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TRUIDA PREKEL AND LU-MARIE SOBEY

SOWING SEEDS FOR

INNOVATION AT UNIVERSITIES

Creativity and innovation are important worldwide to promote new knowledge, develop improved solutions, and create economic and social wealth. Although universities can play a major role in promoting innovation, this potential contribution is not always realised. Active efforts to increase awareness of this role and to develop innovation skills at universities can make a huge impact on our societies. In this paper we give an overview of initiatives at three universities where faculty, students and staff were exposed to a practical approach to creativity and innovation: Stellenbosch University and the University of the Western Cape, both near Cape Town, and the University of Applied Sciences in Muenster, Germany. We see the ground rules and tools shared with hundreds of participants as seeds that could germinate to grow many new ideas.

Universities contribute to innovation in various ways, including:

- Research leading to new knowledge, new products, scientific breakthroughs and novel approaches in many fields;
- Collaboration between academics in various disciplines leading to new insights and applications – breakthroughs often occur on the interfaces between disciplines;
- Innovative teaching utilising new technologies that actively involve, and meet the needs and expectations of students who have grown up in the digital world;
- Equipping students with practical innovation skills to use in their studies, in their future careers and in their personal lives;
- Collaborating with business and government (the so-called 'triple helix') to ensure that knowledge, the sciences, funding and planning are effectively co-ordinated to achieve maximum synergies to address challenges facing communities, countries and the world in innovative and productive ways.

Despite the huge potential for innovation at universities, such activities are often inhibited by insistence on 'proven approaches', caution, convention, tradition, convenience and habit – and in some cases by status, power-plays, territory, or reluctance to share 'intellectual property'.

The classical George Land and Beth Jarman (1993) study showed that people's creative capacity reduces dramatically as they grow older. In a longitudinal study using eight tests for divergent thinking, they found that while 98% of 3-to-5-year-olds were highly creative, it reduced over the years to 35% among 8-to-10-year-olds, 10% of teenagers and only 2% of adults. See Figure 1. Therefore we believe we should 'catch them young', and try to reverse this downward trend by re-stimulating or 're-seeding' creativity among faculty, staff and students at universities.

Overview of this paper

We will first give a few brief case studies of projects undertaken at the three universities, then an overview of the approach shared – and link this with findings from neuroscience which we believe helps participants to get lasting benefits from their

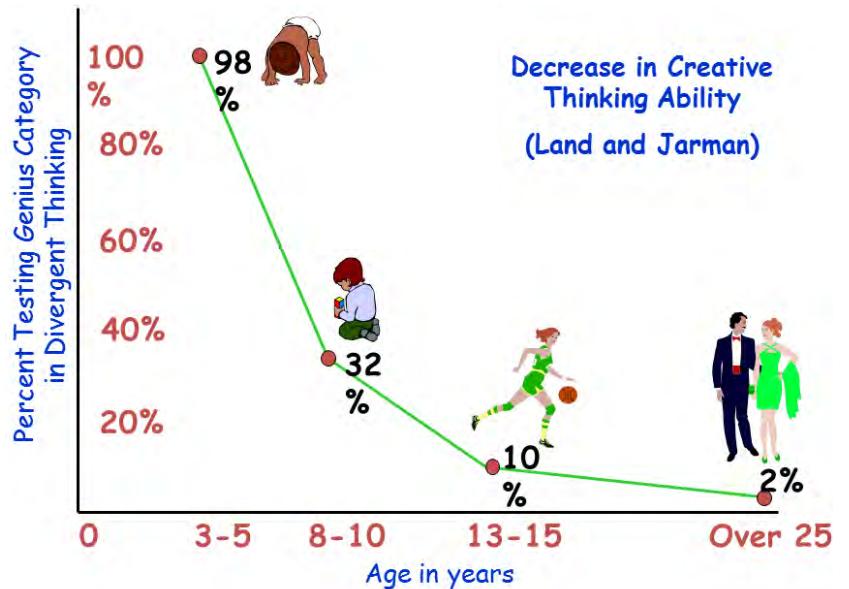


Figure 1: Decrease in Creative thinking ability with age. Land and Jarman (1993)

learnings. We will close with suggestions for universities, government and businesses on ways to both benefit from, and enhance such initiatives.

