1999 and 2003)
- Competition with universities for research money: Recent changes to MoE funding makes matters worse for ITP staff because they will be competing with universities under the new Performance Based Research Fund (PBRF)
- New qualification structures introduced to meet market needs: ICT courses are introduced annually with qualifications reviewed and changed probably much more than other fields of study (eg. Robertson & Ross, Potgieter & Jansen van Vuuren)
- Imbedding of high-level industry qualifications: ICT departments increasingly need to imbed internationally recognized qualifications provided by IT vendors (for example Microsoft and CISCO) (eg. Pascoe)
- Changes to accommodate graduates from PTE’s since 2003: Many students started ICT studies at PTE’s in New Zealand from 2001. Many of these students finished their studies and want to continue at ITP’s. It is becoming clear that the specific use of unit standards of NZQA used by PTE’s results in some complications to allow students to continue their studies at ITP’s.
- Laboratory time: ITP’s consider student time in laboratories as teaching time that should be done by the same teaching staff in order to develop skills and proficiency of students
- Increased administrative demands from MoE: Examples include more thorough programme reviews, increased controls of changes to degrees, and increased reporting requirements
- Contributions required for social responsibilities: Staff are expected to be involved in initiatives with schools, industry and broader society. Most of the time new contributions are required (eg. Corich & McLay)

It appears that ICT teaching staff at ITP’s in New Zealand are generally involved in a broad range of change and innovation initiatives. ICT staff may also wish to point out that each tutor, regardless of the level of seniority, has to deal with many challenges related to the class room situation, for example changes course

contents for new ICT, teaching with new ICT software and equipment, demands from changing student profiles, increasing administrative and teaching requirements from Ministry of Education, complex infrastructures and research, to name a few. In fact, the most senior department staff might in practice only be leading change and innovation activities, while most ICT teaching staff are participating in change and innovation or even performing it themselves. It is therefore important to consider the work arrangements which regulate the priorities and focus of staff, especially those where HOD's may have less control over, such as job descriptions for staff members at highly unionised institutions. This is an perhaps extreme, but it strongly influences the working environment for change and innovation.

4 The contribution of employee associations

ASTE (the Association of Staff in Tertiary Education) is the largest single representative group of academic staff in New Zealand. Site membership sometimes reaches levels far over 70%. At all institutions with high membership figures, the role of the Performance Criteria of staff would be very important for the future of the institution. We will take a look at the agreement of one of the highly unionized institutions where a set of Performance Criteria was negotiated with the union a few years ago and is still in intensive use. We will be interested in the direct or indirect references to the requirements to perform change and innovation.

Three levels of job grades exist for academic staff. The most junior job level is simply referred to as ASM (Academic Staff Member). This is followed by Senior ASM and then Principle ASM. Each has increased/additional duties and performance requirements. We will consider the role of PAsMs because one would expect senior staff to be performing and leading most of the change and innovation.

The Performance Criteria are described in the following categories of duties, namely Generic, Discipline/Subject Area, Teaching and Learning, and Professional Commitment. It is interesting to note that teaching dominates in the document, with *extremely* little reference to the Research and Entrepreneurship elements of the REST framework. This contradicts the challenges faced by ITP's to grow research (Bruce-Ferguson, 1999 and 2003) and to become more entrepreneurial.

The Performance Criteria is 8 pages long (including three grades of staff), covering very roughly 100 points that could be considered for references to change and innovation. However, only a few of the items can qualify as being direct descriptions of change and innovation. Following below are 14 points where words were identified that could be referring to change and innovation.

- Generic (covered on 1 of the 8 pages of the document):

- “Provide *leadership* in discipline and teaching”
- “Leading and *responding* to feedback from students” – responding to student satisfaction surveys
- Discipline/Subject Area (covered on 1 of the 8 pages of the document):
 - “*Expert* knowledge”
 - “*Significant* research and development”
 - “Colleague recognition of *academic leadership*”
- Teaching and learning (covered on 3 of the 8 pages of the document)
 - Planning and preparation
 - “... *renews* programmes and courses” and “demonstrates leading a programme review” and “work they have done that maintains currency”
 - “Leads curriculum *design and development*”
 - Teaching Strategies/Presentation
 - “Demonstrate *innovation* and/or leadership in developing or maintaining effective styles and methods of teaching and learning...”
 - “Demonstrate introducing and *innovative* strategy”
 - Special needs: No references
 - Assessment and evaluation: No references
- Professional commitment (covered on 3 of the 8 pages of the document)
 - Commitment
 - “Demonstrates a commitment to *development* of their discipline and of their teaching”
 - “Demonstrates a commitment to *continuous learning*”
 - “Demonstrate how individual discipline and teaching has been *developed*”
 - “*Significant enhancement* of the Polytechnic’s reputation in...”
 - Effective teamwork
 - “Demonstrates leadership”
 - Attitudes/Values: None

In summary - very little reference is made to change and innovation. It could however be argued that some of the other statements which appear like maintenance of current order, in fact imply some changes and innovations occurring. Examples include references to “external recognition validating expert knowledge”, “colleague recognition of academic leadership”, “Maintains currency...”, “...leadership in...planning”, “...external moderator...”, “leads...in assessment and moderation processes”, “Significant enhancement of the Polytechnic’s reputation” and “Recognized as facilitate, mediator within and/or outside the department” [sic]. It could be accepted that some change and innovation

might be implied from these statements. Whatever the outcome, it is still interesting to note that no special effort was made to emphasize change and innovation.

