

Enterprise in Education: a Model for Institutional Development

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ABSTRACT

This paper proposes a model for developing an enterprise focus as a basis for tertiary education. The model considers aspects of the education process in terms of elements of enterprising activity. Aspects include revenue generation, value proposition, integration into learning, and meeting community expectations. This model is used to consider the status of an Information Technology School within a New Zealand ITP. Seven development priorities are developed: a Job Shop; improving links of the capstone project to other aspects; reinvigorating staff research; focussing on multi-disciplinary links; increased use of problem based learning; stronger entrepreneurial aspects in capstone projects; and developing an “ideas factory”. It is concluded that this was a worthwhile exercise. Recommendations are made for further validation of the model.

Categories and Subject Descriptors

K.3.1 Computer Uses in Education

General Terms

Human Factors

Keywords

Research, revenue, enterprise, work based learning, student engagement.

1. INTRODUCTION

The purpose of this paper is to propose a model for developing an enterprise focus as a basis for tertiary education (EinE).

This work is driven by the convergence of several imperatives in vocational education. This includes work-based learning, the evolution of the capstone, the changing nature of innovation and employment, revenue diversification demands. A particular driver is the changing nature of employment where entrepreneurship and enterprise are increasingly important components of graduate employment (Hegarty and Jones 2008, Davey *et al.* 2011). Bridge *et al.* (2010) distinguish employability (being able to get jobs that exist); enterprise for life (being able to get on, even when right job doesn't already exist); and entrepreneurship (new venture creation).

Gilbert (2012) describes the challenges as to “design and develop applied, industry-engaged learning environments that embrace ambiguity and uncertainty in overcoming pedagogical inertia in educating young entrepreneurs and innovators”.

A model is proposed that considers aspects of the education

process in terms of elements of enterprising activity. Aspects include revenue generation, value proposition, integration into learning, and meeting community expectations. This model is used to consider the status of an Information Technology School within a New Zealand ITP.

The purpose of the EinE model is to provide a vehicle for self-assessment and strategic direction setting for departments within vocational education institutions.

2. EinE MODEL

Figure 1 arranges institutional activities according to a hierarchy of increasing scope and scale. For the purposes of this model scope and scale are treated as an integrated measure. At the top of the model are major projects such as multi-year externally funded research projects. Next are ongoing research programmes, primarily reflecting staff research interests and usually not explicitly funded. Beneath this are major student projects such as capstone projects or year-long internships. Smaller than these are small scale research or development projects, labelled here as “jobshop” although funding could be internal or external. Project based learning within courses (other than the capstone) is labelled “micro-projects”. At the bottom of the model are student ideas – although potentially large scale we have put them at the bottom on the basis that most of them don't get beyond an idea at the lunch table before it is back to the grind of assignment work.

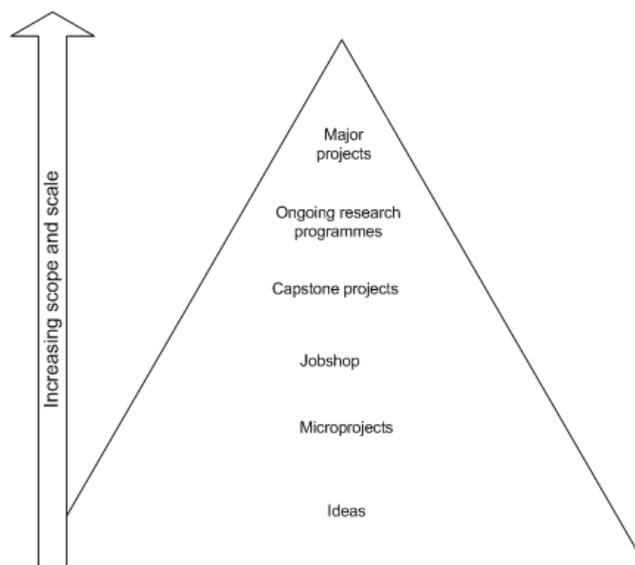


Figure 1: Institutional activities arranged according to hierarchy of scope and scale