A case study of sowing seeds at Stellenbosch

In recent years, SynNovation has enjoyed the opportunity of facilitating about 20 events at Stellenbosch University (SU) to 'sow seeds' to promote collaborative innovation, by sharing ground rules and techniques of the SynNovation / Synectics process with students and staff. (Please see note at end of paper). We will briefly describe three cases, and list a few others.

MAD² – Making A Difference in student activities

Probably the most exciting was helping SU in September 2011 to facilitate a major change from the traditional 'Rag' ('Jool') to a more sustainable, community-minded 'MAD²'. (MAD² means 'Make A Decision 2 Make A Difference'). Over 450 student leaders, with 15 facilitators, used creative thinking skills to both generate and develop novel ways to welcome new students (in residences and private accommodation), and to involve students in meaningful community activities. Many of these ideas were used in the 2012 'MAD²' activities.

The students were divided into five groups of 90 each that met in different residences, each group with three facilitators. Working in groups of 10 around 9 tables with each facilitator helping three tables, the students were first given the 'wish-thinking' tool to generate many possible ideas, then guided to select unusual ideas, and then led to use the Constructive Evaluation tool to develop novel ideas into possible practical actions. There was a great buzz of excitement, as hundreds of ideas were generated. At the same time, the students learned-by-doing practical tools and ground rules they can use to generate new ideas when facing other tasks or opportunities, in their studies, future careers or private lives, and to work creatively with others.

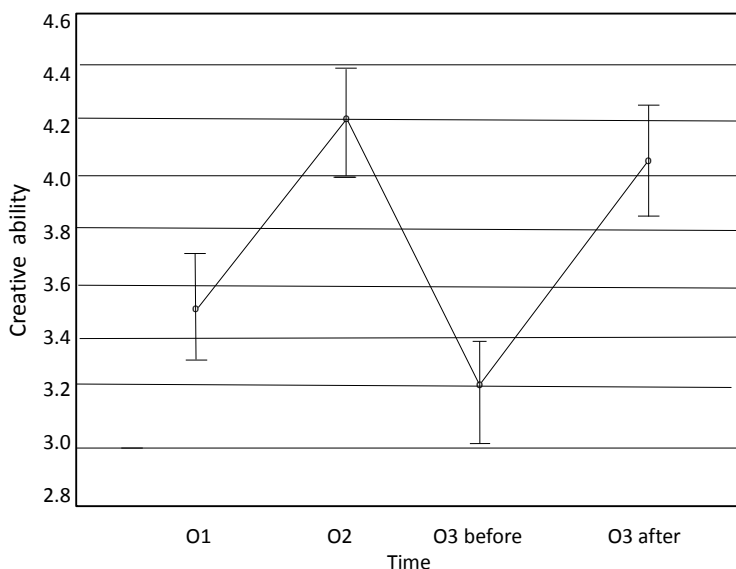
WE BELIEVE MANY UNIVERSITIES COULD AND SHOULD DO MORE TO NURTURE AND DEVELOP THE CREATIVE ABILITIES AND INNOVATION SKILLS OF THEIR PEOPLE...

Enhancing innovation skills of BCom students – and measuring skills retention

Two lecturers in Entrepreneurship and Innovation Management (Scheepers & Coetzee, 2010) wanted students to improve their creativity skills by attending SynNovation workshops, and designed a research project in which three groups of 15 final year BCom students volunteered to attend a one-day Toolbox for Brainwaves. An extract from this report:

‘Before taking part in the ‘Toolbox for Brainwaves,’ students were asked to rate themselves on various aspects such as their knowledge of innovation and creativity principles, their individual creativity skills, as well as other related team skills, such as communication, teamwork and problem-solving. Immediately after the one-day workshop, they were again asked to rate themselves using a similar questionnaire. A final evaluation took place three months after the workshop. Students were asked to first think back to their initial skills level before the workshop and then rate their current (i.e. three months after workshop) skills level. This is important as it has been shown that participants in a training workshop might give very high ratings immediately after the workshop, since they enjoyed it very much, but may after a period of time discover that no real skills transfer has taken place. On the other hand, they may also have rated their own skills before the workshop unrealistically (or immodestly?) high’.

