

# A MODEL TOWARDS AN ENHANCED TERTIARY BUILT ENVIRONMENT EDUCATION

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## ABSTRACT

**Purpose of the paper** - This paper proposes a model to engender an enhancement of tertiary built environment education at specifically first year level. Given that a host of built environment stakeholders express concern regarding the competency of diplomates and graduates, a poor throughput rate and the discarding of criteria relating to a matric certificate, a coherent approach to tertiary built environment education is required to alleviate the concern.

**Methodology/Scope** - A survey to test the validity of the model was conducted by means of a questionnaire circulated electronically to a sample stratum comprising the directors of selected built environment organizations. An illustration and explanation of the model preceded a questionnaire in the form of statements which required a response.

**Findings** - The salient findings indicate that; tertiary built environment education is a national responsibility; very strong support is indicated relative to the inclusion of selected subject areas, and the extent of agreement to the statements in the questionnaire is between more than moderate to very strong by the majority of respondents.

**Research limitations** – Although the sample selected to validate the model is representative a further more inclusive validation survey is planned.

**Practical implications** - Notwithstanding that the model proposes a framework for identifying and describing key competencies, it also provides a basis for comparing and restructuring tertiary built environment programs.

**Value** - Furthermore, existing mechanisms such as the National Qualifications Framework would enable that this model be implemented by built environment educationalists to engender an aligned approach to tertiary built environment education.

Keywords: tertiary education, built environment

## 1. INTRODUCTION

A framework for key competencies in the New Zealand tertiary education sector is aimed at generating reflection on core areas for learning in programs and qualifications. It is envisaged that the government agencies will be able to use the framework in policy and operational work to achieve consistency about desirable learning outcomes.

A competency includes all the skills, knowledge, attitudes and values needed to do something and is demonstrated in the performance of a task. Educators need to be aware of what skills and knowledge their protégés have acquired and employers should be able to identify the knowledge and skills they seek (Ministry of Education, 2005).

The model that is presented aims to develop a students' expertise by means of:

- A shared understanding of desired outcomes in relation to key competencies within and between education and employment sectors;
- Fostering the development of higher levels of competence for effective participation in the knowledge society, and
- Enhanced teaching and learning of key competencies in tertiary programs.

The rationale for the study is underpinned by the statement that all tertiary built environment education programs should be aimed at producing people who have the basic capacity for inquiring, innovation and creativity (Daily Dispatch, 2003). Furthermore they should be capable of meeting the client's requirements of quality, price and delivery and be aware of the complementary role of health and safety (H&S) in overall project performance as H&S enhances productivity, quality, time and ultimately cost (Smallwood, 2002). However, a report, although it did not directly refer to built environment education, indicates that current tertiary education is not fulfilling the aim of producing competent people. The Daily Dispatch (2004) reports that; "the skills produced by the system do not match the skills demanded. Our system is producing job-seekers instead of job-makers."

The aforementioned sentiments are corroborated by Sunter (2000), with the suggestion that current education is aimed at the job market of the 1960's. He suggests the creation of a society of foxes by creating an encouraging atmosphere and education system with a bias towards shaping entrepreneurs.

The Vice-Chancellor of a leading university urges a change in the mindsets of the deans and lecturers in addition to a drastic overhaul of the curriculum in a bid to stem huge concerns that tertiary education students are not given the skills needed for the job opportunities that exist (Schoeman, 2003). Further allegations relating to inappropriate tertiary education are made by active members within the construction industry who allege that neither graduates nor diplomates can do the work.

Despite the expenditure of great amounts of time, energy and money on restructuring and transforming South African higher education, virtually no progress has been made and nothing of real substance has transpired. Those intent on maintaining standards seem obsessed with reproducing the antiquated educational experiences of their own student days and blamed the inadequacy of the preparation of students for a throughput rate which has reduced by 50% in 10 years (Wolff, 2008).

However, Wolff (2008) is suspicious of the explanations for the high failure rate given that the students successfully completed secondary schooling and are multi-lingual. Those educators who believe that the high failure rate is indicative of a outstanding education would not give the same verdict for a hospital that loses half its patients.