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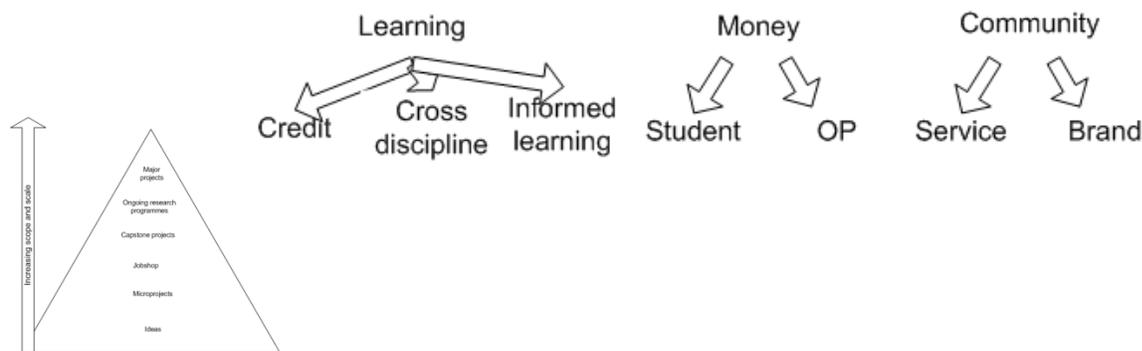


Figure 2: EinE model with assessment parameters for each project classification

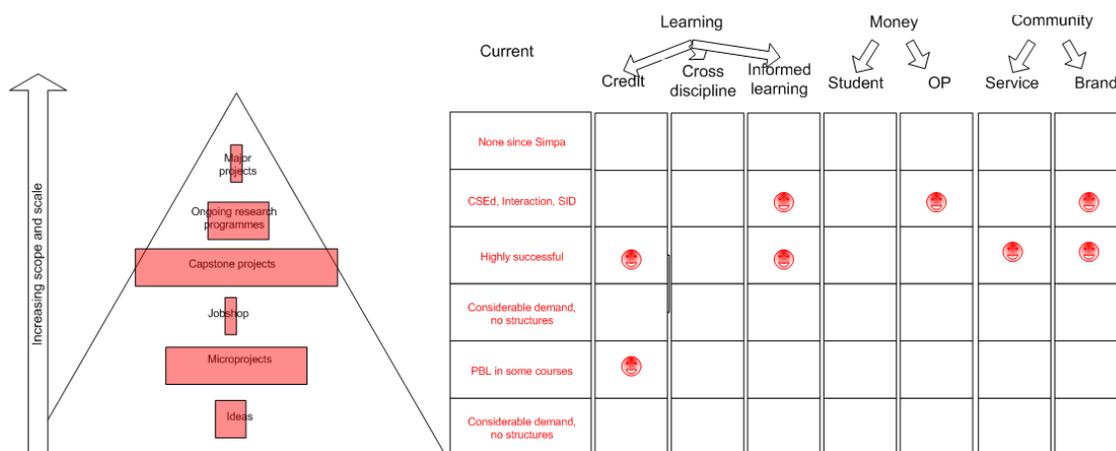


Figure 3: EinE model consensus self-assessment for school

The pyramid surrounding the hierarchy represents a numerical mix of projects. Only few major projects are needed while a great many “student ideas” could be supported. It is worth noting that if this pyramid were to represent money, then the pyramid would be inverted, giving – at least conceptually – a balanced structure if the number is multiplied by the money. Hence we propose that the pyramid shown in Figure 1 can be considered an ideal mix of activity levels for projects for any given institutional structure.

Figure 2 adds to the model a set of assessment parameters for each project classification level. These represent our synthesis of imperatives within vocational education. From the left are three learning parameters. First the goal we adopt from the Work Based Learning literature that learning if at all possible is credit bearing no matter what the form of the learning. Second is a desire to promote cross-disciplinary learning (without getting bogged down here in discussions of differences between cross - mutli- or trans-disciplinary learning), it is widely recognised that awareness of disciplines other than one’s own narrow focus both changes and improves perspectives (Stephens *et al.* 2008, Vingilis *et al.* 2003, Hambrusch *et al.* 2009). Third in this learning group is “Informed learning”. It is an imperative of learning institutions

that to the greatest extent possible, every activity informs learning. This might be direct – as would be the case in capstone projects, work-based-learning and project based learning – or indirect as academics make use of their experiences to construct and inform learning experiences.