It would benefit us at this stage to consider matters regarding the management approach to create the environment for change and innovation in higher education environments. This is required in order to formulate specific proposals for the ICT environment of ITP's.

5 Management and organization of Change and Innovation in Higher Education

Bruce-Ferguson (1999, 2003) described how academic staff and heads of departments at ITP's in New Zealand are faced with the challenges to do and manage research along with other activities, and the stresses this situation can cause. These challenges are often not appreciated by non-academic management at ITP's. Change management to develop a research culture at an ITP institution is clearly a mission in itself! Potgieter & Bruce-Ferguson (2003) asked whether there is a need to assist heads of department at ITP's manage change and innovation. The same could perhaps be asked regarding academic staff, especially academic staff involved in ICT courses.

Several of the papers at the 2003 educational conference of the Higher Education Research and Development Society of Australasia (HERDSA) explored the increased management of change at higher education institutions (eg. Kenny, Huntley-Moore & Panter, Van Schoor). Several other studies emphasize the management of change in higher education (Huntley-Moore & Panter, 2003). ITP's have been going through major changes since the late 1990s due to changes in funding by government. Change and innovation management by higher education institutions therefore appear to be a very relevant field of study for ITP's.

Bates (2000) noted that academic/teaching staff members (educators) operate as independent professionals in relation to their teaching. When managing change in these educational environments, therefore, four key points must be addressed:

- How educators interact with their peers, adapt to change and grow professionally
- The independent nature of work having a major influence on educational innovation
- The need for time for interpretation, understanding and adoption at implementation
- The fact that the real meaning of educational innovation can only emerge during implementation

Fundamental here is the necessity to increase the involvement of teaching staff during the whole process of change, lest resistance impede necessary change.

An educational innovation is likely to require that new understandings and skills be incorporated into teaching practice (Kenny, 2003). This requires teacher change which comes about "when the teachers themselves consciously examine their own activities and critically reflect upon their own practice, their situational constraints in which they work and the consequences of their action". Given the independent work of teachers, the need to change teaching practice requires the involvement of the practitioners themselves, who can study their own practices and determine how these might best adapt to requirements for change. Past research (e.g. Gilbert, 1994; Walker, 1993) has shown that this reflective practice is a common way in which teachers improve their own practice, so extending this model to incorporate needed change would not use unfamiliar processes.

In ITP's, the heads of departments are typically the change managers, linking the teaching environment of teachers with strategic management, though they sometimes drive change rather than just managing it (see Bruce-Ferguson, 1999). They are the people who should know how to lead change initiatives. Potgieter & Bruce-Ferguson (2003) explored the implications for heads of department of ITP's in general. It is likely that the change for IT heads of department will even be higher, considering the nature of ICT and the dynamics of the ICT industry. What are there any matters for consideration by the HOD's to organize the work environment?

Naturally would the first consideration be to create an environment where staff members actually have the time to take part in change and innovation. Morrison (2001) pointed out that teaching staff at ICT departments of most institutions are under tremendous pressure. Resource allocation at national and local level most often causes a very high teaching workload for staff. Leaving little time for research, change and innovation. It should be the focus of the HOD to obtain more resources for the ICT department and staff. But we should in any regards consider the working environment that staff members find themselves in when they do have the time for research, change and innovation.

Kenny (2002) reported on key success factors for projects of radical change in educational environments. Apart from the usual issues of clear support from senior management and sufficient time, two other items are imperative for success in educational environments, namely:

- The establishment of several self-managed project teams with open communication processes, conducting action learning/action research
- Accountability processes emphasizing documentation of learning, iterative development, periodic reporting after a cycle and dissemination to the organization.

Kenny explains that the emphasis is not solely on achievement of goals, but also on learning. Projects start

with a planning phase, continue with a design and development phase and conclude with an evaluation phase. These might appear to be the same as other change projects, but project occurrences are more frequent (with smaller targets) and each project contains high provision for learning experiences. The sequence follows a common action research cycle, and is practised in a range of environments.

This approach has been followed with success during an action research project in an IT department of a Bank in South Africa (Potgieter, 1997). Many aspects of the above principles were also used with success during the change and innovation initiatives of an IT department at an Institute of Technology in South Africa (Potgieter & Herselman, 2003). That particular educational institution is still busy with major developments towards becoming a University of Technology after following the formation of a Faculty of ICT from development in recent years.

