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ISSUE 19 JUL/AUG 2009

ARE YOUR STUDENTS WHO YOU MAKE THEM OUT TO BE?



You might have suspected by now that your thoughts influence your actions and words. But have you considered how it can prevent you from seeing your students' full potential?

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MORE EFFECTIVE QUESTIONING



In class, teachers spend a majority of their time asking students questions. A case study by the Centre for Research in Pedagogy and Practice showed that the teachers did not have a planned structure when questioning. Without a plan, the questioning session may lack clear purpose and direction. How can teachers be more effective when asking questions in class?

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MASTERING THE MOTHER TONGUE



It is difficult enough to learn a language that one hardly speaks at home. It is even more challenging when the spoken and written forms of the language are not the same, as is the case with the Tamil language. How can we get our students to use a language they do not own?

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PROMOTING INQUIRY THROUGH BETTER TASK DESIGN



In the Science classroom, task design is a necessary skill, particularly when it comes to designing Science practicals. In the spirit of Science, a key emphasis of our Science syllabus is that of inquiry-based learning. How can teachers become better content providers, task designers and assessors?

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ARE YOUR STUDENTS WHO YOU MAKE THEM OUT TO BE?

You might have suspected by now that your thoughts influence your actions and words. But have you considered how it can prevent you from seeing your students' full potential?

Article highlights

What is deficit thinking?

Why is it dangerous?

How do you know if you have deficit beliefs?

When your students do not perform well in class, do you attribute it to your teaching method or style? Or do you think it has to do with your students' innate intelligence, family background or personality?

If you think that their poor performance was caused by either genetics, culture and class, or familial socialization, you may be guilty of what researchers call "deficit thinking" (Kwek, 2009).



What is deficit thinking?

Deficit thinking results when we assume that certain groups of students, because of certain characteristics such as race, class, gender or family background will exhibit certain behaviours that would prevent them from succeeding in life (Byrne, n.d.).

It's easier to understand this concept with an example.

When researcher [Dennis Kwek](#) visited a secondary school to conduct a research project, he realized that the teachers had certain stereotyped ideas about their students, who came mostly from the working-class estate.

One of the teachers summed it up for Dennis: "[The majority of them] are likely to have single parents... majority of [broken families and divorce] cases here are extremely unpleasant."

"Our neighbourhood school students have a different definition of success - keep a family together, pay HDB installments, etc.," said another of the teachers.

What is worrisome was that most of the teachers jumped to conclusions about the kind of skills their students need based on these preconceived ideas. And whether consciously or not, they adjusted their teaching styles and the material they used accordingly.

"We tell students to get their basics rights first before they try anything harder. The ones who write more complex things and take risks are the ones who lose. So we have to teach them how to play safe in exams."

One teacher explained their teaching strategy, "They cannot make it lah!... [We] aim for D7 because that is what the students need to go into polytechnics or ITE."

Why beliefs like these are dangerous?

When you have preconceived ideas of what your students can and cannot do based on factors such as their family background, race, gender, it may constrain the way you teach - like the teachers Dennis encountered.

This is especially dangerous as teachers are "the most important variable in making a difference for students" (Comber & Kamler, 2004, as cited in Kramler-Dahl & Kwek, in press).

How do you know if you have deficit beliefs?

There are simple ways to test yourself.

1. Conduct a survey

Instead of assuming your students' prior knowledge before class, you can create a simple survey before the start of the school term or class to find out how much they already know.

For instance, if you are going to introduce the concept of biography in the your writing class, you can do a simple survey asking your students if they know what it is, if it is the same as an autobiography, or if they have read one before? Ask them to name examples so that you can gauge their literacy levels. 

This simple survey would allow you to solicit from your students their prior knowledge and allow you to tailor your lessons based on what they can bring into the classroom.

2. Introduce the content before the lesson

In cases where you are not sure if your students have the background knowledge, introduce the content in class before the formal lesson starts.

For example, if you want to introduce the concept of narrative, you could choose a movie that illustrates the different forms of narratives that you are going to teach. You can then make connections between the movie they have watched, and the narrative genre you want them to explore. Do not assume that all of them are already familiar with the term.

3. Getting to know your students outside the classroom

Get your students to keep a media diary to record everything they read, watch and listen to daily. Alternatively, you could visit them at home and observe their activities for a day. Compare their diaries or your observations to your preconceived ideas of what they read and write outside the classroom.

4. Bring an independent observer to class

An independent external observer, who is familiar with the notion of deficit thinking, would be able to tell you if you possess any deficit beliefs after observing you in a few classes.

There are many ways to surface deficit thinking but it is dependent on how far you would like to go to question your beliefs about your students. And when you recognize that you have deficits beliefs, it is important that you find ways to change your lesson, pace or curriculum to cater to this group of students in a meaningful way.

