



snapshots

secondary edition

The Specialist Schools Trust Journal of Innovation in Education

Contents

Editorial: A New Approach to Development and Research <i>Mr Kai Vacher</i>	2
Peer Coaching at Brislington Enterprise College <i>Miss Melinda Hale</i>	3
Jung, Digital Technology and Visual Art <i>Ms Alana Hampton</i>	7
The Eudoxos Project: Taking Learning to the Stars <i>Ms Carmen P. Rodríguez González</i>	11
A Winning Performance at Garforth Community College <i>Ms Lara Griffiths</i>	15
Transforming Student Assessment to Liberate Pedagogy <i>Professor Anne Bamford and Mr Darrall Thompson</i>	17
Choice: The Key to Lifelong Physical Activity? <i>Vivienne A. Temple, Ms Bree Spasojevic and Ms Fiona G. Hunt</i>	22
Student Welfare: The Benefits of a Student Services Team <i>Ms Carmela Ballato and Mr Ken Thompson</i>	25
The Kittermaster Mummy: Bringing Science to Life <i>Mr Gerry Thraves</i>	29

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A New Approach to Development and Research

PERSONALISING Learning (PL) has recently become a major strand of the Specialist Schools Trust's (SST) work with schools. PL is an ongoing journey that can be defined in phases. The first phase involved 250 headteachers meeting with Professor David Hargreaves, in a series of workshops aiming to define personalisation. They concluded that personalising learning is realised through nine interconnected gateways: student voice; assessment for learning; learning to learn; new technologies; curriculum; mentoring and coaching; school organisation and design; advice and guidance and workforce development. In addition, all gateways demand distributed leadership.

The second phase of the PL journey consists of an exploration of the gateways through a series of conferences launched by the SST and the Secondary Headteachers' Association (SHA) in September 2004. Each conference is followed up by a pamphlet that is distributed through the SST's affiliation network.

'A new and radically different system of innovation and development and research for education must be created' (Hargreaves 2004).

This is the rationale that underlies the establishment of development and research (D&R) networks in the third phase of the PL journey. In this phase, schools are seeking support from the Trust, and each other, to personalise learning for their students through one or more gateways.

In July 2005, the Trust appointed the first set of hub schools for student voice, assessment for

learning, learning to learn, new technologies and curriculum in each of the eleven regions in England.

Once they are up and running, D&R networks will support teachers and schools to develop personalising learning to raise achievement, deepen learning and engage students at all levels in schools. D&R networks will develop more effective approaches to teaching and learning by disciplined innovation focusing on an agreed agenda. There are four main elements to the operation of D&R networks:

1. distributing the innovation required effectively to schools in the D&R networks;
2. developing effective practice to raise achievement for students at all levels;
3. finding a rigorous definition of what constitutes good practice; and,
4. transferring knowledge effectively to schools throughout the affiliation network.

The Trust and the schools involved are truly excited about the establishment of D&R networks. They promise to define, develop and transfer good PL practice to all schools affiliated to the Trust and its international arm, iNet.

References

David H. Hargreaves (2004). *Personalising Learning: Next Steps in Working Laterally*.

Mr Kai Vacher

Head of Personalising Learning (London)
Specialist Schools Trust

Deadlines for future issues of *Snapshots*

Details of how to submit papers to future issues of *Snapshots* are published on page 32.

The deadlines for submissions are as follows:

Volume 3 Issue 4: **1 December 2005**
Volume 4 Issue 1: **1 March 2006**



Specialist Schools Trust
EXCELLENCE AND DIVERSITY

Peer Coaching at Brislington Enterprise College



At this school, teachers observe and coach their colleagues to improve pedagogy.

BRISLINGTON Enterprise College, in Bristol, is a large city comprehensive. Students come from a wide range of socio-economic backgrounds. The college is defined as being 'in challenging circumstances'. It has a large staff and is committed to helping teachers to develop their own practice. To this end, the college has set up a team of six teachers to act as peer coaches. As an Advanced Skills Teacher, part of my role has been to lead that team.

What follows is the story of the setting up of coaching at Brislington Enterprise College. It includes an evaluation of the thoughts and feelings of the coaches, as well as those they coached, at each stage of the process. Also provided is a summary of what we believe we have learned so far, and a brief

discussion of how we might further support our colleagues in developing their classroom practice.

The Beginning

My first experience of coaching was at a training session in July 2003. An exercise, where a volunteer was coached to throw a ball over his head and into a bucket, was used to demonstrate the main principles of coaching. I could see how the same technique might be used to work with a teacher who wanted a quiet and purposeful classroom but was unable to see how he or she could get from their current position to the ideal, perhaps even believing it was impossible. The idea of the coachee controlling the process – choosing the nature and level of feedback,

Continued on page 4

making suggestions as to the way forward, and also having the right to stop at any point – greatly influenced us in setting up a coaching protocol within the college.

Training the Coaches

Two staff, including myself, attended an extended training session and then trained the other four coaches. This gave us an opportunity to consider the process in much closer detail, and to think about our role as coaches.

The idea of the coaches controlling the process ... greatly influenced us in setting up a coaching protocol within the college.

We decided to spend the first term coaching one another, in order to practise and develop our skills. Each pair had an initial meeting, in order to decide on a focus for the observation. We then carried out the observations, and provided feedback. The lessons were recorded on video because we felt this would give us a way of reflecting together on exactly what had happened during the lesson. We felt that these reciprocal relationships would allow each of us the opportunity to experience how it felt to coach and be coached, and to support one another in developing a level of confidence in our own skills. We then shared our experiences with the team.

Setting up the System

We then met to agree upon the protocol for the coaching process. We wanted a system that was clear, non-threatening and easy to use. We were all adamant that our first clients should be volunteers, believing that, if the process was to work well, they needed to be fully committed.

We agreed that there would be very little paperwork – a copy of the initial agreement form, which would detail the focus for the coaching, a record of the dates and times of observations, and a final evaluation form. Teachers being coached would be free to make their own notes. However, coaches would not routinely provide any form of written feedback. This was partly to help those who were being coached feel that they had a greater level of confidentiality. It also emphasised the point that they were in control of the process and were able to choose what they wanted to take away from any meeting.

Phase 1

We asked for volunteers and six staff members applied. We then met as a team to allocate a coach to each of these teachers. This was a useful process because we were able to review our respective

strengths and decide upon the best allocation. At this stage, the coaches were mostly happy about who they had been allocated. However, not all of the coachees felt the same way. Interestingly, the one who initially felt the least confident about her allocated coach eventually wrote a glowing evaluation of the process, saying that she wished it could have gone on for longer!

Once these partnerships were set up, each coach arranged an initial meeting with their coachee. The purpose of this meeting was to agree upon a focus area and to arrange the first observation. We found that this was often a particularly productive part of the process. First, it provided the coachees with an opportunity to talk at length about their issues of concern. Second, it allowed them the space to suggest their own solutions. Following the first observation and feedback session, the coaching

partnerships developed in a variety of ways. These included:

- reciprocal observations;
- joint planning;
- modelling;
- videoing parts of a lesson and discussing these with students, as well as the coach; and,
- team teaching.

Each coaching team met regularly to talk about how things were going and to offer help and support to one another where necessary.

What the Coaches Thought

After we had finished working with the first set of coachees, we wrote down our own reflections on the process. Our reports were based on a series of questions about how each of us had felt at each stage of the coaching process. What had we learned from the experience? What might we do differently next time?

Below are the questions and a summary of the responses to them, including some direct quotes from the coaches.

1. *'How did you feel before the process started?'*

Most of the coaches were worried about being viewed as the expert, and concerned that they might not have anything positive to offer. Most were excited about getting started on 'real' coaching but nervous about how it would work in practice.

- *'We had great flexibility about who we worked with. This was good as it made us more relaxed about the process.'*
- *'I was keen to get started, but a little nervous as well.'*
- *'Once I had spent time listening to, and learning*

from, the other coaches, I felt more at ease with the process.'

2. 'How did you feel during the process?'

All of the coaches enjoyed the process, although all felt concerned that they were not really offering anything of value to their coachees.

- 'By having control over what it is they would like to focus on, coachees feel as though they have control over what the next move will be. Rather than being a recipient, they are the initiator. My presence was more as a facilitator than a leader.'
- 'I like this model as it is about bringing out, and building on, the strengths and skills that exist in teachers in an equal and supportive way.'
- 'The initial discussion was useful in identifying the real issues, and drawing a picture that was truly representative of what was going on in the classroom.'
- 'I felt that the process allowed for an imaginative approach to investigating how one helps to improve the practices of an already competent teacher.'

3. 'How do you feel now the process is completed?'

All coaches enjoyed the process and felt that there was much more they could and would have wanted to have done. I think it was very useful to have a cut-off point because otherwise all of the coaching partnerships could have continued indefinitely.

- 'The most positive aspects were sharing ideas with others, learning from each other, and helping me to reflect on my own practice.'
- 'It suddenly became clear to me why a strategy I had tried in the past hadn't worked for me, and it was a good starting point for our discussion on making it work for him, and for me.'
- 'There is a sense of accomplishment for both of us.'

4. 'What do you feel you have learned?'

All of the coaches felt that they had learned a great deal about themselves and their behaviour as a coach, as well as about how to support colleagues in developing their practice. They also felt that they had learned a great deal about teaching, and picked up lots of good ideas from the colleagues they had been coaching.

- 'The team approach to a problem, coupled with the recognition that it is fine to try new things and make mistakes in a non-judgemental environment, is a most empowering way of thinking and working.'
- 'Simply being a listener is often just as useful as offering critical advice. This allows coachees a

space where they often identify their own weaknesses and suggest their own, extremely insightful solutions.'

What the Coachees Thought

Coachees were asked to evaluate the coaching process. The evaluation sheets consisted of a series of comments on the process, and coachees were asked to rate each of these comments on a scale of 1 to 5 (1 being 'not at all', and 5 being 'very much'). No one rated any part of the process at less than 4. There was also an opportunity for the coachees to make comments. These evaluations were analysed and then summarised by a member of the leadership team.

- 100% of the coachees felt comfortable with the process;
- 100% of the coachees were satisfied with the coach they were allocated;
- 100% of the coachees found the feedback helpful;
- 100% of the coachees felt that the coach helped them to set personal targets;
- 83% of the coachees felt that the coaching was a very useful experience (the rest found it useful);
- 67% of the coachees felt they were now in a position to help themselves to continue to improve;
- 100% of the coachees felt they would like to be

I could see how the ... technique might be used to work with a teacher who wanted a quiet and purposeful classroom but was unable to see how he or she could get from their current position to the ideal, perhaps even believing it was impossible.

involved in coaching someone else; and,

- 100% of the coachees said they would recommend coaching to a colleague.

The following comments are worth sharing.

- 'The video was really helpful.'
- 'It's been a really positive experience and has given me lots of ideas about how to improve my teaching.'
- 'Very enjoyable. I would like to do it again.'
- 'I would have liked it to continue for longer.'
- 'It would have been good to have had more feedback from pupils.'

Continued on page 6

Phase 2

At this point we decided that we should begin to work with colleagues who had not volunteered. We decided to work with all of the staff within two whole faculties. Each member of staff within those faculties was offered a minimum of an initial meeting, an observation and a feedback session. After that, the decision would be taken between the teacher and the coach as to what would happen next.

