

# New Zealand Productivity Commission

## *New Models of Tertiary Education*

### New Zealand Board for Engineering Diplomas (NZBED)

#### Part A: General Comments

The New Zealand Board for Engineering Diplomas (NZBED) is an Incorporated Society established to provide strategic oversight of the delivery of the New Zealand Diploma In Engineering (NZDE) and the New Zealand Diploma in Engineering practice (NZDEP). These two diplomas were established under the Targeted Review of Qualifications (TROQ) process.

The Board itself is comprised of representatives from providers (13 Institutes of Technology and Polytechnics (ITPs) and 2 private Training Establishments (PTEs), Industry Training organisations (ITOs) and industry. Under the constitution of the Society, the Chair of the Board must be an industry representative.

There are significant and long-standing issues facing engineering education in New Zealand. These issues are identified and addressed in the E2E initiative ([www.engineeringe2e.org.nz](http://www.engineeringe2e.org.nz)) which has the objective of increasing the number of engineering graduates in New Zealand by 500+. This is a challenging target and will make demands on the tertiary sector, especially the providers. There is little doubt that the policy setting and the regulatory/funding machinery of the present tertiary sector is not well placed to assist in the achievement of the above goals.

Meeting the challenges of achieving a significant increase in the numbers of people graduating with a NZDE will require effective leadership and creative approaches to the regulatory and funding environments.

The *New Models of Tertiary Education Draft Report* covers a comprehensive range of issues facing tertiary education in New Zealand. While the scope of the draft report extends beyond the area of interest to the NZBED it is notable that the NZBED has, nevertheless an interest in the following list of issues addressed in the report:

- Funding
- Economies of scale
- Innovation
- Supply and demand
- Student decision-making
- Universities not directing students to non-university providers
- Role of employers
- Transferable skills
- Engagement between employers and providers

- Qualifications and skills mismatch
- E2E
- Out of region provision
- Transition from school
- Staircasing and articulation
- Industry training
- Apprenticeship systems
- Quality assurance arrangements
- Quality teaching and learning
- Mathematics teaching
- Recognition of prior learning
- Flipped learning

In many ways the challenges facing the provision of Engineering diplomas provide an almost unique lens through which to consider the issues facing the wider sector. Because of its narrow focus the NZBED experience can avoid the 'noise' that inevitably exists when considering a sector involving thousands of qualifications across hundreds of providers.

### **Funding:**

There can be little doubt that the single most influential factor at the institutional level across tertiary education is funding, both the level of funding and perhaps more importantly the method of funding.

While the present EFTS system was designed to be relatively simple, it has become increasingly complicated over the past decade. The main reason for that increasing complexity has been the search for greater accountability and transparency.

Irrespective of the complexity of any funding system the reality is that funding, more than any other factor, drives behaviour. The key strategic decisions made by providers of tertiary education are, in most cases driven by funding.

The present funding system is based almost entirely on the number of EFTS a provider can attract. From the providers' point of view, therefore they are motivated to (a) attract as many EFTS as possible and (b) retain them for as long as possible. At the next level down, the motivation is to arrange the student cohorts into the biggest possible groups in order to maximise the student/teacher ratio. The economies of scale inherent in such system are considerable.

### **Economies of scale**

Since the largest provider is funded at exactly the same rate as the smallest provider for students engaged in similar programmes, the disadvantage to the smaller provider is considerable. In addition to the disadvantage attached to the simple 'numbers game' (provider A has a cohort of 100 EFTS @ say \$10,000 per EFTS = \$1m against provider B with a cohort of 30 EFTS @ \$10,000 per EFTS = \$300,000) both providers are confronted with exactly the same basic, unavoidable fixed costs. By way of example, both providers are required to support a council, a CEO/Vice Chancellor, a quality management team etc.

but these costs, compared with total revenue are disproportionately far greater for the smaller provider. And they are unavoidable.

The NZDE is delivered by fifteen providers, eight of whom are located in the five urban centres, Auckland, Hamilton, Wellington, Christchurch and Dunedin. The other seven providers are spread across regional centres. While nearly 80% of total EFTSs are located in the main urban centres, it is critical that access to this qualification is maintained in the regions if the growth targets are to be met and maintained.