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MORE EFFECTIVE QUESTIONING

In class, teachers spend a majority of their time asking students questions. A case study by the Centre for Research in Pedagogy and Practice showed that the teachers did not have a planned structure when questioning. Without a plan, the questioning session may lack clear purpose and direction. How can teachers be more effective when asking questions in class?

Article highlights

Why is questioning an important instructional tool?

How can teachers ask better questions?

Why use questioning?

Questioning is second only to lecturing in terms of popularity as a teaching method. Research indicates that 30% to 50% of a teacher's instructional time is spent conducting questioning sessions (Cotton, 1988).

Teachers find questioning a critical instructional tool as it facilitates communication, engages the students and focuses their attention on a topic. It also allows teachers to assess their students' learning, develop their interest and challenge them.

It is evident that questioning plays an important role in class instruction. So how can we ensure that teachers maximize these sessions and that the questions asked meet the lesson objectives?

What questions are being asked in class?

A case study from the Learner's Perspective Study (see box story for details) found that the teachers' questioning lacked a planned structure. Also, a large proportion of questions asked at all levels were low-order questions.

Low-order questions are useful for facilitating recall of facts and procedures. High-order questions, on the other hand, are used to test knowledge application, evaluation and creation of new ideas. Questions of this nature are ideal for developing thinking skills. (Cole & Chan, 1987)

What constitutes effective questioning?

"Questions should always be purpose driven" (Godinho & Wilson, 2008, p. 1). Good questioning begins with sound planning and being clear about the objectives of the lesson. Teachers need to pay attention to the *design* of the questions as well as the *manner* in which the questions are delivered.

Here are some tips summarized from *Teaching Principles and Practice* (Cole & Chan, 1987):

1. What questions to ask

Ask a variety of questions

Questions should cover the entire range of lesson objectives. Include both low- and high-orders questions that are relevant and related to the skills and content of the lesson.

Pitch questions at students' ability level

This increases the chances of students getting a right answer. Students' self-confidence will improve and they will be more receptive to answering questions and learning similar tasks.

Phrase questions clearly and directly

Use language and vocabulary that students understand so that they may be able to respond appropriately.

2. How to ask questions

Field questions one at a time

Asking too many questions at one time might confuse students.

Order questions in a logical sequence

You can start with easy questions and proceed to more difficult ones. This helps students better understand the flow of the content.

Allow adequate time for students to reply

This encourages higher-order thinking as students have more time to process their thoughts. Giving some wait time allows students to give more meaningful answers.

Allow all students to participate

Encourage all students to share in the discussion and do not favour any students. Students will be more willing to participate if they know that everyone's contribution is being valued.

Do not always repeat your questions and answers
Students will lose interest if questions are repeated. Repeat or rephrase a question only when students have difficulty understanding it.



Engage and stimulate your students intellectually

Effective questioning enhances communication between students and teachers. Most importantly, it stimulates students and challenges their thinking.

"When a question engages pupils and motivates them to ask further questions or challenge their ideas, it has the potential to take pupils beyond their current thinking and engage them in higher-order thinking" (Godinho & Wilson, 2008, p. 2).

Students exposed to effective questioning learn to ask effective questions themselves. This skill is especially useful in this knowledge-intensive era where students will require critical thinking skills to question what they read and hear.

A case study from Singapore

In this case study, three competent math teachers in Secondary 2 math classrooms were observed for 10 consecutive lessons each. Subsequently, data from 5 of the lessons were analysed to identify and study the types of questions posed in the classrooms as well as the techniques and behaviours of the teachers.

The study revealed that teachers did address mathematical problem solving and thinking skills during questioning. However, a majority of the questions asked were low-order questions (78.7%), which required only agreement, recall of facts or description of procedures.

It was also observed that teachers did not structure their questions coherently and purposefully in order to maximize the potential of the questioning technique.

This case study was part of the Learner's Perspective Study. For more information, refer to Benedict and Kaur (2007).

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MASTERING THE MOTHER TONGUE

It is difficult enough to learn a language that one hardly speaks at home. It is even more challenging when the spoken and written forms of the language are not the same, as is the case with the Tamil language. How can we get our students to use a language they do not own?

Article highlights

- Why are our students struggling to learn their Mother Tongue?
- What are the specific problems in learning the Tamil language?
- How can we encourage students to learn their Mother Tongue?

As part of Singapore's bilingual policy today, every student needs to learn a "mother tongue" language. In every mother tongue language classroom, it is not uncommon to find students who struggle to learn this second language, be it Mandarin, Malay or Tamil.

The main aim of the second language curriculum is *communication*. We want our students to be able to converse comfortably in a language other than English. This is particularly important for minority ethnic communities because the language also embodies their culture.

