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TEACHER ED |

A Time for Change

Making one change in our lives is easy, sustaining it is not. Do innovation programmes, often seen as catalysts for change, really lead to positive changes in teaching and learning? What are the real effects on teachers and students? SingTeach speaks to Lim Tze Mien, who explores these issues in her doctoral research project which looks into issues involved in sustaining educational change.

Article highlights

- Do innovation programmes really make better teachers and students?
- How can teachers and schools sustain educational changes?

To innovate is to introduce new ideas or new ways of doing things for the better. When we talk about innovation programmes in school, we are talking about changes in the way teachers learn and engage students.

Change in context

"The problem is a practical one," says Tze Mien, who has more than 12 years of teaching experience. "I've been on the ground for many years and one of the things I see happening after *Thinking Schools, Learning Nation* and *Teach Less, Learn More* is the quick impetus for change."

There've been many attempts at change at the curricula, pedagogical and administrative level and," Tze Mien continues, "it feels like everything is in constant flux."

Not that change is an unwelcome thing, but often, most schools do not engage in deep conversations with all levels of stakeholders about the learning innovations they want to implement. Few schools have a well thought-through blueprint for innovation. As a result, learning innovations are seldom implemented with sustainability in mind. Many often fade away, negating efforts and resources that were put in in the first place.

In an effort to answer the call for innovative changes, teachers and schools are in a frenzy to "sample" as many of such programmes as possible. Tze Mien's challenge to them is to stop broadening and start consolidating their positions.

She says, "If schools continue to sample at the buffet table of possibilities without taking stock of how ideas fit into a blueprint for sustained change, little will be translated into real practice. Teachers will tend to hold on to traditional practice in the face of constant flux, and we will not be able to cultivate and nurture the kind of students that the global futures demand as quickly as we want to."

She adds, "We might possibly find ourselves in a lag situation instead, trying to undo problems like programme overload and burnt-out teachers."

What then can teachers and schools do to sustain change and fully reap the benefits of these innovation programmes?

Fullan (2005) offers some ideas on sustaining change. In his book, *Leadership and Sustainability: System Thinkers in Action*, he proposes eight elements schools can adopt. These elements are to be taken as a "meal-plan", not "good-to-have" items:

Eight elements of sustainability

1. Public service with a moral purpose: Schools should hold the moral purposes of education at the core of all change programmes.

2. Commitment to changing contexts at all levels: Worthwhile innovations must be supported by buy-in and structural/process changes at all levels of the school system.

3. Lateral capacity building through networks: By valuing learning communities, one can create

peer-to-peer capacity building networks that could help to generate the critical mass and conversations necessary to sustain an innovation.

4. Intelligent accountability and vertical relationships: These peer-to-peer communities would naturally generate commitment and accountability systems of their own. Together with closely coupled vertical relationships – between teachers and school leaders, cluster leaders and MOE etc. – These communities of practice could allow an innovation to be extended further and deeper than if teachers were to manage change on their own.

5. Deep learning: Deep learning involves whole schools engaging constantly in difficult conversations and risk-taking. Schools that adopt a top-down or delegated (e.g., based on teacher initiative only) means of pushing through with innovation are not likely to sustain change.

6. Dual commitments to short-term and long-term goals: Organizations that are focused on sustaining change will look at both short-term and long-term results. These results should be crafted in alignment with the moral vision that they want to realize.

7. Cyclical energizing: This refers to how schools have a focus on "energy management" throughout innovation cycles. How are school leaders and teachers managing their energy levels throughout the school year? Are there times teachers and leaders can come together to consolidate their learning, to rest and to reflect?

8. The long lever of leadership: It's not about just delegating responsibilities, it's about sharing and extending it. Leaders at different levels need to be working in concert towards the same objectives in order to sustain innovation. This is a simple concept, but it has tough implications of building empowered leaders at all levels and structural support that matters.

The ninth element

Based on her research, Tze Mien is proposing a ninth element – diversity.

Diversity underlines how much we value cultural diversity in our midst. It starts with understanding our specific cultural contexts. It's not just about importing systems but designing approaches that maximize the cultural strengths of our context.

