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RESEARCH within REACH

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HotTOPIC

Making Meaning in the 21st Century

We often think of learning in terms of subjects, defined by disciplinary boundaries, and knowledge as a constant body of facts, defined by the curriculum. These assumptions are being challenged and redefined in today's rapidly changing environment.

Professor David Hung is keenly interested in the science behind learning. He believes that the way we view learning must change as we face the future. "Going forward, singular ways of seeing meaning would be insufficient because the world is changing at such a rapid rate."

Teachers today are faced not just with students' diverse learning needs, but the need to equip them for this ever-changing future. Singular ways of teaching are clearly inadequate.

Borrowing a phrase from renowned author and educator John Seely Brown, Prof Hung describes what we are seeing as the emergence of a *new culture of learning*.

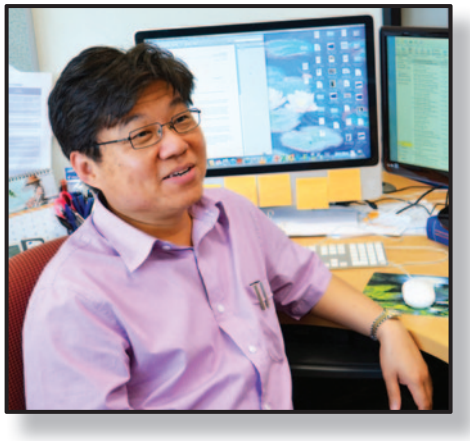
Making Learning Meaningful

Diversity is a hallmark in this new culture of learning. In response, educators at all levels have been calling for interdisciplinary ways of making meaning.

"Since diversity is something inherent, the problem doesn't lie with diversity per se; the problem lies with a one-size-fits-all approach to learning," he notes. "Because if we have only one way of seeing the world, we will probably not be able to anticipate how other people see it."

In the classroom, this means first recognizing that there is a diversity of intelligences—that some are better in one area than others at any point in time. We can then begin to address students' multiple ways of learning.

"That's not to say academic disciplines are thrown out the window, but we should start from where the child is—identify their strengths and start from there."



Going forward, singular ways of seeing meaning would be insufficient because the world is changing at such a rapid rate.

- Prof David Hung, *Office of Education Research*

In this issue

New Culture of Learning

All these and more at http://singteach.nie.edu.sg

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Supported by Marshall Cavendish Education

Multiple Modes of Learning

Seeing and understanding in numerous ways require multiple literacies. Multiple literacies is also an important starting point for developing multi*modal* literacies. By using multiple modes of teaching and learning, we can begin to cultivate a variety of perspectives.

This has become almost imperative with the torrent of new media, where "much of the rampage of information requires the ability to interpret meaning, appropriately and accurately," says Prof Hung.

"Meaning-making," he explains, "is the ability to construct one's understanding—deep understanding—of a particular episode or phenomenon. It is when one is able to personalize that knowledge and contextualize it into one's own experiences."

Arts education provides for one way of seeing things from a different perspective. "Arts education allows a suspension of a dominant methodological approach of seeing, allowing a free flow of ideas and a generating of ideas first before we narrow it down too quickly to a particular approach."

Grounding Learning in Values

In all of these, the place of values becomes increasingly important. In our present-day context, however, he notes that it is not enough to "pass on" values.

"What we are faced with today and in the future are encounters that have never been experienced in previous generations. Therefore, constructing these values, and not just receiving values from the past, is becoming a very critical issue."

For Prof Hung, this is where the heart of 21st century learning lies: grounding our youth in sound values so that they can apply these to their particular experiences in the future.

"So we do not just talk about meaning-making of knowledge, but we talk about meaning-making of values and self-knowledge. All knowledge is constructed socially; so even knowledge of one's values and oneself is constructed socially and experientially."

This process of meaning-making is something our students will have to navigate for themselves. What we can do as educators is to equip them with the means to make meaning.

Meaning-making is the ability to construct one's understanding—deep understanding—of a particular episode or phenomenon.... to personalize that knowledge and contextualize it into one's experiences.

- Prof Hung *on meaning-making in today's context*

David Hung is Professor and Associate Dean of Education Research at NIE. His research interests are in the area of learning, in particular, socio-cultural orientations to cognition and communities of practice.