Having regard to the economies of scale issue mentioned above, maintaining the provision of the NZDE in regional centres would be greatly enhanced if the present funding system could be adjusted at the margins in order to make the delivery of this qualification more attractive and sustainable in the regions.

**Recommendation:**

**That consideration be given to adjusting the funding system in a way to ameliorate the disadvantages being experienced by smaller regional providers of the NZDE.**

### **Distribution of funding by providers**

There is another aspect of the funding system which is highly influential but perhaps not well understood. The system is based on 'funding categories' which vary according to the perceived cost of a programme. Medicine and dentistry for example are funded at a higher rate per EFTS than Engineering which in turn is funded at a higher rate than Arts or Commerce. There a logic to this but the reality is that there is no requirement for a provider to apply the funding rate for a particular programme to that particular programme. The system is a 'bulk funding' system where the distribution of the funding within the organisation is subject to the decision-making processes within that particular organisation.

The distribution of resources within a provider is usually subject to: history, pressures to meet the needs of the local community/economy and a complex matrix of interactions and politics within the organisation.

**Recommendation:**

**Having regard to the present government priority with respect to engineering qualifications, steps should be taken by the Tertiary Education Commission (TEC) to ensure that no Engineering Department is disadvantaged by the allocation of resources within a particular provider.**

### **Priority areas**

For a number of decades now, successive governments have identified Science, Technology, Engineering and Mathematics (STEM) subjects as high priority areas within education generally. The problem has been identified as insufficient student numbers enrolling in STEM subjects. During that time, various simple solutions have been sought to

address the problem. These included lifting the cap on the numbers of EFTS which can be funded in those areas and providing additional funding to STEM. None of these strategies have been successful because they have tended to address the symptoms of the problem rather than the *cause* of the problem. The answer to finding the *cause* of the problem lies in asking why people are choosing not to study STEM subjects. In the case of Engineering for example the causes lie in (a) a poor understanding of what Engineering actually is, (b) a poor understanding of the career prospects in Engineering, (c) difficulty in meeting the required level of Mathematics, (d) in too many cases Engineering is seen by providers as a relatively high cost, low 'return on investment' by providers.

The focus of attention in addressing these problems to date has tended to be on the supply side whereas the core of the problem is on the demand side. The design of the present funding system is not well suited to addressing such problems because the funding system is focused almost entirely on the supply side.

## **Innovation**

The draft report spends much time on the topic of innovation. The report, however, does not actually define or describe exactly what constitutes innovation in the context of tertiary education. There is no doubt that the delivery of teaching and learning in many cases is not the same as it was 30 years ago, whereas in other cases it may be very similar. Innovation, where it exists within tertiary education is more likely to be evident at the micro level rather than at the 'macro' or institutional level. These innovative successes are exemplified by creative and effective teaching and learning techniques by individual teachers.

At the institutional level the tertiary education sector, in particular the ITP sector does have a track record of innovative practices. Almost without exception these initiatives have been costly failures.

Notwithstanding the previous experiences in innovation, or perhaps because of them, the entire tertiary sector is risk adverse. Apart from past experiences, the funding and regulatory systems are such that providers have very limited headroom within which to experiment with innovative thinking or processes. These pressures include: funding rates being squeezed, the ability to raise fees is tightly constrained, providers are required to maintain surpluses within a narrow tolerance and providers have limited scope to manage fixed assets.

The draft report is correct in stating that tertiary education is 'co-produced' i.e. providers and students both play a part in the learning process. Students also make a substantial financial contribution to their learning. Both of these factors would combine to suppress innovative tendencies.

If innovation is to be encouraged, it would need to be focused on teaching and learning and initially at least, efforts be made to shift the financial risks from the providers.

### **Recommendation:**

**That a contestable *Engineering Innovation Fund* be established and administered by TEC. This fund would have a specific focus on improving the quality of teaching and learning within Engineering.**

### **Role of employers**

The NZDE was developed through the TROQ process with considerable input from employers. In addition to their involvement in the development of the qualification, employers are actively involved in the NZBED's Board which oversees the delivery of the qualification. The position of Board Chair is mandated by the Society's constitution to be always held by an industry representative. There are grounds to believe that the NZDE provides a positive working partnership between providers and industry in an important qualification.