We were all keen that it should never become a process that is forced on people because its success is dependent upon both parties being committed to making it work. However, we were also aware that many colleagues were suspicious of the process. We hoped that, once they were able to experience it, they would find it to be something they would like to have greater involvement in.

The staff in those faculties were asked to select lessons when they would like to be observed. Coaches were allocated simply on the basis of being available at the appropriate time. A timetable of observations and feedbacks was set up over a period of two weeks. The timescale was deliberately short, meaning that we were all at the same stage at the same time. We hoped that this would enable the coaches to compare their experiences more closely. We also hoped that the teachers would talk about the process with one another.

Evaluation of Phase 2

Once this second phase had been completed, a further analysis of the evaluations was carried out. The results were very similar, with all of the coachees stating that they had felt comfortable with the process and that it had been a useful experience. Many expressed an interest in continuing with coaching, although most felt they would prefer to start the process again during the following academic year, with a different class.

Monitoring the Work of the Coaches

During this second phase, we decided that we would monitor our feedback in order to ensure that we were working consistently. Our initial thought was to observe the feedback session. However, we were concerned that the coachees might find that to be a bit disconcerting. We decided instead to video our feedback sessions and then deconstruct the resulting videos together. In order to protect confidentiality, coachees were given the choice as to whether or not they were prepared for the video to be shared within the coaching team.

The team met for an extended session to deconstruct the feedback videos. We began by talking about our own feedback and the ways in which we prepare for feedback sessions. We shared ideas on how we decide which areas we want to discuss and

the kinds of questions we might want to ask our coachees. We discussed strategies that had helped, and those that had hindered, the feedback process. These mostly came down to practical considerations, like finding a quiet space in which to have the feedback meeting, and making time for it within the coachee's timetable. We also talked about what we felt were our own weaknesses. These ranged from a tendency to ask too many questions, to talking too much, and even not talking enough! We watched a series of clips from the videos, and carried out a comparison exercise.

We concluded that, although we all had very different styles, there was a commonality in our approaches. All of the clips demonstrated that the coach was able to put the coachee at ease, to listen, to provide constructive feedback, and to support the coachee in setting goals for development. We talked about what we could learn from having watched one another, and ideas we might take away to use ourselves in future feedback sessions.

What Happens Next?

We need to look more closely at the long-term impact of coaching. We know that teachers felt that it helped them to develop their practice. We need to find out whether they have been able to sustain the improvement, and if they believe they are still in a position to evaluate and develop their own practice. Importantly, we also need to find an objective way of trying to measure whether the changes in teachers' practice have had an impact on student learning.

As a college, coaching also provided us with a springboard into a wider model of peer learning, with a major focus on learning from observing colleagues as they taught. This has had a very successful start and we are looking forward to our first evaluation of this innovative approach to teacher professional development.

ABOUT THE AUTHOR

The coaching programme described in this paper was developed by Miss Melinda Hale. Miss Hale has worked for twelve years at Brislington Enterprise College, Bristol, fulfilling roles as diverse as Maths teacher, Head of Year, Primary Liaison Coordinator and Senior Teacher. She has been an Advanced Skills Teacher for almost three years. Part of this role has been to lead the team of learning coaches within the college. Miss Hale would be pleased to discuss any aspect of this work and can be contacted via email on: HaleM@because.org.uk.

Jung, Digital Technology and Visual Art

Digital technology and a philosophy of personal discovery have taken art to a new level at this Queensland school.

'Image and meaning are identical; and as the first takes shape, so the latter becomes clear.'
(Jung, *On the Nature of the Psyche*, p. 135)

THE philosophical basis of the ideas outlined in this article range back to Ancient Greek philosophy. They also take in Jung and the visual imagination and rest firmly on the acceptance of visual intelligence as a way of knowing. Technology is, and has always been, a tool in the construction of meaning.

The School Context

St Hilda's School is an all-girls Anglican boarding school for students between preschool and grade 12. It is situated on the Gold Coast of Queensland, in Australia, and was founded in 1912. The school was named in honour of the seventh century Abbess of Whitby. See our website at: www.sthildas.qld.edu.au/history.htm.

Art making at St Hilda's encourages best practice with 21st Century approaches, techniques and technologies, whilst valuing all forms of wisdom in the search for meaning.

Constructing a program to accommodate this range of concerns has led to some lateral thinking. Along the way, some profound discoveries have linked the soul of C.G. Jung, ancient labyrinths, laptops and sandpits.

A Whole Learning Environment

Since embracing digital technology over a decade ago, the Visual Art Department at St Hilda's School has explored numerous avenues for using it as a purposeful tool in art making across our middle and senior schools.

As a girls school, it was important that the technology not be an end in itself. Rather, we wanted it to be part of a whole learning environment aimed at exploring and extending the creative process. What we discovered in the search for purposeful ways of using the new tools was not limited to the technology itself. In fact, it developed into a successful way of teaching a form of philosophy based on the image and visual language. It is not art for art's sake, by any

means. Neither is it a formula and the process is not set in concrete. Nevertheless, we believe that the direction is something quite special.



The sandplay area



A sample sandplay

Continued on page 8

The Rationale

Research tells us that girls rarely engage with technology for its own sake. However, they will happily apply any means at hand to the process of making connections and for the purpose of making meaning. In this vein, providing the girls with the opportunity to use new media in the art department was not enough. There had to be a purpose beyond the tools. Encouraging personal voices through visual language; the push to experiment widely and to develop and express a personal aesthetic; the idea that art is another way of knowing and communicating: all of these aspirations are at the heart of my own practice as an artist. They form the core of St Hilda's Visual Art curriculum.

Focus on Self-Discovery

By placing the idea of self-discovery at the root of the curriculum, students have learned to seek the concept first and then to apply whatever media is appropriate to its realisation. From year 7-12, students use the digital camera for composition and for a gathering tool in units such as Natural Forms (year 7) and Alchemy and Sandplay (year 12).

'... artists create a language of symbols for things for which there are yet to be words ... radical innovations of art embody the preverbal stages of new concepts that will eventually change a civilisation. Whether for an infant or a society on the verge of change, a new way to think about reality begins with the assimilation of unfamiliar images. This collation leads to abstract ideas that only later give rise to a descriptive language.'
(L. Shlain, www.artandphysics.com/chapters.html)

With an increasing need for all forms of literacy over recent years, the importance of visual literacy

has finally been appreciated. It has now been embraced by our educational institutions, even if only in recognition of its importance in popular culture and the media. The root of the issue is far more profound, as some writers point out (see Kress and van Leeuwen, in *Reading Image: The Grammar of Visual Design* and Shlain, in *The Alphabet Versus the Goddess: The Conflict between Word and Image* and Hoffman, in *Visual Intelligence*).

'What happens when you see is not a mindless process of stimulus and response, as behaviourists thought for much of the twentieth century, but a sophisticated process of construction whose intricacies we are now beginning to understand.'

(Hoffman, *Visual Intelligence*, p.1)

The Ideas of Carl Jung

The ideas of Carl Jung shaped the foundations of the St Hilda's program. Jung validates the image as a language form. Alone, his reverence for the image is a very powerful influence. However, his philosophy has been active in a great deal more than this. Sandplay does not require language skills. It is a method used by Jungian analysts and psychotherapists to explore the psyche, valuing the image or symbol as an expression of the unconscious/subconscious. Students were taught aspects of the theory and encouraged to explore their own symbol systems.

'... a true symbol appears only when there is need to express what thought cannot think or what is only divined or felt ...'

(C.G. Jung, *Man and his Symbols*, 1964)

Following from the precept that art making is about facilitating personal discovery, much of the St Hilda's



Kate Whelan, year 10 2003 Dressups
Relief Print from digital portrait



Madison Bone, Kate
Goddard and Olivia Bell,
year 9 2003. Bag of Jewels
with symbols



The Imaginative Image: The Labyrinth built by year 11 students at Fingal Head in 2003

program is based on the idea that an image or symbol carries an entire thought in one. It does not involve a linear progression to convey a thought in the way that written language often does.

Personality Investigation

In units such as Lucid Dreaming, Transformation and Transcendence, year 11 students investigate aspects of their personality using Jung's profiling techniques. They also use digital photography, manipulated in Photoshop using the layers function, as part of a unit on self-portraiture. Year 9 students use a simplified version of Jung's archetypal theory to select symbols to use in mixed media pieces, in the Bag of Jewels project. Year 10 students play at personifying their alter ego in a unit called Dress-ups. The digital camera is used to capture and compose images for use in relief prints made in the traditional way.

Implementation

Photoshop remains one of the few accessible image manipulation programs that allows for the link between new media and authentic art making. As a photographer, it is a seductive tool indeed. At the beginning of the process the school purchased enough licences to make the program a viable learning tool for classes of 25 students. We also purchased a digital camera, a scanner and a colour printer. The art department now has three dedicated, wide-screen computers, a scanner, an A3 colour printer, two CD ROM burners and two Sony Mavica digital still and video cameras. These are all used continually - before, during and after school time - by a myriad of eager girls. Of course, we still paint and draw beautifully and we also make art from junk shop detritus.

The engagement with digital technology began with a self-portraiture unit for all grade 8 students in 1998. After completing a self-paced unit designed for our intranet system (bravely titled *How to Use*



Lynda Wilson year 12 2003. As Above, So Below Mixed Media on Canvas. Derived from sand play. Developed and composed with digital images.

Photoshop) students were encouraged to distort, enhance, transform and resolve a digital image of themselves to communicate something of their personality to others. Students embraced this with enthusiasm, struggling with the fledgling computer system and its inevitable operating problems.

Importantly, the task was not embraced for itself alone but because it presented students with a stronger reason for their involvement: the making of meaning and the communication of something deeper.

A Multitude of Connections

New media has also allowed students to draw in connections from across time, other cultures and other people. They are now able to span the personal and the archetypal, whilst engaging with the image

Continued on page 10

as a way of constructing personal meaning. In the Bag of Jewels project, year 9 students were invited to use symbolism to explore different aspects of their personality. They were asked to bring a handbag to school as a symbol of the outer representation of themselves. In the handbag they were to place at least three objects selected as symbols of the three primary centres of perception: the belly, (the home of sensation); the heart (the home of emotions) and the head (home of thought, as derived from Plato but also espoused by various cultures). Students were then asked to draw and write about their selected symbols in their ever present visual diary, before using the digital camera to photograph them in five different compositions. Photoshop was used to manipulate the images.

'... drawing, painting, and modeling can be used to bring unconscious material to light. Once a series has become dramatic, it can easily pass over into the auditive or linguistic sphere and give rise to dialogues and the like.'
(C.G. Jung, 1941)

Year 9 students went on to produce pamphlets, videos and PowerPoint presentations to assist the class of 2004 in their own Bag of Jewels project.

Challenge for the Seniors

The present incarnation of the Art Department began with a new senior work program called The Labyrinth, which was written four years ago. Here, Jung's ideas about the importance of having an imaginative symbol to convey deeper levels of potential resonated with my own belief that, in order to make meaningful images, one needs to engage in deep process work. The Labyrinth project involved making an actual labyrinth. This was constructed in the sand at a local beach on the afternoon and evening of a full moon. It was presented to the students as a ritual, signifying a rite of passage: students were entering into the senior years of Visual Art and taking on all the weight of meaning and purposeful engagement that this implied.

Entering a labyrinth is a conscious decision to begin the process of evolution. One does this in the knowledge that it is only by travelling inward that we can hope to make sense of the external. It is both a physical and a spiritual endeavour and students must be engaged with it as a purposeful process.

