

## TEACHER ED

### Assessment Literacy Makes for Better Learning

*Method A works. Pedagogy B doesn't. Approach C, somewhat. Being able to evaluate our own teaching effectiveness gives us insights into which techniques help students learn and which do not. This also enables teachers to foster in students the habit of lifelong learning.*

#### Article highlights

- Are assessment literate teachers different from assessment users?
- Can we teach students how to assess for learning?
- How can assessment literacy help to create better a learning environment?

#### From assessment user to assessment literate

Through the years, teachers have been using traditional assessment tools such as projects and pen-and-paper exams to assess students, with much success.

Though these tools are useful and necessary, in truth, they assess the result of how well students remember content knowledge, not whether they have become effective learners. In other words, they serve as useful diagnostic tools of how well students have learned.

With increasing emphasis on 21st century skills, the student today must not only master subject matter to perform well in school assessments, he or she must also be able to evaluate and even create new knowledge—both in and out of school.

This calls for an assessment literate teacher—one who not only understands why assessments are important, but who is also skilled in assessing students and in evaluating the curriculum.

This teacher believes in passing on assessment literacy to students, developing in them the habit of critically thinking about what they learn and the way they learn.

#### Recommendation 5: Assessment of learning and assessment for learning

Classrooms of the 21st century need to balance the demands of assessment of learning and assessment for learning. NIE's report, *A Teacher Education Model for the 21st Century* (TE<sup>21</sup>; 2009), differentiates between the two.

Assessment of learning uses traditional assessment tools to assess student achievement against institutional goals and standards.

Assessment for learning, on the other hand, helps students understand their own learning and the goals for learning through effective feedback.

According to the Assessment Competency Framework proposed in the TE<sup>21</sup> report (p. 96), the assessment literate teacher should be able to:

- Design appropriate assessment tasks
- Plan assessments as part of effective teaching and learning
- Understand and communicate the goals and criteria of assessments
- Develop capacity for self-assessment through reflective and self-directed learning
- Provide feedback to help learners improve
- Administer, score and interpret the results effectively
- Recognize unethical and inappropriate assessment practices

This enables teachers to show their students the importance of assessment literacy, thereby making students independent learners.

#### Focusing on assessment for learning

##### *Assessing the teacher*

Assessment begins with the teacher. The process of self-assessment is vital in providing clear direction on how to improve what we do. It adds to our personal and professional development.

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We can assess different facets of our teaching: Does this work? Who does it work for? How can it be improved? Is my attitude correct? Can I learn anything from my peers?

You may like to keep a reflection journal, discuss problems with peers, review lesson plans against the curriculum, or read up on current research and teaching practices.

Whatever method you choose, self-assessment is best carried out on a continual and regular basis as the classroom changes with every class, every cohort and every new policy.

#### *Assessing the curriculum*

Assessing the syllabus and curriculum material allows us to understand the intent of the curriculum and use the appropriate assessment tools.

Just like a master mason understands the dynamic relationship between himself and the tools of his trade, the teacher who can clearly assess the curriculum gains better mastery of it.

We can then skilfully wield the tools available to us to better engage our students in learning, effectively marrying the content knowledge with the learning outcomes.

#### *Assessing the student*

Traditional assessment tools tell us about a student's ability to memorize and only at certain points of the year. Learning can be improved through teachers' continual assessment of students' progress in learning.

If we pay ongoing attention to student progress, we can clearly see their pattern of growth and adjust our teaching method accordingly.

This paves the way for creating a collaborative learning environment in the classroom, where students assess their own learning process through thinking critically and reflecting on the content.

### **Forging a collaborative learning classroom**

Once a teacher grasps the principle of assessment for learning, assessment literacy can be imparted to students.

Transmitting assessment literacy to students opens the door to further growth. As they learn to assess themselves and what they learn, students shift from being non-participating members to becoming active participants in the classroom.

They will be motivated to co-operate with teachers and participate equally in the classroom. This collaboration allows students to further hone their evaluating and critical thinking skills, especially in classroom discussions.

In time, students who are involved and driven thinkers will naturally become lifelong learners who take responsibility for their own learning.

### **Fostering a learning habit**

Assessment literacy gets at the heart of education—it can be more than just instructing and testing. For both the teacher and the student, it is about a continual process of growth.

