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# Redesigning Pedagogy 2013

Big Idea

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## Thinking: Time for a Rethink?

*The theme for this year's Redesigning Pedagogy Conference was Thinking: Time for a Rethink? Co-convenor Dr Kerry Lee tells us why we need to take a closer look at thinking, especially in education.*

Dr Kerry Lee has noticed something curious about the field of psychology: Thinking doesn't come up as often as we might expect it to in the research literature.

"It's strange that you don't hear much about thinking or read very much about it," he comments. After all, psychology is "what's happening between your two ears and how thinking affects your behaviour".

In contrast, thinking is a big thing in the education literature, with a number of journals devoted to thinking.

It comes as no surprise that educators are so concerned about it. In order to learn, we need to think. And it seems that more than ever, our students need to be strong thinkers.

### Strong Thinking Skills and Dispositions

The theme for the Redesigning Pedagogy Conference 2013 was *Thinking: Time for a Rethink?* At the opening ceremony, Senior Minister of State for the Ministries of Law and Education Indranee Rajah described a new world order that our students will face when they graduate.

It is one characterized by immense technological advancements, which results in a high degree of change in the way we live, work and interact.

"This change will not be comfortable," she observed. "The world that our students will inherit will become increasingly complex, and so will the problems they will encounter."

What we as educators can do to help students now is to cultivate in them a strong set of critical and inventive thinking skills and dispositions.



What we called "mugging" is not blind learning; it's not mindless. A lot of thinking has to be involved if you were to remember anything at all.

- Kerry Lee,

Centre for Research in Pedagogy and Practice

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## “Every Student, a Thinking Student”

Senior Minister Indranee Rajah summed up MOE’s vision for critical and inventive thinking as “every student, a thinking student”. To fulfil this vision, we need to rethink our beliefs, classroom practices and learning environments. She described the three principles underlying that vision:

- All students can develop good thinking.
- Good thinking should be deliberately developed within the

context of subject disciplines and the total curriculum.

- Schools and classroom culture must consistently support and develop students’ thinking.

Ms Indranee defined good thinkers as those who can “exercise sound reasoning and reflective thinking to make good decisions underpinned by values such as respect”. Such thinkers are able to think of novel ideas and manage complexities and ambiguities in the face of challenges.

It is important for educators to believe that *all* students can think well and be creative, and they cannot leave the development of such abilities to chance.

She urged schools to deliberately infuse thinking processes into school life and the curriculum. Also, the classroom environment should be a “safe” and open one where students can voice their opinions and see mistakes as learning opportunities.

### Different Perspectives

Kerry, who is the co-convenor of this year’s conference (along with Associate Professor Manu Kapur), was trained as a psychologist and is now studying cognitive development in the context of education. He is well aware that thinking is a wide-ranging concept and different fields study it rather differently.

The five keynote speakers were thus carefully chosen for the different perspectives they bring to the conference theme.

For example, Professor Neil Mercer adopted the psycholinguistics perspective in looking at how language and talk can help students think together (see “The Value of Talking” in this issue). Professor Bonnie Cramond is a strong advocate on why we should nurture creativity in schools (see “Getting Creative about Teaching” in the online version of this issue).

This year, educators and researchers also got to hear what the youth of today have to say about education. Adora Svitak, a 15-year-old American youth, writer and public speaker, was invited to talk about the potential of youth digital culture in enhancing learning.

### What Is Thinking?

Kerry has his own take on the conference theme: There’s a lot more to thinking that we need to think about!

For example, how do we measure thinking? He explains that researchers and scholars had come up with terms such as critical or inventive thinking in order to organize thinking into smaller, manageable chunks that they could study and measure.

And really, what they measure isn’t thinking itself, but manifestations of thinking. In the same way that researchers need to operationalize, say, creative thinking, teachers should also be clear about what they’re looking for when assessing whether students are being creative.

What is creative thinking? Are there different exemplars of it? Is one better than another? These are all questions that teachers should consider as they take their students through the thinking process.

### Thinking and Learning

Another question for us to think about is the role of thinking in learning. Their relationship may not be so obvious in certain instances. For example, we assume that students are not actively thinking when they’re mugging for exams. Kerry begs to differ.

“What we called ‘mugging’ is not blind learning; it’s not mindless. A lot of thinking has to be involved if you were to remember anything at all,” he points out.