An excerpt from the task sheet, Personal Signatures, illustrates this point.

Student response: *'The journey to the centre of your deepest self and back out into the world with a broadened understanding of who you are ... guess what, I think that my piece "As Above, So Below" represents that journey to the centre of me. It helped me to begin to figure out who I was*

and now, maybe, my piece for semester 3 might be the next part of that journey ... the journey back out into the world.

The task sheet also said that with a labyrinth, there is only one question - whether or not to enter. I think I have already done that - entered. I did it on the year 11 excursion at Fingal Beach. I remember it was so scary to enter because I didn't know what to expect. But when I think about how I felt while I was walking that spiritual path to the centre and then, just sitting in the centre, pondering ... I'm just so grateful to have had the chance to experience such an extraordinary thing ...'
(Lynda Wilson, year 12, 2003)

Our curriculum is flexible, it evolves and transforms with the needs of our students, embracing new ideas as they present themselves year by year. Photoshop and digital photography have become tools for every year level and are now embedded in their work programs. Students have confidently gone on from St Hilda's into tertiary studies, in a range of areas such as software development, animation, digital video CD ROM production, and many other related areas.

'The creative process, so far as we are able to follow it at all, consists in the unconscious activation of an archetypal image and elaborating and shaping the image into the finished work. By giving it shape, the artist translates it into the language of the present and so makes it possible for us to find our way back to the deepest springs of life.'
(Carl Jung)

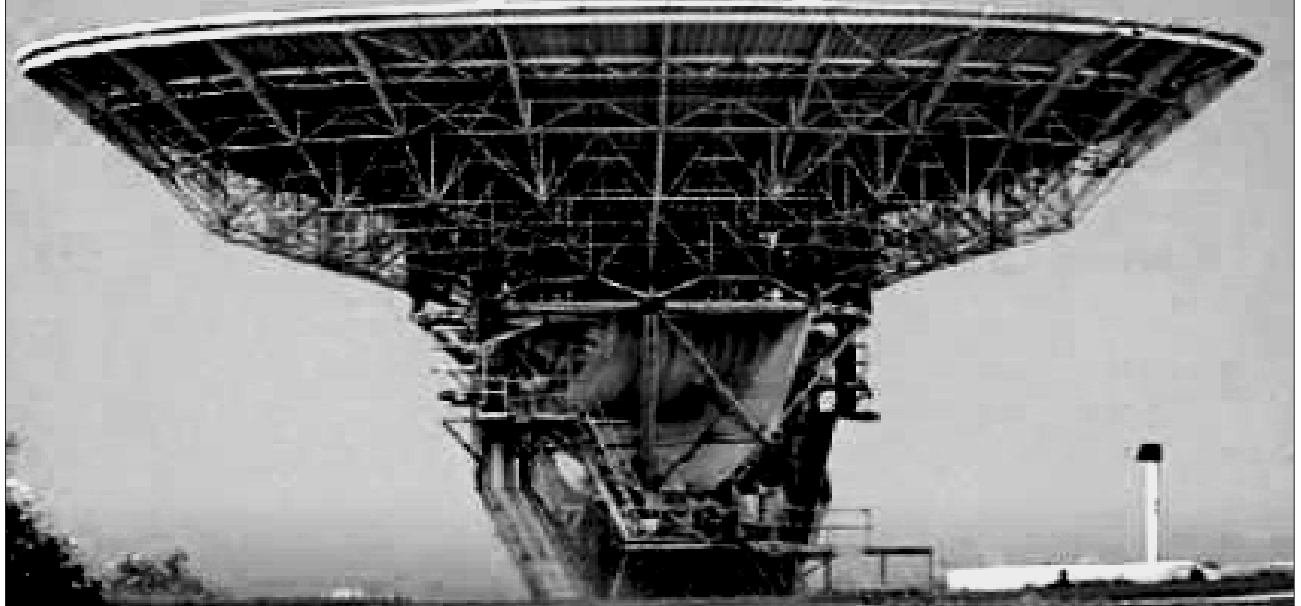
'Art making contains within it gateways to seeking and finding both purpose and meaning. Visual Language and art making media only provide for the first level of the journey, the outer shell.'
(introduction to the Labyrinth project)

The ideas that underpin the approach embody my own particular areas of interest in visual literacy, photography (now passionately digitally based), Jungian psychology, Jungian/ Kalfjian Sandplay, (tutored and encouraged by my colleague and friend, Robyn Sandgren) and pathways to the unconscious via imagery. My fascination with Jung stems from a serendipitous reading of his commentary on *The Secret of the Golden Flower* when I was sixteen.

ABOUT THE AUTHOR

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The Eudoxos Project: Taking Learning to the Stars



The Eudoxos project explored the potential of the internet to transform the classroom into a research laboratory.

'Today's students are rapidly losing interest in the traditional laboratory experience. In many cases, instruments appear to be very old and the connection between the theory and the experiment (even when this is clear) is not very interesting. In a traditional laboratory, students often find it difficult to see the practical importance of some subjects, such as mathematics or physics. It is likely that the use of a telescope, direct involvement in planning and carrying out the experiment, and the feeling of being a major participant in the experiment, could wake up the interest of students.' (teacher, Italy)

This paper was written after the LACE (English translation: Laboratory for the Analysis of Educational Change) research group, in Spain, evaluated a European Commission e-Learning project.

Background to the Project

The project, e-Learning, is a European Commission initiative (www.elearningeurope.info). Its aim is to use new multimedia technologies and the internet to improve the quality of learning. The advantage of the internet is that it provides easy access to resources and services and stimulates remote exchanges and collaboration.

The Eudoxos project began in October 2002 and finished in June 2004. The consortium comprised several educational and research institutions and four secondary schools: namely the National Centre for Scientific Research (*Demokritos*); the University of Athens; the *Ellinogermaniki Agogi* (all in Greece); BG und BRG Schwechat and the Management Centre Innsbruck (both in Austria); the *Institute Tecnico Industriale Statale Pininfarina*, (in Italy) and the University of Cadiz and the *Campiña de Tarifa* (both in Spain).

Use of Emerging Technologies

The Eudoxos project aimed at using the possibilities the internet offers, in order to transform the classroom into a research laboratory. The project studied the applicability of the emerging technology in the schools and provided a platform that allowed students to use the Andreas Michalitsianos Telescope, of the Eudoxos Nacional Observatory for Education and Research, in the framework of their school curriculum.

The robotic telescope is installed on Ainos Mountain, on Kefallonia Island, in Greece. Students from all over Europe could access pictures from the

Continued on page 12

universe. The project was funded by the European Commission, within the framework of the innovative 'e-learning action plan'.

Introduction

The implementation of the e-learning project involved educational institutions in the development of teaching and learning programmes in which the internet and new technologies could take on a central role.

New tools and resources were made available to European schools in order to improve the education of students, improve educational processes and try to guarantee their development via innovative and comprehensive strategies.

A Complex Kaleidoscope

However, this is no easy task and a multitude of factors were at play in each programme to create a complex kaleidoscope of situations that go to make up classroom life and affect the teaching-learning process. To analyse the development of this process, it is necessary to take into account the unique reality of each school.

Eudoxos offered four major lessons to participating schools (Saturn's Rings, Shadows on the Moon, Solar Rotation and Asteroid Rotation Period). The schools took this material from the web page and integrated it into their curriculum.

These lessons were explained to the teachers and later revised, taking into account their comments, before being put into practice in the classroom. Each lesson was based on a physical cosmic phenomenon that was able to be observed by a telescope. What could have been just one more academic activity turned into a real scientific problem. Tasks were set that gave students some practical challenges, with real application.

Genuinely Scientific Work

After a theoretical explanation of the fundamental concepts necessary for the later geometrical, optical and mathematical problem-solving, the practical work was started. This was eminently scientific. The steps to be followed included observing and collecting the data obtained from the telescope, in the form of images. This involved preparing the observations and using the appropriate coordinates. The data was then analysed, conclusions reached and the initial questions solved. Students had to provide a report, answering the questions they had been given. The lessons followed a predetermined logic that was made available on the project's web page.

Innovation and Tradition

The Eudoxos lessons put into practice in the classroom were characterised by the development of innovative and comprehensive didactic planning. The internet was used as a source of information and

communication. The computer was a resource used daily in the classroom as a basic support for carrying out activities and writing reports.

Eudoxos gave a central role to these innovative strategies in the teaching and learning of astronomy. However, the teachers did not abandon their traditional methods of explaining content and undertaking activities with their students. Blackboard presentations and teacher support during student computer work supplemented the use of the new tools.

Enhanced Student Interest

These resources, without a doubt, brought about an improvement in the quality of information sources used in the classroom. The teachers confirmed that the students showed a lot of interest in studying, especially when they could use the images that they had obtained from the internet and the remote control telescope. This way of constructing new knowledge seemed more interesting because the content was not presented in an isolated or decontextualised way. In this project, learning derived from real experiences and was therefore full of personal significance that allowed it to be better understood. Students were given the opportunity to discover the purpose of the mathematical calculations that they had to undertake. They then understood that the results had application in reality, making them meaningful.

Closing the Gap

With the use of the internet, Eudoxos managed to bring different worlds and people closer together. The learning process took on a new dimension when there was the opportunity to connect knowledge centres that were apparently unconnected. The groups of scientists that work in their research centres and laboratories created new knowledge, which could later become part of school subject matter. However, students are unaware of the 'ins and outs' of the life of a researcher and the processes they use to access new concepts, ideas and media. Eudoxos innovated in allowing students and scientists to work, collaborate, debate and learn together, exchanging valuable information that was rich in content. The teacher and the internet became the mediators of this union which, as we will see in a later analysis, powerfully motivated students and encouraged their interaction with the world of science.

Thanks to their participation in the project, teachers and students became aware of having achieved another major objective arising from the use of advanced technologies that will open new doors in classroom learning. The internet also allows traditional barriers of time and space to be broken down and for scientific work to be converted into an attractive, everyday task, perfectly integrated into the everyday life of a school. The telescope located in Greece was in the hands of the students and they could work with

the material that it offered, either in the classroom or at home. In this way, they reconstructed the concept of a science laboratory and made it more flexible.

What did Students Learn?

Once involved in the implementation of the lessons, the students' expectations started to be met. This became a basic element of motivation for their participation in the activities. Some students showed initial resistance when they discovered that the material was not included in the curriculum and, as a result, it had to be optional. The teachers confirmed that this group of students was not very large.

What most caught students' attention during the whole learning process were the photographs taken of the sky. The images obtained, as a result of the telescope's location in Kefalonia, made the lessons extremely meaningful. Students worked with a sense of purpose, instead of trying to learn abstract operations that were unrelated to their lives. The construction of knowledge based on instruments and concepts that were practical, alive and touchable really did increase their interest.

The Attraction of Astronomy

The fact that astronomy was to be studied was also an important factor for the students. As the Eudoxos experts predicted, the students thought that the topic was different, and much more interesting than the subjects they usually had to study.

For example, the Italian students, with a more solid and specific background in the world of science, highlighted that the learning outcome was the development of deeper and more comprehensive knowledge about space and certain heavenly bodies. They added to this that, through their involvement in Eudoxos, they were able to learn how to determine parameters, how to measure and select images and, in short, how to observe the sky. They also recognised that they had become familiar with the way that telescopes work. This was an aspect that was highly attractive to them, even before they started the lessons.