The resistance to genuine pedagogical change is hardly unusual given the tendency of lecturers to reproduce for their own students the experiences of their undergraduate years. Half a century ago a distinguished philosopher adopted a brutally difficult but effective technique to effect the mastering of a subject. The same technique was adopted by his predecessor half a century later thereby rendering this pedagogical device one hundred years old.

Furthermore Wolff (2008) concedes that the poor throughput rate is an indication that the old methods are failing to educate the people enrolled at the universities and the universities of

technology. He would rather see a creative, imaginative and successful education than reproduce the punitive system of high failure rates and the mindless, destructive maintenance of 'standards'.

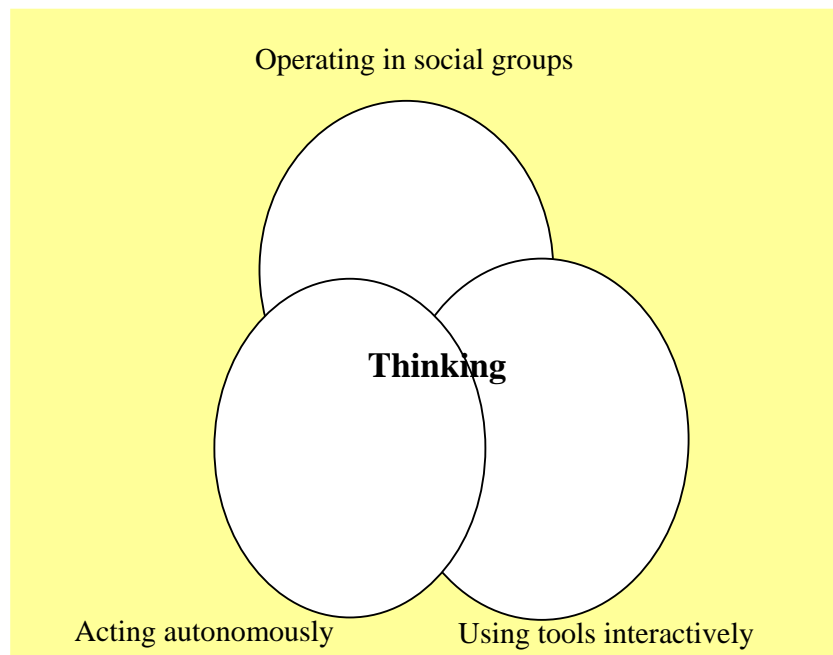
The features of the punitive system are that an entire year of credit rests on an end of year exam and the difficulty in transferring credits from one institution to another. However modularization is beginning to erode the rigidities of year-long courses.

Wolff (2008) provides the following reasons why the merging of several institutions, to rationalize the size and shape of higher education, is a bad idea:

- They consume the scarce time and energy of the few able administrators at historically disadvantaged institutions;
- They save little or no money;
- They do nothing to improve the education of young people;
- The campus infrastructure is immovable;
- The faculties and staff that are entrenched cling to old procedures, and
- Nothing changed on any of the five campuses that merged into the University of Massachusetts system except an increase in bureaucracy.