MathED

Engaging Multiple Intelligences in the Math Classroom

Most of us would have heard of the concept of multiple intelligences. Find out how one group of Math teachers successfully implemented it in their school.

Children learn in different ways. This was the belief that led the Math teachers at West View Primary School to explore different ways of teaching the subject.

"Every child has a different dominant intelligence—you have to try to reach out to every child," notes Lead Teacher Mdm Suriani Othman, referring to Howard Gardner's concept of *multiple intelligences* (MI).

"You can't teach in traditional ways and expect a student who's not interested in just listening to be excited in what you're doing," she explains.

The teachers were particularly concerned about the low performers in Math. "Most of them don't like Math, and they don't look forward to Math lessons," says Mdm Suriani, who is also the school's Research Activist.

So they tried to infuse teaching strategies that would suit their young learners. "We believe that if we can teach them in a more fun way, they'll get interested, they'll be motivated, and they'll learn. The whole idea is to excite them about the lesson and get them interested."

Article highlights

- Why use multiple intelligences strategies in the classroom?
- How can these strategies be applied in the Math classroom?
- How can pupils' learning benefit from this approach?

Every child has a different dominant intelligence—you have to try to reach out to every child.

- Mdm Suriani Othman, *West View Primary School*

Action Research in MI

In 2008, Mdm Suriani, Miss Lee Yong Min, Mrs Sam-Hu Huijun and Mr Lewis Thong embarked on an action research project to infuse MI strategies into Math lessons. They started with Primary 4 Math classes.

After reviewing the current research on MI, the teachers drew up lesson plans for Fractions and Decimals. They also assessed each student's MI profile at the start of the school year so they knew "who is dominant in which intelligence".

The surveys showed that most pupils are naturalistic and bodily-kinesthetic learners, so the teachers tried to incorporate a variety of methods to reach out to all pupils.

They recited rhymes, raps and jingles, and played games such as *Bingo* and *Uno*. They also sang and danced along to songs about Math concepts. "They like to play, so our lessons would definitely include games."

Making Math Fun

The results have showed that the MI approach works. Pupils in the project group scored better in review tests than those in the comparison group. In fact, the MI intervention has had a greater impact on low-performing pupils.

In 2009, the school obtained a pass rate of 66.4% in PSLE Math. The next year, when the first batch of pupils who were taught using the MI approach took the PSLE, the pass rate increased to 81.1%.

The pupils have enjoyed the lessons. When interviewed for feedback, one of them enthused: "Our teacher teaches us Math in very fun ways. I love to play more Math games and learn more about Math. The problem sums are really challenging!"

And the teachers have been able to see the benefits. One teacher reflected: "Pupils can relate better, recall the learning points better, and on the whole they're more motivated, even for homework—pupils actually look forward to learning. This is true 'Teach Less, Learn More' in action."

A Whole-school Approach

The intervention was so well received that by 2010, the approach was implemented across the whole school. All Math teachers in West View Primary are now using MI strategies in their classrooms.

To make the workload more manageable, teachers at each level worked as a group and engaged in team-based lesson planning. By the end of 3 years since MI was used, there now is a pool of shared resources for all topics at all levels.

"The teachers are not working alone. They did it as a group, as a level," notes Mdm Suriani. This also resulted in greater collegiality as teachers worked together, sharing resources and thinking creatively about how to make lessons better for the students.

As a result of more engaging lessons, the Math classroom has become easier to manage. "When you carry out the lesson and the children get excited, you have fewer disciplinary problems in class because they are engaged."

Customizing Teaching Strategies

It has been a challenging learning process for the teachers, who have had to learn to adapt their teaching strategies to accommodate the pupils' learning orientations.

Math teacher Ms Yong Lee Min says, "We have our own dominant MI also. We tend to teach according to how we learn or the way we think that they would learn. But if you tend to talk a lot and they're not auditory learners, they'll just switch off, which is the case in many classrooms."

Dr Lee Ngan Hoe from NIE's Mathematics and Mathematics Education Academic Group, who was also the project consultant, concurs. "The concept of MI serves as a framework for teachers to vary their instructional strategies. It also helps to sensitize teachers to the individual and evolving needs of pupils as they progress through their learning journey."

A significant observation is that the dominant intelligence of some pupils changes by the end of the year. Mdm Suriani thinks it's because pupils were using intelligences that were previously missed. "You're giving them the opportunity to venture into other ways of learning a concept. You're actually developing the child holistically!"