Teachers who are assessment literate will be able to provide transformational opportunities for their students. It is about enriching learning environments, not just about using assessment tools.

Being assessment literate helps teachers learn how to be better teachers who can then encourage students learn how to be better learners—for life.

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#### **Reference**

National Institute of Education. (2009). *A teacher education model for the 21st century*. Singapore: Author.

*Read about the other TE<sup>21</sup> recommendations in previous issues of SingTeach.*

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## **MATH ED**

### **Fostering Collaborative Decision Making in the Math Classroom**

**by Ng Kit Ee Dawn**

*What types of tasks can teachers use to enhance collaborative learning in the Math classroom? And how does working in groups enable students develop mathematical decision-making skills? Find out how contextualized tasks can help.*

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#### **Article highlights**

- What is the value of contextualized tasks for mathematical learning?
- How can such tasks help to foster collaborative decision making?
- What difficulties do teachers need to look out for?

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Contextualized tasks are mathematical tasks embedded in the experiences of students. They are open-ended and non-routine, and may be interdisciplinary in nature.

Project work, application tasks and mathematical modelling tasks are examples of contextualized tasks.

Such tasks help students to relate school-based learning with real-life use of mathematics. They provide opportunities for flexible, adaptive applications of what students know.

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The knowledge and skills that students bring to the task, whether taught or self-discovered, determines their personal interpretations of the context.

### Mathematical learning in context

Contextualized tasks help students learn important and interlinked mathematical skills, such as:

- Making sense of context (e.g., drawing assumptions and specifying conditions or constraints);
- Making connections between mathematical concepts and skills and real-world needs; and
- Making appropriate and reasonable mathematical decisions based on the contextual demands.

Students also learn collaborative skills as they often have to work in groups when dealing with contextualized tasks. This encourages them to learn with and from one another.

A research study was carried out to investigate how students apply mathematical concepts and skills to a contextualized task.

Two aspects of the study are described: the difficulties students faced during mathematical decision making; and effective strategies for interpersonal monitoring of mathematical thinking during group collaboration.

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### Using contextualized tasks in the Math classroom

A total of 398 Secondary 2 students in the Express and Normal (Academic) streams from three Singapore government schools participated in this study (Ng, 2009).

The students had to work in groups of four to complete an interdisciplinary project over a 14-week period. They were tasked to design an environmentally-friendly building in a location of their choice in Singapore.

They met with their facilitating teachers on a weekly basis and were given mini-tasks to complete along the way. Three of the mini-tasks required them to apply mathematical knowledge and skills:

1. Deciding on the design, size, location, features and facilities of the building;
2. Calculating the cost of fitting out an area in the building; and
3. Making scale drawings of the building.

Each group also had to construct a physical model of their building according to their scale drawings.

Surveys were administered to consenting participants. Additional data was gathered through interviews, lesson observations and video-taped lessons of 10 voluntary groups (5 groups from each stream) across the 3 schools.

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### Understanding students' mathematical difficulties

The students were found to have difficulties in at least three areas: spatial visualization; awareness of the purpose and use of scale drawings; and integration of real-world knowledge with mathematical decision making.

#### *Difficulties with spatial visualization*

Some students had difficulty making realistic and reasoned estimations of lengths and areas. One student suggested that the dimensions of the school hall floor should be 5m by 5m. A group member questioned how the entire school population would fit in an area of 25m<sup>2</sup> during weekly assemblies.

Some students could not visualize how the various views of the building (e.g., top, side, front), when put together, would form a coherent image of the whole building.

#### *Limited awareness of the use of scale drawings*

Several students had difficulties distinguishing between scale drawings and measured drawings (i.e., drawings with only dimensions indicated). There was also evidence that they did not understand the purpose of scale drawings. Some groups made unrealistic scale drawings from which they could not make physical scale models.

#### *Lack of integration of real-world knowledge*

A few students did not apply their understanding of furnishings and budgeting to the decisions they made. For example, one student insisted on having a bathtub in a school toilet, to the intense objection of group members who felt this was unrealistic and out of the budget.

### Interpersonal monitoring of mathematical thinking

As the students worked together, they also engaged in interpersonal monitoring of mathematical thinking.

These strategies were identified based on an analysis framework adopted for this study, which drew upon other established frameworks (Artzt & Armour-Thomas, 1992; Goos, 2002; Schoenfeld, 1985).