## 2. A NEW ZEALAND FRAMEWORK FOR KEY COMPETENCIES

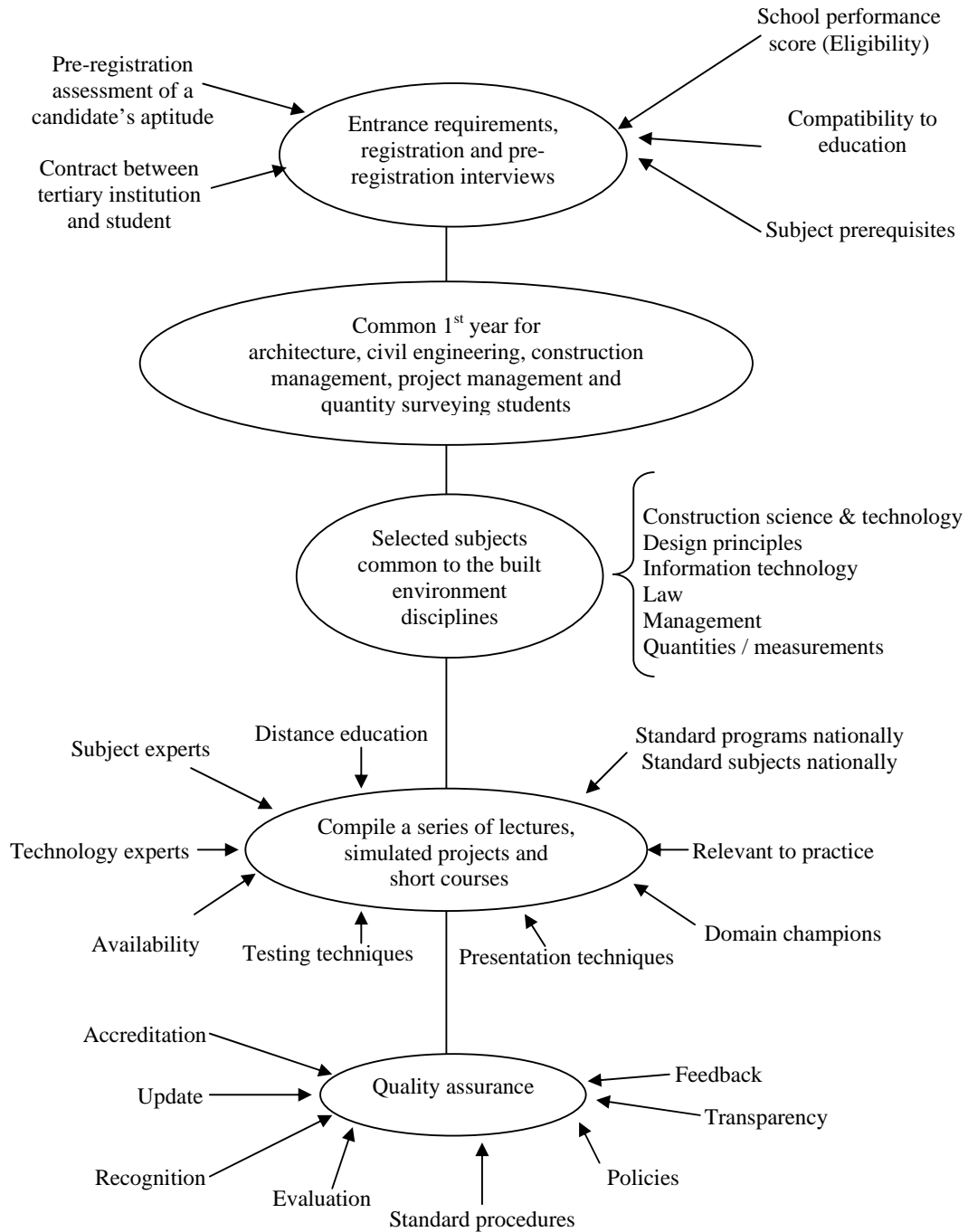
A New Zealand framework for key competencies is proposed to help educators shape the way they specify key competencies and incorporate them into their programs and qualifications. Figure 1 illustrates the four groups of key competencies. Operating in social groups includes all the competencies that are relevant when interacting with people, and can include situations where people are required to compete, cooperate and share. Acting autonomously means that individuals are able to define themselves and operate effectively in a variety of spheres of life. Using tools interactively encompasses language, information, knowledge and technology. The proposed framework also identifies thinking as encompassing the ability to think creatively and use cognitive and meta-cognitive strategies, including for example, critical and logical thinking, learning to learn and adapting to new contexts, and reflection and judgement.



**Figure 1: Overarching framework of key competencies (Ministry of Education, 2005).**

### 3. A MODEL FOR AN APPROPRIATE TERTIARY BUILT ENVIRONMENT EDUCATION

The model depicted in Figure 2 embraces the problem, salient literature and the conclusions relative to findings of a study by Manthe (2008) into the appropriateness of tertiary built environment education.