A time to change

For real change to take place, schools have to take stock of the real needs of their institutions: the readiness of the teachers, the areas of strengths and lack in their staff and organization, what is worth adopting and what needs to change structurally and process-wise to support change.

Tze Mien believes it is an urgent matter for schools to take stock of all the pedagogical exposure that teachers have had thus far, and engage in deep conversations at all levels to draw up a viable plan for incubating and extending critical innovations school-wide. Rather than see rapid cycles of sampling, trials and abandonment of ideas, with the attention shifted to the next sexy innovation, change should culminate towards meaningful and significant improvement.

Tze Mien has been in the education service for 12 years. She was formerly Vice-Principal of St Margaret's Secondary School and a Research Fellow with the National Institute of Education. She had also served as Head of the Humanities and Aesthetics Branch with the Curriculum Planning & Development Division at the Ministry of Education. She is currently pursuing her PhD at the NIE.

Reference

Fullan, M. (2005). *Leadership and sustainability: System thinkers in action.* Thousand Oaks, CA: Corwin Press.

LANGUAGE ED |

Keeping SCoRE: How a Corpus can Help Improve Teaching

Which words do Math teachers use most? Do Science teachers have a different style of teaching? What kind of talk goes on in the typical Singapore classroom? Researchers have been able to find answers to these sorts of questions by using a corpus of classroom data.

Article highlights

- What is a corpus?
- What does a corpus of classroom language tell us?
- How can you create your own corpus?

A corpus is not just simply a collection of texts. Different corpora may contain different types of content, depending on their purpose. A corpus can help us analyse how language is used by different people in different contexts.

The SCoRE so far

Researchers at the National Institute of Education have been building up a Singapore Corpus of Research in Education, or SCoRE < http://score.crpp.nie.edu.sg/score/> in short, since 2005. It is a collection of real classroom dialogue from over 450 lessons in over 120 Primary 5 and Secondary 3 classrooms.

SCoRE comprises, literally, scores and scores of transcribed data from English Language, Mathematics, Science and Social Studies classrooms.

It is now a rich source of empirical data for education researchers, linguists, teacher trainers and curriculum designers who want to understand the interactions of students and teachers in Singapore classrooms.

What does SCoRE tell us?

A corpus can show us how language is really used. An analysis of the data provides rich evidence of the pedagogy and language patterns that are typical of the classroom environment in Singapore.

For example, the SCoRE researchers have made discoveries about the following:

1. Frequently used words

• Math teachers frequently used words for numbers, concepts (like “triangle”) and operators (like “minus” and “divide”). They also used the word “must” far more than other teachers!
• Science teachers used a lot of subject-specific words (e.g., “cell”, “photosynthesis”).
• Social Studies teachers tended to use words that relate to key social issues (e.g., “water”, “Singapore”, “Malaysia”).
• However, English Language teachers had a more diffuse core set of keywords. And, interestingly, there were more content words (e.g., “dinosaur”) than subject-specific words (e.g., “adjective”, “clause”, “verb”).

2. Common phrases

By looking at “lexical bundles” or fixed phrases, we know that teachers have characteristic ways of getting things done in the classroom through the use of language:
• Knowledge building, which often takes the form of a question (e.g., “How do you make…?”)
• Classroom management, which is used to manage interpersonal relationships (e.g., “I want you to…”)
• Discourse facilitation (e.g., “Okay, now, I’m going…”)

3. Discourse patterns

Most lessons have a basic “flow”. The most common is a three-part pattern known as the IRF: teacher initiation (I), student response (R), and teacher follow-up (F). A very high proportion of Singapore classroom talk was found to follow the IRF pattern, regardless of subject, level or stream, but they differ in the types of initiations, responses and follow-ups commonly used.

By combining these analyses, and others, we can explore the characteristic patterns of teaching.

References

Biber, D., Conrad, S., & Reppen, R. (1998). *Corpus linguistics: Investigating language structure and use.* Cambridge, UK: Cambridge University Press.

Biber, D., Johnasson, S., Leech, G., Conrad, S., & Finegan, E. (1999). *Longman Grammar of Spoken and Written English.* Harlow, UK: Pearson Education Ltd.