However, it has become more difficult to achieve this goal as increasingly, more and more students are from English-speaking homes, where the "mother tongue" is hardly spoken, if at all. This has many implications for the second language classroom.

Learning the language

What makes learning the Tamil language particularly challenging is what sociolinguists call "diglossia". This means that the language has many varieties or dialects. In Tamil, the spoken and written varieties are not the same.

The Tamil dialect that is spoken at home has no written equivalent. It is a colloquial, functional variety. It is the language spoken in informal interactions, on the streets and in the shops.

However, the Tamil language curriculum in Singapore focuses on a literary variety of Tamil that is reserved for formal, usually written, communication. Literary Tamil is hardly ever used in everyday social interactions.

It does not help that the content of the Tamil language textbooks is also alien to both students and teachers. "The lessons are mostly about ancient kings and ancient Tamil literature, which is very difficult for our Singapore students to understand because they are in the 21st century," says Dr Seetha. "We cannot expect the students to understand the out-of-context content."

Speaking the language

In previous generations, learning Literary Tamil in school was not difficult as almost all students came from Tamil-speaking homes. They already had a grasp of the spoken language, which made learning the rules of formal communication easy.

Today, however, statistics show that more than half of the Tamil language students come from English-speaking homes. Without early exposure to the spoken language, learning Tamil is like the proverbial Greek - totally foreign and a herculean task for many.

Dr Seetha argues that by eliminating the spoken language from the classroom, we are only tolling the bell for the demise of the language. And research has found that it takes just five generations for a language to be lost.

"Because within the classroom they don't speak (the language), so when they go to the community, they switch to English," explains Dr Seetha. "If you speak literary Tamil, then people will laugh, so they immediately change."

Keeping the language alive

In an effort to keep the Tamil language alive in the community, researchers like Dr Seetha have recommended incorporating the use of spoken Tamil into the curriculum. "If spoken Tamil is used, then code-switching (to English) will be reduced," says Dr Seetha.

For many years, however, this recommendation has been met with resistance because of the perception that spoken Tamil is a low - and lesser - variety of the language. Literary Tamil, on the other hand, was perceived as a high - and thus, better - variety of Tamil.



According to Dr Seetha, this is a grave misperception. "Within spoken Tamil, there is one variety, which is Standard Spoken Tamil, spoken by the educated Tamils. It is not a low variety," she explains. "Standard Spoken Tamil is a lingua franca... like a bridge between the dialects."

It is only in recent years that policy makers in Singapore have recognized the need to incorporate this standard spoken variety of Tamil into the language pedagogy.

Teaching the language

Starting from 2008, Standard Spoken Tamil has become part of Singapore's Tamil language curriculum. The challenge for Tamil language teachers is - how do we make use of spoken Tamil in the teaching of Literary Tamil?

Dr Seetha's advice is simple: *Keep talking*. "The teacher has to talk - talk a lot - because they need to listen," says Dr Seetha. "And get your students to keep talking, too!"

Provide as many opportunities as possible for students to speak to and interact with each other in Tamil. You could sing songs, tell stories, engage in discussions. You can also make the more confident students role models.

But do remember to withhold judgement. Be open to their spoken language, even if it isn't perfect, or when they take a little longer to articulate their thoughts.

As students become accustomed to the language, they will become more confident in using it. In time, they will hopefully also come to love the language and to own it as theirs

Bringing spoken Tamil into the classroom

The key to being able to communicate in Tamil, says Dr Seetha, is *exposure* to the spoken language. And it is best that this be done as early as possible - right from Primary 1.

Teachers are key in these efforts, emphasizes Dr Seetha. Even if you are teaching a secondary level class, it is not too late to begin exposing your students to the language. It doesn't take very much to do so.

Always try to:

- Use local context-based materials, so that the topics are familiar to the students.
- Use domain-based vocabulary, that is, words as they are used in real, everyday living.
- Use age-related content, that is, topics that are relevant to the students at their particular stage in life.

It is also important to identify students who need extra help. "If the child is not able to speak Tamil, when he reads, his voice goes down. He is very slow and very shy; sometimes he feels angry with himself. He doesn't like the Tamil class," explains Dr Seetha, "because he is from an English-speaking home. So we have to understand these problems of our students."

Further reading

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*This article was based on the research project on **Standard Spoken Tamil in the School and Media**. This project is funded by the **Centre for Research in Pedagogy and Practice**, and led by Principal investigator Assistant Professor Seetha Lakshmi. Dr Seetha is keen to consult or collaborate with schools that are interested in improving Tamil language pedagogy. Email her at seetha.lakshmi@nie.edu.sg for more information.*



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Standard Spoken Tamil in the School and Media

An examination of the corpus and status of Standard Spoken Tamil in the school and media domains in Singapore

This study aims to examine the corpus and status of Standard Spoken Tamil (SST) in the school and media domains in Singapore in order to establish SST as an additional resource for the teaching and learning of Tamil. The rationale for this study is that it will lead to instructional strategies that seek to redress the disjunction in the pedagogic context where only one monolithic norm, namely Literary Tamil (LT), prevails.