Here, Kerry points to the popular perception that Asian students prepare for exams by doing one practice test after another and how it is often viewed negatively.

“It’s been found in some schools in Mainland China that they do practise a lot. But they do not blindly practise, and they practise on problems that are quite complex,” he says.

### Useful Resource

The speech that Ms Indranee Rajah gave at the Opening Ceremony of the Fifth Redesigning Pedagogy International Conference can be found on the Ministry of Education website: <http://www.moe.gov.sg/media/speeches/2013/06/03/speech-by-ms-indranee-rajah-at-the-opening-ceremony-of-the-fifth-redesigning-pedagogy-international-conference.php>

"What the practising does is that it helps them to be attuned to the complexity and variations in different patterns and problems, so that they become more flexible in the application of knowledge."

### Seeds of Curiosity

We're still looking for answers to many big questions about thinking. But Kerry hopes that the conference this year has at least given teachers a better understanding of the different ways to perceive thinking.

"I hope that they had the opportunities to hear what the teachers of other schools are doing, and that they gathered some ideas and practices that they can use in their schools," he says.

"Ultimately, you can't expect overnight changes. But I hope it planted the seeds of curiosity."

**Kerry Lee** is the Guest Editor of this issue. He is the Head of the Centre for Research in Pedagogy and Practice, Associate Dean of the Office of Education Research and Associate Professor with the Psychological Studies Academic Group at NIE.

## Research

### Popular Media in the Physics Classroom

*Can students learn anything about science from the media content they consume every day? The answer is a definite yes, and here's how it can be done.*

Do your students ever ask, "Why do we have to learn Physics?" Physics is all around us, but this may not always be obvious to them.

To help students make connections more readily between their everyday life and what they learn in class, some teachers use the context-based learning (CBL) approach.

#### Context-based Learning

"The idea is to move away from learning isolated and unrelated concepts," explains Dr Tang Kok Sing.

Instead, concepts are learned in relation to common and real-world situations. For example, the nuclear accidents in Japan and Russia can be used to introduce the topic of nuclear activity to students.

The approach certainly makes learning more relevant and meaningful. But there are some limitations to how CBL is being implemented.

One is that the contexts in the curriculum are usually chosen by the teachers and curriculum planners. "Underlining this is an assumption that teachers know what kinds of contexts genuinely appeal to youth," Kok Sing says.

Rockets, aeroplanes and balls are commonly used to illustrate Physics concepts, such as projectile motion. But Kok Sing finds that some students don't relate well to such real-world examples.

#### Examples from the Media

What, then, might students be interested in? To find out, he and his research assistant Jeslyn Lee asked Physics students in Innova Junior College to each choose a media artefact with content related to both their personal interests and a Physics concept. It could be anything, from a newspaper article to a YouTube video.

"It's also a test for them to recognize the connection between what they're familiar with and what they're learning in Physics," Kok Sing notes.

The diversity of what students chose was an eye-opener for the researchers. They were interested in sports, martial arts, skateboarding and dance, music harmonics, forensic science and sci-fi shows, just to name a few.



**Listen to their (students') voices and incorporate what they have learned outside the school into what they learn in school.**

*- Tang Kok Sing (from left), Natural Sciences and Science Education Academic Group; Innova Junior College teachers Ong Chee Wah and Alvin Ng E-hian; and Research Assistant Jeslyn Lee*

The students came up with a scientific question based on the media artefact they had chosen, devised an explanation for their own question, and also critically evaluated the media they had chosen.

“They know that in a lot of media, some content isn’t accurate or scientifically correct,” Kok Sing says. How to critique the media content that they encounter in their everyday life thus becomes a learning point too. Kok Sing and his team are now working on identifying the strategies students employ to interrogate media content and evaluating their facility in doing so.

Finally, the students presented their work in the form of a glog, which is a graphical blog or digital poster. They were graded for the quality of their question, the depth of their research, how they evaluated the reliability of the media source, and the design of their glogs.

### Voices of the Students

The researchers and teachers were impressed by what the students came up with. One of the best glogs was by a student who investigated a murder case presented in *Fringe*, a sci-fi TV series.