As Figure 2 (below) shows, the researchers found that all participants rated their skills immediately after the workshop (O2), significantly higher than before (O1); and that these new skills were ‘durable’, as they stayed high three months after the time (O3 After). The rating scale was 1 = low to 5 = high. An interesting finding is also that they realised three months later that they had rated their knowledge before the workshop (O1) higher than it actually was (O3 Before – to be compared with O1), which suggests that they were somewhat overconfident of their creativity skills initially. Figure 2 shows the boxplot for Creative Ability as an example. The results for the other creative skills measured were similar, when comparing average scores for all three student groups on Knowledge of Creativity and Innovation Skills, Communication Skills, Teamwork and Problem-solving.



Innovation skills for Food Science students

A similar study was done with a group of 23 final year students in Food Science. They also participated in a one-day Toolbox for Brainwaves workshop, with similar pre- and post-assessments to the BCom students. These results were similar, despite the fact that the BCom students had had previous exposure to creativity training as students in entrepreneurship.

Innovation and product development are key skills in food science. SynNovation regularly gives bursaries to attend a two-day Thinking, Innovation and Problem-solving Skills (TIPS!) workshop (formerly WITS!) to one member of the winning groups in product development projects in the final year BSc in Food Science. A condition is that s/he shares the skills with group mates. A professor who knows the process says when she sees groups working on projects, she can see if they have had the benefit of exposure to SynNovation. Here are comments (in 2011) from the first recipient of this bursary, now working in R&D:

“I attended the SynNovation WITS! workshop in 2008, and learnt some valuable tools for generating innovative ideas for my product development project at Stellenbosch University. In the second term product development project our group used the tools to generate ideas and the tools worked because we ended up winning the prize for the most marketable product. I have graduated now and been working for 4 months in a research and development department. The job requires me to generate ideas for new products for different customers. I have been utilising the SynNovation tools daily, and they have been working very well so far. The tools really help to streamline creativity, thus maximising on innovation.”

Other opportunities to ‘sow seeds’ in Stellenbosch

- A workshop with 130 student leaders – Student Council, and committees of residences and associations – sharing basic skills and principles with them, to encourage a collaborative, idea-friendly climate
- A strategy workshop with top management, with the Vice-Rector Teaching and team, focussing on how to integrate the work of three divisions in order to enhance student success
- Industrial Engineering: Half-day workshops with final year students in Industrial Engineering, giving them basic tools and ground rules, for use in projects and to take into their careers; and working with Master’s and doctoral students giving them thinking tools to build more creativity and innovation into their research;
- Training mentors who guide first-year students – mainly in behavioural and problem-solving skills;
- Workshops at USB Business School, in the Post-graduate Diploma in Dispute Settlement and the Certificate in Neuro-Leadership, exploring linkages, benefits and applications of the approach in these fields;
- Training staff working in Student Affairs, Student Communities and Leadership development in thinking, innovation and relational skills for use in their work, and to pass on to students as valuable life skills.

Figure 2 (left): Box plot of the change in creative ability before and after the workshop

Helping to build an AIDS-free South Africa: Projects at UWC

SynNovation has also been working with the HIV and AIDS Programme at the University of the Western Cape (UWC) to develop new approaches to their work. Twenty peer educators have been trained in the principles and tools – which they have found very useful in planning innovative new interventions with fellow students, and with learners in schools.

A team of 10 facilitators helped UWC to enable active participation and practical planning at a conference organised by the UWC HIV and AIDS Research Centre. On 26 and 27 March 2012, over 90 delegates from national and provincial departments of Education and Health, educationists and academics, health professionals, people from NGOs and international donor organisations met at UWC to explore new approaches to HIV/AIDS education.