Students helped to monitor each other's mathematical thinking by questioning their group members on:

- The repertoire of mathematical knowledge and skills they could bring to the project;
- Whether there was important information missing in the given project description;
- The suitability of their mathematical approaches;
- The progress in their chosen approaches; and
- The appropriateness, logic and accuracy of their decisions and calculations.

### Providing effective scaffolding

These findings can help teachers facilitate mathematical learning more effectively when using contextualized tasks.

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For example, teachers can tap the potential of contextualized tasks through careful and purposeful scaffolding. Scaffolding can focus on the interlinked aspects of mathematical learning highlighted above.

Teachers can also encourage group members to question each other critically in order to activate effective interpersonal monitoring of mathematical thinking.

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## References

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## About the author

Dawn Ng lectures in Mathematics Education at NIE. Her research interests include the use of contextualized tasks for learning math, metacognitive strategies during group collaborations, and the role of assessment in teaching and learning.

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# LANGUAGE ED

## Testing Beyond Words: Multimodal Assessment in the English Classroom

by Caroline Chan and Suzanne Choo

*Our students today are exposed to a wide range of media-rich texts on a daily basis. Teaching and assessment can no longer just be focused on the printed word.*

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## Article highlights

- Why is there a need for multimodal assessment in language learning?
- How can a multimodal assessment framework be applied to reading comprehension?
- What are the key outcomes of this assessment?

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Our examination of secondary English language comprehension passages raised two key concerns:

rigidity in the choice of reading passages, and a lack of emphasis on critical thinking skills in the type of questions asked.

We need to consider other forms of texts, which have a combination of words, images, sound and video. We propose a framework for multimodal assessment of reading comprehension.

## A multimodal assessment framework

When assessing multimodal texts, there are three key outcomes that students must demonstrate: *text analysis*, *author analysis*, and *context analysis*.

Consider the following TV commercial:

### Tan Hong Ming in love

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Figure 1. TV commercial “Tan Hong Ming in Love”. (Source: <http://www.youtube.com/watch?v=f36Mk24NQ2U>)

### Text analysis

The first stage of analysis begins with students demonstrating knowledge of the given text.

*Theme/subject.* This question deals with students’ understanding of the main subject matter. The answer is usually obvious.

**Question (Q):** *What is the main idea highlighted/key message propagated?*

**Possible response (R):** Being “blind” to race.

*Obvious content.* This question goes beyond a general understanding of the text and requires students to look for evidence. This is still considered lower order as students are only required to identify one or two keywords.

**Q:** *Identify the main target audience of this commercial.*

**R:** Adults.

*Inferred content.* This question requires students to think about the connotative meaning of particular words or phrases in the text. Students have to infer the reasons or intention behind a particular statement made by a character or the author.

**Q:** *Why does the producer choose to deliver her key message via children?*

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**R:** To highlight that our children are “colour-blind” and that adults can learn from them.

*Connected content.* For this question, students need to locate information from different parts of the text. They may need to find more than one example to support their point.

**Q:** *The producer focuses on questions like, “Why do you like her?”, “What do you wish to say to her?” Highlight other phrases that promote her key message.*

**R:** “She is pretty/has a ponytail/wears earrings.”

*Connected-inferred content.* Students are required not only to find the evidence but, more importantly, interpret the evidence by suggesting the reasons or intention implied behind what is observed.

**Q:** *By analysing the verbal and linguistic signs in the text, explain the duality of the messages depicted in the commercial.*

**R:** The commercial is about “puppy” love. It is sweet, innocent and joyous. The underlying message is a reminder to all adults: if children do not see the racial divide, why do adults place so much importance on it? The subtle message is embracing: humanity is actually one family, regardless of colour, creed or religion.

#### *Author analysis*

While text analysis centres on the text and the information derived from it, author analysis moves a step out of the domain of the text to consider the influence of the author.

*Identification of explicit claim.* Here, students have to identify the explicit claim the author is making through the text. The answer is usually obvious.

**Q:** *What is the explicit message of the commercial?*

**R:** Human beings are basically born innocent and change (positively/negatively) with exposure to differing experiences, mindsets, values and time.

*Identification of implicit claim.* Sometimes a claim may be manifested in more subtle ways, such as through visuals, colour, setting or word associations in the text.

**Q:** *What is the implicit message of the commercial?*

**R:** We need to be more aware that there is a tendency for some adults to be narrow-minded and have prejudices which are insensitive and unnecessary.