Create your own corpus

A corpus can make a powerful teaching resource. With current technology, it isn't too difficult to create one of your own. Here's a simple recipe for creating your own corpus:

1. Collect a large sample of your students' work

To make this step as easy as possible, get your students to submit their essays to you electronically (e.g., as an MS Word document). For best results, save the documents as plain text (.txt) files with an indexical file name (e.g., "student_text_001", "student_text_002", etc.).

2. Process the text

You can use a concordance program to produce a key-word-in-context (KWIC) concordance for a specific word. Free concordance software is easily available on the Web, (e.g., the Simple Concordance Program <http://www.textworld.com/scp/>, ConcApp Concordancer <http://www.edict.com.hk/pub/concapp/>or KWIC Concordance <http://www.chs.nihon-u.ac.jp/eng_dpt/tukamoto/kwic_e.html>)

3. Design curriculum tasks

Now you have data with which you can design authentic tasks and assessments. For example, you can create a simple multiple context cloze task (fill in the blanks) using your concordance search results. The use of the students' own work for such an exercise will also help to raise students' consciousness of the ways they are using grammar in their own texts.

Resources for research

Doyle, P. (2002). Grammar learning and thinking. In S. C. Chang & Y. M. Cheah (Eds.), *Teachers' handbook on teaching thinking skills across disciplines* (pp. 127–133). Singapore: Prentice Hall, Pearson Education Asia.

Doyle, P. (2007). Teaching grammar with a learner corpus. In T. Ruanni, F. Tupas, Y. Yi, & C. Nur (Eds.), *Changing perspectives on pedagogical grammar* (pp. 77–86). Singapore: Singapore Association for Applied Linguistics.

Doyle, P. (2009). Language development in Singapore classrooms: A corpus-based description of the 'school variety'. In R. Silver, C. Goh, & L. Alsagoff (Eds.), *Language learning in new English contexts: Studies of acquisition and development* (pp. 91–111). London: Continuum.

> Visit the SCoRE website <http://score.crpp.nie.edu.sg/score> or contact the project's principal investigator, Dr Paul Doyle <http://www.crpp.nie.edu.sg/user/view.php?id=1721&course=1>, to learn more about the corpus.

This is an example of a multiple-context cloze task based on data generated by a concordance program. Find the missing word that fits ALL of the blanks below.

"The law has just been passed, making it illegal to give _____ or sell alcohol to anyone under the age of 18."

"Restaurants have become so desperate that they no longer turn _____ customers who are not properly dressed."

"Awareness has led to a shift in local consumer sentiment _____ from processed, imported foods to locally-produced, organically-grown fruit and vegetables."

"Though this latest condominium development is just five minutes _____ from Tiong Bahru MRT station, figures have shown that sales are low."

When she discovered yoga in 2002, Catherine knew right _____ that it would transform her both spiritually and physically."

MATH ED |

Practical Lessons on Problem Solving

Most secondary school students and teachers would be familiar with Science practicals. But how about Math practicals? Could a "practical" lesson help us teach mathematical problem solving more effectively? A research project by NIE Math professors paves the way for this new approach.

Article highlights

- Why is mathematical problem solving important?
- How can teachers help students learn problem-solving skills?
- How can teachers conduct a math "practical" lesson?

Although Singaporean students do very well in math internationally (as shown by the Trends in International Mathematics and Science Study [TIMSS] <http://nces.ed.gov/timss/>), they are relatively weaker on problem-solving items.

Attempts to teach problem-solving skills have not always met with success. Dr Toh Tin Lam and his colleagues at NIE believe that students are not motivated to learn as they are not assessed on this skill.

So, how can we teach problem solving effectively? A research project by Dr Toh and his team shows us how mathematical "practical" lessons could be the solution.

Problem solving is important

> *Mathematical problem solving is central to mathematics learning. It involves the acquisition and application of mathematics concepts and skills in a wide range of situations, including non-routine, open-ended and real-world problems. (MOE, 2006a, p. 6; MOE, 2006b, p. 2)*

Mathematical problem solving is a core focus in Singapore's primary and secondary math curriculum, in line with global trends in math education.

The ability to solve math problems is seen as a measure of spatial-logical cognitive ability. This means that if students successfully learn how to solve math problems, they will have learned how to think well.