> Pupils actually look forward to learning. This is true "Teach Less, Learn More" in action.
>
> - West View Primary School teacher *on how MI has helped pupils' learning*

West View Primary Math teachers Ms Yong Lee Min (left) and Mdm Suriani Othman

Mdm Suriani Othman and **Ms Yong Lee Min** presented their action research project on MI at the recent ERAS Conference 2011. They were one of three winners of the Teacher Research Paper Prize. Videos and other resources from their project are available on the *SingTeach* Facebook page at http://facebook.com/SingTeach.

Article highlights

- What "new literacies" do we need to develop in our students?
- Why are multimodal literacies important for language learning?
- How is the new media age changing the classroom?

Caroline Ho *wants to engage students in new ways of learning*

This article draws from the project "Engagement, Expression and Embodiment: Bridging Multimodal Literacies and Language Arts through Constructing an Interactive Virtual Museum" (OER 26/08 CH), which Dr Caroline Ho was the Principal Investigator of. She is presently with the English Language Institute of Singapore. More information on the project is available at http://muse.nie.edu.sg.

Virtual Museums Give New Life to Language Learning

by Caroline Ho

What happens when young people create a virtual museum gallery? Researchers on the* MUSE *project, a Museum-based Multimodal Learning Initiative, found that the process of engaging in making-meaning also enables students to express themselves.

This article provides a playful take on multimodal learning in the language classroom. Dino, a 3D artefact from the Dinosaurs gallery, and Merly, a mascot from the Youth Olympic Games gallery, are having a conversation.

Learning New Literacies

Merly: It was cool being a 3D exhibit in a virtual museum! It's interesting how we helped in language learning, of all things.

Dino: Yes! Have you noticed that language teaching and learning now goes beyond printed materials, like textbooks?

Merly: Thanks to the new emphasis in MOE's 2010 English Language (EL) syllabus, the focus is now on *multimodal literacy*.

Dino: It's because meaning-making now includes a broader range of skills—viewing, listening and speaking; reading, writing and representing. Students need to tap into the spoken, written, visual *and* tactile! It's using "New Literacies", which explores how communication is mediated through new technologies.

Merly: It's a whole new way of learning, isn't it? This dynamic learning environment requires students to be more involved in critical engagement, identity construction, and digitally mediated social practices. They have to draw on their personal experiences and interests to actively construct knowledge in meaningful ways.

Dino: This student-participatory model departs from the primarily teacher-driven practice of the past. Vygotsky would call this a socially mediated process of learning. Learners are responsible for their own learning, and they construct their own learning through collaborating with others in "communities of practice".

Merly: Isn't this also a form of inquiry-driven learning, where students direct their own investigative learning by asking questions, planning activities, drawing and justifying conclusions about what they learned?

Dino: You're right. The belief is that focused and sustained multimodal exposure will broaden students' use of multimodal resources, causing them to experiment more with using different resources for specific purposes.

Learning More in a Virtual Environment

Merly: And that's where we come in! Designing a virtual museum gallery—and artefacts like us—allows students to engage with each other in a variety of meaning-making practices.

Dino: Artefacts like us are students' manifestations of "sign-making". The process brings out learners' creativity in using various semiotic resources to construct knowledge through multimodal representations. This can lead students to critically question and challenge traditional ideas that shape the use of "texts", and analyze the contexts being shaped by these ideas.

Merly: I really enjoyed helping the kids learn!

Dino: Me, too! Remember a camera panned over a world map that had digitally encoded location markings of T-Rex dinosaur fossil sites? The students saw artefact images and textual descriptions popping up over the "markers".

Merly: Yup! They got to construct alternative viewpoints and broaden the scope and layers of meaning-making in a dynamic way. In fact, multimodal literacy develops many other skills: interpretative skills to make sense of content; evaluative skills to critically assess the nature and effects of the exhibits; oral and presentation skills to communicate clearly and effectively; and independent research skills to source and adapt content from multiple sources.

Dino: And this provides the basis for critical engagement, interpretation, and resources for teaching meaning-making in various genres. We can then begin to develop a multimodal pedagogy that fosters critical inquiry.

Designing Teaching for the New Media Age

Merly: So what's the teacher's role in this 21st century learning environment?