Direct communication with the experts involved in Eudoxos through the project web page was one of the activities that most interested the students. The opportunity to speak to the scientists directly made a great impression on them, and secured their motivation right until the end of the project.

Globalising Knowledge

One of the students stated that she had learned to combine maths and physics. This comment is palpable proof of how students were able to work in a multidisciplinary way, using different branches of knowledge in a globalised way, giving more meaning

and coherence to each activity and therefore facilitating the learning process. As well, some students showed their satisfaction at being able to leave aside the well-known and traditional tasks of choosing and studying theoretical concepts in textbooks and specialist manuals. *'It was very interesting and not the normal way our physics lessons are [...] I think that this project is really a good idea, we didn't just listen, what's really an advantage [sic], and just listening is very boring!'* (Student 4, Austria).

However, this interpretation was not superficial or limited to recognising the use of the computer and the internet as new learning mediums. The students were able to recognise that they had taken on responsibilities in undertaking an interactive project. Despite the guidance of the teacher, the quality of the photos obtained depended on the students' own work and dedication, and therefore the end result of each exercise and lesson. The students were aware that, in Eudoxos, their work was not limited to listening to the explanation of the teacher. They knew that they played a fundamentally active role in their own learning process.

More Independent Learning

Students were able to choose, within certain constraints imposed by the teacher and the lessons, what to observe, what parameters to send and how to measure and analyse the images obtained. They had to organise their work in an autonomous and independent way and, despite the complications with the mathematical calculations, the students who were most deeply involved really felt they were at the centre of their own learning.

The pilot group proved that, given the right curriculum, these students were equally as capable as others in the college.

This new way of working, and especially the sense of autonomy and independence, was key to the improvement of the process of knowledge construction in each classroom. However, some teachers stressed the danger that such a novelty could present. According to them, some students were losing interest in the Eudoxos activities as the lessons advanced. One demotivation factor was that many of the students found the mathematical operations they were expected to perform were too complicated. Some students became disillusioned and gave up on the activities.

Continued on page 14

Another achievement that the students stated was that they believed they were able to understand how real scientists work. Their teachers confirmed this. The processes involved in any scientific research were all present in this project:

- being immersed in a scientific process;
- the use of real images and data, taken directly from the natural world;
- the mishaps and obstacles that they had to face up to (such as meteorological problems);
- the slowness, at times, of the process of obtaining images; and,
- small technical problems.

Team-Based Learning

Finally, we would like to highlight one of the realities that the Eudoxos project, and the teachers who delivered it, taught the students. This was the importance of working in a group. Despite the importance of the development of individual academic abilities and skills in the secondary school, science requires professionals who are able to participate in research projects that require the support and collaboration of various people. The students valued the chance to undertake group work very highly and suggested undertaking more activities of this type. In the same way, they showed their satisfaction at having shared lessons with students of other nationalities. This revealed their interest in increasing the number of opportunities for communication and the exchange of ideas with students in other countries.

Academic Results

All of the work carried out by the scientists, teachers and students was fruitful. Although some obstacles arose in the teaching-learning process, and in the whole e-learning initiative (such as language and technical difficulties), the overall assessment by teachers was very positive.

Academic results reflected this satisfaction and provided us with an idea of the level of effectiveness of Eudoxos in the scientific learning of the participating students. The information below, which came from the assessments made by each teacher, using various criteria, clearly showed the level of conceptual and academic knowledge acquired by the students.

- *'25% failed (no interest, difficulties in mathematics and in PC use);*
- *65% achieved almost all expectations;*
- *10% achieved more than expected (report in English, deep research at home on the internet and/or on books).'*
(teacher, Italy)

This data, obtained from the Italian school, could be applied to the rest of the educational institutions. The rest of the teachers gave us enough information to be able to state that the majority of students learned

the content that they had worked on, and participated actively in the tasks they were given.

The teachers stated that the most important problem was the difficulty that many students had with the mathematical calculations necessary for the problem-solving activities. This handicap blocked and limited the dedication of some students, who then suffered a progressive lack of interest in the project. To this, we have to add the problem that a small group of students did not value the hours devoted to the project, as they did not consider it to be as valuable as other subjects included in the official curriculum. However, in counterbalance to this, we have to highlight the great interest shown by the teachers and the physics experts involved in the project. Eudoxos allowed the students to develop skills that cannot be measured by exams but which can be seen and analysed in the daily work of each school.

The teachers expressed their satisfaction with the students' ability to read and write in a foreign language, English. They had already considered it important for their students to be able to understand that English is the language of science and that it is necessary to learn it.

Technological Competence

The teachers discovered that their students had developed another series of skills that were important for maximising their ability to study. The work undertaken on the project required students to use the internet as just one more source to search for, and select, information. The students handled files from different computer programmes easily, were able to organise and interpret (with their teachers' help) images and data, producing individual reports that reflected their learning process. They also reasoned effectively with the scientists through the forum available on the project website.

The Eudoxos project is an example of how new technologies and the altruistic effort of scientists, teachers and students can help our schools to develop new initiatives to learn. Through this kind of partnership we can reinvigorate the curriculum, the nature of activities we offer students and the skills that young people can learn while they are still at school.

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A Winning Performance at Garforth Community College



The innovative step of employing six freelance performing artists has refreshed student motivation, leading to improved student outcomes.

GARFORTH Community College, in Garforth, Leeds, is a high attaining, 11-18 specialist performing arts community school. We are currently working as the lead school in a support federation with two inner city schools facing challenging circumstances. With the remit of raising the attainment of both partner schools, as well as exploring new ways of approaching teaching and learning within the work-related curriculum for our own students, the College has adopted an innovative approach to delivering the BTEC (Business and Technology Education Council) First Award in the Performing Arts. We have limited our focus to the performing arts but the method of delivery is transferable to other vocational areas. The college will use a similar model for vocational courses in Business, Leisure and Tourism, Art and Design and Construction, commencing in September 2005.

Regional Centre of Excellence

In the last four years, Garforth Community College has grown to become a regional centre of excellence,

named in Ofsted's 'honours list' as one of the nation's top 200 schools. Always an institution with high standards, it has transformed into a forward-looking and innovative institution committed to excellence, sustained high performance and continuous improvement, with a high reliability ethos. At every level, the school works to ensure success for all of its students and staff. Removing barriers to learning has created a 'no excuses' culture that promotes achievement for all. This has resulted in a secure and sustained improvement in recent years of over 20% in its 5A* - C GCSE pass rate, which rose to 82% in 2004.

Achieving one of the highest value-added scores in the region has provided the college with the reputation, credibility and confidence, and proven methods for success, to work under a satellite arrangement with the two schools. Extensive support includes using key college staff, structures and

Continued on page 16

systems to help raise standards; promote inclusion and find new ways of approaching teaching and learning to build capacity between schools. Within the curriculum, the college focused upon developing a vocational alternative to the traditional offer, with an attempt to re-engage key stage 4 students in both partner schools.

Focus on Underachieving Boys

The students taking part in the first pilot of the scheme were a group of underachieving boys, selected because of their negative value-added scores, poor attendance and general attitude. All had the capacity of achieving 5A* - C passes at GCSE but, typically for boys, none were working at their potential.

The BTEC certified course, equivalent to two GCSEs A* - C, is delivered in one year, over 180 hours. We used blocks of time that were arranged to fit in with a student's calendar, rather than being fixed on the weekly timetable. This allows the students to continue with their normal core and entitlement curriculum. The BTEC diploma, equivalent to four GCSEs, could be delivered in a similar fashion but over two years. We allocated six days every half-term for delivery over the spring and autumn terms, together with a two-week block in the final term. Using blocks of time in this way not only helps in the organisation of the course, as practically the entire course is delivered off-site, but we also found that students returned to this core curriculum refreshed and reinvigorated after their vocational experience.

The course we are currently delivering is the BTEC First in 'Performing Arts – Production'. This is predominantly a technical course that enables students to experience the wide variety of skills and career options available in this field. The units of work available are varied and wide ranging and include the following: The Performing Arts Business; Lighting Operations; Crewing; Set Construction; Mask Making; Wardrobe Management; DJ Technology, and Sequencing.

On vocational courses, students are expected to experience and learn first-hand about the industry they have chosen to study. As a teacher, I am able to deliver the material stipulated in the examination specification and provide my students with contacts within the local areas. However, I do not work directly in the Performing Arts industry and, as a consequence, do not have immediate access to professional working practices and up-to-date resources. For this reason, we decided to approach a range of freelance artists working within the performing arts and outline the principles of our project to them.

We now employ six artists across a range of disciplines, who work alongside our students, within the context of their BTEC courses. The artists are responsible for engaging the students in an innovative, exciting and vocational way and providing them with useful, transferable skills. They are not asked to provide programmes of study, assignment briefs or any other administrative assessment material. As the lead teacher, I am responsible for all of this and work closely with the artists when developing the schemes of work and the assessment of evidence.

Achieving one of the highest value-added scores in the region has provided the college with the reputation, credibility and confidence, and proven methods for success, to work under a satellite arrangement with the two schools.

Excitement about the Future

Our first certificate cohort has now completed the course and all of the students enrolled received both A* - C GCSEs. We have recently begun a second cohort (studying the Diploma) and already have excellent results. Students are excelling both in artists sessions, as well as in their own schools, in their core and entitlement subjects. Students who, only a few months ago, were disillusioned with the education system are now excited about their future opportunities.

The Artists Programme removes the 'teacher-student' barrier and so enables young people to learn effectively in an environment that stimulates them and encourages change.

The success of this project has led to further interest from other schools and two more cohorts will soon begin. I currently have six artists working as part of our team and have no doubt that this project will attract many more.

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Transforming Student Assessment to Liberate Pedagogy

A web-based approach to assessment, known as 'ReView', is about to be trialed in several countries.

CURRENT modes of assessment offer little information about the development of the range of attributes required for a changing world and workplace. Despite transformations in curriculum and the greater emphasis on creative approaches, quality teaching/learning and critical thinking, assessment regimes have remained largely unchanged.

Existing forms of assessment and written reporting are inadequate. They fail to accrue assessment data in a way that supports lifelong learning, holistic learning approaches and the development of desired qualities within the learner's disposition. Testing and assessment often occur without implicit design. Frequently, the criteria measured by assessment tend to document children's memorisation skills rather than their ability to think creatively, critically or reflectively. Similarly, assessment criteria are rarely explicit and information about learning may be hidden in a single grade, which fails to ascribe a differential value to various aspects of the learning process.

Pedagogical Impact of Assessment

Research in the last ten years has shown that assessment processes have a profound effect on students – and arguably the pedagogical approaches of teachers – and tend to drive their learning. Given that assessment too often rewards the development of short-term memory, the rote learning of answers and standardised responses, its value for student learning would appear to be biased toward the lower brain functions. Marton and Saljo's (1976) first exploration into student learning research in Sweden showed that the mere existence of tests and exams tended to encourage the adoption of 'surface approaches' by students in a formal learning environment. If we concede that surface approaches may include copying, plagiarism, cheating, 'cramming', memorising past papers and minimal attendance, then perhaps it is time to question the value of current assessment methods.