A model for problem-solving

The team used Polya's model of problem solving (see Figure 1) as its 4-step approach is easy for the students to remember.

However, based on their previous experience, they expected that our students would be resistant to following the stages of the model. They found that even students who were able to solve the problems were reluctant to make the extra effort to check their work and extend the problem.

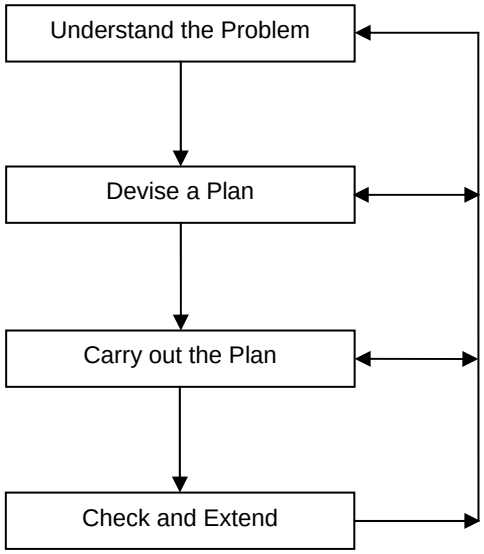

Figure 1. Flowchart of Polya's problem-solving model.

To overcome this resistance, the team constructed a worksheet like that used in science practical lessons. Students were told to treat the lesson as a math "practical" lesson, and to follow the four steps closely.

The project team wanted to change the way students look at problem-solving work in class. By treating this as a "practical" lesson, they hoped students would accept problem solving as an integral part of math education, and not something that is difficult and irrelevant to them.

Conducting a math "practical"

A problem-solving lesson has two parts.

For the first part, the students work on several problems while the teacher walks around the class to help and guide them. The teacher then works out the solutions with the class in a teacher-led discussion.

For the second part, the students work on the problem given in the worksheet. Students who cannot complete the problem in 15 minutes have to go through all four stages of Polya's model. Students who are able to solve the problem within 15 minutes only have to do the last stage of the model.

This worksheet is especially useful for students who struggle to solve the problem as the specific questions at each stage (see box story) make them pause and be aware of their thought processes.

Solve problems in four steps

Divide the worksheet into two columns. Write the workings in the "Detailed Mathematical Steps" column and the decisions and observations in the "Control" column. The following questions may be used as a guide.

Students may need to return to each section a few times. Number each attempt accordingly as Attempt 1, Attempt 2, etc.

1) Understand the problem

a) Write down your feelings about the problem. Does it bore you? Scare you? Challenge you?
b) Write down the parts you do not understand or that you misunderstood.
c) Write down the heuristics (e.g., guess-and-check, draw a diagram) you use to understand the problem.

2) Devise a plan

a) Write down the heuristics you used to explore the problem so as to devise a plan.
b) Write down the key concepts (e.g., properties, definition) that might be involved in solving the question.
c) Do you think you have the required resources (e.g., formulae, techniques) to implement the plan?
d) Write out each plan concisely and clearly.

3) Carry out the plan

a) Write down in the "Control" column, the key points where you make a decision or observation: go back to check, try something else, look for resources, or totally abandon the plan.
b) Write out each implementation in detail under the "Detailed Mathematical Steps" column.
c) Do you think you have the required resources? If you need resources, such as formulas or techniques, you may ask the teacher.

4) Check and extend

a) Write down how you checked your solution.
b) Write down your level of satisfaction with your solution. Write down a sketch (brief description) of any alternative solution(s) that you can think of?
c) Give at least one adaptation, extension or generalisation of the problem.
(Adapted from Toh, Quek, & Tay, 2008)

Mathematical Problem Solving for Everyone

Encouraged by the success of the pilot project, the team was keen to explore how practical work can be extended to more math classrooms. They have recently embarked on a new research project called *Mathematical Problem Solving for Everyone* (M-ProSE).

The aim of the M-ProSE project is to design and implement a problem solving curriculum in Integrated Programme schools. The teachers will be trained on how to implement this curriculum in their classrooms and to assess its effectiveness.