The project aims to ascertain the acceptability of SST among Tamil speakers and educators in order to establish a baseline for an acceptable speech style for educated SST. This will be used for developing instructional materials for NIE trainee teachers and for developing teaching materials in speaking skills for Tamil classrooms, to extend the use of Spoken Tamil in the Tamil classroom as recommended by the MOE Tamil Review Committee.

Project Brief

Project Number:

CRP 6/04 SL & 10/06 SL

Research Focus:

Language & Literacy

Keywords:

Mother tongue; Tamil language; curriculum materials

Start Date: June 2004

Status: Completed Mar 2009

Project Team

Principal Investigator

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- Vanitha Saravanan

Collaborator(s):

- **Harold Schiffman**,
UPenn

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PROMOTING INQUIRY THROUGH BETTER TASK DESIGN

In the Science classroom, task design is a necessary skill, particularly when it comes to designing Science practicals. In the spirit of Science, a key emphasis of our Science syllabus is that of inquiry-based learning. How can teachers become better content providers, task designers and assessors?

Article highlights

Why is the importance of task design?

How does collaboration help to improve task design?

How can teachers design effective Science practicals?

The Science classroom is envisioned as a site of student-centred inquiry. A key goal, therefore, is to impart the skills of inquiry. Therein also lies the draw of the scientific process - the joy of discovery! To achieve this end, the tasks that teachers design are key.

Designing learning tasks

How do Science teachers in Singapore typically go about selecting learning tasks for the classroom? Here is what one Biology teacher from a local secondary school said:

"When we choose an assessment task, we make sure that it is in line with what we have already taught and that generally it is not too difficult for the students to do. Because it's really for pragmatic reasons: if one task is more difficult than the other...it's only natural that I will choose the one that is easier for my students so they will get a better score." (in Towndrow & Tan, 2009, p. 17)

A good definition of a "task" is important in helping teachers identify and assess their roles, notes Assistant Professor Phillip Towndrow (2005). It should not, he says, be a "proxy" or substitute for a desired learning outcome. That is, a task should not be designed solely with the learning outcome in mind.

Towndrow suggests that "a learning task is understood as involving teachers and/or learners working to complete an activity or sequence of activities that have both desirable and measurable outcomes" (2005, p. 511). Moreover, "the ability of learners to complete a learning task successfully is a function of the way that task is planned and presented" (p. 511).

When learning tasks limit learning

What can teachers do to create a more conducive learning environment in Science classrooms? This was one of the things Towndrow and his research team from the National Institute of Education were interested in finding out.

Working with a group of Biology teachers in a secondary school, the research team helped them to refine their existing pedagogy and practice. One of the issues the teachers struggled with was how to ensure that the tasks they set were more inquiry-centred.

Most times, the teachers relied heavily on supplied or existing instructional materials for experiment ideas. Most of these experiments were designed to arrive at a single solution. The teachers could then assess their students' performance based on whether they had attained the prescribed outcome.

Because the outcome of these experiments is predictable, more often than not, teachers do not even try out the experiment for themselves. As one teacher described it,

"For Biology, most of the tasks are pretty standard. We've done them many times in secondary school and college. So, sometimes we don't even try them. We will just run things through in our mind, first, because we roughly know what's going to happen and what to expect." (in Towndrow & Tan, 2009, p. 17)

While inquiry-based, open-ended tasks are more difficult to design and to assess, they are a necessary part of the current Science syllabus. So, how can Science teachers encourage learning through the tasks they choose?

Two heads are better than one

Towndrow and team asked the Biology teachers to design and carry out an experiment that they had never attempted before.

While the task seemed simple to begin with, they soon encountered several problems. But with help from the researchers, and after several attempts, much discussion and online research, they finally got the desired result. Throughout this exercise, the teachers had to think about how they would assess their students on the same task.



Next, the Biology teachers then shared what they had learnt with two other groups of colleagues - the Physics teachers and Chemistry teachers. The Physics and Chemistry teachers were then asked to do the same - select an unfamiliar experiment in their area of specialization and carry it out. This time, the Biology teachers were on hand to advise their colleagues and provide suggestions.

Through this exercise, the teachers realized that they had much to learn from each other although they were from different specializations. Through working together, they could share their experience and leverage on each other's expertise to solve problems. One of the teachers commented that this process made her "enlightened and more confident".

This study helped both teachers and researchers to realize the value of collaboration in designing tasks or planning lessons. There was a sense of shared practice as they interacted with each other to build a repertoire of classroom practices. Such a community of practice also enhances one's own growth as a teacher.

