



Module 1: Soft-skills

Topic 1.3: Approaches to teaching soft skills

Video lesson

- <https://youtu.be/IPp1cvmmYFk>

Reading material

- Teaching Innovation and Entrepreneurship – The Singapore Experiment

Teaching Innovation and Entrepreneurship

The Singapore Experiment

Charles Hampden-Turner

In 2002 the Economic Development Board of Singapore sponsored a series of 4 month experimental programmes in “technopreneurship”. The word is a hybrid of entrepreneurship and the kind of high tech development which Singapore has been promoting for decades. The EDB is one of the most creative departments of government in the world. It wanted to discover whether entrepreneurship could be deliberately taught in its universities to its own citizens and whether such programs would lead to new start-ups. The answer was “yes we can!” to echo Barak Obama. This chapter tells the story of the last six years of this programme which we also carefully evaluated. Our methods of capturing this innovation are also potentially important.

The Nanyang Technopreneurship Cen-

Charles Hampden-Turner was an associate of the Judge Business School, Cambridge University for 17 years and is currently a Visiting Professor to Nanyang Technopreneurship Centre at Nanyang Technological University in Singapore and an associate of the Institute for Manufacturing at Cambridge. He has just published *Teaching Innovation and Entrepreneurship* with Cambridge University Press in August. He is completing an 80 minute documentary entitled "Innovation and the Fate of Nations" which he narrates. Its premiere is in June in Singapore. In 2003 he was Hutchinson Visiting Scholar to China and toured eleven universities there. Riding the Waves of Culture with his business partner Fons Trompenaars has passed 250,000 copies in English alone and has been translated into 19 languages. He co-founded Trompenaars-Hampden-Turner in Amsterdam in 1986.

tre was purpose-built as an interdisciplinary programme, apart from other graduate schools at Nanyang Technological University in Singapore. The course was designed and run by Professor Tan Teng-Kee, a Singaporean-American alumni of NTU, an ex-entrepreneur and corporate executive who obtained his PhD from Cambridge University in 2002, under the supervision of Charles Hampden-Turner. The design of TIP (Technopreneurship and Innovation Program) was crucially influenced by his thesis and by the ideas set out in this book. Dilemmas methodology is at the heart of this initiative. Recently a second programme in Mandarin for students from the People's Republic of China has been started. This remains to be properly evaluated although early indications are very positive.

The programme was not confined to the classroom. Innovation cannot be enclosed in a specific place. Rather “Prof. Tan” as he is called, designed an “innovative ecosystem”, stretching from Singapore to China to the USA. The idea was to confront students with an environment, which had highly contrasting stimuli, great *hopes* great *disappointments*, great *riches* great *poverty*, a *past* heritage that had been invaluable and *future* prospects that must be brighter still, as the torch was passed from the entrepreneur founders of Nanyang to the

second generation and the third. (Words italicised indicate strong contrasts).

“You will go from zero to millions and back to zero” Prof. Tan tells his students. Why back to zero? Because they will all end up dead and can take nothing out of this world. Everything they *get* they must *give* and the only legacy they can leave behind is the bestowal of the wealth they have created to enrich the lives of others.

An eco-system is characterised by a great *variety* within a single *unity*, like the coral reef that plays host to a thousand species of tropical sea creatures. The program begins with three days in an Outward Bound exercise wherein *individuals* are taught to bond in *teams* as they discover *opportunities* in *crises*. It is also intended to join *minds* with *bodies* and *challenges* with *responses* to these.

The next stop is the Chinese Heritage Centre at the heart of campus, a museum of the struggle of early Chinese immigrants. Nanyang is an authentically Chinese university built not simply by wealthy entrepreneurs but by the pennies of rickshaw drivers who wanted their children to have a better chance than they. The key to *change* is *continuity* stresses Prof. Tan. You can only transform yourself if you know where you came from and where you want to

go, a “red line” joins your *heritage* to your *legacy*.

Throughout the entire 16 weeks the teams of students engage in a *simulation of reality and play* at the *serious* task of running their own businesses. The exercise speeds up the process of *trial and error*, with *strategies* created and *results* fed back to improve those strategies, in a process of *error and correction*.

Students are also put “on stage” there to *imagine* and *dream* a scenario they want to *come true* and to *realize*. Theatre is a mark of higher civilization which allows us to imagine shocking *failures* so that we can avert these to *succeed*. To imagine disaster is to suffer only vicariously while experiencing life vividly, dramatically and memorably. Students exposed to twenty common reasons of business failure, experienced while rehearsing can avoid such mistakes in their futures.

Students of Chinese ethnicity are raised to be *modest* and *shy*. There is no problem in having such feelings within you, but those seeking to be entrepreneurs must be at least outwardly *bold* and *confident*, even while questioning themselves. After all if they need others to believe in them, they must believe in themselves.

Another strong contrast within the classroom is between being a *competitive arena* in which participants vie to think up better ideas and having a *family atmosphere* in which all have close memberships. “What are we?” cries Prof. Tan rhetorically. “A family!” respond the class. One result of everyone being so *different* in their aspirations is that they are the *same* in their need for attention, warmth and support. They need to be *supported* as persons, yet *critiqued* as innovators and trust that this feedback is authentically intended to help them succeed.

What this programme does is to transcend a zero-sum game in which good grades are inherently scarce and others’ brilliance spells your own eclipse. Because success is multidimensional and every success is unique, students are no longer win plaudits at each others expense. There are still failures, a great many, but these are steps in the process

of improvement. Better by far to be told that your product is not good enough by a member of your “family” than by a distant angry customer demanding a refund.

Not only is Nanyang Technopreneurship Centre full of new products, trophies and pictures of successful product launches but visitors come there most days. These are entrepreneurs willing to share their secrets, venture capitalists willing to explain their judgements, government representatives with details of incentive programs and soft loans to the enterprising, “Angel” investors looking less for personal gain than a noble cause, experts on the acquisition of small companies by larger ones (a common strategy for start-ups is to get acquired and begin again).

There are visitors from other uni-

Innovation cannot be enclosed in a specific place.

versities, loan officers specialising in smaller businesses, corporations seeking to renew themselves and hosts of the curious. Students come to realise this is *their* programme, a new venture in itself and one for which they share responsibility with their mentors. They interview the next intake, choose the speakers they want to hear from and help improve the programme design for next year.

But if the world comes to NTC, NTC also goes out to meet the world. The entire class travels to Shanghai, to the eco-suburb nearby, to incubators near Fudan and other universities there and around Beijing. It travels to Seattle on America’s West Coast to visit Google, Starbucks and others. Students discover and champion inventions created by the Bioengineering School at the University of Washington, where the *disciplines* biology, medicine and engineering meet *cross* each other. Students write up business plans for the *commercialisation* of these *inventions* and pitch them before real venture capitalists, who are not simply *sharing their knowledge* with students but also *practicing* their profession. Some inventions were funded.