By focusing on problem-solving skills, the team hopes to develop higher order thinking skills in our students. They are confident that these efforts will result in more engaged learners who are ready in the 21st century!

References

Ministry of Education. (2006a). *Mathematics Syllabus Primary.* Singapore: Ministry of Education, Curriculum Planning and Development Division. Retrieved March 25, 2009, from http://www.moe.edu.sg/education/syllabuses/sciences/files/maths-primary-2007.pdf

Ministry of Education. (2006b). *Secondary Mathematics Syllabuses.* Singapore: Ministry of Education, Curriculum Planning and Development Division. Retrieved March 25, 2009, from http://www.moe.edu.sg/education/syllabuses/sciences/files/maths-secondary.pdf

Toh, T. L., Quek, K. S., & Tay, E. G. (2008, December). *Mathematical problem solving–A new*

paradigm. Paper presented at the Mathematical Association of Victoria Annual Conference, La Trobe University, Bundoora, Melbourne, Victoria, Australia.

The research team comprises five academic staff from the National Institute of Education, Singapore. They are Assistant Professors Toh Tin Lam, Dindyal Jaguthsing, Leong Yew Hoong and Associate Professor Tay Eng Guan from the Mathematics and Mathematics Education Academic Group; and Assistant Professor Quek Khiok Seng from the Psychological Studies Academic Group

SCIENCE ED |

The Nature of Learning

Acting and singing are not what you typically see in a Science class. But that's exactly what took place at a recent nature symposium for students.

Article highlights

- How can we help students build knowledge?
- How can nature inspire students to learn science?
- What practical tips are there for teachers?

Guided by their teachers, students from four schools–Boon Lay Garden Primary, Corporation Primary, Marsiling Primary and Methodist Girls' School–had attended a one-day Nature Learning Camp (NLC) last year. The students then conducted investigations into scientific phenomena at Upper Seletar Reservoir from June to November last year, and presented their findings at the symposium this year.

Members of the Natural Sciences and Science Education and Learning Sciences and Technologies academic groups at the National Institute of Education came together to study how students can build on their scientific knowledge. Assistant Professor Lee Yew Jin and Dr Jennifer Yeo tell us about their research project, *Making Meaning of Environmental Science through Computer-supported Collaborative Learning.*

"The aim of this project was to help students understand the nature of science and environmental issues arising from their NLC visit to Upper Seletar Reservoir," explained Jennifer.

"What we did was to get the students to identify puzzling questions concerning the reservoir and forest habitats that they were interested in. They then carried out investigations in school and they presented their findings at this symposium after many months of hard work."

The NIE team wanted to extend the students' learning experiences to give students more time to explore environmental issues. Jennifer said, "While the children were having fun, their understanding of science increased through doing experiments and, more significantly, discussing with peers and teachers about this very process itself."

The team also explored how students build scientific knowledge through face-to-face interactions and through computer-based platforms. Students planned and carried out their experiments, conducted searches on the Internet, and in this way gained knowledge about how to do research in collaborative groups. Above all, the NIE team has tried to create informal learning environments beyond the four walls of the classroom.

The Nature Learning Camp

The NLC has its roots in a small reforestation project launched in 1999 with five schools - Bukit View Secondary, Raffles Girls' Secondary, Corporation Primary, Henry Park Primary, and the Singapore American School. In 2000, in partnership with National Parks (NParks) and the Public Utilities Board (PUB), Assistant Professor Shawn Lum, together with five teachers, conceived what is known today as the NLC.

SingTeach speaks to Shawn about the NLC.

SingTeach: What was the objective behind the NLC?

Shawn: To foster a better understanding of and an appreciation for the environment and our water resources, and also to get students from different age groups and schools to work together.

I really do think, based on experience and what I've read in the literature, that it's really important to get students out there to do authentic, hands-on work. I mean, watching a video and actually doing something are two totally different things.

The other objective was how to then, through these activities, build up a database of knowledge so that students could build upon the work and information gathered by their predecessors. In that way, it was set up as a kind of a long-term research project; not so much about research on learning, but rather, research in environmental and ecological sciences.

SingTeach: It's been 10 years since it all started. What impact has the NLC had?