Making the most of the task

Here are a few practical things we learnt from this study about designing Science practicals:

1. Choosing an assessment task

Very often, teachers choose tasks that are expedient - they are easy to carry out and immediately linked to the learning outcomes. This, however, goes against the fundamental principle of scientific inquiry, where the process is the main.

2. Designing the task

Our research has shown that it is important to try out the task first, to become familiar with the content and the skills required. We also found that collaboration significantly helps to improve task design.

3. Asking questions

There are many ways to ask the same question: the more specific the question, the lower the level of openness in the inquiry. Asking open questions always lifts learning to the next level, as it opens up their minds to think and inquire. Framing inquiring questions also makes learning more meaningful for the students.

4. Assessing the outcome

The essence of assessments is to collect evidence "from which inferences can be made about students' skills, knowledge, and affect" (Popham, 2009). By making use of this information for formative assessment - providing students with descriptive feedback, instead of a summative grade alone - classroom instruction and student learning can be modified while it is happening. Remember that the mastery and demonstration of laboratory skills is more important than the correctness of the end result.

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Read more about this research project:

Transforming Science Practical Pedagogy and Practice Through Innovative Departmental Planning
Designing Tasks to Teach SPA Skills at Lower Secondary Level in Singapore



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Transforming Science Practical Pedagogy and Practice Through Innovative Departmental Planning

This research study concerns the introduction of the school-based Science Practical Assessment (SPA) scheme for candidates offering pure sciences at the O levels. It builds on a previously completed pilot study that investigated how SPA influences laboratory practices from the perspectives of three individual teachers.

According to the pilot study, simply doing practical work was insufficient to bring about an understanding of scientific concepts, especially when its purpose was not made explicit to learners. Although the teachers were willing to modify their teaching practices, they were constrained by the department's scheme of work (SoW) that strongly emphasised book-bound theory and recall over inquiry. Therefore, a SoW is required to allow SPA reforms to transcend individual effort. To do this, members of the Science department should develop practices that are supportive of systematic change and continuing professional development.

This study is divided into three major phases: (1) orientation and needs assessment; (2) intervention; and (3) evaluation. In Phase 1, the team will observe, document and problematise the implementation of the existing SoW based on perspectives of teachers and students. This will lead to the formulation of co-generated interim recommendations and input into the SoW for 2007. In the intervention phase, research collaborators will institute a community of SPA practitioners that will design, implement and field-test classroom innovations. In the final phase of the study, the collaborators will measure and assess the achievements of the intervention.

The study ends with the planning and production of the 2008 SoW, which will represent principles and practices that are fully consistent with the aims and objectives of SPA both in terms of its content and method of production.

Project Brief

Project Number:

CRP 1/06 PT

Research Focus:

Science

Keywords:

Organisational change;
assessment; teacher
development

Start Date: Apr 2006

Status: Completed Dec
2008

Project Team

Principal Investigator:

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Collaborator:

- Tan Aik Ling, NSSE

Contact Person:

Phillip Towndrow

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Designing Tasks to Teach SPA Skills

Designing tasks to teach SPA skills at lower secondary level

This pilot project investigated the implementation, development and improvement of Science Practical Assessment (SPA) skills at among secondary students in Singapore. Researchers critically examined existing laboratory practices, collaborated with teachers in designing instructional materials, and evaluated novel assessment practices for SPA skill development.

This research showed that teachers were willing to try new approaches in teaching and learning Science practical skills. However, there was also an overriding concern to cover the content-driven departmental scheme of work. This affected the innovations undertaken. Students rarely questioned lesson content and lacked confidence in planning and enacting Science practical work. Achieving (expected) correct results was regarded as more important than the appropriateness of procedures and improved understanding of scientific concepts was not generally evident.

This study demonstrated the need to develop pedagogical practices that are consistent with the intentions of SPA. SPA is not simply a more detailed way of measuring traditional laboratory practice. Therefore, teachers need to reconsider the roles of students in experiments or lose the activity's formative and educative function.

Project Brief

Project Number:

CRP 28/04 PT

Research Focus:

Science

Keywords:

Curriculum materials; assessment; teaching strategies; professional development

Start Date: Jan 2005

Status: Completed Jul 2006

Project Team

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WHAT MAKES AN IDEAL EDUCATION SYSTEM?

Imagine an education system with no ability streaming. No standardized testing. No high-stakes national assessments. No school inspections and no school ranking. Now add to that high learning outcomes and high quality teachers. These are not just ideal attributes of an imaginary system, but features of an actual education system.

As Professor Hannele Niemi¹ described these elements of the education system in Finland at the Redesigning Pedagogy conference in June 2009, the audience sat in rapt attention - partly in disbelief, partly in excitement at the possibilities - as what she was saying sank in.

