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Enterprise Education

For

Tertiary Education Commission

Presented by

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PURPOSE OF THESE NOTES

These notes are in response to a request from the Tertiary Education Commission to consider some issues about fostering enterprise education in the tertiary sector. These notes are a collection of ideas from my 20 years of experience in enterprise education.

QUALITIES OF ENTERPRISING PEOPLE

Enterprising people make ideas happen as entrepreneurs or intrapreneurs (entrepreneurs inside organizations). Many of them also make _new_ ideas happen in which case they are also innovators. Below are a list of qualities typical of entrepreneurs, intrapreneurs and innovators. These notes will consider educational practices that will lead to the development and expression of these qualities.

- Passion, especially for ideas
- Energy
- Vision – desired future states can be seen very clearly
- Confidence
- Resilience and optimism
- Creativity
- Experience in making ideas happen
- Courage to be different
- Life expectations that include being innovative, entrepreneurial or intrapreneurial
- Can work in groups
- Communicates effectively
- Has the ability to carry people with them
- Technical knowledge in their field of endeavour
- Knowledge of marketing, financing, intellectual property management, legal issues, economic evaluation, cashflow management, business management, project management, innovation, and technology management is helpful

- Moderate risk taking for those things that are within their control
- Intrinsically motivated
- Trust their own judgment
- Form their own insights
- Practical
- Action oriented

EDUCATIONAL PROCESSES

Below are some ideas on educational processes that are likely to lead to students gaining these qualities.

Attitudes and Beliefs

I was constantly surprised that students had come to believe that success was to get a good grade, to get a good degree, to get a good job. There seemed little in the students' perception about the value of learning, academically exploring the unknown, or personal growth. We had some classroom exercises on identifying life's choices and making them happen. It was noticeable that the undergraduate students generally had some animating dreams beyond getting a good degree, but the masters students were less likely to have this.

Entrepreneurship researchers have studied what are the characteristics of entrepreneurs or their experiences that explain their likelihood of success. Only one factor really stands out – they chose to make their idea or business happen. This choice is similar to the passion that drives parents to raise good children. Excellent parenting is not generally a product of wanting one's name to go through to the next generation, or seeing the child as a good superannuation policy, or passing a PhD in child psychology. It is as basic as genuinely wanting to raise a good child. This vision is so animating that it overcomes obstacles in the way, despite repeated setbacks and tough times.

The mindset of entrepreneurs is the same. It is a deeply held choice to make a business or idea work. Choosing is not the same as wanting. If a person wants something, at the end of the day they simply get the feeling of wanting. By choosing something they develop the passion to drive it through.

There are a number of strategies and skills that enable students to move from wanting to choosing. These can become abiding such that individuals develop the capacity to repeatedly make ideas happen. Some of these strategies and skills are discussed in the next section.

Personal Development

Visioning is the skill to see an idea as though it has already happened. It is like climbing a mountain. As the tramper stands at the bottom of the mountain their pack feels heavy, the

route uncertain, and the challenge high. However when they stand at the top of the mountain and look back at how they got there, the pack feels light, the route attainable, and the challenge rewarding. This perspective can be achieved in the mind before starting.

We have an innovation class of 50 students who are required to make a venture go that is profitable and ethical. We teach the students to apply visualization skills for themselves and their colleagues. They describe success in their venture with certainty, making the trip visual, real, attainable, desirable, and expected. They apply all the senses in describing the vision, and create stories and images of success. They also merge the feelings of success from a previous experience with the current challenge. And then we instruct the brain to see the pathway back to the present that made them so successful. The effect is dramatic. Usually I see people's shoulders drop, their eyes become clear, and they are filled with a certainty that they will be successful.

These are very well known strategies made popular by neuro-linguistic programming (the process of using word patterns that match the way the brain thinks). The ability to visualize can be taught so that students can apply these strategies effortlessly.

Confidence is also a state of mind. It can be increased by having positive events happen, but it can also be achieved by seeing the positive in any event. Entrepreneurs often say they don't fail, they just have lots of learning experiences. This thinking process can be taught.