The tour moves on to the Bay Area

around San Francisco, down the peninsula to Silicon Valley and to Stanford University’s innovation courses, while visiting IDEO, the world’s best known consultancy on innovation started by Tom Kelley. The \$2 billion Kauffman Foundation, America’s fourth largest foundation, which commits all its funds to innovation is also part of this extended Learning Journey. Carl Schramm CEO of Kaufmann has designated this programme the best in the world outside the USA and among the best even there.

This extensive tour contrasts *developed* with *developing* economies, those calling themselves *capitalist* with those proud of *socialism*, relative *affluence* with relative *poverty*, innovation driven by *self-fulfilment* with innovation driven by *necessity*, a system of *laissez-faire* with a system of *government oversight*, a culture of *individualism* and a culture of *communitarianism*. The contrasts could hardly be stronger.

After their return home the students are exposed to the contrast between supply innovation and demand innovation. Supply is something novel and valuable to customers, typically a technological development, but demand innovation is more subtle and well suited to tough times. You search out the “pain-points” in the customer’s system and try to relieve these. A hospital’s surgery unit that used instruments was forever running back to the sterilizer when one instrument was dropped or mishandled. The company supplied twenty foot rolls of sterilized towelling with the instruments inserted in pockets in the order in which they were used by that particular surgeon. The hospital’s problems were solved.

Developing a Methodology

Given our belief that innovation consists of being presented with highly contrasting values at powerful levels of intensity and learning to reconcile these, how could the success or otherwise of the program be measured? We took a single dilemma transforming ideals into realities and created a questionnaire around this theme.

Despite the risk of doing so we decid-

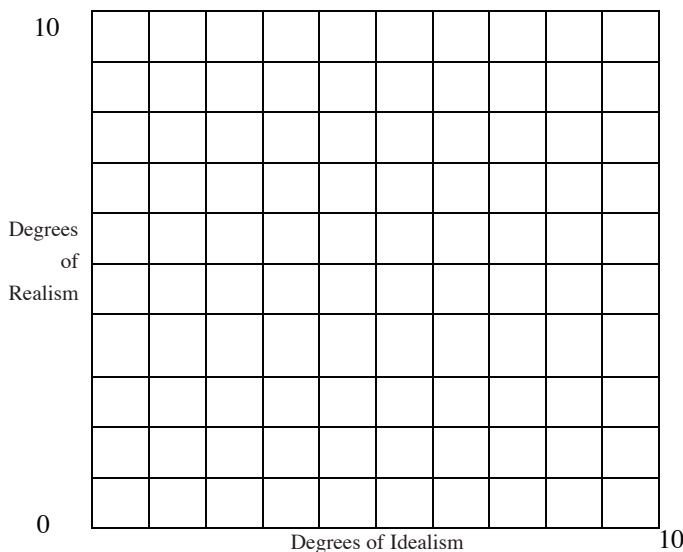
ed to contrast the pedagogy of the TIP program with the 3 year bachelor degree program the same students had received earlier. This was risky because students are typically nostalgic about their undergraduate days and grateful for the degrees conferred upon them, which is the gateway to a career. In contrast, the TIP diploma had scant recognition. Any university fundraiser will tell you that alumni funds are more forthcoming for undergraduate than for graduate studies. Comparing TIP to the university at large and with courses and head teachers the students had selected for themselves was going to be tough. Below are the kinds of instruction we gave to our respondents.

Question X

Please indicate your judgement of the values attained by NTU (U) and NTC (N) as measured against the following statements.

a) My education has been realistic. It readies me for the world as it is, not necessarily as it might be. It is practical and effective.

Not at all (value 1) to Very much so (value 10)



b) My education has been idealistic. It shows me how realities can be changed, so as to create new values. It is inspirational.

Not true at all (value 1) to Very much so (value 10)

Suppose for the sake of argument that you have judged NTU (U) to be slightly more realistic than NTC (N), so you give

NTU a score of 6 and NTC a score of 5. Suppose that you have judged NTC (N) to be slightly more idealistic than NTU (U), so you give (N) a score of 6 and (U) a score of 5. Please place “N” and “U” on the scales above. With these scores in mind please consider transferring them to the Grid below. This gives you an opportunity to record whether “realism” and “idealism” have been integrated or whether these have been polarised. For example a score of 8/1, 2/9 or 5/5 would indicate polarisation while 9/9 or thereabouts would indicate integrity. Were you to copy your scores of 5 and 6 straight on to the Grid they would appear as below.

As you move your cursor across the grids various pop ups appear as balloons. These are there to prompt your choices, so that at top left we have non-idealistic realism and at bottom right we have idealistic unreality. Do NOT worry if you change your mind. After all we have changed the question. We will count your scores on the grids only. Please make sure there is only ONE (U) score and one (N) score for each grid. Please place your score inside a square. We now proceed with the questionnaire.

We posed ten sets of dilemmas, but there is space here to report only five. This is not a serious omission because the answers to all ten different questions were remarkably similar. What seems to matter are not the particular values referred to in the questionnaire but whether the respondent experiences the pedagogy received as polarising or integrating. There is persisting pattern crossing all dilemmas posed. As we shall see NTU’s undergraduate pedagogy was largely polarising in its effect on respondents, while TIP’s graduate course was largely integrating in its effect. The differences were very large indeed and highly consistent across all questions. Two very

different styles of education are being assessed here. The first is quite sterile. The second is highly innovative. No less an authority than the new President of the United States is an advocate of this integrative view. The five pairs of values are summarised below.

The Results

We now turn to the evaluation of TIP as compared to NTU undergraduate courses. We found 153 qualified respondents. Many others had attended other universities. These were omitted. Many qualified respondents were out of the country and preoccupied with business. We received 68 usable replies. All questions were on the theme of Realism vs. Idealism. We regarded the first as a traditional value, which NTU was pledged to uphold. We regarded the second “progressive” value as one essential to innovation and acclaimed by TIP and many creativity experts.