Could such an educational utopia exist? Is it even conceivable here in Singapore?

Is it possible?

While many would not argue about the rigour and strength of the Singapore education system in producing academically competent learners, we would also readily admit that there is still room for improvement.

The Finnish education system presents us with a challenging model. It has received attention from all over the world because it came out on top in the PISA surveys² - Finnish 15-year-olds have been number one in terms of skills in science, mathematics, the reading literacy and problem solving.

Now add to that highly qualified teachers, societal trust in the work of educators, and the highest respect for learning, and you have a dream come true. The difference is that this model has been tried and tested - and proven successful.

How does it work?

According to the McKinsey report on the world's best-performing school systems, there are three things that matter most in top school systems:

1. Getting the right people to become teachers
2. Developing them into effective instructors, and
3. Ensuring that the system is able to deliver the best possible instruction for every child (Barber & Mourshed, 2007, Executive Summary)

A closer look at the system reveals that the Finnish system fulfils all the above criteria - and then some.

1. Getting the right people

Finland's teachers are recruited from among the top 10% of each cohort. Quality teachers make for a quality education system.

2. Developing effective instructors

All teachers are required to possess a master's degree, even primary school teachers. They undergo a research-based education which aims to nurture analytical and open-minded individuals. By improving instruction, student learning outcomes are also improved.

3. Ensuring the best possible instruction for every child

Finland's educational policy has purposefully aimed at equity in education. Education is free for everyone, through to the higher education level. There are also no "dead-ends" when it comes to learning - the system provides options for everyone to further their education, with extra support available for the weakest students. By putting such support systems in place, the standard of every student, and thus the whole system, is raised.

In addition, the Finnish education system has several unique features:

1. There is no streaming. Believing that it is too early to judge individual capacities at age 11 or 12, streaming was discontinued and a common 9-year education introduced.
2. There is no top-down curriculum system. Schools design their own curricula, based on a national core curriculum, and decision making is decentralized.
3. There is no high-stakes testing and no school inspectorate. Instead, there is an evaluation system where assessments are sample-based and the results used for formative purposes.

It is important to note that the Finnish system has had a head start of over 30 years. An OECD review team (in 2006) described their education system as a "complex of practices" that has taken a long time to mature.

What's the next step?



The Finnish example gives us much to think about. "Is such a system possible in Singapore?" many would ask. This raises many other questions to ponder:

1. Do we need ability streaming, and if so, at what age?
2. What alternative modes of assessment can we adopt? Will it work?
3. Are our schools ready for decentralized decision making and curriculum design?
4. Is our society, especially parents, ready for a system that does not seem to produce measurable outcomes?
5. What part does culture play in the success of such an education system?

However, the Finnish education system gives us a tried-and-tested alternative to consider, perhaps even a model to aspire towards. If nothing else, it demonstrates that such a system is possible - and can, indeed, be successful!

Participating in PISA

Singapore will participate in PISA for the first time in 2009. Administered by the OECD, PISA assesses how far students have acquired some of the knowledge and skills that are essential for full participation in society as they near the end of compulsory education.

While our students have consistently topped the charts in the Trends in International Mathematics and Science Study (TIMSS), which has a greater emphasis on content knowledge, it will be interesting to see how they fare in PISA. How will they compare with students from around the world?

Notes

1. Hannele Niemi is Vice-Rector and Professor of Education at the University of Helsinki, Finland.
2. PISA stands for the Programme for International Student Assessment.

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Keynote Speakers

Deborah Loewenberg Ball, [University of Michigan](#), USA

Making Mathematics Learnable in School: What is the Work of Teaching Mathematics?

With an ever-increasing demand for mathematical literacy around the globe, the need for skilful teachers of mathematics has never been greater. An effective system of professional preparation rests on a coherent and detailed understanding of the work that teachers are expected to do. This matters because teaching is paradoxically both an utterly commonplace and fundamentally unnatural practice. Teaching centres on knowledge, but it is about helping others learn to know and do. It requires ways of working with groups of learners while being responsible for individuals' progress. This presentation will probe fundamental aspects of the teaching of mathematics that must be at the core of teachers' professional training in order to supply the number of skilled teachers needed to reach broader and higher levels of mathematical literacy.



Deborah Loewenberg Ball is Dean of the School of Education and William H. Payne Collegiate Professor at the University of Michigan. Her research focuses on mathematics instruction, and on interventions designed to improve its quality and effectiveness. Her research groups study the nature of the mathematical knowledge needed for teaching and develop survey measures that make possible analyses of the relations among teachers' mathematical knowledge, the quality of their teaching, and their students' performance. Her research has been recognised with several awards and honours, and she has served on several national and international commissions and panels focused on policy initiatives and the improvement of education, including, most recently, the

National Mathematics Advisory Panel.