Resilience is the ability to bounce back from setbacks. It is highly influenced by a person's level of *optimism.* Prof Martin Seligman has developed a powerful theory on the link between optimism and the language patterns that people use to describe events to themselves. His work has spawned nearly 1000 world studies on optimism, supporting the idea that these language patterns can be taught and acquired, even late in life.

Entrepreneurs have an *action orientation.* The typical university course encourages thinking over action. Yet the education literature notes that action learning is the most effective way that students learn.   Academic learning and the process of encouraging an action orientation can be synergistic.

Skills can also be taught to help students to *learn from experience*. Whatever challenge is being faced there will always be a reservoir of prior experience that can be drawn on to assist the process. So much education is based on motivation from external rewards such as exam marks, that students often lose the confidence to believe in their own talents and experiences. They are also asked to quote other sources than themselves. I lost count of how many students (about 200) who over the years made comments like, "In my first year I used the words 'I think'. As a result I was soundly criticized and received a poor grade. I thought university was a place that encouraged people to think for themselves but it's not is it? I know to just quote others and to never use those 'I think' words at university again."

This links closely to the issue of fostering *intrinsic motivation.* A key element in entrepreneurship is the drive that comes internally from wanting to make a business or idea happen. Earning a living ranks third in US research on the principle motivation for entrepreneurs, and becoming rich ranks 8th with just 3% of respondents cited this as their main motivation. First and second are 'being one's own boss' and 'making an idea happen'. Entrepreneurs however use money as a motivating measure, but not a main goal in itself. Intrinsic motivation can be achieved through students bringing their own interests or choices to the field of study. At its simplest this can be achieved by getting the students to choose their own topic for an assignment. Several more ideas will be provided later in these notes.

Teamworking is essential to make ideas happen. This has become increasingly important, as new innovations are more complex. For example, early computer games were developed by individuals, but the size of the project team has progressively grown. TEOs need to develop robust processes that support group learning. There is more on this issue later.

Creativity is a skill that can be taught, with a number of strategies that can be applied to generate new ideas. Creativity is often a neural process of oscillating cells in the brain at the same frequency to link non-like thoughts. This process is a learned habit that individuals can quickly switch to when they choose to be creative.

Analysis is a useful skill for entrepreneurs. It is well developed in TEOs.

Experiences

Entrepreneurs accumulate a series of life experiences that enable them to make bolder ideas happen as they progress. University can be an excellent place to acquire an eclectic range of experiences. Some useful experiences are to work in teams, make an idea happen, work alongside businesses, apply some theoretical learning to real problems, internships, and experiments.

Knowledge

Useful knowledge has been listed in the qualities section above. These include aspects of *business planning, technical knowledge, and an understanding of the industry*. Business planning knowledge is greatly overrated. Indeed, having worked with entrepreneurs and latent entrepreneurs on 2500 business plans, I have concluded that business planning as the major initial exercise reduces the probability of making the idea happen! Why?

Business planning looks at issues like market research, marketing, financing, intellectual property management, technology requirements, cashflow management, legal issues, organization structure, timing and risk management. Thus planners look intently at all the reasons why the business will fail. But entrepreneurs are motivated by a vision of the project succeeding. There is an adage that 'what we focus on is what we get'. So focusing on the potential causes of failure saps the energy away from the vision.

Another adage says that 'Failing to plan is planning to fail". This is also true.

I have concluded that the answer is to iterate planning with doing. It is a bit like learning to swim. We will never become a swimmer in the classroom. At some stage we need to get wet, even if it is just putting our big toe in the water. At a later stage we may put our head under water, and still later go out beyond our reach. There are times when learning skills and thinking about the issues is very good, at other *times we simply need to act*.

Learning Processes

The learning process should therefore *iterate between planning and doing*. With entrepreneurship education I learned to make the *ultimate outcome the progress of the venture*. I used to make the ultimate outcome the completion of the business plan. However this made students focus on the plan as the outcome, not the venture. The problem is not restricted to students who believe they are taking a course to get six credits. It is equally true of the 700 inventor/innovators who we offered funding to in a DSIR seed venture capital scheme. Ultimately only two of these applicants successfully grew their ventures because we had created a bad process that focused on planning.