Dino: Teachers have to recognize and respond to the shifts of emphases in the EL curriculum, to the innovative learning contexts that are emerging, and to the rapid technological developments and associated changes in new literacies.

Merly: So, this would call for curriculum design and language pedagogy that support these changes: integrating visual communication into language teaching and learning; enhancing awareness of the specific "grammars" of varied semiotic modes; and seeing how these function separately as well as in the co-construction of meaning.

Dino: Yes, classroom practitioners need to move away from merely being executors of planned language lessons towards being more engaged, collaborative participants in the *design* of the lesson.

Merly: The challenge is to align assessment practices with this multimodal instructional focus.

Dino: Yes, particularly given the predominantly pen-and-paper assessment practices. These could be re-modelled to address the gap that exists between multimodal pedagogy and traditional written assessments.

Merly: So, you're talking about assessment criteria that address the nature of multimodality and assess the impact on its audience?

Dino: Yes. And also to develop skills and dispositions required for this new media age, like broad knowledgeability, flexibility, problem-solving ability. Tasks that enhance students' reflexivity in their practice and focus attention on the interrelationships between and across modes through probing questions; and guided scaffolding that raises questions about "texts" and teases out the intersections between visual and verbal semiotic.

Merly: It's important to have practices that emphasize the relationship between process and reflection, and explore "resourcefulness" in signalling learners' engagement too. But ultimately, I think it's just as important to think of new ways to engage our kids. Like Bob Dylan said, "The times, they are a-changin'". Teaching *and* learning should keep up.

Resources

Ho, M. L. C. (2011). Virtual museums for enhancing teaching and learning: Platforms, purposes, and prospect. In H. Yang & S. Yuen (Eds.), *Handbook of research on practices and outcomes in virtual worlds and environment* (pp.117–144). Hershey, PA: Information Science Reference/IGI Global.

Ho, M. L .C., Nelson, M. E., & Mueller-Wittig, W. (2011). Design and implementation of a student-generated virtual museum in a language curriculum to enhance collaborative multimodal meaning-making. *Computers and Education, 57*(1), 1083–1097.

Nelson, M. E., Ho, M. L. C. & Tang, C. O. (2011, August). *The semiotic construction of identity parameters in a virtual museum project*. Paper presented at the 16th World Congress of Applied Linguistics, Beijing Foreign Studies University, Beijing, China.

Related article

See "Testing Beyond Words: Multimodal Assessment in the English Classroom" in *SingTeach*, Issue 27, Nov/Dec 2010.

TeacherED

Portfolio Review: A Documentation Process in the Visual Arts

by Yap Kheng Kin

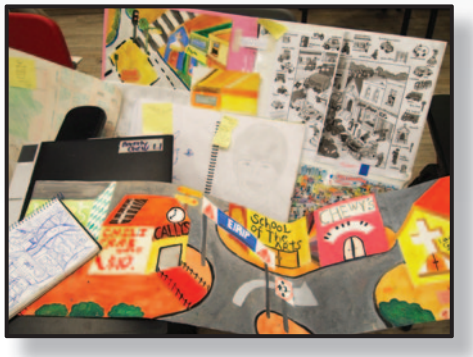
The use of student portfolios has found its way into many classrooms today. The practice has its roots in the visual arts, where it serves as a showcase of student work. The documentation of student work also provides a useful means for teachers to assess student learning and growth.

Article highlights

- What is the value of student portfolios?
- How can portfolio documentation benefit the art student and teacher?
- How can portfolio review be carried out more effectively?

The challenge, with any student portfolio, is to make sure the students' efforts in documenting their work are not in vain. We go back to the visual arts to learn a few

lessons on how we can make the process of portfolio documentation and review both formative and fruitful.



A student's art portfolio may include sketches, artwork, work-in-progress and written reflection.

Keeping Art Portfolios

As art teachers, we usually remind students to keep a visual diary or portfolio and tell them that we will check these. In most cases, however, these students graduate with their portfolio cases loaded with artwork that the teacher has not properly looked through.

The lack of attention to proper documentation and review reflects how art portfolios have become a mere afterthought. Students are not usually required to present all of their work, only the relevant pieces for the exam. Their visual diary is seldom reviewed as a whole; instead, images are isolated from their original context.

But the teacher's role is not just to give guidance for exam submissions. It is also to document students' understanding and development in art, and direct them further on the path of discovery.