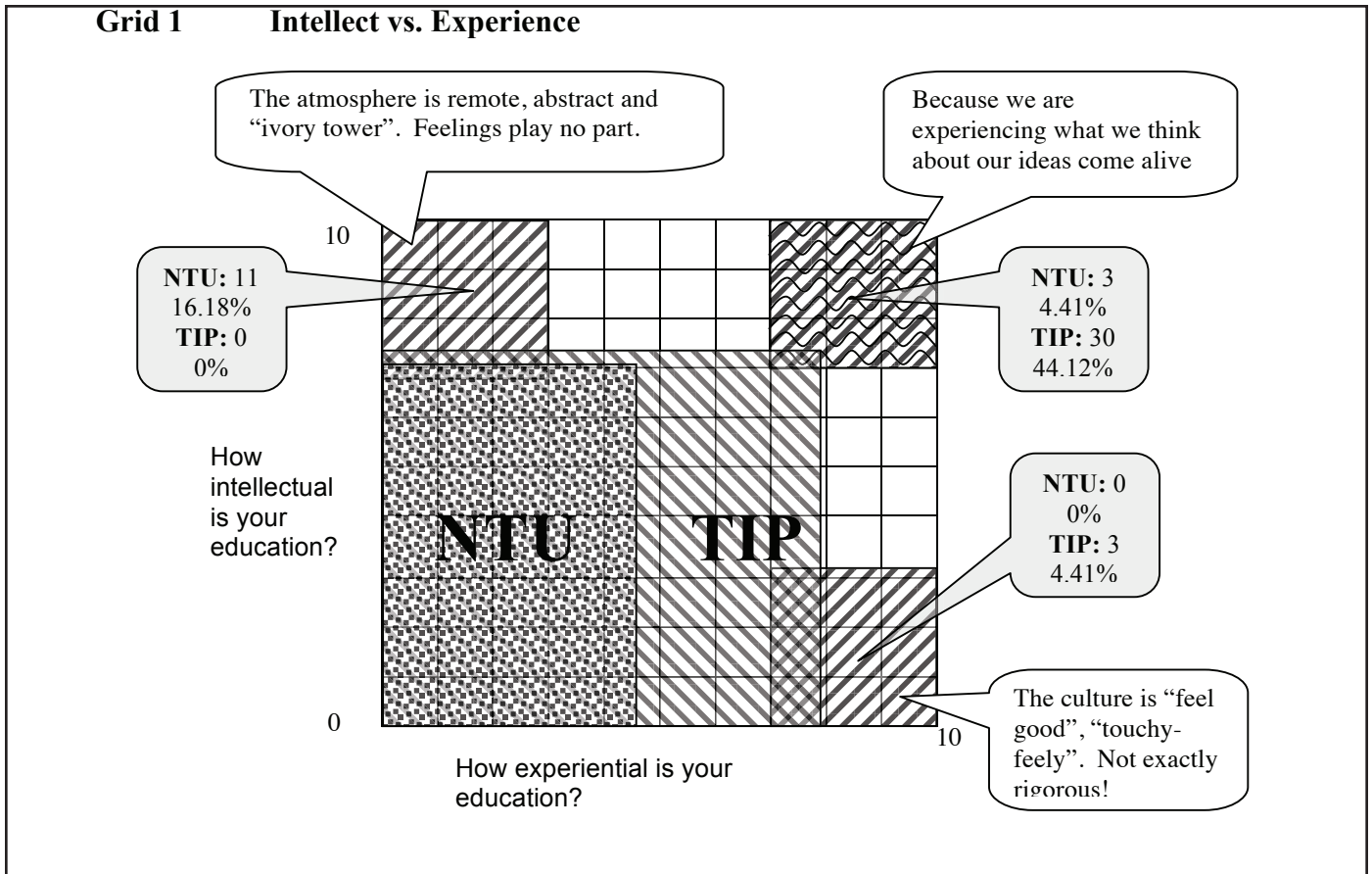
We first used the Likert Scales to measure from 1-10 how *intellectual* the pedagogy was in the mastery and organization of key ideas. We next used the same scale to measure how *experiential* the pedagogy was, in working with feelings and emotions. Respondents were then presented with the grid below and asked to locate themselves upon it.

We were looking for those who could experience emotionally what they were thinking about at the top-right of the Grid. We were also looking for those who failed in this attempt, at top-left and bottom-right or compromised in the middle. To this end pop-up balloons prompted their choices and nudged them to consider whether these values had been integrated. The results are below.

Dilemma 1

Intellectuality vs. Experience

The responses are set out below and we see that “Prof. Tan” and his TIP education has not only exceeded other university courses, but has done so by landslide proportions. This is not on one axis only, as we might have supposed, but on BOTH. If you use your intellect to be innovative you not only have your heart in your mouth, you strive to be more rigorously intelligent still, since your whole future now depends upon it. Although vivid emotional experiences can detract



from intellectual rigour and although intellectual activity at universities often occurs in a moratorium from stressful experiences, intellect and experience can develop together. This is strongly suggested by TIP’s scores recorded below.

The different locations on grids 1-5 need to be explained. There are two “pathology zones”, the nine squares at top left and the nine at bottom right. There is one Reconciliation Zone, the wavy pattern across the nine squares at top right. The average scores for the NTU pedagogy are clearly marked as are average scores for the TIP pedagogy taught at NTC. In virtually all cases the number of squares occupied by TIP is substantially larger than those occupied by NTU. We see that the intellectual attainment in the “Technopreneurship” course was judged to have exceeded the NTU average. The TIP course scored 7.20 out of 10, compared to the university average of 7.06. Yet as expected, TIP won hands down upon the intensity of emotional experience, scoring 7.97 to the university’s 4.78. The simplest comparison is to count the number of squares covered in the Grid above by NTU and by TIP. When we do this NTU covers

33.26 squares and TIP 57.38, the latter is 74.2% higher ($R^2 = 34.23\%$, $P < 0.01$).

We laid two deliberate traps for TIP and the University respectively. These are represented by the “pathology zones” top left and bottom right. We prompted respondents to say that the TIP program was “feel good” and “touchy feely”, see bottom right of the diagram above. We wanted to smoke out any anti-intellectualism. But only 4.41% agreed with this verdict. We also prompted respondents to say that NTU courses were “Abstract, ivory tower and remote.” Fully 16.18% agreed that this was so. (see Appendix II). It is important to stress that NTU as a university DOES succeed on its own terms. 42.65% of its students rated their education as 8, 9, or 10 on intellectuality, see Appendix III. What it does not do so well is to bring intellectual order to its own personal experiences. Only 4.41% of respondents succeeded in scoring their undergraduate learning in the Reconciliation Zone, see wavy square at top right, while 44.12% of TIP graduates reached this zone, their “ideas coming alive”. Hence on Question 1, TIP’s capacity to combine intellectuality

with emotion the programme scores ten times higher.