The learning process is enhanced by having a *clear process* that steps students through stages of planning and doing. It helps to have *immutable deadlines*. I once asked a masters graduate who had just completed his thesis what would have happened if the process had been managed like an undergraduate paper with 5% off for every day late in a series of hand in requirements. He said he would have done the thesis in a quarter of the time, with a lot less stress, and to a higher standard. Entrepreneurship education is the same, especially as entrepreneurial students thrive in the heat of battle.

Peer pressure is useful. I often get students to present to the class, and then act as consultants to each other. In the farming industry, it was found that discussion groups were a very cheap and powerful way of fostering adoption and diffusion of innovations. Farmers would comment on each other's farming practices, and advisors attended simply to make the process seem more formal. The advisors said that the farmers would be more willing to make an idea happen if they heard it from a peer, or accounted for their actions to their peers, rather than with experts. Adoption and diffusion literature across all disciplines supports this anomaly. Students cannot be placed in a position to judge or mark their colleagues, but they can certainly be in a position to comment and to *learn from each other*. It is also useful to provide them with *mentors* who provide expert information, but more importantly provide a sounding board that reflects confidence back to the students.

Students thrive on *high expectations*. For ten years I taught a class of between 500 and 1000 introductory management students, and created learning processes and classroom activities that were about action learning, student led learning, student management, problem solving, linking with real businesses doing real things, and so on. I was rocked at the number of people who have told me it is impossible to do this, despite the clear evidence that it is very possible and the students excelled in their studies.
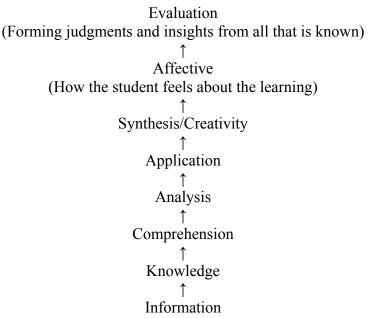
The current class of 50 innovation students is an example of setting high expectations. I presented the students with some possible projects and invited them to add lots of project ideas of their own. The projects I suggested were bold, but I described them in a way that assumed the students would achieve them. The students lifted their sights, and I am now amazed that their vision of what they plan to achieve eclipses what I had thought possible. Young people have an extraordinary capacity to excel if they are in an environment that expects them to.

Professor John Hatte of Auckland University's Education Department conducted a meta-analysis of the factors that made the most difference in fostering learning in schools. By far the most important factor was the provision of ***timely, constructive, feedback to each student in a personal way***. Too often university marking is slow, impersonal, and focuses on the errors and faults in a student work. The bane of my life were tutors I employed whose marking obsessed over the lack of perfection in student referencing.

Goals and Assessment

Assessment is a powerful way to focus students on what is important. Too often assessment is chosen that is easy to mark, especially with large classes. This is the tale wagging the dog. Assessment should be chosen for the quality of education it elicits, and then find a way to mark it so it is fair and accurate.

In 1972 Bloom developed a taxonomy of learning objectives. The Ministry of Education has extended these and assisted teachers to set questions, activities and assessment that encourages children to apply lower and higher order thinking styles on the taxonomy. The taxonomy is:

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Evaluation
(Forming judgments and insights from all that is known)
↑
Affective
(How the student feels about the learning)
↑
Synthesis/Creativity
↑
Application
↑
Analysis
↑
Comprehension
↑
Knowledge
↑
Information

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Assessment is easiest for the lower order thinking styles as it is possible to have right answers. It is also easier to have consistent marking. I observe that university course assessments focus on lower order thinking skills.

I have experimented with many different assessments in my innovation and management classes that were aimed at fostering higher order thinking skills. They took more time to mark than say a multiple choice test, but I found consistency could be readily achieved even in classes that had 33 tutors doing the marking. We had a rate of 0.3% turnover of marks with an independent remarking process. Assessment exercises include:

- Making projects happen
- Working as unpaid consultants to businesses to foster innovation or growth
- Structured journals
- Presentations
- Conducting research
- Write reports at the request of businesses
- Elevator speeches
- Students to design, manage and debrief their tutorials offering experiential exercises that help their colleagues to absorb the learning from the previous week's lectures.
- Consultancy advice to colleagues
- Outward Bound

It is also important to assess institutions and staff on higher order learning expectations. Devising these measures is the subject of another paper.