Forming Habits of Mind

The keeping of portfolios is an important process for art students to foster a habit of carefully documenting their work.

This documentation process is an important aspect of cultivating the eight studio habits of mind: *developing craft*, *observing*, *reflecting*, *envisioning*, *expressing*, *stretching and exploring*, *engaging*, and *understanding the art world* (Hetland, Winner, Veenema, & Sheridan, 2007).

Inculcating these studio habits is a key takeaway for any art student. An easy way to achieve this is to give students a checklist of what we expect in their portfolios and let them do self-reflection in their own time.

Furthermore, portfolios can be a crucial assessment tool, especially since our subject grading is not summative but formative in nature. With the art portfolio, we as teachers have a yardstick to tell them if they are making progress in their work, and how well they are building up their studio habits of mind.

> Portfolios can be a crucial assessment tool, especially since our subject grading is not summative but formative in nature... our emphasis should not be on passing the exam or simply getting the art project done.
>
> - Yap Kheng Kin,
> *School of the Arts, Singapore*

Portfolio Documentation Process

How can we support each student in their development in art? Teachers can use the following process for conducting art documentation with students:

- Explain the **requirements** of the portfolio. State what its contents are and, if needed, provide your own sample.
- Engage in constant **review**. It may be helpful to look at the first work (diagnostic work) and compare it with subsequent works. Here are three ways you can do this:
  - **Formal review**
    Offer a private review of each student's portfolio; perhaps select a few students for each term. These sessions provide a more thorough understanding of students' thought processes.
  - **Informal review**
    Every so often, informal reviews of students' works may be done during class time. Make it spontaneous and encourage students to express themselves freely.
  - **Group critique**
    Review work with students as a class. At the end of a term, or once students finish a studio work, display their work in class for feedback and review. Select a few students—good examples or those needing improvement—to talk about each of their works.
- Encourage students to **reflect** on their own work. They can be given a set of questions to reflect on when they prepare for documentation.

Reference

Hetland, L., Winner, E., Veenema, S., & Sheridan, K. (2007). *Studio thinking: The real benefits of visual arts education*. New York: Teachers College Press.

Useful resources

Resources on student portfolios may be found on the *SingTeach* website.

Reflecting on the Right Questions

Reflection is a beneficial way for students to evaluate their own portfolio. Here's a list of questions they can use to develop the eight studio habits of mind:

1. Is there improvement in your skills? How did you *develop* your craft?
2. Did you *observe* how different your works are?
3. Did you *reflect* on why they are different?
4. Can you *envision* other possibilities of your work?
5. How can you *express* the new possibilities? Have you discovered any new methods and techniques?
6. Can you *stretch and explore* any areas of interest?
7. Did you stay *engaged* in the process?
8. How well do you *understand the art world*? Are there any artists you like very much? How can you try out or experiment with their styles?
9. What studio habits of mind have you learned? What was lacking?

Throughout the documentation process, teachers can cover the technique and process of studio work on a variety of artworks. Students can engage with the teachers to clarify doubts, seek direction, and correct judgements.

This can be followed by teachers' feedback on possible directions and projections of future outcomes. Suggestions for improvement of techniques can be simply stated or through show-and-tell instructions. Criticism should be kept to a minimum and more encouragement should be given.

It may be a tedious thing to frequently conduct reviews of their portfolios, especially if there are many students under our care. You may start slowly and at a lesser degree at first, but it is a small step in the right direction for the overall growth of your students.

About the author Yap Kheng Kin has been an art teacher and practitioner for 10 years. He currently teaches Visual Art at the School of the Arts, Singapore. He would like to thank Professor Libby Cohen for her unstinting support and help.

ScienceED

Imparting Values through Science Lessons

by Tan Kok Siang, Heng Chong Yong, Lin Zikai, and Tan Shu Hui

As educators, we know how important it is to teach values and life skills in schools. We also know, however, that it is difficult to convince students of the importance of these skills. Some Science teachers decided to experiment with teaching values through the usual Science lessons.

Article highlights

- What is the link between values and academics?
- How can values be integrated into Science lessons?
- Will teaching values make students more motivated learners?

It is common to hear teachers say that most students are motivated to learn only because the concepts taught in class are assessed. While there are exceptions, where highly motivated students are willing to learn anything "out of the syllabus", these are few and far between.