Dilemma 2

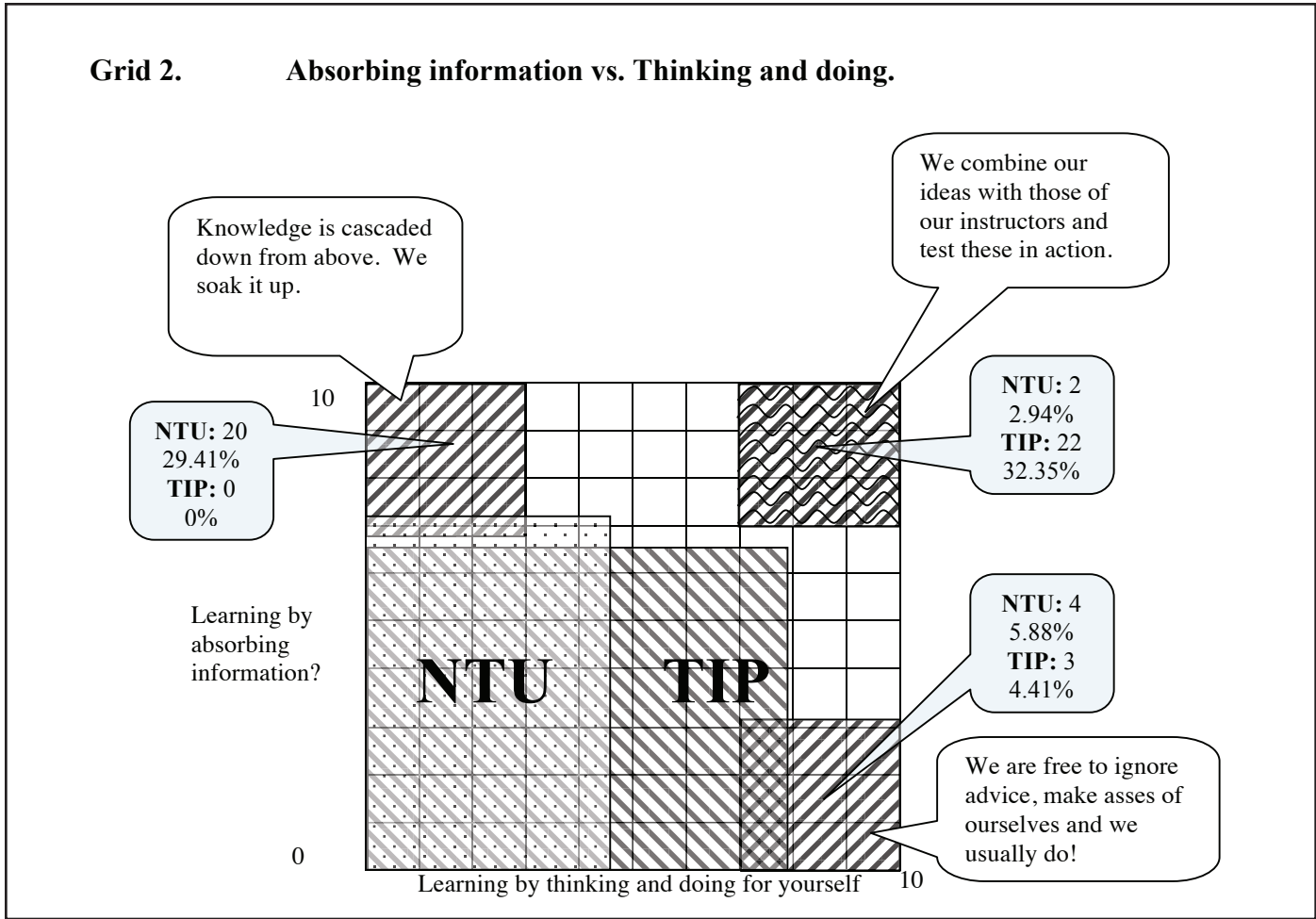
Learning by absorbing top-down information

vs.

Learning by thinking and acting for yourself

Our second dilemma, one that affects all pedagogy, is to consider how learning is communicated. Is it transmitted top-down by educators “filling up” students with information and knowledge? This was the view of John Locke that educators “wrote” upon the *tabula rasa* of the mind. Or are there innate structures of the mind (Platonic forms) that educators elicit so that in a sense we already know? Clearly both visions have some validity. Those who wish to think and act for themselves need information *with* which to think and they might be wise to listen first, or they may jump to a wrong conclusion. Those who only absorb conventional wisdoms filtering down upon them may take on the characteristics of a sponge. Since this accusation had been made against traditional Chinese education, we wished to see if it had lingered.

Grid 2. Absorbing information vs. Thinking and doing.



Dilemma 3

**Level playing field for competitive for competitive efforts
Are we good enough?**

vs.

Extended family of brothers and sisters who root for you

Whether business enterprise is “basically” competitive or cooperative is one of the oldest arguments. But no one witnessing the rise of Asian countries with Confucian family-based ethics can doubt that familial relationships play an important part. The case is even stronger for creativity and innovation. Great writers, artists, scientists for the most part, knew and respected each other and were members of a salon or group.

Creative eras tend to come in bursts of one or two generations. There occurs an inter-stimulation of like minds, a mixing of intimate strangers. There are signs of this today in such places as Amsterdam, Seattle, the Bay Area, Helsinki, Dublin, Taipei and Shanghai.

Genuine innovation requires us not just to listen and absorb, but to select, convince ourselves and act. We obtained the following results.