Continued on page 18

Assessment for Future Learning

If the view is accepted that assessment has a tangible and direct link on a student's learning, and consequently on teaching styles, it can be equally argued that assessment could potentially be the driving force to promote innovative learning and quality teaching. UNESCO argues that *'regular, reliable, timely assessment is a key to improving learning achievement'* (UNESCO 2004: p.26). The goal of these assessment processes should be to give learner feedback and improve teaching and learning practices. To enable this to occur, more holistic forms of assessment are needed, which enable systems to measure achievement, not assess failure. Boud (2001: 67) contends that:

'Assessment is the single most powerful influence on learning in formal courses and, if not designed well, can easily undermine the positive features of an important strategy in the repertoire of teaching and learning approaches'.

Given this connection between assessment and learning, it is vital that assessment processes keep pace with the changes in learning and teaching and, more broadly, the innovations occurring within society and the workplace.

The communication revolution has transformed the ways in which we live (Throsby & Hollister 2003). The rise of the internet as a means of accessing and exchanging data, on a scale never before imagined, has been particularly important. Modern society is becoming more complex, information is becoming available and changing more rapidly, prompting users to constantly re-think, switch directions and change problem-solving strategies. In a knowledge-driven economy, innovation is the main means of wealth generation (Hartley, 2004). Creative people are intrinsically motivated. This means that they see inherent value in what they are doing, as opposed to extrinsic motivation, which causes them to engage in an activity only to fulfil ulterior goals. Assessment should build intrinsic motivation. Hargreaves (2004) argues that *'Educational processes are complex, so the amount of improvement any single strategy can effect is small. To maintain the momentum, new approaches to assessment are needed'*. It is apparent that innovative education requires models of assessment that are multi-disciplinary and integrated.

If innovation, creativity and problem-solving are endorsed as learning outcomes, they **must** become a valued and explicit part of the assessment process. Landry (Landry & Bianchini 1994) makes the distinction between creativity and innovation, suggesting that the former is the process through which new ideas are produced, while the latter is the process through which new ideas are implemented or enacted. Given this, creativity is a precondition for innovation. Concurrently, innovation involves the

evaluation and assessment of creative ideas. For innovation to occur, it is necessary to step outside familiar structures and to experiment. This is equally true of learning and teaching as it is of learning environments and assessment.

Importance of Reflective Thinking

It is increasingly important to prompt reflective thinking during learning, to help learners develop strategies to apply new knowledge to the complex situations in their day-to-day activities. Hmelo & Ferrari (1997) argue that reflective thinking helps learners to develop higher-order thinking skills, by prompting learners to:

- relate new knowledge to prior understanding;
- think in both abstract and conceptual terms;
- apply specific strategies in novel tasks, and;
- understand their thinking and learning strategies.

Creative, problem and project-based tasks provide learners with instructional mechanisms that can increase reflective thinking. Similarly, learning tasks that are authentic, holistic and encourage social interactions also build critical and reflective thought (Albanese & Mitchell, 1993; Donahuse, 1999; Hmelo & Ferrari, 1997). This mindful stance toward learning is essential for efficient development of reflective thinking and, ultimately, knowledge construction.

It can therefore be argued that models of assessment based largely on reproductive thinking are no longer of relevance to the sorts of qualities required into the future. Conversely, assessment needs to record creative, critical and reflective forms of learning. Kolb and Schon, Houle (1980) and Brookfield (1983) focused on the experiential aspects of reflective learning. Brookfield identified two contrasting experiences. On the one hand, reflective learning describes the sort of learning undertaken by students who are given the chance to acquire knowledge, skills and feelings in an immediate and relevant setting. Experiential learning thus involves a *'direct encounter with the phenomena being studied, rather than merely thinking about the encounter, or only considering the possibility of doing something about it'* (Borzak, 1981, in Brookfield, 1983, p.16). The second type of experiential learning is *'education that occurs as a direct participation in the events of life'* (Houle, 1980, p. 221). Here, learning is not sponsored by formal teaching but by the students themselves. It is learning that is achieved through reflection upon everyday experience and is the way that most of us do our learning. The early reflective learning practitioners thus built on the concept of experiential learning.

Pragmatic Issues Driving Reform

While the previously stated points indicate the nature and scope of assessment needed to promote creative, critical and reflective learning, there are also pragmatic issues in education that are driving the

need to reform assessment. Increasingly, global indicators are being used to determine the effectiveness of student learning, teaching performance and national educational standards. Currently, there is a lack of standardised indicators of quality. Most existing measures fail to adequately capture the complexity of the learning process (UNESCO, 2004). Aligned with this agenda, as education systems in the United Kingdom and in other regions of the world move to the greater use of centrally provided online content, there is a need to develop systems of assessment that can sit alongside e-content provisions.

Schools are required to produce the sorts of qualities within children that will be required at least ten years into the future. To meet this imperative, teachers are required to be futurologists and forecast the types of learning children will need. Effective global, national and school-based assessment should assist in charting previous, current and future learning pathways. Efficient assessment is the result of dialogues across the social and cultural learning domains and should be informed by understandings of local and global contexts, now and into the future. Currently, curriculum and pedagogy are largely responsive, rather than proactive or predictive. To ascertain the effectiveness of innovative learning designs and local and global educational policy and practices, thorough and trustworthy baseline assessment data is needed.

Assessment for Learning

More holistic approaches to assessment encourage the view that learning and assessment are lifelong and connected processes. Rigour in the assessment processes of the future should be judged by the extent to which the design of measurement and judgment tasks encourage active learning through dynamic, critical thinking. Current assessment practices tend to do little to support the development of curriculum that ensures intellectual quality.

In most instances, assessment processes fail to recognise that children learn at different rates and have different entering experiences. Now, and in the future, assessment needs to be able to track and report on individual achievement and be unambiguous and fair. But this does not mean we need to rely on exceedingly limited standardised tests of literacy and numeracy. These types of assessment trivialise these

disciplines by failing to acknowledge that all learning is layered, complex and spontaneous. Good assessment maps achievement in rich learning tasks, in rich ways, and involves accurate and reliable component mapping across individuals and groups.

The Role of the Teacher

While researchers, students and teachers may agree that current practices in assessment fail to connect with real learning, there is the concern among teachers working at the coalface that reforms to assessment might make an already burdensome task even worse. Studies of teacher satisfaction regularly highlight assessment as being one of the least liked aspects of a teacher's work. Rising levels of exam anxiety and stress-related disorders in young people also point to the unworkability of current approaches.

Any tools to reform assessment need to be manageable and sustainable within the realities of classroom teaching. They also need to build - rather than disempower - teacher professionalism, by engaging teachers in pedagogical debates about the criteria that underpin learning. Effective assessment occurs within a collaborative learning community, and operates as an active

Existing forms of assessment and written reporting are inadequate. They fail to accrue assessment data in a way that supports lifelong learning, holistic learning approaches and the development of desired qualities within the learner's disposition.

system involving students, teachers, school administration and wider education and policy bodies. Rather than remove assessment processes from the hands of teachers, systemic, national and international assessment measures should recognise the ability of teachers to make qualitative and quantitative judgments of student learning. At the same time, they must be very practical, trouble-free and workable.

Future tools for assessment should simplify the assessment and reporting processes within integrated learning models and allow the tracking of impact through evidence-based assessment models.

It is on the basis of these concerns and future trends that we developed a system of web-based, criteria-based assessment.

A New Approach to Assessment

ReView, developed at the University of Technology, Sydney (UTS), was designed to address the growing demand for more workable, holistic and thorough

Continued on page 20

ways of measuring the achievements of students within quality teaching and learning contexts.

What are the advantages of a web-based, criteria-based assessment model? The ReView system is being piloted as a web service that combines the assessment of graduate attributes with criteria-based measurement of knowledge and skills. It aims to 'unpack' the assessment process by making explicit what is being measured or tested. For example, if an exam is testing the memorising of facts or accuracy of calculation, then this should contribute to students'

ReView provides an online and accessible assessment framework that ... can accommodate learning across integrated and transdisciplinary themes, to determine levels of deep knowledge and understanding.

development in a category termed 'professional or practical skills'. If it is testing their ability to communicate, rather than just remembering a concept, then the assessment should be adding to the students' ongoing development of communication skills. If they are asked to apply a concept innovatively, then the grading of this should be adding to their ongoing development of creativity and innovation. If they are asked to analyse a text, the assessment should add to their ongoing development of critical thinking skills, and so on. If these criteria are made explicit and each one graded (rather than all this information being hidden in a single grade), then the software can ascribe a value to each assessment criteria and store the numbers under different criteria categories.

ReView provides an online and accessible assessment framework that uses criteria to embed relevant and purposeful rich learning tasks. It also readily tracks learning within a multilateral framework and can accommodate learning across integrated and transdisciplinary themes, to determine levels of deep knowledge and understanding.

User-Friendly for Teachers

The design of ReView provides a user-friendly and simple way for teachers to build reliable assessment and learning portfolios and reports. Its online interface is customisable and can be adapted to address needs at the individual, local and national levels. It enables ongoing assessment and reporting and its integrated premise recognises that knowledge is gained across

borders in an integrated way and that evidence of learning can occur at any point of a teaching day. Its existence as a web-based portal means that it can integrate ICT content, including the greater global sharing of learning objects and the increasing use of technologies in learning. It also means that parents, students and administrators can, if authorised, get immediate and constant access to various configurations of assessment and reporting data.

Five Colour-Coded Categories

The ReView system is based on criteria that are grouped into five colour-coded categories. These categories are comprehensive and present an optimum structure for monitoring child development through thematic projects or subjects. The five colour-coded criteria groups are:

- creativity-innovation;
- communication;
- attitudes-values;
- practical skills; and,
- critical thinking.

Creativity-innovation involves learning processes that encourage inventing, risk-taking, imagining, problem-solving, playing, creating and originality.

The **communication** criteria explore the multimodal nature of communication and the making of meaning. This involves speaking, writing, reading, mathematical literacies, gestural and non-verbal communication, visual literacy, multisensory communication (for example, sound and moving images) and social languages (for example, ritual language, manners and negotiations).

The criteria covered by the descriptor **attitudes-values** cover the ethical, personal and social dimensions of learning. This includes levels of intrinsic motivation (for example, keenness to learn), leadership, curiosity, collaboration, interpersonal strengths (for example, friendships and reciprocity), intrapersonal skills (for example, self-assurance and confidence), ability to handle and respond to change, care and consideration of self and others, respect, self-discipline, determination and judgement.

The criteria group called **practical skills** refer to the range of skills a person needs to become an effective learner at any given age. This includes physical skills (for example, skipping, running, dancing, holding a pen, handwriting, drawing, typing, playing an instrument and singing); conceptual skills (for example, measuring, composing, analysing and evaluating); ICT skills (for example, computer skills, camera skills and online/internet skills) and learning skills (for example, using a library, researching, interviewing and reporting).

The fifth criteria of **critical thinking** encourages children to recognise the strengths and weaknesses of certain ways of thinking and, based on this reflection, to think in diverse and multiple ways. Critical thinking is evident in the way learners can make connections to other learning, are aware of their own learning (reflection on learning), adopt a stance of open mindedness, gather information from a range of sources, make statements based on evidence, build relationships between different pieces of information or skills, see things from several points of view, ask interesting questions and can identify their personal strengths and weaknesses as a learner.

Every learning task, unit of work or entire subject can be unpacked to determine how these five criteria groups are evident in the learning within the task(s). Learning is then envisaged as a series of criteria, either developed by the teachers, chosen from the curriculum or modified from the criteria bank supplied. The students' names are added into the database, along with the assessment tasks and associated criteria.