**Figure 2: A model for an appropriate tertiary built environment education.**

### **3.1 Components of the Tertiary Built Environment Education Model**

#### **3.1.1 The First Component – Quantitative Entrance Criteria**

Quantitative entrance criteria and should be applied to determine the compatibility of the candidate before a contract is entered into between the tertiary education institution and the student given that the throughput rate relative to the national civil engineering diploma has dropped from 67% in 1992 to 27% in 2002 (Capazorio, 2007). Furthermore, a university lecturer professor states in an interview (The Herald, 2007) that quality ‘raw materials’ are required at any institution in order to increase the throughput rate.

Quantitative entrance criteria may become imperative due to the new curriculum, which allows pupils who scrape through their matriculation year on subjects that are no longer graded, to be eligible for university. James (2008) reports that South Africa fared the worst in the world in international testing, which tests achievements in mathematics, science, reading and literacy. The importance of the aforementioned subjects is attested to by respondents in the findings of this thesis.

The first component should take cognizance of the three limits to education, namely, the definite limit, the objective limit and the absolute limit.

Allowing students to enrol for programs when they do not have the prerequisites or capabilities is not empowering the students or contributing to the economy of the country. It is conceivable that irreparable psychological damage to students’ self-esteem could occur if they perform poorly.

#### **3.1.2 The Second Component – Common 1<sup>st</sup> Year**

A common 1<sup>st</sup> year is proposed given that most construction projects require the services of the five built environment disciplines survey. The notion of team working has a long history and in the second half of the twentieth century, its theoretical and practical contribution to workplace engineering and re-design has been extensively reviewed and comprehensively documented.

The quantity of team management literature, team-building seminars and conferences act as a tangible testimony to the enduring appeal of team working philosophies. Tennant and Langford (2005) reason that the professional construction teams require a multi-functional, inter-disciplinary representation, engaging a cross-section of industry professionals responsible for carrying out duties particular to their specialist education and training.

Moore and Dainty (1999) argue that construction is the largest collectivist activity of all the UK industry sectors. Tennant and Langford (2005) utilized an ‘A team toolkit’ comprising seven key team indicators concentrating on the following aspects of the team relationship to measure team cohesion:

- Interdependency;
- Membership compatibility and diversity;
- Team dynamics;
- Trust;
- Corporate intent;
- Procedure, systems and customs, and
- Culture.

### 3.1.3 The Third Component – Common Subjects

A plethora of subjects are proposed by built environment stakeholders for inclusion in the five disciplines' programs. However, the six subjects presented in the model are the most frequently cited.

### 3.1.4 The Fourth Component – Standard Lectures and Short Courses

Standardization relates to order and control. However, standards are invented and only give an illusion of control. They should be adapted and not elevated to the status of truth (Amod, 2006).

In essence this component espouses that a series of lectures and short courses relevant to specific subject areas be recorded and made available from a website. It is envisaged that these lectures be presented professionally and recorded by domain champions and subject experts.

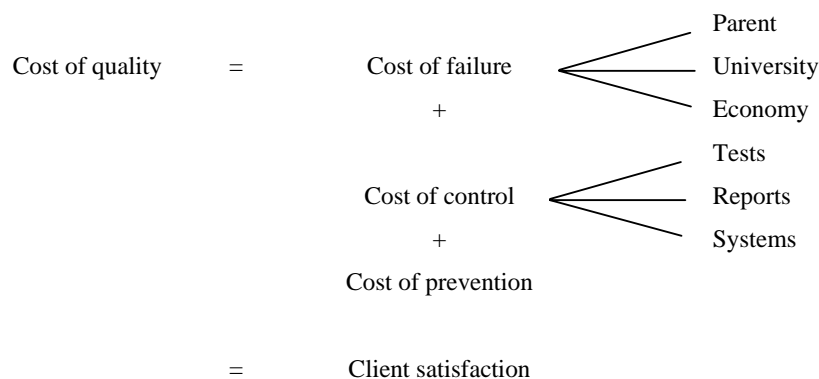
Given that the importance of testing is attested to by Suppes (1992) declaring that it is the fifth educational innovation, it is included as a component in the model. Computer-assisted instruction has the attendant advantages of flexibility, accessibility and feedback.