*Analysis of arguments.* Analysis of the author’s claims may reveal the following:

- Assumptions and speculations: where there is insufficient supporting evidence
- Generalizations: where people or situations are stereotyped into general categories
- Logical fallacies: where there is an absence of a logical link between the evidence given and the point made

**Q:** *Give two reasons and explain why you may find the claims in the commercial debatable/problematic.*

**R:** The portrayal via children is rather simplistic, especially when dealing with a sensitive and potentially explosive issue of race. It highlights the problem of racial fault lines but does not quite offer a solution. It assumes that most adults are biased and need to be made aware of this problem. However, this claim is not supported with evidence. Impact and change on the target audience is highly dependent on the individual person.

*Analysis of style.* This requires students to identify the stylistic techniques in the areas of language (e.g., figurative language and word order and design) and the link between images and words used to convey an intended effect.

**Q:** *Discuss how the producer attempts to make the commercial appealing to the target group through the use of language and design.*

**R:** The producer employs the image of children and the concept of irony to depict the key message of the commercial. It is ironic that in the eyes of an adult, the two children are worlds apart. However, children do not have deep-seated prejudices. The protagonist, a Chinese boy, sees no issues with declaring his “feelings” towards a Malay-Muslim girl to the producer. The children’s innocence is reflected in their facial expressions and responses.

#### *Context analysis*

The final component of the assessment framework moves beyond the text and its author to view historical influences, the present society and the larger world.

*Analysis of audience representation.* Students must first identify the target group and their respective category (e.g., age group, gender, race, political association).

**Q:** *What ideals does the producer associate with the target audience and which group has been excluded in these ideals?*

**R:** The commercial appears to highlight that people want to change; they just need to be made aware of the fact that they are being racially biased. It is positive and embracing, though somewhat naive and idealistic.

We hear the voice of the producer via the children. Excluded are the voices of others who might hold differing perspectives on racial issues. Like most commercials, it lacks a sense of “balance”.

*Analysis of thematic representation.* Students could examine this in the light of these questions:

- Product association: What value, habit, skill or lifestyle is this commercial associated with?

- Possible effects of the commercial: What are some of the positive as well as harmful effects this commercial may have on consumers who overuse/subscribe to it?
- Alternative perspective: How can this text be given a more balanced perspective, providing both the pros and cons of the commercial? What other information has been excluded but should be included?

**Q:** Design 6 storyboards of a commercial for the Ministry of Education, targeted at teenagers, emphasizing that all humankind regardless of colour, creed or religion must see each other as part of a global Singaporean family. Submit your commercial in both print (i.e., storyboards) and non-print form (i.e., the completed commercial clip).

### A paradigm shift

The inclusion of a framework for multimodal assessment involves a shift in the mindset of educators. But we will find that our students are better able to critically read other forms of texts in the real world, as they apply reading skills learned and assessed in the classroom.

#### About the authors

Caroline Chan is a Teaching Fellow with the English Language and Literature Academic Group at NIE. Suzanne Choo is currently completing her PhD at Teachers' College, Columbia University.

## SCIENCE ED

### Assessing Science Learning Naturally

**Assessment—a word much dreaded by pupils! But all is not lost if they can see its value for learning. Science practical assessments, in particular, provide opportunities to help pupils apply concepts they are tested on to the world around them.**

#### Article highlights

- How can science assessments make learning more meaningful?
- Why is the “test of transfer” important for science learners?
- How can extension application questions be used to enrich learning?

The mere mention of *assessments* often elicits an array of negative responses. But they can also make learning refreshing and impactful, if carefully applied.

The typical aim of assessments in science is to test pupils' acquisition of scientific knowledge and ability to transfer this knowledge to solve problems in the natural world.

This “test of transfer” is essential as it demonstrates that learners can comprehend their surroundings scientifically.

### Extending learning through science practical work

Science practicals or laboratory work are a useful way of encouraging and assessing this transfer of learning.

Ms Tan Poh Hiang, a Teaching Fellow with NIE's Natural Science and Science Education (NSSE) Academic Group, strongly supports this idea: “Building an activity around a science concept can contextualize the learning process.”

This is because practicals test a different domain of knowing science concepts.