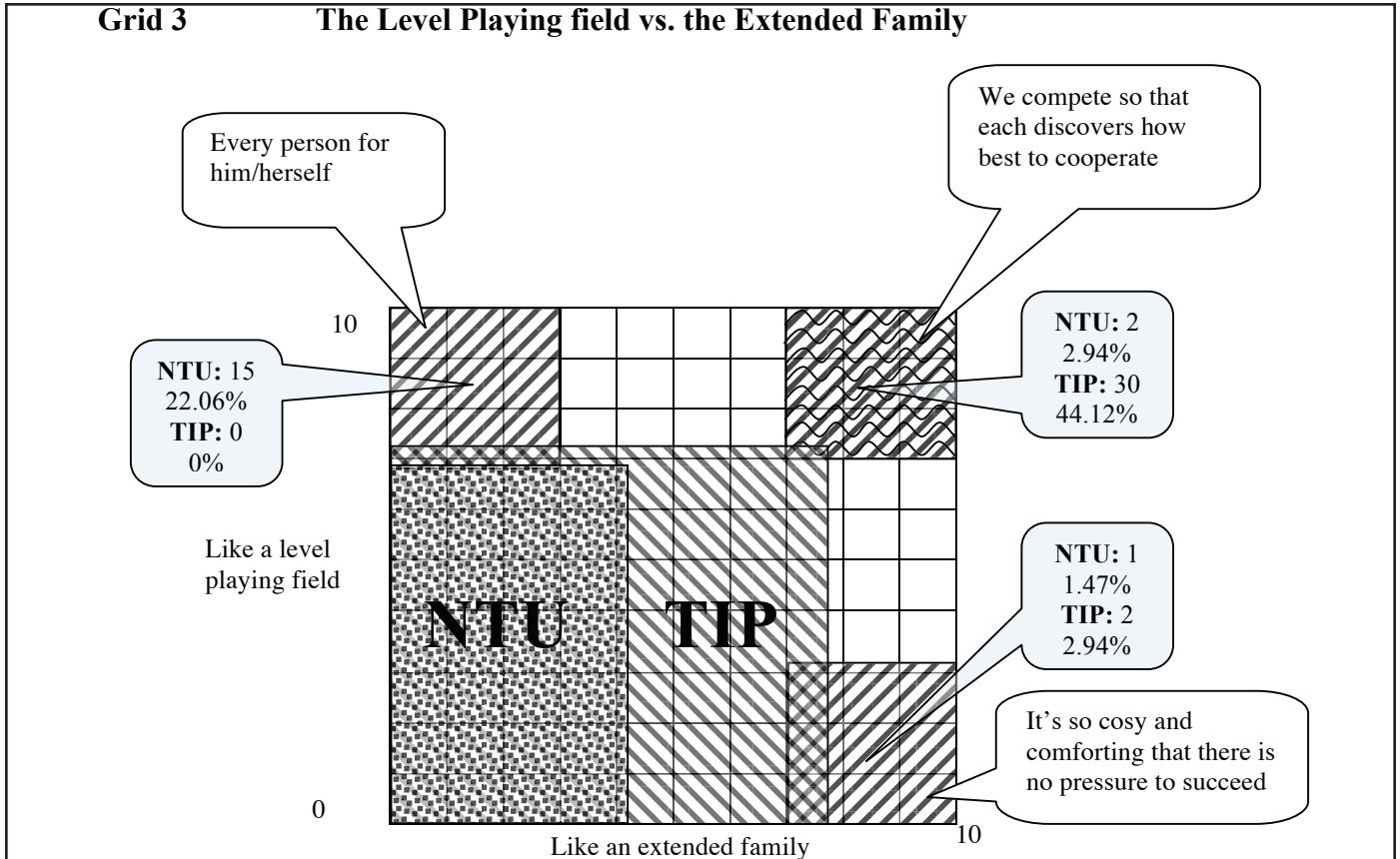
Once again the pathologies are cross-hatched at bottom-left and top-right, while the wave-forms characteristic of the Reconciliation Zone are top right. Comparing the number of squares covered gives NTU a score of 33.66 and TIP a score of 53.52 squares covered. This is a 60% advantage ($R^2 = 25.36\%$, $P < 0.01$). As we had anticipated NTU scored higher on the top down transmission of knowledge, but the difference was surprisingly small, considering how much less time TIP spends lecturing, compared to the university at large. NTU scored 7.24 and TIP 6.74. Anyone wishing to think and act using information would need first to absorb the information. It seems TIP students did this. When it came to “thinking and acting for oneself”, the University scored only

4.66 and was swamped by TIP scoring 7.94, almost three squares higher. Again we tested the authenticity of “thinking and acting” for oneself. Was it just pretending? We prompted the answer above “We are free to ignore advice, make asses of ourselves and we usually do!” Yet only 5.88% taxed TIP with this fault. We prompted respondents to complain of NTU “Knowledge is cascaded down from above we soak it up”. 29.41% believed this to be the case so the concerns about passive memorisation are upheld.

Yet the university succeeds in its aims with 58.82% testifying that information from above is absorbed in the degrees of 8, 9 and 10 (Appendix III), yet only 2.94% felt that they could use that information to think for themselves! In contrast 32.35% of TIP scored in the Reconciliation Zone by absorbing information *and* using it to think.

Grid 3

The Level Playing field vs. the Extended Family



Singapore follows the American “level playing field” axiom, so faithfully that it may be a purer meritocracy than its mentor. Yet innovation is crucially different because what constitutes “merit” has not been defined before hand. You need an extended family of colleagues to champion and to give significance to what you are trying to do, which authorities may not recognize. It may be recalled that we wanted to test the proposition that where those in the class wanted something *different* from each other, that head-on rivalry would be less and most would wish each other well. We believed a “family” of innovators might well rejoice at each others fortune. Players needed coaches. Might programme members willingly coach each other, mixing cold criticism of the work with warm support for the person?

It was, at any rate, our hypothesis that TIP might be more competitive *and* more cooperative and familial than NTU. We believed this to be true of creative communities historically, a crucial blend of personal striving with interpersonal supportiveness, a co-mingling of contrasting minds..

NTU covered in all 26.80 squares. TIP covered 56.37, or 103% higher (R2

=36.23%, P<0.01). TIP’s average score on Competitiveness was 7.19, compared to 6.85 for NTU, so that NTC was even more competitive than the mean for the university-at large, but on the classroom environment resembling an extended family, the University scored but 4.22 compared with TIP’s 7.84, a huge margin of 3.62. Once again the University “succeeds” in being competitive, 42.65% score the environment 8, 9 or 10 as a “level playing field” for competition, yet 44.12 % of TIP report “co-opetition”, with competition and cooperation in a family-style culture reconciled at top-right. Once again we probed for dysfunctional extremes of too much familial atmosphere and too much “cut-throat” competition. (see cross-hatched squares) We tempted respondents to admit that the family atmosphere at TIP was “cosy, comforting and free of pressure” but only 2.94% agreed. We tempted respondents to say that NTU’s competitiveness placed “Every person for him/herself” and 22.06% agreed - a rather worrying proportion. NTU appears to have imported a large dollop of Western-style alienation into its pedagogy. Undergraduates feel apart,

absorbing information with their emotions not engaged.