Most importantly these standard lectures and short courses will update and refresh the educators whilst ensuring a broad and equitable transmission of knowledge.

### 3.1.5 The Fifth Component – Quality Assurance

Given the numbers that are attending tertiary institutions, it is essential that the whole approach to selection, teaching and nurturing should be reviewed to ensure that a larger number of students in the middle group achieve a sufficiently high standard to be of value to industry. In the model quality is assured given that the evaluation of the students and the accreditation of the programs are on a national basis. Furthermore, the transparency of the program will encourage feedback thereby ensuring that the program is regularly updated. Quality may be further enhanced by recognising and adopting standard procedures and policies.

Figure 3 is an adaptation of what Zietsman (2005) establishes as the factors that contribute to the cost of providing a product that complies with certain standards.



**Figure 3: Factors that contribute to the cost of providing a product that complies with certain standards (Zietsman, 2005).**

### 3.2 The Validation Survey

According to Hubley and Zumbo (1996), it may be argued that of all the concepts in testing and measurement, validity is the most basic and far-reaching, for without validity, a test, measure or any inference made from it are meaningless.

The sample stratum comprises twelve prominent built environment stakeholders who were selected in their capacity as a director of the five organizations whose members were surveyed. The other seven people selected to respond to statements to validate the model were from a major construction company, a Master Builders Association, a development organization, the Council for the Built Environment, a training authority, a research institution, and a prominent research academic.

The survey was conducted by means of a questionnaire circulated electronically. Attached to the questionnaire was a diagram of the proposed model with an explanation thereof.

Despite follow-up requests seven responses were received which equates to a response rate of 58.3%. The extent to which the respondents agreed to the range of statements relative to the model are reflected by means of frequency distribution and central tendency.

To enable an interpretation of the mean scores, a range relative to the mean scores categories used by Fester *et al.* (2005) is adapted, adopted and presented in Table 1.

**Table 1: Mean score categories relative to a range.**

Category	Mean score	Range
1	4.20 $\geq$ 5.00	Between strong and very strong agreement
2	3.40 $\geq$ 4.20	Between more than moderate to strong agreement
3	2.60 $\geq$ 3.40	Between less than moderate to more than moderate agreement
4	1.80 $\geq$ 2.60	Between less than moderate to strong disagreement
5	1.00 $\geq$ 1.80	Between strong and very strong disagreement

## 4. FINDINGS

Given that the mean score relative to ten of the twenty-three statements are in the first category of mean scores and a further nine statements are in the second category of mean scores, the extent of agreement to the statements may be deemed as being between more than moderate to very strong by the majority of respondents (82.6%).

The highest mean score is relative to the statement that tertiary built environment education is a national responsibility. It is notable that very strong support is indicated relative to the inclusion of all the six broad subject areas illustrated in the model. Less than moderate agreement relative to the statements concerning a common 2<sup>nd</sup> year is indicated by a mean score of 2.86, the only mean score less than the mid-point of 3.00 (Table 2).