The second group of parameters on Figure 2 concern money. This represents a positive flow of money to the student or institution (here represented as OP). Note that we include financial reward to academics, either through salaries or other incentives as covered under institutional financial arrangements. We do recognise that this is an over simplification of models and we do not preclude other relationships (Mann *et al.* 2003).

The last group of parameters on Figure 2 represent the institution’s relationship with its community. This community includes all stakeholders. We separate these somewhat arbitrarily into things that we can do to meet community service expectations, and things that contribute to a perhaps less tangible brand image (quality of education etc).

3. EXAMPLE APPLICATION

The purpose of the EinE model is to provide a vehicle for self-assessment and strategic direction setting for departments within vocational education institutions. In the sections that follow we describe the application of the EinE model to the School of Information Technology at Otago Polytechnic.

This EinE process was carried out in March and April 2012 as part of the school's annual self-assessment performance review. The model was first applied on a whiteboard during a staff meeting and then discussed in two further staff meetings until a consensus was reached on the assessed parameters and strategies. The model and the emergent strategy then formed part of the day-long performance review with the institution's Leadership Team.

For each of the research/enterprise levels on the model the School assessed itself against the "ideal" level of activity represented by the pyramid. The assessments against the activity scale and the criteria are not absolute, and not based on firm evidence – rather, they are the result of a considerable discussion.

4. CURRENT SITUATION

Figure 3 shows the EinE model applied to the school. The hierarchical levels are considered in turn from the top of the model.

The School has some history of major projects. Simpa (Mann, *et al.* 2006, Mann and Russell 2010) was a major project funded from 2007-2009. Survival Factor (including Rescue, Mann *et al.* 2010a) was a shorter term project but had a large team from across the institution. As neither of these projects are current we scored no smiley faces on the criteria.

The school believes that it is operating at about 50% of its capacity in terms of ongoing research programmes. It is active in computing education research – particularly in capstone projects, software engineering, and programming. In other areas the school is active in interaction design and computing sustainability. The school believes it is meeting some criteria – this research activity is informing learning and through its research outputs contributes to the institutions' brand as having a recognised research standing. Through PBRF, this activity also contributes financially.

The school is proud of its activity level in the area of capstone projects. The methodology is described by Mann and Smith (2004ab, 2005abc, 2006ab, Mann *et al.* 2009, 2011). Also included at this level is a successful internship programme (Smith

and Mann 2010). Projects contribute directly to the community brand through contributing value to many areas of the community and through demonstration of strategic attributes (Mann and Bould 2011). Despite this apparent success, there are areas for improvement. Successful cross disciplinary projects are not frequent (although there are notable exceptions such as the JamSessions collaboration with students from design (Mann *et al.* 2010b). Also notably absent are the monetary benefits to either the school or students (except that accrued through EFTS student funding and the future employment of students). In a large part this is due to a deliberate decision not to charge for the projects. The projects are described as "real projects for real clients" and in identifying projects a value proposition that delivers a nominal \$10,000 per student is used as a guide but crucially no money changes hands (wiki.ict.op.ac.nz). Although more common in a cooperative experience it is felt that not committing to requiring payment allows for a wider range of opportunities and more challenging projects for students. There is an entrepreneurial route through the projects but this rarely results in successful businesses.

The small bar representing activity for the "jobshop" on Figure 3 is a recognition that the school performs poorly in this area. The current practice is that we receive a steady stream of people wanting students to do some development work for them. Typically these are "a website for my wedding supply company" – too small for capstone projects but too big to be solved over the telephone. The usual practice is that details are taken and a sign placed on student noticeboards or a student shoulder-tapped to contact the client. The school usually takes no further part in this arrangement. While some are successful, an all too common outcome is that the client follows up a few months later with "that student never contacted me". The school assessed no smiley faces for this.

Problem based learning is common in teaching across the degree but after much discussion, the school assessed this as about half the potential. Accordingly, no criteria are met, except that it does contribute to credits where used. "Student ideas" is similarly poorly reflected. Some students manage to develop ideas in one course and continue the development in other courses (such as professional practice, software engineering and the project – the JamSessions project followed this trajectory, (Mann *et al.* 2010b) but these are the exception rather than the rule.