Dilemma 4

Serious hard work

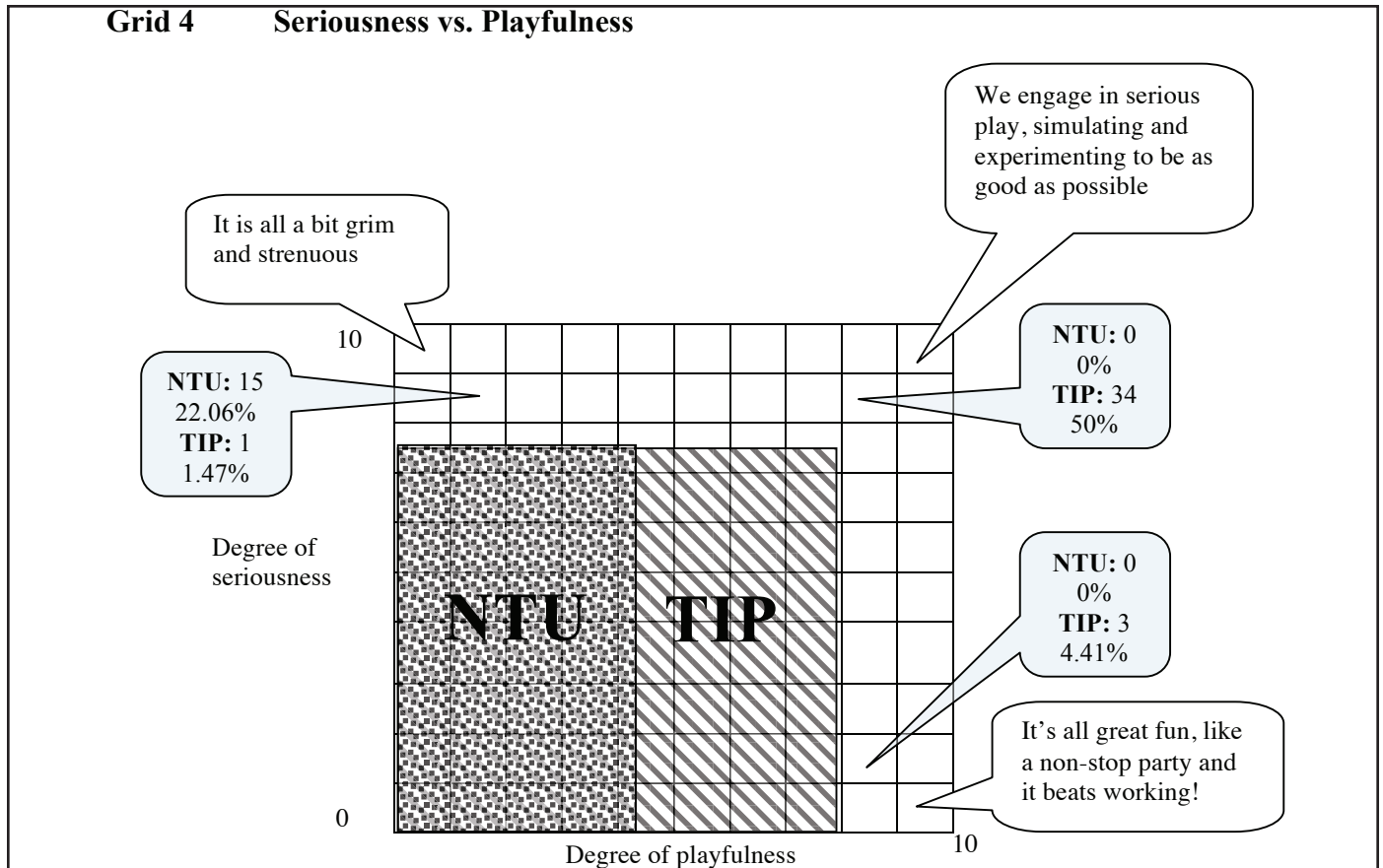
vs.

Playful enjoyment

Those who want to succeed in the world of free enterprise and opportunities-for-all had best take such challenges seriously. Few will make it without determination and perseverance. Hard work is the inescapable recipe. Yet countless studies of innovative persons note their playfulness. They have created something that gives them untold pleasure and they want to share it. They find joy in their work and are guided by secret delights. Moreover, much use is made of simulations, skits, role plays, prototypes and models, because these can fail inexpensively. Innovators practice with “toys” as the actual product takes shape.

Michael Schrage has suggested that innovation consists of Serious Play, i.e. a playful process leading to a serious outcome, light hearted experimentation in search of a crucial solution. We hypothesised that the University would tend towards Seriousness, even to the

Grid 4 Seriousness vs. Playfulness



point of strenuousness. We knew TIP was much more playful but were its participants aware of the serious purpose? The course has a business simulation running its full length. It has practice presentations to Venture Capitalists and many skits and plays, but were these games more than fun? Could seriousness and playfulness combine in a joyful rendezvous with reality? Could playful prototypes culminate in serious products and services? Could we take the problems seriously but not ourselves? Play inevitably involves error, but because models, simulations and prototypes are cheap, such errors are not “serious” as much as instructive. Piet Hein calls it *The Road to Wisdom*.

The road to wisdom – well it’s plain
 And simple to express
 Err and err and err again
 But less and less and less...(Quoted by Schrage, 2000)

What we are talking about is the “error correcting system”.

The University scored 7.54 on Seriousness, but interestingly TIP is extremely close behind with 7.50, a non-

significant margin. TIP is quite as serious as NTU. But when it comes to Playfulness the difference is dramatic. The University scored 4.24 on Playfulness and TIP scored 7.97, over three squares above. NTU covered 31.54 squares and TIP 59.78, or 91% higher ($R^2 = 34.53\%$, $P < 0.01$).

We tested to see whether TIP’s playfulness was “like a non-stop party”, a trap it is easy to fall into, but only 4.41% agreed. We asked if the experience of university courses was not “a bit grim and strenuous” and 22.06% agreed. Once again TIP has demonstrated that playful processes can prepare for serious purposes as the hours slip by because you are enjoying yourself. 50.00% of respondents said that TIP reconciled work and play, but none (0%) claimed that the University managed this.

But note that once again the university succeeds on its own terms. 52.94% of its students score the teaching environment 8, 9, or 10 in Seriousness, even if fun is scarce. However this is lower than TIP’s score on Playfulness.