Shawn: I suppose you'll have to ask the students but some of them have gone on to study at great universities - Columbia, Stanford, and other fantastic places. Many of them did major in environmental science and have actually done a lot of good work, both as volunteers and professionally in environmental sciences.

We've had great buy-in from the NParks Board and the PUB. Of course I don't think this happened just because of the NLC, but you can see how these two organizations - from being just managers of our environment and natural resources - have really changed into outreach organizations, in particular NParks: They have 2 full-time outreach officers now, and we've worked closely with them. I'd like to think that maybe some of that developed because of these nature camps.

The other thing was that we started out with 6 teachers and now there are about 10. We continue to work together, even 10 years later, voluntarily; it's not mandated by anybody. It's just out of sheer interest that we continue to work together and develop material. Hopefully it will result in a set of resources that will be available to any student or any teacher.

So there've been benefits not only for the students involved but also certainly for teachers and practitioners. There's been a steady process of working together continuously. It's quite inspiring for all of us to participate in something like this.

Let them ask questions

And what did the NIE team discover from the experience?

"One thing that struck us was when we worked with the younger students—the quality of questions that they raised sometimes really surprised us," noted Yew Jin.

"The type and the depth of probing into certain scientific phenomena were actually quite deep. These were curiosity-driven questions about science that we thought only older children were capable of asking."

Keep an open mind

For teachers who are keen on implementing a similar environmental science cum thinking programme, Yew Jin advises: "Just try it! Once you try teaching science in such interactive and motivating ways, you gain more confidence.

"I think this was the case for ourselves, too. We set off with a more academic emphasis but when we started working with teachers and young children, we realized that sometimes you just have to implement it to know what works and what does not. And everybody learns in the process, even teachers."

The members of the research project comprised NIE staff Associate Professor Tan Seng Chee, Assistant Professors Lee Yew Jin, Tan Aik Ling, and Shawn Lum, and Dr Jennifer Yeo.

Tips for teachers

For teachers who may be interested in embarking on similar projects with your students, here's what the experts have to say:

Look: Yew Jin says, "The school grounds have many teaching resources for environmental science. We just made do with what we had in the school, like the school garden, the pond, and even the drains. All it needs from teachers is to look with new eyes, to look afresh at what they have in their immediate surroundings."

Ask: While big classes can be a challenge, you may need to be creative in getting enough manpower to run such a programme. Schools can make arrangements so that there would be at least two teachers, or enlist the help of allied educators. Help is there if you ask for it.

Do: Ultimately, Jennifer advises teachers to "Just do it. You have to learn science through doing and through experience."

Hot Topic |

Unpacking Assessment

"We should have more assessment," some say. "No, our children are being over-tested," others retort. "We should do away with assessment!" This "testy" issue was debated once again when the Ministry of Education recently announced a new policy to do away with examinations for all Primary 1 and 2 students. One educator shares her reflections on the topic.

Primary Education Review

In response to a Primary Education Review and Implementation Committee's recommendations, the Ministry of Education recently announced a new policy – no summative examination for all Primary 1 and 2 students. Instead, there will be more emphasis on project-based learning. Assessment will be continual, rather than limited to the mid-year and year-end examinations. Alternative and more holistic forms of assessment will be explored. Time would therefore be freed up for these students to pursue other forms of learning.

Read more < http://www.moe.edu.sg/initiatives/peri>

"Assessment is a testy issue, especially in Singapore. Everybody has an opinion about assessment. It means different things to different people. And when people react or respond to changes in assessment policy, they are reacting to a different aspect of assessment.

What is assessment, and why is everyone so hung up about it?

1. Purpose(s) of assessment

"It is interesting to note that the term assessment is derived from the Latin root assidere meaning 'to sit beside'" (McTighe & Ferrara, 1998, p. 2). This is a statement about assessment that I particularly like.

Assessments have long been associated solely with large-scale standardized testing – hence the tension associated with assessment, and the extreme reaction when references are made to continual assessment. However, if we unpack the concept of assessment in terms of its purpose, I realize that assessment does not really have to be a testy issue after all.

"Effective teachers employ formative assessments at the beginning of instruction…they assess regularly throughout the unit or course of study" (McTighe & Ferrara, 1998, p. 6). Indeed assessments can be very powerful pedagogical tools used by effective teachers to facilitate learning.