“Although not tested in the PSLE, it is a feature that many schools are implementing for deep learning of science, which is very different from pen-and-paper formats,” says NSSE Assistant Professor Lee Yew Jin.

“Working an activity, or better yet a series of activities, around a science concept will result in long-term mastery of science,” adds Yew Jin.

Poh Hiang, who was recently attached to Temasek Primary School, found that pupils are more engaged in the learning process when carrying out practical activities.

These activities also make learning less abstract, especially for weaker pupils. “Lower ability pupils have difficulty handling text, but hands-on learning illuminates the whole learning process,” she says.

### Extending practical learning through extension application questions

Poh Hiang recommends that schools make use of practicals to help pupils understand and apply science concepts to their daily lives, rather than just to evaluate learning using written tests.

This also aligns with our Science curriculum, which aims to help pupils explore the surroundings they call home.

To make learning more meaningful, she proposes adding *extension application questions* to science practicals.

Such questions require pupils to apply what they have learned from the earlier experiment to a question relating to their lives. These create opportunities for pupils to learn a scientific concept in greater depth rather than just recalling knowledge.

### Incorporating extension application questions

To conduct meaningful science practical assessments:

1. Start off with a hands-on activity such as an experiment.

2. Allow pupils to draw conclusions from this practical session.
3. Conclude the practical session with an extension application question.

Poh Hiang suggests devising extension questions that relate to a real-life scenario, something pupils would experience in their daily lives.

For example, ask pupils to measure their waistlines using different tools provided—a measuring tape, ruler or string. Pupils would naturally select the measuring tape.

Teachers can then scaffold the task by asking pupils to use the other tools instead. While it is the same task, pupils now need to think of new ways to achieve the same goal.

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### Extending thinking through hands-on inquiry

Poh Hiang's method of adding extension questions to practical assessments adds a refreshing twist to science learning, which is often text-based.

"Nowadays, pen-and-paper assessments always have thinking questions, which the lower ability pupils struggle to handle," notes Poh Hiang. "These questions will help pupils to extend and apply what they learn in practicals to questions dealing with the real world."

"Extended application questions not only provide time for pupils to explore scientific concepts in depth but also for them to propose their ideas and discuss them with their peers and teachers," adds Yew Jin. "Collaboration will benefit weaker pupils who find thinking questions cognitively challenging."

Yew Jin believes that science practicals are valuable for learning as well as for assessment purposes, even at the primary level, as "the physical manipulation of abstract things such as science concepts is the bedrock of higher cognitive functions."

With frequent use, extension questions not only help pupils tackle analytical questions found in their daily assessments and the PSLE, but also facilitate the "transfer" of learning to life.

### Extending assessments to life experiences

The fear of assessments can be greatly minimized if the process of science learning is made more enjoyable for pupils. They will become enthusiastic about learning when they are able to relate their knowledge of science to real life.

The challenge is for teachers to show pupils that assessments are not hurdles in their student life but a means for them to apply their scientific knowledge in practical ways.

Developing this much needed habit of applying acquired knowledge beyond school assessments will help pupils become better exam-takers and better problem solvers.

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## HOT TOPIC

### Reflections on a Life in Singapore Education

*"How do you measure a year in the life?" echo the song lyrics from the award-winning Broadway musical RENT. How do you measure the worth of a man and his life's work? Professor S. Gopinathan shares his thoughts on his life in education.*

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Professor S. Gopinathan is considered by many to be a pillar of teacher education in Singapore. When asked how long he has been in education, he replies: "A very long time."

From being a student in the 1940s, to a school teacher from 1966–1968, an educational publisher and organizer of annual book fairs in Singapore thereafter, and a teacher educator since 1974—all in all, it has been over 60 years in education.

"It's been a long but very meaningful and empowering life in education," he surmises. "I am fortunate and grateful."

Prof Gopi's journey in education may be summed up in three words: *passion, commitment and people*.

### A passion for education

Prof Gopi has not only seen the Singapore education story unfold, he has lived it and had a part in writing it.

"The Singapore education story is actually a successful narrative; in Minister Mentor's terms, a four-decade transition from a Third World system to First World. No system is perfect, but it's a better and, importantly, a more inclusive system now, and I think we have all made it a better system.

"I can quite honestly say that I played a part in this; and if you play a part in something that's growing and respected, that people admire, you feel good. I benefitted from the system, I had a role in making changes happen, and I had a role in writing about it."