**Table 2: Responses relative to statements to validate the model.**

Statement	Response %					Mean score	
	Strongly disagree.....Strongly agree						
	Unsure	1	2	3	4		5
Raise entrance requirements for:							
Universities of technology	14.3	0.0	0.0	28.6	42.9	14.3	<b>3.29</b>
Universities	14.3	0.0	0.0	42.9	14.3	28.6	<b>3.29</b>
Mathematics	0.0	0.0	0.0	0.0	42.9	57.1	<b>4.00</b>
Pre-registration assessment	0.0	0.0	0.0	0.0	42.9	57.1	<b>4.00</b>
Common 1 <sup>st</sup> year	0.0	0.0	14.3	14.3	28.6	42.9	<b>4.00</b>
Common 2 <sup>nd</sup> year	0.0	14.3	28.6	14.3	14.3	28.6	<b>2.86</b>
Inclusion of subjects:							
Design principles	0.0	0.0	0.0	16.7	33.3	50.0	<b>4.33</b>
Information technology	0.0	0.0	0.0	0.0	33.3	66.7	<b>4.66</b>
Law	0.0	0.0	0.0	0.0	33.3	66.7	<b>4.66</b>
Management	0.0	0.0	0.0	0.0	33.3	66.7	<b>4.66</b>
Quantities	0.0	0.0	16.7	16.7	16.7	50.0	<b>4.00</b>
Standardization of programs	0.0	0.0	42.9	28.6	0.0	28.6	<b>3.43</b>
Standardization of content	0.0	0.0	42.9	28.6	0.0	28.6	<b>3.43</b>
Standard lectures ensure:							
Broad knowledge	0.0	0.0	28.6	42.9	28.6	28.6	<b>4.00</b>
Reduced preparation time	0.0	14.3	0.0	42.9	0.0	42.9	<b>3.57</b>
Accessible	0.0	0.0	0.0	28.6	14.3	66.7	<b>4.29</b>
Encourage feedback	0.0	0.0	0.0	14.3	28.6	66.7	<b>4.43</b>
Professional presentation	0.0	0.0	0.0	14.3	42.9	42.9	<b>4.28</b>
National tests and exams	0.0	14.3	14.3	28.6	14.3	28.6	<b>3.29</b>
Standard procedures and policies	0.0	0.0	28.6	28.6	0.0	42.9	<b>3.57</b>
National responsibility	0.0	0.0	0.0	0.0	28.6	71.4	<b>4.71</b>
Contribution	0.0	0.0	0.0	28.6	14.3	66.7	<b>4.29</b>

Table 3 summarizes the mean scores into categories to engender an interpretation of the extent of agreement. It is notable that the extent of agreement to the collection of statements range between less than moderate to very strong agreement.

**Table 3: Grouping of mean scores in categories.**

Category	Mean score	Number	Percentage
1	4.20 ≥ 5.00	10	43.5
2	3.40 ≥ 4.20	9	39.1
3	2.60 ≥ 3.40	4	17.4
4	1.80 ≥ 2.60	0	0.0
5	1.00 ≥ 1.80	0	0.0

Notwithstanding that the findings from the survey validate aspects of the model a survey of all the people that responded to questionnaire related to the exploratory and primary survey will be sent a synopsis of the study and a diagram of the model that was developed. The purpose of this feedback

is twofold; firstly to validate the findings of the study and secondly as a token of appreciation for their participation in the survey directed towards an improvement of tertiary built environment education.

## 5. CONCLUSION

Globalisation and information technology have meant that people need to be able to operate effectively in local, national and international contexts. Individuals need to develop higher levels of proficiency by combining and using different competencies in increasingly complex contexts. Better teaching and learning of key competencies will be crucial to building a society where people have the knowledge and skills to lead successful lives.

For example, specific or technical competencies underpinned by higher levels of competence directly contribute to increased productivity through:

- Improved performance;
- Increased ability to use and adapt existing skills to new demands, and
- Increased ability to see, create and exploit new opportunities.

The National Qualifications Framework provides a good basis for articulating and assessing learning outcomes. The proposed New Zealand Framework of key competencies will assist the tertiary sector to include, teach, assess and report key competencies in a systematic way by;

- Providing a shared reference point from which tertiary providers could plan for the consistent implementation of competency based courses, and
- Assisting educators, program and qualification developers to articulate, teach, assess and report key competencies without making them 'add-ons'.

Effective teaching is fundamental to effective learning and improving outcomes for students. Descriptive standards could be explored to guide the outcomes for higher levels of competence. Hughes (2007) reasons that applying standards that drive a person and the management towards preparing business plans, budgets and forecasts give the recipients confidence that you know what you are doing.

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