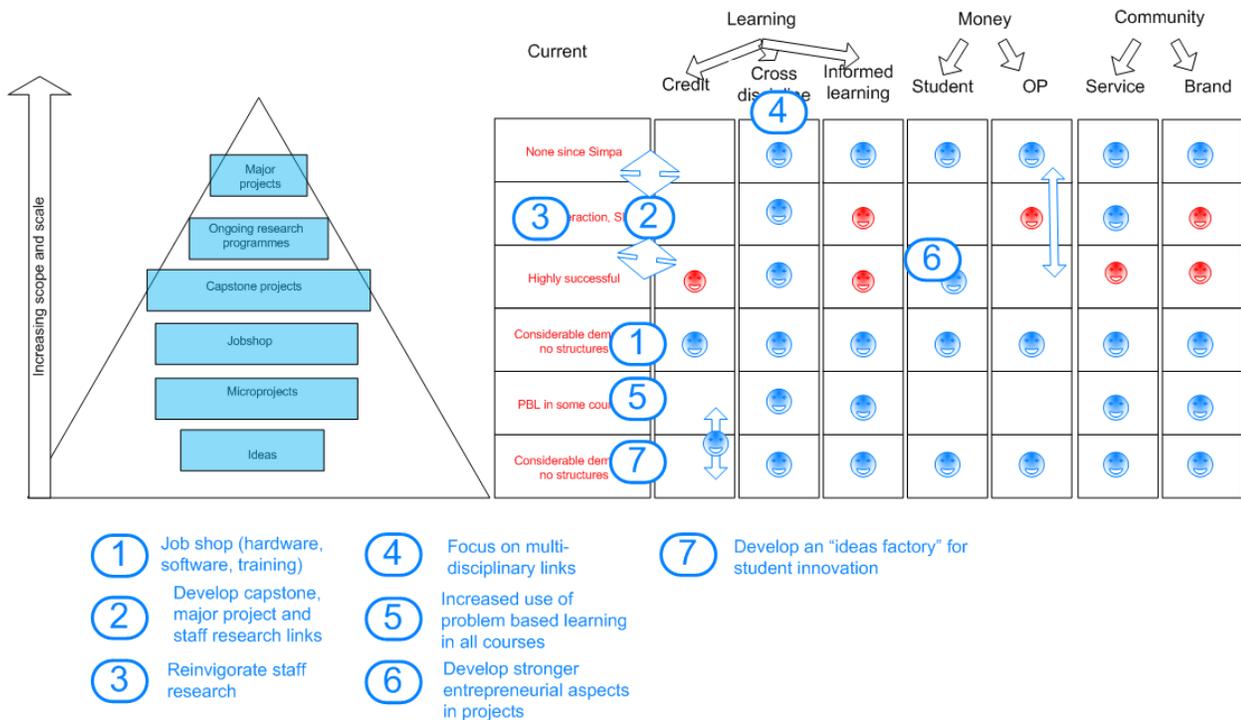


Figure 4: EinE model used to develop a development strategy for the School.

5. STRATEGY DEVELOPMENT

Figure 4 summarises the results of the EinE model used to develop a development strategy for the School. The strategy was developed by asking the school to imagine smiley faces in all the cells and then to consider what were the options to make that happen (some smiley faces were then removed as being unrealistic or not desired). The priority of strategic initiatives was then derived from the impact (as represented in frequency of new smileys). In practice it is expected that these initiatives will overlap and result in synergistic benefits.

The numbers here correspond with the numbers on Figure 4 and represent the priority order.

Priority 1: Job shop

The first priority is to develop an IT Job Shop to facilitate and formalise the process of matching students with small pay jobs. The Job Shop will also improve the ongoing management of the projects, imposing a level of project management, quality control and client communication. Otago Polytechnic has a Job Shop already operating in communication design with a commercial design studio "NewSplash" (www.newSplash.co.nz). The model used in NewSplash is that all design students are cycled through the studio, working on a credit bearing basis for two months. Some then maintain an ongoing paid work relationship with the studio. A crucial part of the success of NewSplash is a manager who integrates commercial and academic roles. The strategy for the IT school is to open an IT Job Shop in association with NewSplash. Initially focusing on the already identified demand in web design, the IT Job Shop will then expand to hardware and training. A proportional role has been budgeted to manage this

facility. The IT Job Shop creates smiley faces across all the criteria.