In one episode, a woman was killed by an electromagnetic bomb, and the student wanted to find out if this was really possible. By applying his understanding of electromagnetic forces and reading up on it, he went on to hypothesize about the design and effect of the electromagnetic bomb. From his calculations, he concluded that the bomb is theoretically possible, but not practical in real life.

Some students were surprised at how relevant Physics is to their interests. “Skateboarding was something I didn’t expect to be related to Physics,” a student commented, “because in the lecture notes they always try to tell us to imagine an aeroplane or a ball in projectile motion.”

Through this project, Kok Sing hopes to open up some space in the classroom for students to pursue their own interests. “Youths need to have the agency to search for and talk about their own interests,” he says.

To the teachers, he advises that a good way to engage students would be to “listen to their voices and incorporate what they have learned outside the school into what they learn in school.”

By creating the space for students to pursue their interests, he hopes they can make a stronger connection to what they learned in school and ultimately identify their own purpose of learning.

**Tan Kok Sing** is Assistant Professor with NIE’s Natural Sciences and Science Education (NSSE) Academic Group. He presented his paper “A Pedagogical Model of Context-based Science Learning Using Students’ Everyday Media” at the Redesigning Pedagogy Conference 2013. Also involved in this project are Lee Yew Jin from NSSE and Natasha Anne Rappa from the Learning Sciences and Technologies Academic Group.

## Classroom

### Connecting with the Community

*At Bendemeer Secondary School, the students don’t just learn History from the textbook. Instead, they ventured into their neighbourhood to learn more about its heritage and interact with the community.*

For Mr Samuel Goh, a History teacher at Bendemeer Secondary School, History lessons are not just about past events. History is, in fact, everywhere. So he decided to bring History out of the classroom and into the neighbourhood.

“At Bendemeer Secondary School, many of our students live in the Kolam Ayer area. They know the area, but do not really appreciate the rich heritage of the area they live in,” says Samuel. “That is why I used this opportunity to bring them out of the classroom to learn about their heritage and also about values in the process.”

#### Learner Independence

Students were asked to plan heritage trails for Kolam Ayer as part of their service learning programme. Samuel refrained from telling them in a step-by-step fashion how to organize the trails.

“As a teacher, how much do I want to control them? I let them develop their own plan, let them fall and let them learn. So that’s what we did in service learning,” explains Samuel.

"It's about teaching for independence, so I didn't want to spoon-feed the students."

But at the same time, it's also not about leaving them to do things on their own. Samuel balances his roles as a teacher and facilitator in encouraging independent learning.

"Learner independence means that you help students think of what they need to do and actions they need to take in their tasks. How to keep them thinking? How to develop students who are intrinsically able to be motivated and want to achieve something? How do we make them feel this?"

### Community Involvement

Samuel gave students the freedom to plan their own trails also because he wanted them to be involved with the community and interact with the residents.

"That is why we brought our students out to their neighbourhood, to make them feel a connection with where they live," he explains. "They've got to see themselves as part of the community. By seeing themselves in this light, they were able to appreciate the learning."

As they connected with the residents to find out more about Kolam Ayer, the students also became aware of how important it is to behave and act responsibly.

"What is needed now is for them to know that there are consequences for their actions. We need them to take action and not to just be a sponge," Samuel explains.



**They've got to see themselves as part of the community. By seeing themselves in this light, they were able to appreciate the learning.**

**- Samuel Goh,**  
*Bendemeer Secondary School*

### Rethinking Teaching

"When I was a student, I was from the generation when whiteboards were black and my teachers used overhead projectors," reminisces Samuel.

But things have changed and are changing still. "Teachers are no longer a breathing textbook," he says. "We need to do more than

'you follow what I say'." In fact, he thinks that teachers have to be their students' biggest cheerleaders.

That is why even though his students took charge of their tasks, he didn't just stand by and watch. He pushed and encouraged them to think further and achieve more. "What can you do better? Is there any

part of the task that can be better developed?" These were some of the questions he made his students think about.

"Nothing motivates and encourages our students more than a sense of achievement," says Samuel. "So that is why our roles as teachers have to change."

### Values for Life

After the trails were planned, the students acted as guides and took people through the trails they had designed. The nearby community centres became involved as well and Minister for Communications and Information, and Minister-in-charge of Muslim Affairs Yaacob Ibrahim was invited to launch the trails. Through this process, they learned how important it is to be good ambassadors for the school.