Dilemma 5

Career continuity and mastering chosen paths

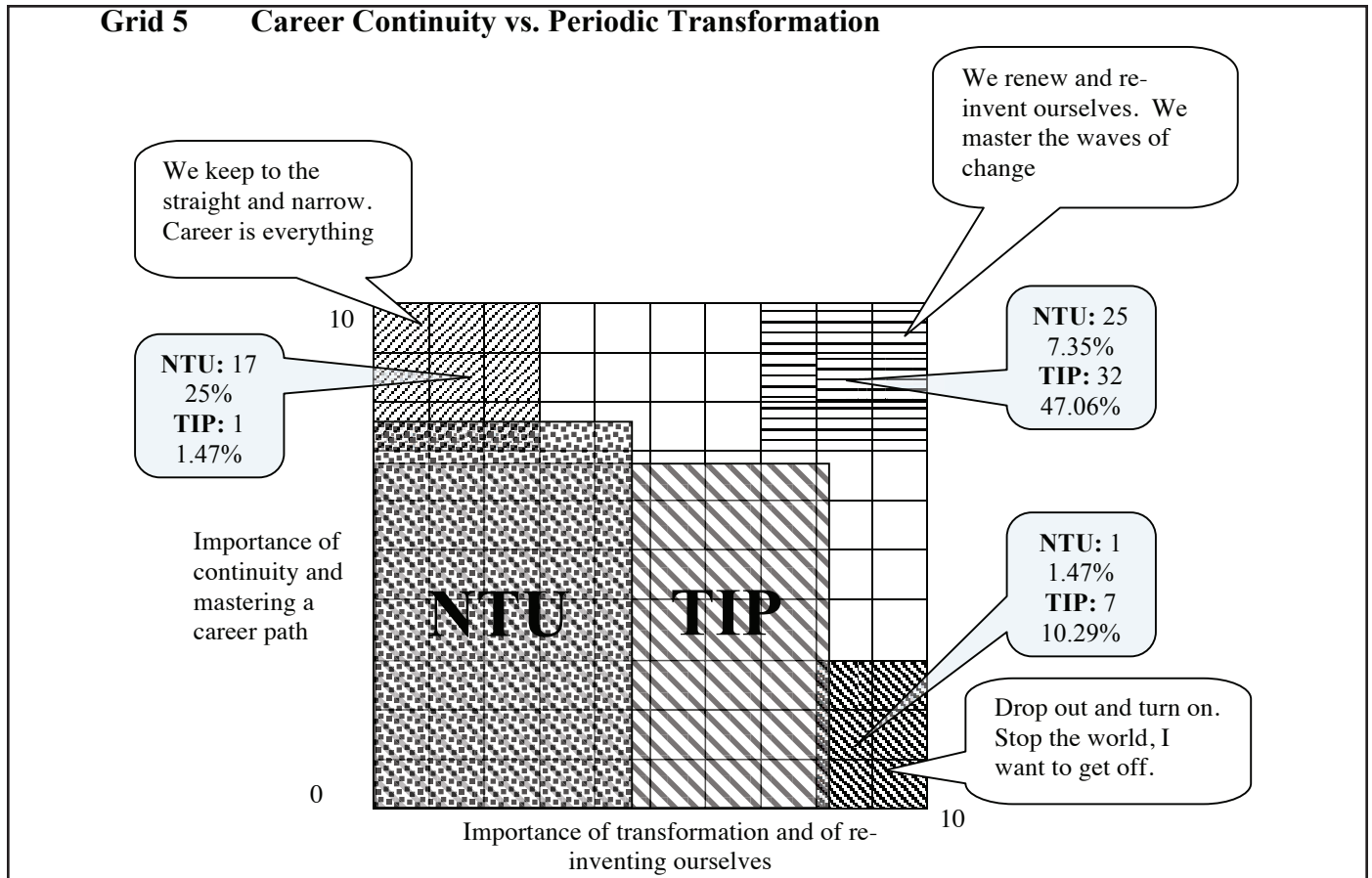
vs.

Transformation of yourself and reinvention

Universities still prepare people for careers, although how long certain careers can now last grows ever more problematical. Whole technologies may come to the end of their useful lives. Never-the-less continuity remains crucial, as does choosing your career path. Even innovations tend to advance certain disciplines and callings, with one innovation forming “the platform” on which the next is based and so on. The core competence of a company makes no sense without thematic continuities. The greater the whirlwind the more you must rely on sense of direction so as to ride upon it.

Increasingly those who learn will ride a new technology for perhaps five-to-ten years and then transform and re-invent themselves jumping from one form of competence to a contiguous one in variations on underlying themes. The TIP

Grid 5 Career Continuity vs. Periodic Transformation



course was designed to help students transform themselves, hopefully without losing an underlying sense of continuity. Is it possible to combine the two, changing radically while still retaining a stable identity? We believe it is. Transformation that sacrifices continuity takes you back to square one. In any true development there must be a path, however winding, that brings you to your destination.

We set out to discover how NTU and TIP balanced career continuity with self-transformation of the kind that outstanding entrepreneurs and innovators achieve. We expected NTU to stress continuity and TIP to stress transformation, but we hoped to discover whether TIP retained at least some sense of continuity, without which a sense of growth and the development of core capabilities over time may be lost. Knowledge is to an important extent cumulative. One verified proposition links to another. We generalise as far as we can and then examine the exceptions. Disrupt continuity and you break up knowledge into incoherent fragments. TIP must serve continuity AND transformation.

What “technopreneurship” means is that you simultaneously follow relevant

technologies in their most advanced states, yet take a stand between these, entre-preneur “to stand between”. As we shall see, TIP succeeded in this. You take the most advanced work from at least two disciplines and create a novel synthesis between these. Here are their scores.

NTU covered 34.80 squares. TIP covered 49.45 or 67% higher ($R^2 = 24.77\%$, $P < 0.01$). NTU outscores TIP on career continuity by 7.76 to 6.81 or 0.95. Note how small this difference is and how emphatic is the TIP course on maintaining a sense of continuity. Since innovations often combine two disciplines, the entrepreneur needs to be aware of career trajectories that are converging or running parallel in a way that makes connections possible. The combination of two lines is often transformative, while still retaining the initial continuities.

When we asked how transformative NTU’s courses were, the university scored 4.69 but TIP scores 8.35, nearly four squares better. 47.06% of respondents reported that TIP combined Continuity with Transformation the Reconciliation Zone, but only 7.35% made that claim for NTU. We checked that TIP was

not cheating in selling Transformation as “dropping out and turning on Hippie fashion” yet 10.29% agreed and there may be a little danger here. We asked whether students “kept to the straight and narrow” at NTU and 25% agreed, see Appendix II. Yet this “straightness” meant that 63.24% of our respondents rated the university at 8, 9 and 10.

Final Proof of Success

We have looked at the scores for the five questions and found that TIP scores considerably better on all lateral dimensions, while not being below NTU on the traditional, vertical dimensions by any significant margin, so that TIP may be said to uphold the university standards. However, the most remarkable finding is that nearly 42% of all TIP students scored in the Reconciliation Zone, eight times more than achieved in undergraduate classes at NTU. This unique capacity to integrate contrasting educational processes would seem to be its greatest virtue. Yet there remains one nagging question. The purpose of this programme was NOT primarily to be well assessed by those who participated in it, encouraging although this is.

The programme is not an end in itself but a means to making its members more innovative and entrepreneurial. Is there any evidence that they became so? There is.

By January 2008 out of 154 students 46 had started business ventures, employing about 75 of their numbers. This had happened despite the fact that:

a) Many had not joined the programme to become entrepreneurs.

b) Twenty or more had gone on to get their MSc degree of which this programme was a module.

c) Most are in debt when they graduate.

d) The course advises them to get experience in their selected area of innovation before launching their own ventures.

e) They have an average of only 2-3 years to launch such a venture..