Priority 2: Develop links between capstone projects and major projects/staff research

The second priority is to enhance the links between capstone projects and major projects. This will operate in two directions. First, major projects and staff research will become a source of projects for students. In the case of the staff research, the school wishes to change to longer term projects rather than one-off single output 'writing a paper for this conference' approach. Thus research will become research programme based (rather than single project based) and therefore lead to ongoing collaborations with serial cohorts of students. The second area is the identification of projects that could become major funded initiatives. This identification needs to happen both at the start of projects (ie develop projects explicitly with this mind) and the end (mining projects for further development). These relationships will then meet the goal of gaining revenue from the projects without the disadvantages of charging for projects.

Priority 3: Reinvigorate staff research

Staff research has drifted somewhat in recent years. The strategy is to reinvigorate this effort. This will include the reappointment of a research coordinator, building of research teams and weekly working group sessions. The institution is developing a new template for individual research planning.

Priority 4: Focus on multidisciplinary links.

The fourth priority crosses all the activity levels and crosses research, teaching and enterprise – a focus on cross disciplinary engagement. To some extent this has been on the table for years, but has never really progressed. It is hoped that identifying it as a

specific priority will progress this. In particular the capstone projects will benefit from collaboration with students from design and business. Despite barriers of conflicting academic schedules, assessment practices and sometimes opposing academic paradigms, we believe the pay-back from this will be significant.

Priority 5: Increased use of problem based learning in all courses

The institution is committed to experiential learning in all courses. An evolving strategy is the development of work based learning. In one degree in the institution the entire first year is project based. The school should explore this option (perhaps less radically).

Priority 6: Develop stronger entrepreneurial aspects in projects

There is an entrepreneurial route through the projects, and has been enhanced with a close relationship with a student business entrepreneurship programme (www.audacious.co.nz). There have been some successes. Alex Dong's Trunk.ly, for example, placed in the Audacious top five in 2011. This was Alex's capstone project which he subsequently sold to AVOS. Alex is now employing about 14 fulltime developers in Dunedin. Also in the top five in 2011, Rimu Boddy and Jeff Hardisty's Fish Basket aims to provide IT solutions to the fishing industry. This development is ongoing – in September 2012 this system will be installed on several boats from a major New Zealand fishing company.

Out of the 20 capstone projects underway in 2012, 8 are explicitly entrepreneurial. It should be a priority to support these and future groups to make the transition to successful business. The approach should involve a reinforcement of entrepreneurial aspects of the capstone (such as a requirement for delivering real sales by the end of the project) and to develop a relationship with the city's business incubator UpStart (www.UpStart.co.nz).

Priority 7: Develop an ideas factory

This initiative is prioritised as number seven despite potentially generating benefits right across the spectrum on the EinE model. Partially this is because the school has not quite come to terms with what it means – either conceptually or in practice. The notion is that an “ideas factory” capture and support students at all levels to explore their ideas. This implies the creation of a creative space to support initiatives of any scale and from any source. Perhaps this a model akin to Google's “20 percent time” whereby engineers to spend one day a week working on projects that aren't necessarily in their job descriptions (eg Eidelman *et al.* 2012). What would be the effect of the school dedicating Fridays to “ideas workshop”? Could the curriculum be managed to free up both the time and the credits to both staff and students to work together on unspecified projects. The Sustainable Community Enterprise initiative (Davy and Mann 2012) is the first attempt at such an approach.

6. CONCLUSION

The paper has proposed an Enterprise in Education model for developing a research and enterprise focus as a basis for tertiary education. The model was usefully applied to the exploration and articulation of a development strategy for an Information Technology School within a New Zealand ITP.

The next step in this research in validating this model is to replicate the process in other departments and in other institutions. Along with the development of the model and the data analysis

processes, such a widening would provide a basis for generalising the model. It would also be worthwhile to follow the case study presented here and repeat the analysis over time.

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