The 4th Annual UWC 'HIV in Context' Research Symposium featured several experts in the field, both national and international. At the start, Lu-Marie Sobey introduced participants to the key principles of SynNovation, to encourage them to 'listen for ideas' in order to get the maximum out of presentations. On 27th March a team of ten SynNovators facilitated creative small group problem-solving sessions, to ensure delegates go away with a selection of fresh ideas and approaches each of them can implement, and action plans they can adapt to suit their specific situations.

Delegates also experienced the key ground rules and tools, which they can now use both personally, and back at work to encourage creativity, collaboration, open-mindedness to achieve practical problem-solving.

Feedback was that this conference was: "really productive and enjoyable." "It was invaluable from the point of view that stakeholders from various organisations could get together to share perspectives – rather than debate points of view – and so generate new ways to put formal policies and national strategies into useful practice. It opened the door for communication and made the need for closer collaboration evident."

Scattering seeds at a German University

In April 2012 four innovation skills workshops were conducted with staff and students of the Department of Home Economics and Nutritional Science – Facility Management at the University of Applied Sciences Muenster, Germany. Below is feedback from Professor Carola Strassner who initiated this.

"The four workshops you held reached students from our undergraduate and graduate degree courses, our alumni and brought together our academic and administrative staff on common issues. The evaluations and feedback show that all participants won new insights and practical techniques. I think I can say that all those who attended came away inspired. We were also delighted that you could accommodate us with both English and German workshops."

"I am especially excited that three of our Sustainability Masters students told me that they will be using SynNovation techniques in their Masters project! They are going to develop a set of principles for SMEs to implement eco-sufficiency for selected stakeholder groups."