We contend that 46 surviving start-ups is a very remarkable result. If only 10% of these eventually prosper they will have repaid the cost of the course several times over.

Can we Model the Innovative Process?

By what process do TIP students and innovators in general reach the Reconciliation Zone at top right of our Grids? In order to understand this we need a three-dimensional model, with the third dimension representing time. One way dilemmas are resolved is by emphasizing first one dimension then another in sequence, and by achieving the second dimension *through* the first.

For example, when innovating we first feel excited, doubtful and emotional until such a time as we can intellectually order these fresh insights, see Dilemma 1(a). This results in an anti-clockwise helix. On the other hand most students must first absorb top-down information and only when they have enough of these resources can they think and act for themselves, see Dilemma 2(a). This results in a clockwise helix.

It is at least probable that students feel initially that they are competing with all other members, but as the extended family develops around them and team skills develop they start cooperating, see

Dilemma 3(a). This results in a clockwise helix. There is little doubt however that playfulness, experimentation and simulation precedes the serious business of creating finished quality and risking everything in the market, see Dilemma 4(a). In this event, the helix is anti-clockwise once more. Finally, the mastery of your chosen discipline and career path precedes the intersecting and cross-cutting with other disciplines to make new connections, see Dilemma 5(a). In this event the helix is clockwise. Note that we have retained our grid pattern

Genuine innovation requires us not just to listen and absorb, but to select, convince ourselves and act.

on the face of each cube and that helices flirt with pathology by skirting these zones. There is no innovation without danger. It is easy to go too far in either direction as our results show.

Is this nothing but the “Hawthorne Effect”?

Before concluding, let us address a likely critique of this article. “Here we have”, critics will say, “nothing more than the Hawthorne Effect.” This occurs when respondents grow to like their teacher and “give him what he wants”, perhaps because his own enthusiasm is infectious and because they feel they owe him in return for a fun time, or both. What these critics fail to realise is the “Hawthorne Effect” is a *vital part of life itself*. We create nothing without hope and yearning, nothing without passion and optimism. So *what* if the prophecy is self-fulfilling? You believe in yourself, in part because your teacher does and that belief is vindicated. That is what being innovative is all about and if it breaks taboos on clinical detachment then the fault is with those taboos.

But in any event this was not research that measured a heady optimism at the end of the program. Students had, on average, been out in the cold, hard world of business reality for two and a half years when this research was conducted. It is more than likely that they had tried

and failed at least once since graduating. What is more likely than they would blame this program for any disappointment? That they do not seem to have done so in any numbers testifies to the lasting legacy of this educational experience.

Are we to have a science of only dead things that cannot respond to the investigator? *You discover innovation by engendering it*. There is no other way. Remain cold and unmoved and the world around you mimics your own demeanour. We hope to have demon-

strated that innovation can be elicited, that it builds on what the university already teaches, while qualifying and augmenting this, that innovation requires dilemma-

resolving, lateral type thinking. The capacity to create wealth resembles the ancient Alchemists’ dream of creating gold from base metals. The world’s current predicament is pretty “base” as we fight the credit crunch and the death of the Anglo-Saxon economic model.

An answer to world crises?

It is clear that innovation CAN be taught, that this builds upon the university’s traditional mission to society by placing this in an innovative context. This is very exciting for students, transformative in its impact upon them, as witnessed by many moving accounts. It is hard to think of a more vital topic in world affairs than generating a capability to innovate spontaneously. This capacity can reconcile and generate abundance out of scarce resources, create satisfactions out of wants, agreements out of discord and realities out of ideals and imaginings.

The very process is joyful and playful, while the consequences are valuable and serious. It is hard to see how societies dedicated to innovation would have the time or the inclination to kill, how a mind that could be generative and thus get its “highs” could ever want to be befuddled with abusive substances. Teach our children and young people to be innovative and scarcities are transcended, ideas are joined and so are the people who believe in these. Innova-

tion needs not just diversities of ideas but diversities of people supplying those ideas. From their inclusion comes not only wealth but our best hope of tolerance and global dialogue. A world where imagination fathers new forms can solve its own problems.

Those who “give” each other knowledge still retain it within themselves. Romeo’s words to Juliet become more nearly true, “The more I give you the

more I have.” There is a secret world of abundance within us that is widely shareable by those willing to gain-share and fate-share. To create makes of our lives a lasting legacy. The obscenely large salaries of bankers who proved to be incompetent can become things of the past. People who innovate do not need to be bribed to do so by extrinsic rewards. It is simply a better way to live.

To have shareholders’ money to play with is a privilege.

References

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shadowtouch

featherglide chills
the nape of my neck
with a *shadowtouch* of wild

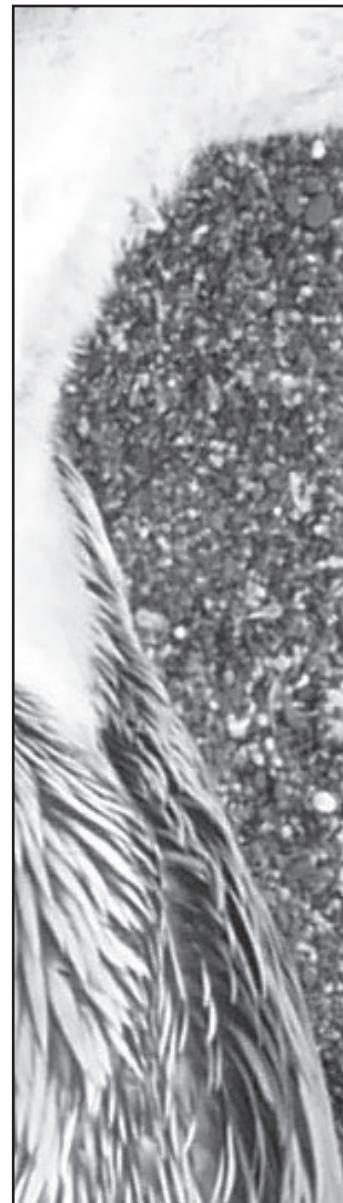
he is one of mine
brags the wind

I fall into a fit of full hearted laughter
as the swift soaring hawk outstrips all vision

some *things* must be felt
before they can be heard or seen
and even then
and even then
reason refuses to believe
in anything not bracketed
between its iron clamps
so no wonder *wonder* crumbles into doubt
and yet
and yet

deepdown
an appetite awakes
that seeks no proofs
but blindly hungers
for *another taste*
another touch

John Thompson



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