It becomes more challenging to convince students of the importance of learning skills in the affective domain, particularly with easy access to social media and communication systems today.

With more emphasis being placed on imparting values and soft skills, how should we as educators respond? Can teachers really do something effective in this area of affective learning in school?

An Integrative Teaching Approach

In 2010, three Science teachers in two secondary schools experimented with a pedagogy that integrates learning experiences in the cognitive and affective domains.

This was part of a 3-year school-based initiative to design a pedagogy and craft curricular materials for primary and secondary school Science lessons. The aim was to impart values and teach positive soft skills and habits to students through Science lessons.

This cognitive-affective pedagogy was initiated in 2009 by Dr Tan Kok Siang, a Science Education lecturer at NIE.

(From left) *Tan Kok Siang with Science teachers Tan Shu Hui, Lin Zikai and Heng Chong Yong*

If every teacher is equipped with such a value system and can infuse values in every lesson, values-centric education will become integrated in their lives and not as a separate subject.

- Lin Zikai,
Bukit View Secondary School

The approach involves teaching Science concepts and process skills as usual, through classroom and laboratory lessons. But the lesson also includes a 5- to 10-minute segment where students are asked to discuss and reflect on a daily life experience that may have some similarities to what they have just learned.

For example, students will learn about chemical reactions as required in the syllabus but they may also discuss how the characteristics of these reactions are comparable to certain life events or their personal habits.

Examples of Affective Teaching

In the first school, 32 Secondary 4 Normal (Technical) students were taught the reaction characteristics of the metal potassium and asked to reflect on their social behaviour when involved in a heated argument with friends. Students reported that they were able to associate the violent reaction characteristics of potassium to the danger of violent social behaviours.

In the same school, a Secondary 3 Express Chemistry class was taught the concept of sedimentation. They were asked to observe the difference in appearance between a sample of stirred muddy water and another in which the sand had settled below a clear layer of water.

They then reflected on how these samples were similar to their states of mind—when they were confused or disturbed, and when they were calm and relaxed. Students were able to point out the importance of making critical decisions with a clear and calm mind.

In another school, 11 Secondary 2 Express students compared the rates of reaction of weak and strong acids with pieces of magnesium. They were then asked to identify which acid had reaction characteristics that best represented the way they spend their monthly allowances.

The teacher found that the students' responses accurately described their spending habits. For example, the self-admitted spendthrifts could relate their quick spending habits to the strong acid reaction characteristics.

Teachers' Reflections on Values Teaching

The teachers reported strong interest among students in this "less-than-usual" way of surfacing affective messages through the usual Science lessons. They also noted that these learning activities did not require much curriculum time and the conceptual learning was not diluted.

Through classroom activities, the teachers were able to observe their students' personal habits and learning needs. Ms Tan Shu Hui says these interactions helped her to sway her students' thoughts towards a positive direction.

"This pedagogy has enabled students to relate Science to values in life. The activities have also helped me to recognize the relation between students' responses and their attitudes towards life."

Mr Heng Chong Yong found that because the students could relate the values taught to their daily life, teaching the lesson became easier. "We used to pause our lessons to scold students for misbehaviour or not paying attention in class. This cognitive-affective integrative pedagogy reduces the need for scolding and allows us to insert some 'teachable moments' into the lessons."

"Such an initiative is crucial for the C2015 curriculum, where students need to be equipped with certain values and life skills, such as being a confident and self-directed learner, concerned citizen and active contributor," adds Mr Lin Zikai.

While this pedagogy is still experimental, he says, "If every teacher is equipped with such a value system and can infuse values in every lesson, values-centric education will become integrated in their lives and not as a separate subject."

Reference

Tan, K. S., Heng, C. Y., Lin, Z., & Tan, S. H. (2010, December). *Teaching school science within the cognitive and affective domains*. Paper presented at the Global Chinese Conference on Science Education, Hong Kong SAR, China.

About the authors Dr Tan Kok Siang is a Lecturer with NIE's Natural Sciences and Science Education Academic Group. For this research initiative, he worked with Science teachers Mr Heng Chong Yong and Mr Lin Zikai from Bukit View Secondary School, and Ms Tan Shu Hui from Chung Cheng High School (Main). To find out more about this initiative, email Dr Tan at koksiang.tan@nie.edu.sg.