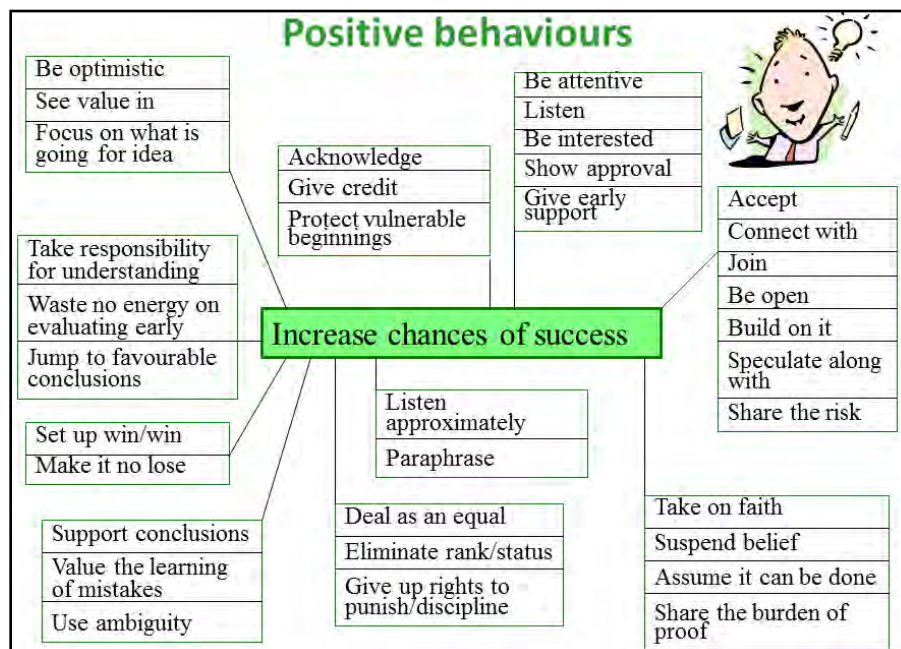


Figure 3: Positive behaviours – Nolan 2007

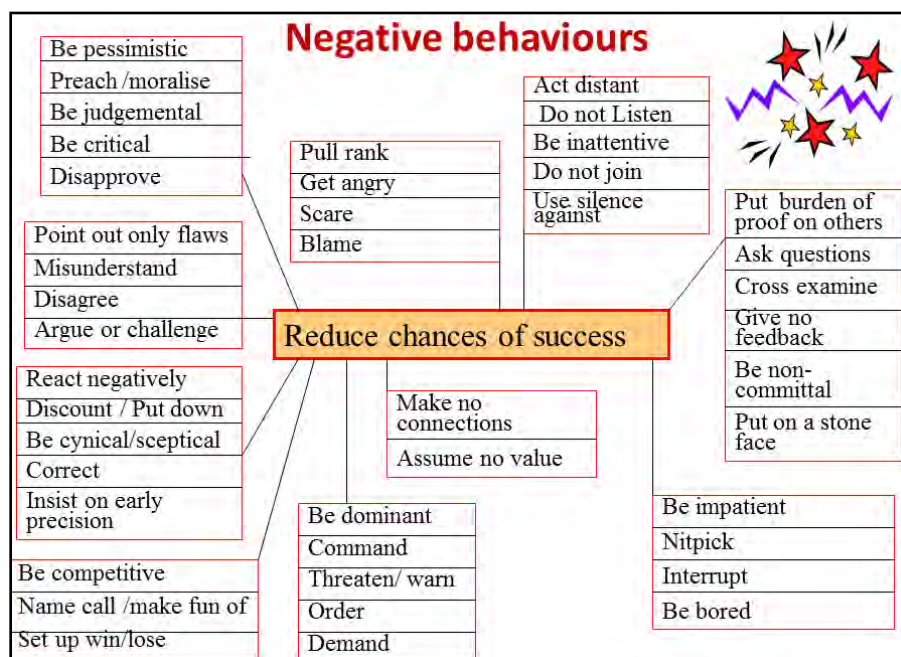


Figure 4: Negative behaviours--: Nolan 2007

Universities are important melting pots for cultural diversity and at all three universities where we have worked, there were students from different cultures and different countries. The German experience again showed that – because the approach is based on principles that 'make our heads work best', the principles are effective across cultures.

The approach used

The approach shared and used in all these events was mainly a combination of ground rules and behaviours that create a positive climate, and an overall process and several easy tools to both generate and develop creative ideas. Figure 3 (above) shows the positive, collaborative 'green' behaviours of respect and mutual support that encourage innovation and participation. These behaviours, discovered by Syntectics in the late 1950s, correlate closely with concepts such as Emotional Intelligence (Nolan, 2007), and the African Ubuntu culture. Respectful approaches promote confidence, collaboration, sustainable creativity, learning, and positive emotional experiences – and thus also brain functioning and performance (Prince, 2003). This contrasts with negative 'red' behaviours (Figure 4 above) that are critical, hierarchical, and discourage creativity and innovation.

Did the seeds take root?

Neuroscience shows how results can be lasting

Although feedback from all these ‘events’ has been very positive, it has mostly been informal. It will take time to see how and where these seeds have taken root. Inevitably, some seeds will have been picked up by the birds of time, habit, ‘the way we have always done it’, discomfort with something ‘different’, uncertainty or disinterest.

However, our experience of working with Synectics / SynNovation over 16 years in various organisations is that the positive climate and the results are usually more lasting than initially expected. Some tools and ground rules become a way of life for individuals wishing to promote creativity and a positive climate – even if the whole organisation may not fully embrace them.

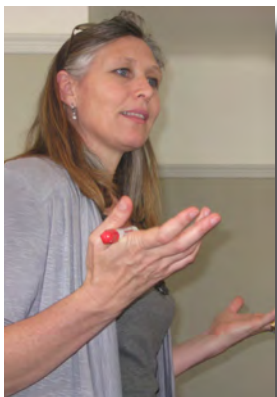


The lasting effectiveness of the Synectics approach and practical tools, discovered in the United States experientially over 50 years ago (Nolan and Williams, 2010, Prince, 2003, and Nolan 2007), can now be explained by neuroscience (Rock, 2008, 2009). Behaviours, ground rules and facilitation that create a positive climate, clarity in roles and process, fun group activities, recognition of ideas, and informal seating and healthy

‘brainfood’ during workshops, all enhance ‘well-being’ in participants, and release positive neuro-transmitters. This encourages participants to use the positive behaviours and tools afterwards, and thus enhances ‘durability’ of learning and performance.