It is interesting to adopt the perspective of assessments being used for learning. Coffey (2003) speaks of actively engaging students in "assessment-related activities – deliberating about quality work, reflecting on and revising work, completing evaluation sheets and commenting on work done by their peers" (p. 75).

If seen from this perspective, assessment becomes something not to be feared or dreaded, but something to be appreciated as part of the learning process.

2. Forms of assessment

Until recently, the most common and (thought to be) reliable form of assessment that the Singapore school system has been used to is the standardized pen-and-paper test. Only in recent years has the Singapore education system introduced alternative modes of assessment, like project work, and school-based assessment of science practical skills, as components of high-stakes assessments.

As I ponder about the alternative forms of assessment that can be employed, I am particularly appreciative of the various types of assessment presented by McTighe and Ferrara (1998). There is indeed a variety of multiple ways to assess students. The challenge is to choose the most appropriate form of assessment that is aligned to the intended purpose.

For example, to ascertain prior knowledge, a simple and quick "multiple-choice" type assessment would do, whereas a performance-based assessment (see box story) would be most appropriate to evaluate acquisition of skills and dispositions, in addition to content knowledge.

3. Consequences associated with assessment

This is probably where most of the "testy" issues arise – where there are consequences associated with assessment.

As assessments are used in standardized testing approaches, they then are not only limited to classroom assessments, used for assessment of and for learning. In the context of standardized testing, assessments (and students' performance in them) are used for sorting, for ranking, and to determine the subsequent educational path of a student.

When seen in this context, assessment then becomes a thorny issue. Issues of stress, of putting students under undue duress, of using a single examination to determine the fate of students are difficult to resolve.

When assessments are used to compare students across different schools and contexts, issues of reliability and validity then come into play, and these then impact the choice of modes of assessment, as certain modes of assessment lend themselves better to standardization.

There are more issues than answers here, but in moving forward, teachers need to be aware of the issues at hand.

There is no silver bullet as far as assessment is concerned, and as educators, we need to strike a fine balance. The challenge is to incorporate multiple assessment approaches into the learning process, and to provide so much scaffolding that students do not feel stress or anxiety. After all, how else can we know what students are really learning in the classroom?"

These are the reflections of Ms Ng Chen Kee, who is currently in the US on an MOE scholarship, pursuing a Master's in Education at Stanford University. Prior to that, she had taught at Temasek Junior College for 9 years and was involved in setting up its Integrated Programme. She was also involved in MOE's FutureSchools@Singapore <http://www3.moe.edu.sg/futureschools> initiative, which seeks to transform the education experience in Singapore through the innovative use of ICT.

Alternative assessment

How can we assess student learning in the classroom? Besides the usual multiple-choice and fill-in-the-blanks questions, McTighe and Ferrara (1998) recommend the following performance-based assessments which require students to apply knowledge and skills rather than simply to recall and recognize:
(please see the table below)

References

Coffey, J. (2003). Involving students in assessment. In J. Atkin & J. Coffey (Eds.), *Everyday assessment in the science classroom* (pp. 75-87). Arlington, VA: National Science Teachers Association.

McTighe, J., & Ferrara, S. (1998). *Assessing learning in the classroom.* Washington, DC: National Education Association.

If you have a view on a current issue in education, we'd love to hear from you. Write to us at sgteach@nie.edu.sg

Performance-based Assessments		
Product *Student products provide tangible indicators of the application of knowledge and skills.*	**Performance** *Through student performances, teachers are able to observe directly the application of desired skills and knowledge.*	**Process-focused** *Process-focused assessments provide information about students' learning strategies and thinking processes.*
• Essay • Research paper • Story/play • Poem • Portfolio • Art exhibit • Science project • Model • Video/audio production • Spreadsheet • Lab report	• Oral presentation • Dance/movement • Science lab demonstration • Athletic skills • Dramatic reading • Enactment • Debate • Musical recital • Keyboarding • Teach-a-lesson	• Oral questioning • Observation • Interview • Conference • Process description • "Think aloud" • Learning log

(Adapted from McTighe & Ferrara, 1998)