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David C. Berliner, [Arizona State University](#), USA

Rational Responses to High-stakes Testing and the Special Case of Narrowing the Curriculum

The criteria by which one's activities are judged are always kept in mind and influence the behaviour of the person being evaluated, whether that person is an Olympic diver, a stock broker, or a teacher. The diver may concentrate on her entry into the water, the broker may be concerned with profits rather than morality, and the teacher will be concerned with student test performance. These are rational responses to evaluation. But the preoccupation with the use of test scores to judge teachers and schools in the US and elsewhere has resulted in many well-documented unfortunate occurrences: gaming the system; cheating; treating students inappropriately; and the one that may ultimately have the most economic impact, narrowing the curriculum. Evidence exists that the number of hours in the school week is greatly higher in reading and language arts, and mathematics, the tested subjects. While the hours per week are down dramatically in subjects such as social studies, history, art, music, physical education, and even science, the subjects not tested in the U.S. accountability scheme called *No Child Left Behind* (NCLB). What turns out to be rational responses to high-stakes testing may be hurting students, teachers, and the economic future of the USA.

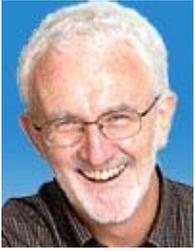


David Berliner is Regents' Professor of Education at the Arizona State University. He has taught at the Universities of Arizona and Massachusetts, at Teachers College and Stanford University, as well as at universities in Australia, The Netherlands, Denmark, Spain and Switzerland. He is a member of the National Academy of Education, and a past president of both the American Educational Research Association (AERA) and the Division of Educational Psychology of the American Psychological Association (APA). He is co-author of the best seller *The Manufactured Crisis, of Putting Research to Work in Your School*, and of the textbook *Educational Psychology*, now in its 6th edition. He is co-editor of the first *Handbook of Educational Psychology*, and of the books *Talks to Teachers and Perspectives on Instructional Time*. His newest co-authored book, *Collateral Damage*, is about the corruption of professional educators through high-stakes testing. Professor Berliner has also authored more than 200 published articles, technical reports and book chapters.

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David Hogan, [National Institute of Education](#), Singapore



David Hogan is Professor and Dean of the Office of Education Research. Prior to that, he was Professor of Education at the University of Tasmania. He had earlier held an Associate Professorship and act as Director of the Education, Culture and Society Program at the Graduate School of Education, University of Pennsylvania. Prof Hogan has won a series of awards for his work, including the American Educational Research Association Outstanding Book Award (1986), the Henry Barnard Prize, the History of Education Society Award, a Spencer Fellowship and a National Endowment of the Humanities Fellowship.

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Erica McWilliam, [National Institute of Education](#), Singapore

The Knight's Move: Its Relevance for Educational Research and Development

Many of the changes we have predicted have been proven wrong - the millennium bug, the paperless office, more leisure time - all flawed predictions. Meanwhile we continue to see crucial changes which few of us ever anticipated - an African-American in the White House, global fiscal meltdown, the powerful impact of email on work, the Stanley knife used as a weapon of mass destruction. In this century we will continue to confront a future that is neither more of the same nor a predictable process of gradual improvement or decline. Change in the 21st century will be of an order that William Gosling calls "the knight's move". In other words, change will not be linear or regular in the future, yet neither is it likely to be chaotic. In anticipating irregular patterns of 21st century change, we are challenged to re-think "straight road" programmes of educational research and development, and the assumptions they make about the linear-cumulative nature of learning. Denied the "straight road", the knight is a powerful chess-piece in its ability to make strategic, irregular moves. It works best in the thick of the action, rather than on the margins. The knight is also somewhat differently deployed by Eastern and Western players. The knight's move can thus be a useful metaphor for imagining relevant moves in research and development in a new century. With an understanding of the knight's strengths and limitations, and its similarities and differences across East and West, we are better placed to understand the challenges of designing relevant programmes of educational research and professional development. In doing so, we can hope to build more epistemologically agile learning communities that can be proactive and powerful at the centre of the learning action.



Erica McWilliam is Professor of Education with the Centre for Research in Pedagogy and Practice at the National Institute of Education, Nanyang Technological University, Singapore. She is also an Adjunct Professor at the Queensland University of Technology and a co-leader of the Creative Workforce Program in the Australian Research Council Centre of Excellence for Creative Industries and Innovation. Her scholarship covers a wide spectrum, as is evidenced in her numerous publications on creative capacity building, innovative teaching and learning, research methodology, and training and educational leadership and management. She is currently series editor of *Eruptions: New Thinking Across the Disciplines*, an academic series for Peter Lang Publishing, New York. Her latest book, *The Creative Workforce*, is published with UNSW Press in Sydney.