Writing about education—and publishing and disseminating his works and his peers'—is Prof Gopi's other passion. To describe his list of research publications as extensive would be an understatement. Prof Gopi has over 140 published titles to his name, not counting numerous other papers he has presented at conferences.

"I've been publishing actively since 1974. I was editor of the *Education Journal*, a publication of the School of Education where I did my Master in Education in the

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mid-1960s, and was actively involved in *Pendidek*, later the *Singapore Journal of Education*, and the *Asia Pacific Journal of Education* in the Institute of Education and NIE respectively.

"I am proud of my role in initiating and co-editing *Education in Singapore: A Book of Readings* and *Language, Society and Education in Singapore*. These are standard texts in NIE's initial teacher education programmes and in language in education courses internationally.

"I believe it is important for Singapore's education scholarship to respect context, be available to students and be credible internationally.

"I look back now and I'm glad I persisted because there's a body of work which explains to people, who are now very interested in Singapore education, how we did it—why it is the way it is, what policies and practices are central to it, and what other systems might learn from it.

"In a way, it is a tangible legacy."

### **A commitment to the work**

Long before "lifelong learning" gained currency in the education discourse, Prof Gopi was living it.

"Every period of my career was marked by something I enjoyed doing. There were many milestones in my career. I enjoyed the 35 years in teacher education. Because policies and practices change often, there were new opportunities to research, to reflect and to develop new programmes within teacher education.

"I was closely involved in Singapore's first undergraduate programme in teacher education, the Bachelor of Arts/ Science (Education) programme launched in 1990. As Dean, I initiated NIE's first cost recovery programme in counselling, school leadership and ICT in education.

"When we started the Centre for Research in Pedagogy and Practice in 2003, and when we started 'exporting' NIE programmes to the Middle East—they were entirely new enterprises. So as late as 2003, at the tail-end of a 30-year career, I was still doing new things, in new lands!"

Even now, after taking a step into retirement, he works tirelessly to document the education scene and to help others in their education journey at home and abroad. Not one to rest on his laurels or let life pass him by, Prof Gopi is now a Professorial Fellow and teaches part-time on NIE's postgraduate programme.

What keeps him going?

"I believe in being committed and passionate in whatever you do. Whatever you do, do it well and do it with an eye to how it will benefit others as much as it will benefit you.

"A former student of mine advised me when I was contemplating life after retirement: 'Revisit and re-energize the values that have guided you this far.' It was good advice."

### **Placing people first**

Prof Gopi lives by the same principles he imparts to others. "Do unto others as you would have them do unto you. Go the extra mile. Plant a little seed. Be generous. Bring some happiness, if you can.

"Basically, honour others as much as you would like them to honour you. Nobody is too insignificant, nobody is too junior, nobody is too undereducated for you not to spend your time with them.

"You may think you are a great teacher; you are fulfilled because you are widely regarded and respected. But do your students see you in that light? Because you can be happy and contented, but others might say it was nasty being in your class. I want them to be able to say, 'Well, it was good.'"

What makes the difference between a good teacher and a great teacher? "Certainly not skills," says this veteran teacher, "skills can be learned."

"It's definitely got to be relationships. It's basically wanting to be with your students, wanting to nurture them, scaffold them, hold the safety net beneath them, inspire them. This is the sort of disposition you need to bring to teaching."

So, how do you measure a lifetime in education? For Prof Gopi, we would say it was good—all good!

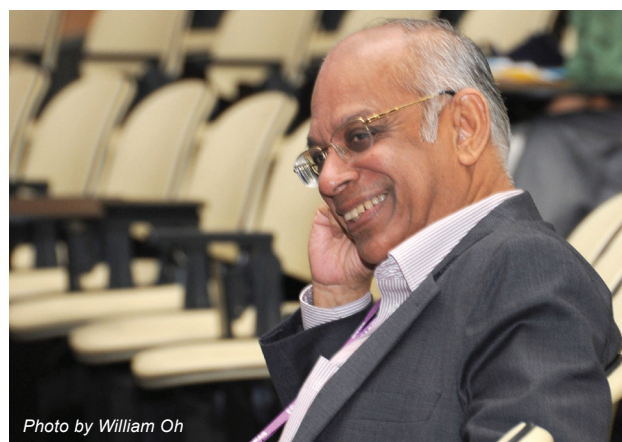


Photo by William Oh