To allocate grades, marks or achievement ratings, the teacher simply moves a slider along a bar grid and/or enters a numerical or graded result. A database then calculates grades, averages and an almost infinite number of data 'searchables', such as performance by task, gender, criteria type, residential district, ethnic group or a number of other ways.

There is also the facility to upload any file to form an electronic portfolio. In later versions, this will allow video, photographic, work samples, tests, and so on, to be added to supplement the assessment data and provide a full, illustrated report, either in an online or a printed form. The colour coding of the criteria means that, by clicking on a button, a teacher is instantly able to see how a child is performing in relation to the overall criteria and also how the child's total learning development is progressing in a number of tasks, in comparison against previous performance or in relation to overall averages or standards of performance.

Pilot Schools

The ReView model of assessment is soon to be trialed in schools within the UK, Singapore, Hong Kong and Australia. It is hoped that the web-based nature of this assessment model will encourage participating schools to collaborate in criteria writing and assessment planning. It is also hoped that, by the completion of the 12-month pilot testing phase, significant data will emerge on the correlative patterns within schools and countries, as well as across the world.

ReView may prove to provide an assessment system that will be a catalyst to reform assessment processes, to more fully recognise and document

creative, critical and reflective learning practices and empower teachers to make meaningful decisions in relation to future education and pedagogy, within a framework of more integrated approaches to learning, greater accountability and quality enhancement.

References

A comprehensive list of references cited in this paper can be obtained from the authors.

* Schools interested in becoming part of the pilot testing process are invited to contact the authors.

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Choice: The Key to Lifelong Physical Activity?



Personalising physical education may be the way to motivate more young people to stay fit and healthy for life.

WE know what is done in childhood and youth affects health and functioning later in life. The establishment of early positive physical activity behaviours is an important component in achieving lifetime wellness (Corbin & Pangrazi, 1998). Promotion of lifelong physical activity is a goal of physical education in many countries, including the United Kingdom (Department for Education and Skills, 2004) and Australia (Victorian Curriculum and Assessment Authority, 2002). Physical education in schools has been identified as critical if we wish to address the decline in physical activity and the promotion of active living (Ernst & Pangrazi, 1999; McKenzie, 1999).

Failing the Needs of Youth

While participation in physical education has the potential to promote active lifestyles, studies reveal that many programs, despite their worthy aims, do not meet the needs of young people (for example, see Flintoff & Scraton, 2001; Lee, Fredenburg, Belcher, & Cleveland, 1999). Many young people find physical education irrelevant or un motivating (Prusak, Treasure, Darst, & Pangrazi, 2004). Learner-centred programs, where individuals have more choice, and are involved in decisions about class activities, impact positively on participation in physical education (Olafson, 2002). Consideration of student autonomy (Grolnick & Ryan, 1987) and student voice, providing activities that students enjoy (US Department of Health and Human Services, 1996) and allowing young people to be responsible for their own learning (Chepyator-Thomson & Ennis, 1997; Lee et al., 1999)

are likely to enhance students' perceptions of the physical education curriculum. Prusak and colleagues (2004) point out that how students feel about physical education in general, as well as the current activities they are undertaking in physical education, are both important determinants of motivation to be physically active.

A Learner-Centred Approach

The aim of the curriculum innovation described in this paper was to use a learner-centred approach to teaching health-related physical activity and then assess students' consequent feelings toward physical education. The innovation involved collaboration between a physical educator at Loyola College and a final year physical education major student at RMIT (Royal Melbourne Institute of Technology) University. Loyola College is a Catholic co-educational independent secondary school, which caters for students in years 7-12. It was established in 1980 and is set on 20 acres in north-eastern Melbourne, Australia. Two year 9 physical education classes, under instruction of the same specialist physical educator, were involved in the study. One class participated in the innovation. The other participated in the regular health-related fitness unit that was assigned to students in this year level, as stipulated in the Loyola College Physical Education curriculum document. In this regular unit, no modifications were made that would provide students with additional choices in relation to content, assessment, and delivery, other than those they would normally receive.

A Three-Part Innovation

A health-related physical activity unit was designed to provide students with opportunities for self-determination and choice. There were three distinct components of the innovation:

1. Prior to the six-week intervention, all year 9 students were surveyed about their interest in participating in various individual and team sports, fitness activities and recreational pursuits. The most popular activities were incorporated into the unit.
2. Students designed and participated in aerobic activity at the beginning of each practical class.
3. Students designed and participated in one other component of health-related physical activity during each practical class. The components students could choose from were flexibility or muscular strength and endurance.

This innovation involved nine practical and theoretical classes over a period of six weeks. In the initial theory class, students were taught the importance, and components of, health-related physical activity. They were also taught how to plan and monitor the components of health-related physical activity. Below is a description of the three major parts of each practical lesson.

PART 1. Part 1 comprised fifteen minutes of student-led aerobic activity. The aim of the students was to keep their heart rate in their target heart rate zone. They were able to choose the nature of the activities, who they worked with, the size of the group they worked in, and the equipment and space they needed. Students were also asked to monitor their own heart rate. The role of teachers was to prepare the work area plan, so that students could sign up for activity spaces. They also had to ensure that students began to work and that they monitored their heart rates. Teachers were available to answer questions.

PART 2. Part 2 comprised approximately 45 minutes of teacher-led health-related physical activity. The aim of this section was for students to experience a variety of health-related physical activities. Students were able to select and implement health-related physical activities from a student preference list. The teacher explained the relationship of the activity to health-related fitness components.

PART 3. Part 3 comprised 20 minutes of student-led flexibility or strength activities. Students were asked to plan, implement and monitor flexibility or strength activities, focusing on either strength or flexibility. The role of the teacher was to provide resources to help students plan and monitor activities.

Marked Gender Differences

The initial survey showed that students were interested in a wide variety of activities. It also revealed some sharp differences between the interests of boys

and girls. For example, walking was favoured by 83% of girls but only 21% of boys. However, as we had not wanted to split the class along gender lines, only those activities with relatively good acceptance by both boys and girls were selected by the teacher for inclusion in Part 2 of each practical class. Those activities with the strongest levels of interest by both boys and girls were:

- self-defence (overall 62%: boys 60% and girls 65%);
- training with weights (overall 55%: boys 55% and girls 55%);
- soccer (overall 59%: boys 67% and girls 50%); tennis (overall 54%: boys 43% and girls 65%); and,
- rap/break dancing (overall 59%: boys 52% and girls 65%).

Student choices presented some challenges to the physical education teacher, as she felt she lacked expertise in some of these areas. As a solution, the teacher brought in experts from the community to teach two of the lessons.

Managing the Logistics

During Part 1 of the practical classes, students organised themselves into the following activities: basketball lay-up circuit; walking/jogging, two-on-two soccer; aerobics and three-on-three basketball. With teacher guidance, students checked their target heart rate at least once during the fifteen minutes and adjusted the activity intensity if their heart rates were outside the target heart rate zone. The major challenge of this part of each practical lesson was the logistics. Students needed to sign up for activity spaces before the lesson. At times there was competition for space, particularly when the class was scheduled indoors and the spaces were smaller. Part 3 of the lesson was less logistically challenging, as the class moved to the fitness studio, which was equipped with weight training equipment. There was also plenty of room in the studio for stretching. Fortunately, the students had already been taught to use the fitness studio. This meant that the physical educator could concentrate on monitoring the overall situation and providing feedback to students.

The Students' Response

The feelings of students toward physical education were assessed before and after the 6-week innovation, using the Feelings about Physical Education scale (Toulmin, 1973). The questionnaire includes 20 questions, using a 5-point likert scale. For example:

'I feel so out-of-place in physical education'

- 'Strongly agree';
- 'Agree';
- 'Don't know';

Continued on page 24

- 'Disagree';
- 'Strongly disagree'.

Some students had positive feelings toward physical education before the innovation. As the reason for this innovation related to those young people who find physical education irrelevant or unmotivating, the classes were sub-divided into thirds, based on their initial feelings toward physical education.

The students less favourably disposed toward physical education (the lower third) in the intervention group were significantly ($p < .01$) more positive toward physical education at the end of the six-week innovation. This change was not seen for the lower third in the control group. In addition to having their feelings toward physical education surveyed, students were asked about their experience of the unit. Answers from students in the innovation group to the question: 'What was good about the physical activity unit?' included:

- 'It was fun and we got to choose';
- 'We got to plan what we want to do and who with'; and,
- 'Group activities done with your friends'.

Thirteen out of the 26 students in the intervention group commented positively about having a 'choice' or 'having a say' in activities. Eight mentioned that the unit was fun and four mentioned they enjoyed being able to work with their friends. When asked what changes students would make to the unit, six students commented that the aerobic component (Part 1, 15 minutes) was not long enough. Some students reported they did not particularly enjoy the theory component of the unit. However, the physical education teacher felt that the theory lessons were important to prepare students to manage their own physical activity.

In the future, it may be beneficial to try to integrate the theory and the practice more. In this innovation, theory occurred in a classroom, with no physical activity in those lessons. Three students didn't like the class breaking up into smaller groups and said that they would prefer to work in a class group. The challenges of this innovation that were reported by the physical education teacher were the logistics for Part 1 (which included feelings of concern about students doing different activities at the same time); and responding to students' interests for Part 2, where she felt she lacked expertise.

In summary, the innovation did not change the feelings of those students who were already positive about physical education. However, it had a positive effect on those students who were less favorably disposed toward physical education. In summary, giving students a voice in deciding what was included

in a health-related physical activity unit, who they worked with, and how some unit objectives were to be achieved can be described as a positive experience for those students who usually disliked physical education.

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Student Welfare: The Benefits of a Student Services Team

This Australian school has created a student services team comprised of trained psychologists. These professionals support students and teachers alike.

GLADSTONE Park Secondary College is a coeducational school for 1,500 11 to 18-year-old students, in Melbourne, Australia. It is located in a municipality that has most educational indicators below the State average. The school community is culturally diverse, which enriches the lives of all students at the College.

Within the appropriate industrial awards, we have been searching for better ways of structuring our most important resource - our people - to support the learning of young people. We have developed a range of workplace restructuring initiatives, including the addition in 2001 of a student services team, made up of psychologists.

Background to the Development

The education funding cutbacks of the early 1990s meant that there was little scope for secondary schools to allocate additional resources to address the increasing complexity of student welfare issues. Even though welfare problems were becoming too numerous and complex to be managed by part-time position holders, many schools were forced to reduce the time allocated to this area.

At the same time, the push for higher retention rates from the Victorian State Government was increasing our awareness of the impact of welfare issues on the ability of some students to remain at school. As well, career education became increasingly important, with many young people who would have left school before completing Year 12 now staying on. There were fewer long-term jobs for those who left school early.

Several other influences combined. First was the outstanding Framework for Student Welfare developed by the Victorian Department for Education and Training (www.sofweb.vic.edu.au/welfare/welfare.htm). This document highlighted the need for a comprehensive approach to student support. The document was produced, in part, in response to

the youth suicide issues that were being highlighted at the time. It exemplified a very positive, constructive and preventive approach. This seminal document highlighted the important stages of primary prevention, early intervention, intervention and post-vention that would become the framework for the student support services at the College.

A new staffing structure was also being developed, and the staffing flexibility under self-management was beginning to provide opportunities for re-thinking the structure of services to young people. The shortage of teachers prompted thoughts to look for alternative ways of staffing these important programs.