### **Apprenticeship systems**

The New Zealand Diploma in Engineering (NZDE) is a two year, Level 6 qualification. One key learning outcome of the qualification is that graduates are able to apply engineering theory to practice working within well-defined engineering problems. The qualification itself was developed in close association with industry players. The present restriction of apprenticeships to Level 4 does not allow any consideration of an apprenticeship-type pathway to this qualification. Such a system has the potential to significantly broaden the pool of potential students in the NZDE. It would also serve to tighten the links between employers and providers. In addition it would have to potential to unlock some innovative possibilities.

### **Recommendation:**

**That consideration be given to enabling an Apprenticeship system at Level 6, specifically for Engineering.**

### **Out of region provision**

The restrictions on 'out of region' provision are applied mainly within the ITP sector. This was not always the case. Experience shows that when the restrictions did not exist, a number of costly 'adventures' were undertaken. Having said that, in the context of the NZDE and having regard to the economies of scale issues mentioned above, there may be circumstances where such arrangements could be made.

### **Recommendation:**

**That consideration be given to explore mechanisms through which the provision of the NZDE could be delivered ‘out of region’. Such arrangements would need to be designed with the intention to expand the provision of the NZDE in accordance with government policy.**

### **Quality Teaching and Learning**

The Draft Report is notable for how little attention is paid to what is perhaps the single most important aspect of tertiary education: the teaching and learning process. There is surely no more critical contributor to success than the quality of those thousands of interactions that take place every day between teachers and learners. If we really want to improve the quality of the tertiary education sector we must bend our backs to the task of relentlessly seeking ways to improve those interactions. This is difficult and unglamorous work but if we fail to address it as a high priority, all of the other potential interventions, no matter how effectively implemented, will amount to very little.

When students are asked about their tertiary education experience they will, almost without exception refer to the quality of the teaching and learning they have experienced and they will be right in identifying that as the key success factor. From an individual provider’s point of view, achieving improvements in this area, right across the organisation would effectively negate any other success factor that could be considered.

While identifying teaching and learning as probably the single most important success factor, it would also have to be said that this would be one of the most difficult areas within which to achieve improvement. All the more reason, therefore to place this topic at the very top of any priority list.

### **Recommendations:**

- **That improving the quality of teaching and learning be regarded as the single most important contributor to success across the tertiary education sector.**
- **That effective leadership from across the wider tertiary education sector including TEC will be critical in developing strategies designed to improve the quality of teaching and learning.**

### **Pathways and Staircasing**

Engineering qualifications are well structured, both nationally and internationally. New Zealand is a signatory to three international engineering accords: the Washington Accord covers four year degree (professional) programmes, the Sydney Accord covers three year

degree (technologist) programmes and the Dublin Accord covers two year diploma (technician) programmes.

In New Zealand the four year degree programmes are delivered by universities, the three year qualifications by six ITPs and one university and the two year diploma by 13 ITPs and two PTEs. The six ITPs offering the three year degree also offer the two year diploma.

Articulation and pathways between these three types of qualifications are not well developed. By way of example and as mentioned in the draft report, students who seek to gain entry to a four year engineering programme in a university and who fail to do so, are too often directed to another (non-engineering) programme within that university rather than being advised to seek entry to an alternative engineering programme at another provider.

**Recommendation:**

**Explore ways to remove barriers to pathways through engineering programmes.**

**Industry training**

In addition to being responsible for the NZDE the NZBED is also responsible for the New Zealand Diploma in Engineering Practice (NZDEP). This qualification is a work-based qualification that tests the trainee's practical application of engineering knowledge and skill. Assessment is conducted by an Industry Training Organisation.

**Part B: NZBED Comments on the Draft Report's Recommendations**

The draft report contains a summary of recommendation (PP337 -343). Part B of this submission addresses those recommendations with comments.

**Recommendations:**

**R12.1** Regulatory and purchasing functions in tertiary education appear to be a poor match to government agencies. In implementing this inquiry's recommendations, government should take the opportunity to design agency forms that provide clarity of function and reduce conflicts of role.

**Comment:**

Agree.

**R12.2** NZQA and providers should use ex post tools that assess the actual quality of the tertiary education experience. Such tools can ensure compliance with minimum standards and verify promises made by providers.