IQ, EQ and SQ

We can accurately measure dead butterflies stretched out on a pinboard, or less accurately as we observe them fluttering alive and vital.

I would like to suggest two metaphors of education.

The first is **building a wall**. Each layer is based on the foundations of the layer below. Achievement is assessed by the height of the wall. A person with a PhD has a very high wall that forms a barrier for competitors to scale and catch up. This metaphor sees education as static, with little purpose, and the potential lies with the bricks and the bricklayer (lecture material and lecturer).

The second metaphor is **growing a seed.**   This time the potential is with the seed enhanced by the environment in which it is grown. Growth is dynamic and with purpose. It implies that educators need to believe that the student has untapped potential. Their job is like the gardener who provides shelter, fertilizer and water.

Early education is like growing a seed, with teachers using hard and soft measures and focused on the whole child. But higher education is more akin to building a wall, and the measures become more numeric and less holistic. It is time to review the measures of education, especially the reliance on examinations.

It might be useful to consider how the brain thinks.

One form of thinking is undertaken by neurons firing in sequence. Each neuron needs to fire much like the way Christmas lights set each other off in sequence. This thinking enables us to follow rules in ways that are rational and logical such as following mathematical steps or applying a research process. This type of thinking can be called an IQ thinking process. It is accurate, precise, measurable, repeatable and reliable, which makes it very suitable for exam based assessment. It is also within rules thinking. Academics tend to be very high in IQ, and create processes that foster high levels of IQ thinking in their students.

A second type of thinking involves neural networks with up to 100,000 neurons in bundles. Our experiences create pathways through the neurons. It is like when the settlers first arrived. They formed multiple tracks through the bush, but after a while a few routes became favoured and turned into highways while the rest of the tracks were gradually overgrown. Our brain makes highways through the bundles of neurons when we have repeating experiences. We also get lazy, choosing the tried and true way of doing things rather than crafting new experiences.

This type of thinking is sometimes called EQ for emotional quotient. The learning is associative, habit bound, and a conditioned response. It enables us to learn pattern recognition and to acquire tacit learning. But it is difficult to explain what you have learnt. For example as you notice the moods that sweep over a person's face you are confident that you can read their feelings, but would find it difficult to explain in words how you do it. Interviews of 500 managers conducted by one of my 2nd year management classes highlighted interpersonal skills as what they wished they had before becoming a manager. This is mainly a form of EQ learning.

The third type of learning is sometimes called SQ for spiritual intelligence or sensemaking intelligence. It is the ability to oscillate cells in the brain at the same frequency – somewhere between 4Hz and 13Hz and then link these ideas with a 40Hz ripple. This occurs most easily when musing such as in the shower, strolling, or going to sleep. Linking two thoughts together in the brain can lead to creativity. Linking many thoughts at once can lead to insight, reframing, the ability to break rules and make new rules, and it can give us meaning which in turn leads to intrinsic motivation. This process occurs entirely inside an individual's brain combining their own unique thoughts and experiences.

My contention is that universities have focused on IQ intelligence as it is easy to teach and measure. I would like to see more effort put into EQ and SQ intelligences. In particular, SQ learning enables students to create their own meaning that in turn motivates students to acquire their own learning.

Entrepreneurs are high in SQ styles of thinking. This is not surprising as it is a key characteristic of ADHD people. Many leave formal education as they struggle to sit quietly learning other people's ideas in other people's ways.

New world countries have very high levels of ADHD, and arguable New Zealand has the highest level. They come from a gene pool of explorers who uprooted their lives to explore new places to live. New Zealand is full of people who chose to come to the most distant country, half way to the penguins, to start a new life. It shows up in our national characteristics – the big OE (NZ has the highest number of passport entries per capita in the world), Jack's as good as his master, the number eight fencing wire trait, refusing to be a small cog in a big wheel (97% of NZ firms have fewer than 20 staff) - and so on. NZ has a genetic pool of enterprising talent that is waiting to be tapped.