"Teaching values is a lot about intentionality. As a teacher, I cannot tell them to learn respect. They have to exercise it to learn to respect others," explains Samuel. "In these trails, the values were caught by them rather than being taught to them."

Samuel was happy to see that the students collaborated very well with each other and took an interest in the history of Kolam Ayer. It was this that motivated the students to go beyond what they were supposed to do.

For these students, History lessons have become more than just another person's story. It's also about how these students develop as individuals as they learn about the past.

**Samuel Goh** is a History teacher at Bendemeer Secondary School. He presented his award-winning paper "Engaging the Head, Heart and Hands: Motivating the 21st Century Learner In Community Work through Independent and Collaborative Learning" at the Redesigning Pedagogy Conference 2013.

### Reading Creatively

*Creativity abounds at Pei Chun Public School, even when it comes to reading. At the school, pupils get to create and write their own mini-books. Some of them also design virtual posters for the books they have read. These are all part of a comprehensive programme to cultivate a love of reading in them.*



We have to consider how best to leverage the love for reading rather than just having another add-on reading programme.

- Rachel Gan-Goh,  
Pei Chun Public School

**Rachel Gan-Goh** is a Senior Teacher at Pei Chun Public School and she has been teaching for 18 years. Together with her colleague, Mrs Wong-Ngoo Ing Choo, she developed the iREAD programme in 2010. She conducted a workshop entitled “Rethinking iREAD” at the Redesigning Pedagogy Conference 2013.

#### Integrated Reading Framework

Delivering a sustainable approach to cultivate a love for reading in their pupils is the main aim of Pei Chun Public School’s reading programme. Known as iREAD, the programme is a bottom-up initiative started by two senior teachers in 2010. One of them is Mrs Rachel Gan-Goh.

As a Special Assistance Plan (SAP) school, Pei Chun’s pupils should be proficient in both the English and Chinese languages. But Rachel found that they tend to read more English than Chinese books.

To synergize the strengths of their library instructional programme for English language and the Chinese reading programme, she and her colleague developed the iREAD programme—*Integrated Reading for Enjoyment, Achievement and Development*—to bring about a balance in their pupils’ reading diet.

Today, iREAD has become a whole-school programme that integrates reading in both languages and the use of information and communications technology (ICT).

#### Hands-on Reading

Every alternate week, the pupils look forward to going to the computer laboratory during their language lessons. That is where, among other activities, the upper primary pupils work individually to create virtual posters, or glogs, of books they have read.

“They use Glogster as a showcase of the books they have read,” Rachel explains. “It allows children to put ideas together—things that children would otherwise just cut and paste on a paper poster.”

Rachel strongly believes that Glogster, a free online platform, has a lot of curriculum potential. The features that pupils create in their virtual posters include audio recordings of their opinions on the book, links to other websites, and images of the books they read. The poster serves as a reflection tool for the pupils as well, as they also have to review the book and decide if they would recommend it to others.

For the Chinese iREAD programme, the post-reading activity involves pupils creating their own physical storybooks from scratch.

“It can be a one-page book for lower primary pupils, or it could be a four-page book that has orientations, a problem, a climax, a resolution for the upper primary pupils,” Rachel says. “Or it could be in the form of what we call the big-mouth book” (see photo in our online version).

#### Learning through Reading

“I think the task of making books lends itself well to getting children to manage complexities,” Rachel explains. “Because boundaries are not well-defined, they first learn to problem-find before making decisions.”

The acts of determining the plot, drawing and colouring the characters, cutting and folding the book all stimulate creative and inventive thinking in these young readers.

The use of Glogster also helps to develop reflective thinking in pupils. At a tender age, these pupils get to practise how to see things from different perspectives. While designing glogs, they have to think like the author who writes for an audience. And when writing a review, they think like a reader who critiques a book.

"It's a complex task and they must actually think about how to manage it," Rachel adds. "It builds perspectives and helps to develop reflective thinking."

To ensure the success of the iREAD programme, which was also showcased at this year's MOE Excel Fair, Rachel says, "We have to consider how best to leverage the love for reading rather than just having another add-on reading programme because if it is a chore, children wouldn't like to read."

iREAD has proved to be a success with the pupils for the past 3 years, because it has made reading that much more fun for them.