In summary do we see that the institutional environment in the higher education institution should follow principles of Action Learning. Opportunities should be created for academic staff to be involved in the whole process of change. Specific involvement would include examination of own activities and critical reflection upon own practice, constraints and consequences. Small self-manages project teams are required and must be held accountable to document learning, do iterative development, periodically report and disseminate learning.

6 Implications and Recommendations

It is firstly essential that resource allocation for ICT in higher education be reviewed at national and institutional level. This is a given and a high necessity, as explained by Morrison (2001) and others. There could be emphasis and initiatives to measure actual workload to support lobbying for reviews of resource allocation, but it is also important to improve current efficiencies simultaneously. The HOD and ICT staff should still attempt to improve change, innovation and improvement of the department in the current environment. The ITP sector, and perhaps the whole higher education, could benefit from tackling this challenge systematically.

A visible indication that the problem is being tackled systematically in the sector would be when the number of publications focusing on improving the effort of tutors to achieve the same academic outcome, increases. Specific topics would include revision of curricula, the effects of teaching approaches, increased use of junior (cheaper) assistants and more self-directed learning. The use of new technologies, taking advantage of the learning styles of students, efficiency of automated assessment and sharing of best practices across institutions are also indicative that work is done systematically to achieve a situation where tutors spend less time on teaching duties. Reference to previous publications and case experiences in the sector building

on previous experiences elsewhere would indicate that iterative development is under way in the community, as recommended by Kenny (2003).

Inside the institutions, HOD's should direct staff members towards research activities that would achieve the above outcomes. It can be emphasized in institutions that these initiatives can help to improve staff's work environment. Special emphasis is required on the need for staff to be involved in the whole process of change experiments, for staff to examine their own activities and then critically reflect on own practices, environment constraints and overall consequences (Bates, 2000). A brief summary of the experiment should afterwards be documented to plan the next intervention and to progress into a paper at the national conference or in a journal. This approach would indicate that staff members are involved in self-directed organizational learning and development, as recommended by Bates (2000) and Kenny (2002, 2003).

More use could also be made from the committees overseeing programmes at each institution. Programme Committees meet frequently to plan the programme, discuss student progress, approve student results, decide on interventions that might be required and review regulations. This group of academic staff could add an important goal or objective to their agenda, namely the improvement of resource efficiency. Discussions and decisions are documented as specified by institutional quality systems that are in operation to ensure that the guidelines of the Ministry of Education are met regarding quality management. This could be an ideal forum where academic quality is balanced with business goals such as financial performance. It would again also involve staff in organizational learning and improvement and be in line with advice of Bates (2000) and Kenny (2002, 2003).

ITP's and other higher education institutions in New Zealand (preferably Australasia) could seriously consider the possibility of national movements similar to that of the LEAGUE in America. The LEAGUE is an association of community colleges that promotes change and innovation in the college environment of America. It operates alongside AACC (the American Association of Community Colleges). Improvement and innovations in teaching and the use of ICT in the college environment are published and shared in annual conference workshops. New technologies are demonstrated and teams meet to work on improving the use of current technologies. The possibility could be explored to formulate a research proposal for special funding by government, since the purpose here is to achieve a situation where the output of the ITP sector is increased without proportionate investment in production facilities.

Reward systems for promotions and salary movements should also be reviewed. In extreme cases like some of the highly unionized institutions in New Zealand, this will be critically important. Much more emphasis is required on the contribution to change and innovation, especially the contribution to reduce the workload and time commitments of tutors. Research publications on

the topic are required, but implementation is much more important - the actual achievement of the ability of themselves and others to free time from teaching while still maintaining academic standards. Rewards need not be only the promotion to higher levels, but could include financial payments or other non-financial benefits such as free time. The principle might understandably be less appropriate for universities where fundamental research about ICT is very important.

But HOD's and management of the institutions must also create the best environment for staff to participate in change, innovation and improvement. Staff could for example benefit from having templates for planning an experiment and writing up the results and a paper. They might also need brief training on experimentation and action learning in small groups to initiate and operate quick, iterative learning cycles. Since some staff at ITP's are not used to reading conference proceedings as they teach full-time, other staff in the department will have to help in this regard. And finally must the communication flow be open inside and across departments while an atmosphere of risk-reward is promoted by management.

And finally should the duties and activities of HOD's themselves be reviewed. HOD's face a range of challenges related to change and innovation (eg. Ramsden (1998), Huntley-Moore & Panter (2003), Potgieter & Ferguson (2003)), and the administrative load of HOD's is very clear. This leaves little time for the HOD to lead these change and innovation initiatives, whereas close involvement of senior management typically leads to more success in education environments (Ramsden, 1998). Some operational matters and administration could be removed temporarily or shared by senior staff in the department. The situation at each institution might be different.

In conclusion – policy changes are required to improve resource allocation for ICT at national and institutional level. But while this is under way, we recommended that institutions (especially ITP's) undertake more directed and coordinated intervention in order to change, innovate and improve where possible. We need focus and action on both levels to improve the efficiency of the sector end enable more change and innovation in future. Further research might be required to determine possible problems with this broad approach and to determine willingness of institutions to participate.

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