Control measures are important – you get what you measure! The difficulty is to design a control process that minimises the emotional and physical cost of compliance and maximises the accountability and comprehensiveness of the desired behaviour.[1]

The pen and paper tests, that focus on the bottom orders of Bloom's taxonomy of learning and a narrow skill set, will lead to students doing increasingly well in these tests over time. The focus of the education system will move to ensure this happens….. but at what cost? What will go are higher order skills, holistic skills and intrinsic motivation.

Assessment is the critical tool for focussing student attention on what is important. It is a form of learning and provides feedback.

Eighteen months ago the newspapers reported on the poor performance of New Zealand children in a general knowledge questionnaire in schools. They mentioned that fewer than half of the children knew where to find the Cook Strait. Had the children been given 24 hours to find the cheapest way to get from Kaitaia to Invercargill, I have no doubt that, they would not only have found the Cook Strait, but would have conquered the economics of crossing it.

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[1] The Macnamara Fallacy
- The first step is to measure whatever can be easily measured. **This is okay as far as it goes.**
- The second step is to disregard what can't be measured easily or give it an arbitrary value. **This is artificial and misleading.**
- The third step is to presume that whatever can't be measured easily really isn't important. **This is blindness.**
- The fourth step is to say whatever can't be measured really doesn't exist. **This is suicide.**

Universities have regulations governing examinations that suggest they are the ultimate assessment. For example only academics can mark exams, but tutors can do the more difficult and influential process of marking assignments with feedback. In many courses multi choice tests are used on large classes for bureaucratic ease of marking. I feel university is not the place for testing memory and right answers skills.

Below is a summary of the qualities that would be expected from the ideal graduate. This pulls together the concepts listed above and relates them to the challenge of providing meaningful measures. A university education should aim to develop students with all of the qualities needed to fulfil their potential and contribute fully to society.

Qualities	Intelligence	Measurement Challenge
Evaluation, synthesis, judgement, insight, creativity, problem solving, intuition, breakthrough thinking, inspiration, vision, commitment, resilience, self belief, enjoyment, flow	SQ	Imprecise, hard to measure many right answers, possibilities, many paths, uncertain outcome, inconsistent standards
Teamwork, leadership, awareness, action, relationship management, emotional wellbeing, physical wellbeing, optimism, skills, experience	EQ	↑
Knowledge, understanding, application, analysis, planning	IQ	Precise, measurable, right answers, within rules, deterministic, know that you know, consistent standards

Linking Assessment into TEO Systems

There are several challenges for TEOs to provide robust systems that support assessment of learning that fosters entrepreneurship.

Group work is a particular challenge. At Victoria University there is a limit of 30% that can be awarded for any piece of assessment that necessitates using a group, even if an individual mark is provided. The ruling aims to prevent students from passing courses where there was free-riding on high performing members of a group. I think a better process to encourage entrepreneurial education is to apply sophisticated marking processes

that provide individual marks that are achieved in a group exercise. I have experimented with ways of doing this, and feel I have systems that are highly effective.

Uneven project sizes is a challenge for markers seeking to compare apples with apples. I have taught around 1000 innovation students who were developing their own projects that differed wildly in scale. One student, for example, successfully raised $20 million for his project, while some of his classmates began and finished small projects. The problem is a mirage. The tutors and I had no difficulty in assessing students for the degree of learning and progress they had made in the context of the challenge they had set themselves.

We also found we could easily mark projects that showed the *value of failure and difficult learning experiences*. Journals are a particularly useful tool for students to be able to express their learning even when they resulted in failure, or were sabotaged by problems with a group.

Higher order thinking styles present a challenge for TEOs to find ways to uniformly assess achievement. The challenge is even greater for NCEA where there is expected to be uniformity across a range of institutions. The intention of NCEA was to break out of the narrow education fostered by examination based assessment so that value can be placed on creativity, problem solving, intuition, judgment and so on. However parents have become anxious about being certain that there is consistency across schools. My personal view is that absolute consistency is less important than the quality of learning, but systems need to be in place to assure a reasonable level of consistency.

NZIM has successfully gained NZQA approval for 'The Entrepreneurs' Certificate' and WelTec has gained approval for the New Venture Development programme. These are radical programmes where entrepreneurs set their own challenges, and are supported in their learning by mentors and coaches. It applies all of the finest elements of fostering real learning. It is worth evaluating this programme as a role model for entrepreneurship education in TEOs.