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Magdalena Mok, [The Hong Kong Institute of Education](#), Hong Kong

Redesigning Pedagogy: Exploiting the Assessment-Learning Nexus for School Improvement

Globalisation and the knowledge economy demand a renewed vision on pedagogy. Within this vision, Self-directed Learning Oriented Assessment (SLOA), in which learning and assessment are tightly integrated, offers a feasible alternative. There are three components of SLOA, namely, assessment of learning, assessment for learning, and assessment as learning. This presentation focuses attention on assessment for learning and will present a field-tested model of implementation, comprising the design and development of a school-level assessment system; re-designing courseware for assessment and learning integration; effective use of the Rasch measurement model; development of continuous measurement scales in English and Mathematics; establishment of classroom-level Computer Adaptive Testing systems; and development of a Web-based reporting system for teachers, students and parents. Outcomes of

the implementation will be drawn from empirical data from schools in China, Hong Kong, and Macau.



Magdalena Mok is Director of the Centre for Assessment Research and Development and Professor at the Department of Educational Psychology, Counselling and Learning Needs at the Hong Kong Institute of Education. She is internationally recognised for her research in educational assessment. Her particular research focus is Self-directed Learning Oriented Assessment in school education. She has undertaken numerous consultancy projects for the governments in Hong Kong and Australia on assessment policies and practice, one of them being the parallel projects entitled SAVIS and APASO, completed in 2002, of which outputs are used by primary and secondary schools in Hong Kong for external and internal school reviews.

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Hannele Niemi, [University of Helsinki](#), Finland

Why on the top? Reasons of the PISA-success - Reflections from the Finnish perspective

The Finnish education system has received attention from all over the world because it came out on top in the PISA surveys. Finnish 15-year-olds have been number one in terms of skills in science, mathematics, the reading of literature and problem solving, and only very few students fall within the lowest PISA categories. Likewise, the differences between schools are small. A major reason for high learning outcomes can be seen as a result of a purposeful educational policy and a high standard of teachers. According to researchers, the educational policy has purposefully aimed at equity in education and has promoted the common comprehensive school model. In the process, many important decisions have been made. One of those has been the decision that all teacher education including primary school teachers was raised to the MA level (5-year programme). The structure and contents of teacher education aim at research and evidence-based orientation. Professors and supervisors of Finnish teacher education have the responsibility to guide students in the research-oriented aspects of their education. The main object of this guidance is not the completion of the Master's thesis itself, but actually to further the process by which students come to see themselves as actively studying and working subjects.



Hannele Niemi serves as the first Vice-Rector responsible for academic affairs, university libraries, quality assurance and equality issues. She has acted as a researcher and scientific director of numerous international projects dealing with teaching and learning, and has served as an expert for the European Commission and the OECD. She has sat on or chaired a number of working groups related to higher education and teacher education. Her research interests focus on teaching and learning, the development of teacher education, technology-based learning environments as well as on ethical questions and values related to teaching. She has served as a keynote lecturer in several international forums. A highlight in her international career was her membership in the Steering

Committee of the Teaching and Learning Research Programme in Britain between 2003 and 2008.

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Roy Pea, [Stanford University Human Sciences and Technologies Advanced Research Center](#), USA

Fostering Learning in the Networked World: Trends, Opportunities and Challenges for Learning Environments and Education

The combination of "always on" mobile computing, location-aware services, open platform technologies, participatory media culture, immersive worlds and games, and increasingly open educational resources provides an exciting horizon for the next decade of research and practice on technology-enhanced learning at all age levels. Exceptional resources for human learning and action will become continuously accessible through networks of information, people, and services. I will argue for the value of re-conceptualizing the nature of learning - from its goals to its infrastructures - and highlight key major research and theoretical challenges.



Roy Pea is Stanford University Professor of the Learning Sciences and Co-Director of the Human Sciences and Technologies Advanced Research Center. He has published widely on such topics as distributed cognition, learning and education fostered by advanced technologies including scientific visualisation, on-line communities, digital video collaboratories, and wireless handheld computers. His current work is developing a new paradigm for everyday networked video interactions for learning and communications, and for how informal and formal learning can be better understood and connected. He is a Co-Principal Investigator with the LIFE Center, one of several large-scale

national Science of Learning Centers funded by the National Science Foundation. He was co-author of the 2000 National Academy Press volume *How People Learn*. He founded and served as the first director of the learning sciences doctoral programmes at Northwestern University (1991) and Stanford University (2001). He is a Fellow of the National Academy of Education, American Psychological Society, the Center for Advanced Study in the Behavioral Sciences, and the American Educational Research Association. In 2004-2005, he was President of the International Society for the Learning Sciences. Roy also serves as a Director for Teachscape, a company he co-founded in 1999 that provides comprehensive K-12 teacher professional development services incorporating Web-based video case studies of standards-based teaching and communities of learners.

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