**Comment:**

**NZBED believes that both ex ante and ex post tools have their place. The ex ante tools are well established but the same cannot be said of ex post tools. In the case of the NZDE, the extent to which graduates are ‘work-ready’ is a key ex post measure. The most common observation made by employers, not just in the engineering sector but more widely, is that too often graduates do not possess the ‘soft skills’ required on entry to the workplace. This is well recognised and the challenge lies in developing such soft skills in students without sacrificing the development of essential technical skills.**

**R12.3** The Ministry of Education should design a new quality control regime for tertiary education that encourages innovation, takes a risk-based approach, and enforces minimum standards of quality.

**Comment:**

**While encouraging innovation is a worthy objective, such a strategy will not be successful unless the issue of the inevitable financial risks associated with innovation is dealt with.**

**R12.4** The Ministry of Education and the Tertiary Education Commission should prioritise analysis of the value-add of tertiary education, including at provider level and by ITO. It should identify what kinds of study, at what providers, result in the best outcomes for different groups of students – including comparisons between provider-based and ITO-arranged training. It should publish this information for use by students, parents, providers, ITOs and purchasing agencies.

**Comment:**

**ITOs and tertiary providers have very distinct missions. Comparisons can be misleading.**

**R12.5** The Tertiary Education Commission should change the way it measures completions so that provider performance is not penalised if a student transfers to continue learning at a different provider or moves into work.

**Comment:**

**Agreed.**



**R12.6** Students should be able to mix and match courses from different providers. The funding and regulatory system should not penalise providers for participating in such arrangements.

**Comment:**

**In the context of the NZDE, it is difficult to envisage such arrangements being sought. In principle the recommendation is sensible.**

**R12.7** Government should discontinue Performance-Linked Funding.

**Comment:**

**Agree.**

**R12.8** NZQA should be responsible for defining minimum performance thresholds and monitoring provider performance against those standards. Providers that fail to meet minimum performance thresholds should lose their licence to operate. The thresholds should be clear and any changes publicised well in advance.

**Comment:**

**In the context of the NZDE we believe that the present system provides a reasonable level of performance monitoring which includes industry and the engineering profession.**

**R12.9** The Ministry of Education should reform its approach to school-based career education so that school students, from an early age, develop the skills and knowledge to make effective decisions about their study options and career pathways.

**Comment:**

**Strongly agree. This 'intervention' needs to be made earlier rather than later.**

**R12.10** Government should consolidate and improve the array of official information sources about study and career options aimed at prospective (and current) tertiary students.

**Comment:**

**Strongly agree.**

**R12.11** All providers should be able to apply to NZQA for self-accrediting status. Self-accreditation would cover processes such as programme approval and accreditation, qualification monitoring, and evaluation and review.

**Comment:**

**The success of such an approach would depend entirely on the criteria established by NZQA.**

**R12.13** NZQA should review their programme approval processes, with a view to reducing timeframes and removing any unnecessary requirements. It should set a target for the median timeframe for approvals.

**Comment:**

**Agree in principle.**

**R12.14** NZQA should update its policies to permit providers to change the location of delivery without prior approval, where those changes do not materially alter the programme from the perspective of students.

**Comment:**

**Disagree. Campuses can be widespread and the learning experience from campus to campus could differ considerably.**

**R12.15** NZQA should amend its guidelines for approval of degree-level programmes to clarify when and why they require a panel review. Panels should be the minimum size and skills composition necessary for quality control.

**Comment:**

**No comment.**

**R12.16** Providers should develop or adopt frameworks of standards for tertiary teaching, suitable for New Zealand's tertiary system, for assessing and rewarding the capability and performance of tertiary teachers.

**Comment:**

**Agree.**

**R12.17** Government should relax its statutory requirements for research-led teaching of degrees.

**Comment:**

**Agree.**

**R12.18** Government should establish a student ombudsman service within NZQA to promote credit transfer, and with the power to arbitrate disputes between transferring students and their destination provider.

**Comment:**

**The recommendation seems logical but would receive the strongest opposition from providers, in particular the universities who would invoke the Academic Freedom provision in the Education Act.**

**R12.19** The Ministry of Education and the Treasury should review the current regulatory arrangements, with a view to separating government's fiscal exposure to tertiary education institutions from its responsibility to protect the interests of students.