The organising principle of the brain is to minimise threats and to maximise reward. Chemical messengers – neurotransmitters – let the brain know if it is receiving ‘good news or bad news’ and then activates specific parts of the brain. The reward response is transmitted by dopamine to stimulate the nucleus accumbens (NA).

Key neuro-transmitters include Serotonin (mood, sleep, appetite), Dopamine (DA) (interest, gratification) and Noradrenaline/Norepinephrine (NE) (alertness). Fear (real or imagined, in work or nature, life-threatening or emotional) releases NE, triggers the amygdala and induces stress. Under stress conditions serotonin and DA drop, and NE increases and stimulates the amygdala.



The amygdala is triggered by feelings like fear, anxiety, anger – whereas the nucleus accumbens is associated with feelings of interest

and gratification. However, activation of the nucleus accumbens can suppress the amygdala, and vice versa.

In many companies, or when individuals face a big problem, people may experience the climate as threatening, with feelings of fear or anxiety for some or most of the time. In simple terms the SynNovation ground-rules, used to create a positive climate, reduce the ‘threat’ response by reducing fears in several ways.

Besides reducing fears, SynNovation techniques include activities likely to increase dopamine production to stimulate the NA, the brain’s ‘pleasure centre’ associated with psychological well-being. The more NA is activated through dopamine release, the more the amygdala is suppressed, reducing fears. Examples of activities likely to increase dopamine production include:

| Required for effective brain | David Rock strategies | SynNovation tools to meet requirements |
|--|--|---|
| Reduce anxiety | Reduce information in prefrontal cortex Activate other parts of brain | Structure of process and tools All ideas are captured All senses involved in various ‘excursions’ and tools |
| Increase alertness Noradrenaline, Norepinephrine | Create urgency Visualise and verbalise the ‘scary’ | Simple, clear task statements Time limits to solve problems Target to generate many ideas Listening for, building on ideas |
| Increase INTEREST GRATIFICATION Dopamine | Novelty, humour Changing perspectives | Expectation for newness Humour in sharing connections thought triggers, Variety of excursions, Using different techniques |

Table 1: Managing optimal neurochemistry for performance: Achieving Rock strategies by using SynNovation principles

- Task statement talking about a dream solution
- Stating ideas as Wishes – anticipation, future orientation
- Novelty – new ideas and solutions
- Humour and shared fun
- Changing perspectives – moving around, different roles
- Rewards for good ideas
- The ‘Aha’ feeling during idea generation, excursions and suggesting new concepts - referred to as insights

Managing fear and enhancing pleasure has an added benefit – it ensures that neurochemicals are at ‘just the right’ levels for peak performance and effective learning. Table 1 shows key conditions required for effective brain functioning, with strategies that Rock (2009) proposes to manage these, and principles SynNovation uses. These are the principles shared in facilitation and training at the various universities.

We trust many of the seeds will be nurtured, and get an opportunity to grow and bear fruits, or grow into trees, in years to come. We need a collaborative climate to promote creativity, so that new ideas can grow into small and larger innovations by faculty, students and staff at universities.

Conclusion:

Suggestions for universities, government and businesses

We believe many universities could and should do more to nurture and develop the creative abilities and innovation skills of their people, and that business and government should actively support such initiatives not only by funding, but by actively collaborating with universities on innovation projects. As employers they should also demand that practical creativity training become part of the curriculum, as they will then benefit from employees who are competent in both individual and group problem-solving – to address the many challenges – big and small – facing businesses and communities in our rapidly changing environment.

If people, particularly managers, are skilled in recognising and nurturing new ideas, and in creating positive, collaborative climates by respectful behaviours, stress levels will be reduced, while performance and employee well-being will improve. Spreading the positive behaviours more widely could also contribute to building healthy relationships, mutual respect and trust in families and in communities. ■

About the authors:

Truida Prekel (pictured top) and Lu-Marie Sobey (pictured below) are innovation catalysts at SynNovation Solutions – facilitating creative problem-solving, innovation and change in a wide variety of organisations. Along with their team of associates they address strategic and operational issues both innovatively and practically, while also building a positive climate and a range of skills that promote creativity, collaboration and communication. For more information: www.synnovation.co.za