#### Online Extras!

Read more about the production of mini-books by pupils and the four reading literacies emphasized in the iREAD programme in our online version.

## People

### The Value of Talking

*Working in groups, solving problems, thinking creatively: These are capacities we want our children to have. But how do we encourage these? Simple, says Professor Neil Mercer. Just get them talking! This article is based on his keynote address at the Redesigning Pedagogy Conference 2013.*

#### How Are We Designed to Think?

What makes the human brain distinctive from other animals? Well, we have brains that are designed to enable us to think collectively.

No other animals can do that. No other animals can come back from an expedition and reflect on what we can do differently tomorrow. This is what we inherited from our ancestors, and it's still working for us today.

One of the things that the people did was that they talked to each other. And it was through using language as a tool to construct an image of reality—past, present and future—that they were able to make plans, get things done, and improve their joint performance.

So if we are to understand the nature of human cognition, we've got to understand the role of language in it.

#### What Do We Use to Think Collectively?

Language is integrated with cognition, and one of the most influential scientists in helping us to understand this is Lev Vygotsky.

To him, children are born into dialogues, and those dialogues mediate their understanding of the world. Thus, from the minute they're born, children acquire ways of thinking. By hearing how language is used to make sense of the world, they come to make sense of the world for themselves. He called this the *intermental* activity.

And as they do their own sense-making and carry out their own actions, they feed back into the social activity of their community. So you've got a continuing spiral of development.

He suggested that language was a cultural tool for thinking collectively—we *interthink*.

We're not instinctive animals; what we are born with are capacities. So although children have all got the capacity to learn languages, they still need to learn how to use it. And that's crucial for my theme today, for the teachers' role in schools.

#### Why Is Talk So Important?

We can't just do talk the minute we're born; we have to learn how to do it. I don't think children understand or appreciate how important talk is in getting things done.



**I think most group work is educationally unproductive. What is needed in group work is what we call *exploratory talk*.**

**- Prof Neil Mercer,  
University of Cambridge**

## Useful Resources

Download Prof Mercer's presentation slides from his keynote address, "Educating the Social Brain: Linking Language, Thinking and Educational Attainment" from the Redesigning Pedagogy Conference 2013 website: <http://www.conference.nie.edu.sg/2013>

More information about interthinking can be found on Prof Mercer's *Thinking Together Project* website: <http://www.thinkingtogether.educ.cam.ac.uk>

Talking skills are rarely taught in school, and it's surprising given today's employment-oriented world. It has to change if we want people to achieve and realize our evolutionary heritage to interthink.

It's again another distinctive aspect of human life: We take responsibility for the education of our young people, enabling them to realize the capacities that they've inherited. For many children, they have a second chance in school. But if children are not being helped in schools, they're not being helped at all.

Furthermore, the notion of the lone solitary genius is pretty much shown to be incorrect. It's a myth. Mostly, people who are creative were working in a creative collective of some kind.

They were able to draw on the efforts of other people to enable their own individual contributions to be realized. So, this is really the age which creativity is really a collective achievement. And the way to enable people to think creatively and collectively is through discussion.

### What Is Exploratory Talk?

Talk is really important for the development of thinking. But what really makes a good discussion? I think most group work is educationally unproductive. What is needed in group work is what we call *exploratory talk*.

Exploratory talk is a creative and productive dialogue. It possesses these characteristics:

- Everyone offers relevant ideas and information.
- Everyone pursues the same goals.
- Everyone's ideas are treated as worthwhile but are critically evaluated.
- People ask each other what they think.
- People ask for reasons and give them.
- People try to reach agreement.

This kind of talk has several educational benefits, as research has shown.

First, it allows students get more involved in learning. Second, they become better at solving problems because they can learn from each other. Third, it improves their individual scores for reasoning tests. Finally, it transfers into better scores for other subjects, like Science and Math.

Just remember, you're always the expert—and the children need your expert knowledge. One of the things you're an expert of is how to use talk effectively and how to think collectively.

**Neil Mercer** is Professor of Education at the University of Cambridge. His interests are in the development of children's language and reasoning, classroom talk, and the application of digital technology in schools.

## Online Exclusives



Let the Games Begin



Learning Math the Fun Way



Toying with Science



Getting Creative about Teaching