**Comment:**

**The government's fiscal exposure in the TEI sector is linked to its ownership role. It is difficult to see how any government would/could surrender that role.**

**R12.20** To improve their ability to innovate, tertiary education institutions (TEIs) should own and control their assets, and be fully responsible for their own debts. Government should seek to amend the Education Act 1989 to allow it to identify financially competent TEIs and treat them accordingly. This includes:

- removing the requirement for such TEIs to seek approval to acquire or dispose of assets, or to borrow money; and
- removing government's guarantee of the creditors of such TEIs.

**Comment:**

**The benefits would not be worth the risks.**

**R12.21** Tertiary education institutions (TEIs) should contribute directly to their local communities by paying rates. This would remove a distortion that leads to inefficient asset use by the TEIs and inefficient land use.

**Comment:**

**No comment.**

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**R12.22** Government should:

- extend funding eligibility to students who do not intend to pursue qualifications;
  - remove specifications that set a lower and upper limit on fundable course duration;
- and
- remove limits on the use of industry training funding on training at levels 5 and above on the NZQF.

**Comment:**

**Agree.**

**R12.24** Educational delivery by institutes of technology and polytechnics anywhere in New Zealand should not require the approval of the Tertiary Education Commission.

**Comment:**

**Experience tells us that when such activities were permitted, the disadvantages outweighed the benefits. The logic of the concept makes sense in a competitive business sense but tertiary education provision cannot be viewed simply in a commercial sense. Such 'out of region' initiatives, however, should be permitted or even encouraged when conducted in a collaborative manner.**

**R12.25** The Ministry of Education should systematically identify and remove regulatory barriers to new entrants in the tertiary education system, subject to quality standards.

**Comment:**

**Disagree. We believe that the present system provides a reasonable level of accountability.**

**R12.26** Any provider should be able to apply to NZQA to use the terms “university” “polytechnic”, “institute of technology” and “college of education”. NZQA should grant or reject such applications based on the provider’s characteristics and on whether students or the public are likely to be misled about the provider’s nature or quality.

**Comment:**

**Disagree. The tertiary education system needs a broad base of provision. Experience tells us that implementing this recommendation would lead to ‘mission drift’ and in a number of cases, costly and futile diversions.**

**R12.27** Any tertiary education institution should be able to apply to NZQA to change subsector (eg, from ITP to university or university to ITP).

**Comment:**

**Disagree.**

**R12.28** Government should approve for New Zealand those providers and courses approved in jurisdictions with which NZQA has mutual recognition agreements, or in other jurisdictions where the New Zealand government is satisfied with the quality assurance arrangements.

**Comment:**

**Agree in principle but it would depend on the criteria applied by NZQA.**

**R12.29** Government should reform the Student Loan Scheme to be an income-contingent loan scheme that ensures that people are not excluded from tertiary education purely because they cannot borrow against future earnings to fund their education. Future Student Loan Scheme borrowers should be charged interest at a rate that covers government’s costs in running the scheme.

**Comment:**

**No comment.**

**R12.30** The Government should alter the definition of an equivalent full-time student (EFTS) to allow alternatives to the input-based “learning hour” as a basis of calculation.

**Comment:**

**This would appear to be based on the assumption that the present funding system is based on a realistic calculation of input costs. It is not. The system was designed in 1990 to deliver to each sector (university, ITP etc) roughly the same amount of funding as it received through the previous multiple funding**

**systems. In addition, the delivery of the funding was intended to be a bulk funding system where the allocation of resources within a particular provider may or may not be in any way related to either EFTS or the dollar value attached to courses.**

**R12.31** The Ministry of Education should review the funding rates applicable to New Zealand and Managed Apprenticeships, with a view to equalising them.

**Comment:**

**Rather than applying a simplistic approach, it would be preferable if a review of the funding system (including rates) applicable to all apprenticeships was conducted.**

**R12.32** Every student should receive an invoice from their provider for government-subsidised education. This should explicitly show the full price of education, and the Government's contribution alongside the fee payable.

**Comment:**

**No comment.**

**R12.33** The Tertiary Education Commission should, in consultation with providers, set – and stick to – a reasonable deadline by which they will confirm funding allocations.

**Comment:**

**Agree**

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