Fortunately, some new funding came along at the right time. New funds for student welfare (1999), student pathways and middle years (2001) all provided opportunities and flexibility in staffing.

For several years the College had accepted students on placement for a Masters of Educational Psychology degree from the University of Melbourne. These people undertook a variety of work, including counselling and research. One had worked on transferring a coaching program (Action Planning) from the UK to the College, with measurable success in VCE results. These postgraduate students impressed us with their high level of academic knowledge, strong counselling skills with individuals and groups, their program development skills and their versatility. They also had a very strong ethical background. They were very flexible in the application of their highly developed skills. They certainly showed the potential benefits in employing people with these abilities and, in some aspects, different ways of thinking about challenges and solutions.

Industrial Considerations

Some teachers voiced their concern that the proposal to introduce a new student services team contravened

Continued on page 26

industrial awards governing school staffing, however this was not the case. At that time, there was no agreement in place between the then conservative government and teacher unions about staffing matters. Subsequently, a Labor government has put in place industrial agreements that have not mandated who may be employed in a range of positions other than core teaching ones.

The guidelines of the Australian Education Union did not seek to mandate the employment of a teacher-trained person, employed under teaching conditions, for student welfare. In practice, the first counsellor employed within the new team structure had previously worked as a teacher and subsequently trained as a psychologist. Others since employed in the team have not had teaching backgrounds.

Some Key Underlying Ideas

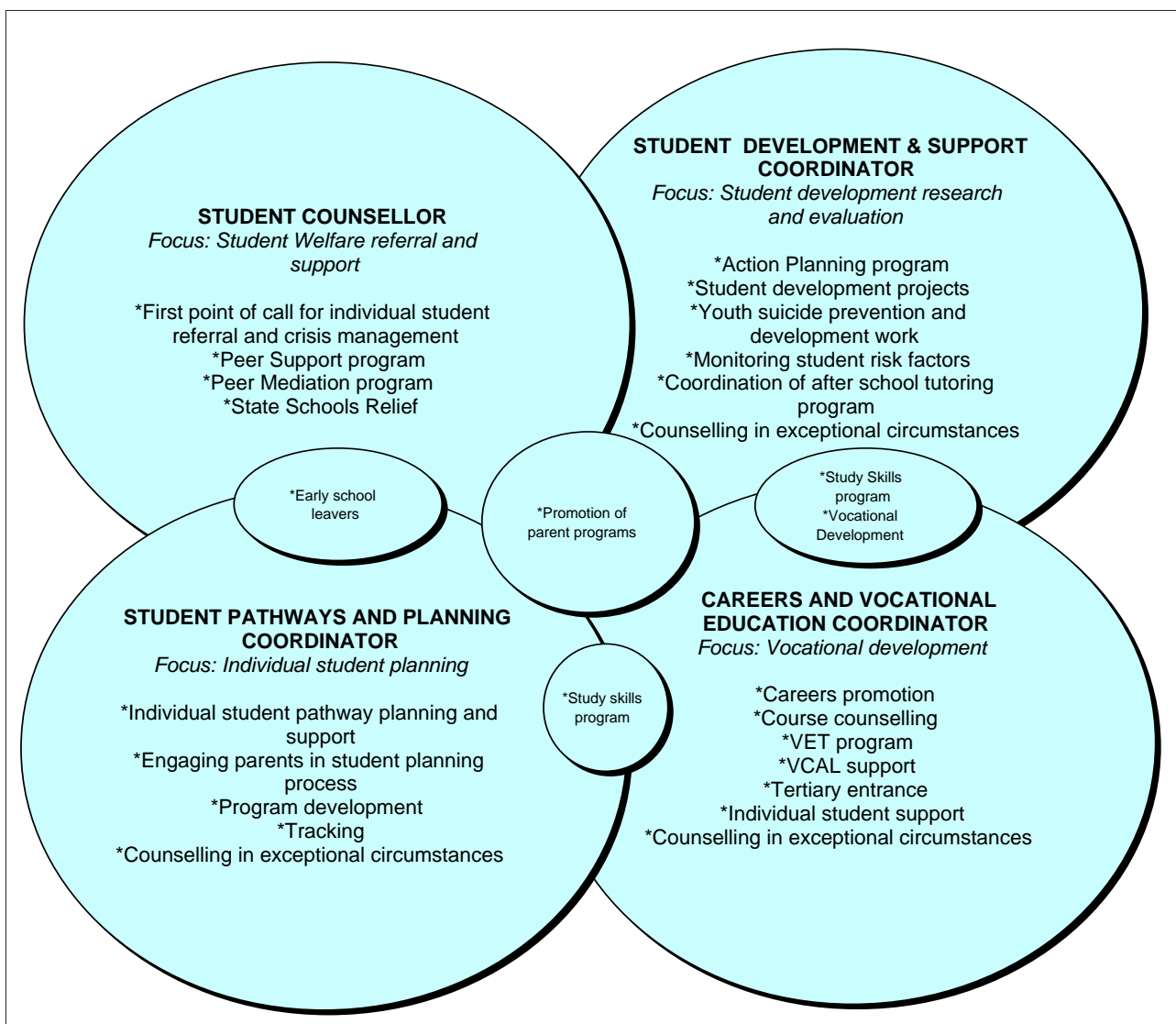
- There is a need to provide a student support service that covers the important areas of primary prevention, early intervention, intervention and post-vention.

- There are some roles in schools that can be equally, or better, provided by those with dedicated training.
- Employment of non-teachers on a non-school year basis provides for a better service to students and families.
- In a time of teacher shortage there is a sound argument to use other appropriately trained professionals for roles previously filled by teachers.

The Impact of the Team

The Student Services Team has always demonstrated a commitment to evaluation of the programs and services it offers. Feedback from students is used to inform the team of possible improvements. Recent student survey results are uniformly positive.

In 2004, for example, 98% of year 12 respondents reported that the Action Planning Program was worthwhile. Similarly, 80% of the year 12 respondents agreed that the Managed Individual Pathways Program encouraged and assisted them to form goals



The positions created in the student services team.

for the future. Students also expressed high levels of satisfaction with the school's Careers service. Students who took part in the Peer Support Program have strongly endorsed it.

From a whole school point of view, the impact of the introduction of the new team structure on student welfare is difficult to assess directly. Student satisfaction data gathered annually since new student welfare initiatives commenced shows a significant increase of satisfaction, as measured by the School Life Questionnaire (Australian Council of Educational Research).

When the Action Planning Program was introduced at the College in 1999, student achievement in the year 12 Victorian Certificate of Education (VCE) increased and this increase has been maintained in the context of very high real retention rates in the school. A greater proportion of VCE students from Gladstone Park SC consistently achieve study scores of 40 and above (out of a possible 50) when compared with students from 'like schools'.

Advantages and Disadvantages

The primary advantage of employing psychologists and social workers in the student services team is their accessibility to students and staff alike. For example, the previous student counsellor and careers teacher were only appointed to the roles on a 0.8 full-time basis. This limited their availability to staff and students, particularly in situations of urgency.

The new staff members are full-time and have been appointed on a non-school year basis, which means that they work for all but four weeks of the year. Students and parents can contact them during term breaks to discuss issues of concern, arrange material aid or obtain career information. The team also find the time without student contact to be very valuable for the evaluation and planning of programs or events. They also use non-term time to attend professional development opportunities not available during the school year and to network with fellow professionals. The team's accessibility also ensures that students feel that their needs are being met, especially when they most need the support.

Another advantage to employing specialist staff in student welfare positions is the lengthy and comprehensive training that they have completed. This is not to disparage their teacher colleagues. However, there is no doubt that trained psychologists bring a level of expertise garnered not only from their professional training but also from their varied work backgrounds. The student services team members collectively have worked in roles as diverse as rehabilitation consultants, weight loss consultants,

foster care agency managers, mental health and educational psychology. They have also previously undertaken much voluntary counselling and welfare work. Their training has required them to complete work placements where they have undergone professional supervision. They also have a strong research and evaluation orientation, which enhances their work on student welfare programs. Membership of their respective professional associations requires them to adhere to a strict code of conduct, as well as ethical guidelines.

The team's brief allows them the luxury of focusing on the welfare, rather than the discipline and learning, needs of students.

The team structure of this group of staff has worked well. Solitary practitioners in schools often complain of isolation. Our student services team members provide each other with support and feedback, so that informal and formal debriefing can take place. They are able to collaborate on larger scale initiatives, such as the school-wide Harmony Week (celebrating cultural diversity) program and to share the load in times of high demand or organisational stress, whilst continuing to fulfil their individual roles and functions.

The team's brief allows them the luxury of focusing on the welfare, rather than the discipline and learning, needs of students. Overall, students embrace the opportunities that this focus provides, confiding their fears and experiences more freely than perhaps they otherwise would have.

Of course, the new team structure has presented some challenges, as well as offering substantial advantages to the school. There was initially some opposition to the appointment of the new staff, both from the existing school personnel and, perhaps more surprisingly, from staff within the teacher professional associations.

The attendance of new appointees to networks of student welfare coordinators and careers teachers was initially met with curiosity and disapproval and sometimes views were expressed that these positions should be held by teachers. The view expressed by a minority of teachers from these networks was that the appointment of non-teachers to these positions was limiting the career opportunities of teachers.

Continued on page 28

Several factors saw the opposition to the changes abate. First, the arguments for the change were strong. The governing body of the College considered the matter at great length. The support for the change was unanimous, and this included elected teacher and student representatives. The quality of the appointees has been very good. They have met the key reasons for the change (greater availability, stronger training and skills). The contributions of team members to curriculum program development and students' wellbeing and management is there for all to see.

The flexibility of the student services team model is perhaps its greatest asset ...

The team members have felt that it has taken considerable time to develop credibility with the teaching staff. At times, this credibility can still seem fragile. There is considerable pressure associated with being agents of change. The team members have had to become familiar with a myriad of school processes and structures.

The sheer size of the school and the number of students it services has presented challenges. In particular, the team has had to respect restrictions placed on its ability to conduct welfare programs with larger groups of students, due to legal concerns related to their 'non-teacher' status. The teacher unionists have since become more relaxed about team members conducting programs with small groups of students, or having teachers to supervise jointly run sessions.

Other concerns voiced by the student services team include their fear that student welfare may come to be seen as the responsibility and concern solely of the team, rather than of the whole organisation. However, this has not happened. In the beginning, too, there was some confusion about the separate and complementary roles of team members. The team is continually developing and changing, as new issues arise.

The leadership team of the College who, in the main, have backgrounds in education (although one is a registered psychologist), have also struggled at times with issues such as the supervision of these professional staff, whom they manage. The team's mission statement includes a commitment to the welfare of staff and of the wider school community, as well as to the college's students. At times, the needs of these different client groups clash, presenting moral and ethical dilemmas that the team must negotiate their way through.

In the main, however, the student services model has proven to be robust. It has survived its 'baptism by fire' and is now much more firmly established within the school. In the four years it has been operating, there has been some turn-over of staff within the team. Yet the multidisciplinary nature of the team has allowed it to survive these changes. In fact, the remaining staff members have enjoyed the opportunities that these changes have presented to renegotiate the team's roles and responsibilities.

The flexibility of the student services team model is perhaps its greatest asset; one that will allow it, hopefully, to thrive, even in the face of emerging directives and new priorities imposed on it, from both within the school and externally.

Lessons for Other Schools

To the extent that this experience can be generalised to other schools (and we fervently believe that it can be), there are some key lessons for other schools. Professional trained counsellors in a school-based team environment:

- can be funded in a continuing way within normal school budgets;
- add a great deal to a school's capacity to promote the wellbeing and development of young people;
- need to be adequately supported with professional development, facilities and political and moral support, especially in the early days;
- bring a new and very welcome perspective to a school;
- provide a very positive environment for professional growth of the counsellors (as opposed to the usual model of a practitioner visiting many schools in a week in isolation from other counselling practitioners or working solo in a school); and,
- give access to further networks that may not otherwise be available to schools.

Indeed, the student services team is a desirable model for all schools to consider.

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The Kittermaster Mummy: Bringing Science to Life



*If science is to excite students, then it must be taken out of school and into the real world, as often as possible, as this story by **GERRY THRAVES** reminds us.*

On a cold sunny morning in February I waited at the village railway station with a small group of sixth formers and a two-man film crew from Teachers' Television. This improbable scenario was the result of my visit in the autumn term to the 'bunker', as the school's IT technicians refer to their combined workshop, office and tearoom. I was there to ask for more storage space on the system. As one of the technicians navigated his way through a labyrinth of folders on the screen in front of him, the other challenged me to guess what was in a large box that sat on the floor on the other side of the room. The box was surrounded by old computer cases. On its lid were spent motherboards and power supplies. Peering through one side, I could see various patterned pieces of material and offered the suggestion that the box contained costumes from a past school drama production. My attention was drawn back to the technician sorting out my account

when, a moment later, I found myself staring at a mummified head, which the other technician was enthusiastically holding up for my view. And that's how it all started; in the box was a disarticulated mummy.

Although not complete, the body parts were wrapped tightly in linen, which had taken on a deep rusty colour. A delicate hand with nails, a foot, two femurs, and a pelvis, along with the head and wrapped neck, constituted what is now referred to as the Kittermaster mummy.

Mystery Identity

In 1965 Dr Kittermaster, a pathologist at St Thomas' Hospital, in London, received the Egyptian mummy from a museum in Wales. On request, and working

Continued on page 30



with specialists from Porton Down and the British Museum, Dr Kittermaster carried out a post mortem, the notes of which have recently come into my possession. The mummy arrived in a coffin with inscriptions indicating that the mummy dated from 700 BCE and was that of a 30-year-old male royal carpenter. The unwrapping and post mortem, however, indicated that the mummy was that of a female in her late teens or early 20s. Dr Kittermaster made no suggestion as to the cause of death, nor is there any record, from that time, of opinion regarding the period of Ancient Egypt to which the mummy belonged. Following the post mortem, Dr Kittermaster retained possession of the mummy and, for many years in his spare time, he would take it to schools and give talks on Ancient Egypt.

In the summer of 2005 William Atkinson, a former student of the College, and now an Illustration graduate, was hired by the College for office cover. One dark thundery afternoon, William had been given the job of clearing out some cupboards in the old school building. The task was dusty and dirty and much of what he turned out was destined for the skip. With one cupboard almost completed, he stretched up and reached to pull out a large old cardboard box on the top shelf. The box tipped forward and William turned his head away as he was showered in body parts. He opened his eyes to see a mummified head bouncing and tumbling across the classroom floor.

Naturally William was shocked but, in an instant as he stared at the head, he knew what he was looking at. He had seen it before, many years ago, when Dr Kittermaster had come to his primary school. It turns out that Dr Kittermaster had eventually donated the mummy to the College. However, with changing staff and the passing of years, the mummy had been forgotten. It was William who collected the mummy parts together and placed them in a plastic box, which found its way to the technology 'bunker'.

Opportunity for Discovery

I knew from the first time I saw the mummy that there was a fantastic opportunity for discovery. The few students with whom I shared my ideas were fired up with enthusiasm. As we carefully catalogued and photographed the remains in Science, the list of questions we needed answers for grew.

How old was the mummy? How old was she when she died? Why did she die so young and what was the cause of death? What evidence is there of disease? Had she given birth? Were the findings of Dr Kittermaster's post mortem correct? To answer these and other questions, we would need expert help. A sixth form cross-curricular committee was established to oversee and steer the whole project. We received encouraging words from many museums and institutions but practical help was not forthcoming. Increasingly, the local education authority was viewing our mummy as a 'dead body' in a school. It was then we had our breakthrough.

Rosalie David, Keeper of Egyptology at the Manchester Museum and Professor of Biomedical Egyptology at the University of Manchester, offered to work on the Kittermaster mummy. Professor David is the Director of the International Mummy Data Base and a world leader and pioneer in the use of modern non-destructive medical techniques to investigate mummies.

Professor David invited a group of sixth form students and I to visit the University of Manchester for the initiation of a programme of research into the Kittermaster mummy. Selecting students from the many deserving and enthusiastic candidates was a difficult process carried out by the sixth form committee. A challenging and exciting day was planned by the university, the start of which would involve the sixth form students interviewing Professor David on her life's work and the future of Scientific

Egyptology. On the train journey north, the students completed their background reading and preparation for the interview. On their arrival in Manchester the students also got their first taste for university life, as they were assigned rooms in a hall of residence.

The Mummy Tissue Bank

The next day Dr Patricia Lambert, who manages the Mummy Tissue Bank, greeted us at the Faculty of Life Sciences. Dr Lambert guided us to a modern glass atrium within the building, where Professor David sat waiting. The students' interview with her continued for a full hour. Professor David explained how the university was establishing the Mummy Tissue Bank and how the tissue in the bank was being used to research the molecular biology of diseases in Ancient Egypt.

It is hoped that this knowledge will help in the understanding and treatment of modern day forms of the same diseases, including the development of vaccines. Samples from the Kittermaster mummy had been successfully retrieved for the tissue bank. In addition, Dr Patricia Rutherford would subject a sample of bowel tissue from the mummy to immunocytochemistry. This technique allows fluorescent tags to be attached to antibodies for specific diseases, which, in turn, are used to locate disease antigens. These chemical tags can be observed using immunofluorescent microscopy, to establish whether the Kittermaster mummy had schistosomiasis. This is an endemic, debilitating disease of ancient and modern Egypt that is of particular interest to Professor David's multidisciplinary research team.

Professor David suggested that, in her opinion, the Kittermaster mummy was from the New Kingdom (approximately 1500 BCE). However, she added that radio carbon dating of tissue from the mummy would confirm the age of the mummy with greater accuracy and that mass spectroscopy and X-ray analysis of the bones would provide further evidence of age at death.

Interesting Detective Work

Following the interview, the sixth form students helped collect tissue samples from the mummy for histological work and DNA analysis. Assisting with the endoscopy, students were able to take samples from the tongue and the back of the eye sockets. Using the endoscope, the students also observed a displaced neck vertebra. The displaced vertebra was firmly fixed in an abnormal position and the absence of any impact damage to the mummy wrappings in the immediate area indicates that the vertebra was not displaced following mummification. The possibility of the vertebra being displaced following death - but prior to mummification - could not be discounted. If the displacement movement of the vertebra had taken place while the subject was alive, it would have

caused death. The displacement may have resulted from an accidental blow to the back of the neck. However, the condition can also be brought about by strangulation. The possibility that we might be dealing with a 3000-year-old murder victim enthralled the students still further.

Facial Reconstruction

The final part of the day was spent in the facial reconstruction laboratory, which is part of the School of Art in Medicine. In this laboratory, Dr Caroline Wilkinson has recently used detailed measurements taken from the skull of St Nicholas and the latest computer software to reconstruct the face of Santa Claus. It is to this laboratory that the head of the Kittermaster mummy will be brought for reconstruction. It is hoped that we will soon be able to look upon the living face of the Kittermaster mummy.

Whole-School Involvement

As the film crew busied themselves filming the students on the train journey home I contemplated the success of the day and the challenge of bringing the Kittermaster mummy project to the rest of the school and other curriculum areas. In the hectic few months that have followed, the project has broadened, with the goal of presenting the research findings as part of a charity evening of entertainment. The culmination of this event will be the first viewing of the reconstructed face of a young woman who lived so many years ago. In preparation, year 9 artists have been working on a series of montages to adorn the walls of the school hall, as well as Cubist influenced masks of Egyptian gods. The masks will be worn by students taking part in vignettes that will portray aspects of the culture and society during the time the Kittermaster mummy actually lived. These scenes will be accompanied by student interpretations of temple dances and ancient Egyptian music.

Whilst there is still a great deal of work to do, and most of the research findings have yet to be gathered in, the project has nevertheless had a great impact on the many students and staff who have enthusiastically been involved. For me, it has reinforced the effectiveness of learning through enrichment, cross-curricular activities and projects that demonstrate the applications of science in what still remains a tantalisingly exotic area of research. It is important that students have the opportunity to do ground-breaking work that inspires both curiosity and the natural instinct to discover and learn.

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Series 2 of the iNet Online Conferences

Register for Series 2 Online Conferences at:
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The Specialist Schools Trust and iNet (international Networking for Educational Transformation) are currently conducting a second series of four short online conferences during 2005-2006. Each online conference will be active for seven days, with an extra reading-only day provided at the end. A wide range of papers will be presented to stimulate online discussion and debate. Each day participants will have the opportunity to debate one of seven selected Focus Papers, as well as contribute to a further general online discussion on the entire range of papers published for that topic on the online conference website.

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We are seeking papers from 1,000 to 3,000 words from school leaders, teachers, education researchers, academics and policy makers from all over the world,

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Papers should be emailed directly to the Online Conference Manager, Ms Debra Brydon, at: brydon@cybertext.net.au by the various due dates. Papers should be provided either as plain email text messages or as attached Word documents (not html). Papers should not include any formatting, such as columns or boxes. Authors are encouraged to email a passport style head and shoulders colour photo of themselves for publication with the paper. All papers should include an 'About the Author' paragraph of approximately 100 words at the end. This should include the author/s title, their full name and their current professional position/location/school. Writers, please confirm in writing at the end of your paper that you give permission for the Specialist Schools Trust to republish your paper.

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Snapshots – The Specialist Schools Trust Journal of Innovation in Education (secondary edition) focuses on new ideas, programmes, policies and practices being trialed or fully implemented in secondary schools. Papers in *Snapshots* describe and discuss innovations in schools all around the world. As such, the journal represents an outstanding opportunity for schools to showcase the work of their staff and to share practical ideas on what works best to improve student outcomes.

Readers are invited to submit a paper to *Snapshots* for possible publication. **The focus should be on innovations that have been implemented in the past two or three years, or are planned for implementation in the near future.** Papers can range from 700-2,800 words. They should contain some information about the writer's school (location, brief history, demographics, special

challenges and any other relevant details), some background to the implementation or trial of the innovation (why it was considered necessary, when it took place if it has already been implemented or when it is scheduled to take place) and a description and discussion about how it has worked out in practice (strengths and successes, risks, weaknesses, perceived future modifications, possible abandonment). It would also be very useful if writers were able to link the innovation to student outcomes (measured and/or intangible), if possible. Details of school partnerships with universities and any education-based action research should also be included. Photos that illustrate the innovation being described should be emailed separately as attached JPEG files (not embedded in text). Papers should be emailed to the Managing Editor, Ms Debra Brydon, as a plain email message or as an attached Word file. Email papers to: brydon@cybertext.net.au.