

collaborative creativity & 21CC

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Editorial



Dr Jennifer Pei-Ling Tan
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CREATIVITY, COLLABORATION and critical thinking are recurrently featured in contemporary global learning frameworks as capacities essential to living and thriving.

While these 21st century competencies (21CC) have long been upheld as integral to progress, they were historically regarded as affordances and aspirations of elite groups.

However, in today's knowledge economies that are characterized by complexity and rapid change, they no longer remain the province of the privileged, but are central to one and all's productive participation in local, global and virtual societies.

This is now more empirical fact than rhetoric.

In recent studies, economists have shown that cognitive academic skills account for only 20% of labour-market outcomes. Non-cognitive 21CC have emerged as much stronger drivers of workplace and life success.

Yet, the dynamic and non-linear nature of such skills are posing tremendous challenges to conventional schooling practices worldwide.

How do we bring 21CC to the fore in everyday teaching and learning? In what ways can they be accurately and meaningfully assessed? How can they be fostered more effectively, with particular sensitivity to the highly networked, technology-mediated lifeworlds of students?

Generating novel insights to these educational conundrums serves as the uniting impetus for the researchers featured in this issue.

The first two studies focus on developing robust measures of collective creativity and teamwork as students jointly solve problems. The next three studies showcase pedagogical innovations that promote students' collaborative criticality and creativity in different domains. Lastly, Prof David Hung and his team uncover the change enablers and challenges encountered by a school as it embarks on an inquiry-based international curriculum.

True to this issue's theme of collaborative creativity, these projects see researchers, policymakers and practitioners working at the forefront of 21st century classrooms. They exemplify Singapore's steadfast commitment to providing future-relevant educational experiences, outcomes and social trajectories for its young people.

As Gramsci asserted, the "sum of effort and sacrifice" invested by one generation shapes the conditions of life experienced by the next generation. The shift to post-industrial modes of schooling and knowledge production is fraught with complexities. But for all of us with stakes in the schooling venture, this collective journey ahead is compelling and exciting.

In the words of Einstein, "creativity is contagious". Let's pass it on. ■

EDITORIAL TEAM

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Sahira Zulkifli
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ReEd (*Research in Education*) is a research bulletin aimed at sharing our research contributions with the global community. This is an initiative of the Office of Education Research at the National Institute of Education (NIE), Singapore.

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How Do We Measure Collective Creativity?

PROJECT TEAM

Principal Investigator Jennifer Pei-Ling Tan, *National Institute of Education, Singapore*

Co-Principal Investigators Imelda Caleon, Elizabeth Koh, *National Institute of Education, Singapore*

Collaborators Poon Chew Leng, Ng Hui Leng, Pik Yen Lim, *Ministry of Education, Research & Evaluation, Planning Division, Singapore*

MANY EDUCATORS think of creativity as encouraging students to think up new and unconventional ideas, and bringing about that breakthrough “Eureka!” moment in their minds.

NIE Research Scientist Dr Jennifer Tan says that while this view is not entirely wrong, it paints an incomplete picture of what creativity is.

Shifting Mindsets about Creativity “Creativity involves the generation of not only *novel*, but also *valuable* solutions,” explains Jen. And what counts as valuable is typically a group decision.

People tend to think of creativity as a mysterious solo act of producing great ideas. But creativity is typically a collaborative process requiring more hard work than that. Equally important are critically evaluating all ideas for the best solution, and effectively communicating this with others.

Put simply, productive creativity is a multifaceted and collective effort.

“Until we can unpack what this really means in terms of assessment and teaching, it will be difficult to shift popular, mistaken beliefs about creativity,” says Jen.

Measuring Collective Creativity For this very reason, Jen and her team are working with MOE colleagues to develop a measure of students’ *collective creativity* as they work in pairs to solve complex problems online. This study is part of the *Assessment and Teaching of 21st Century Skills* international research programme.

Developing reliable and sound measures of creativity is a necessary first step in “helping us better understand the factors that enable or hinder students’ collective creative problem-solving,” says MOE Lead Research Specialist Dr Ng Hui Leng.

MOE Principal Specialist Dr Poon Chew Leng adds, “Analysing data collected on Singapore students will give us a grounded perspective on what actually drives successful creative problem solving in our local context, and ultimately of more practical value to our teachers and curriculum developers.”

Assessing Creativity The team defines collective creativity as comprising a suite of metacognitive, cognitive and socio-communicative

competencies, namely reflexivity, divergent and convergent thinking, and prosocial interaction. It reflects a group’s ability to plan and monitor shared goals and strategies, generate and evaluate new ideas and solutions, and engage in productive dialogue to jointly accomplish a given problem task.

NIE Research Scientist Dr Imelda Caleon says, “Rather than an overall score, our multidimensional measure will generate students’ individual and team profiles across these important skills.”

Such an assessment tool can be very useful for formative learning purposes, by “making visible” competencies that are otherwise hard to pinpoint.

It can help teachers to “better guide and support their students in developing collective creative problem-solving abilities,” emphasizes MOE Senior Research Specialist Ms Lim Pik Yen.

In the longer term, the team hopes to turn research findings into practical resources for teacher professional development and student learning.

“When we understand more holistically what encompasses creativity, we will be able to help teachers nurture it more effectively in students,” says Jen. This would certainly be one step forward towards helping students thrive in the 21st century. ■



NIE researchers led by Jen Tan (sitting second from right) work with MOE officers to understand collective creativity.

It's All about Teamwork Re

PROJECT TEAM

Principal Investigator Elizabeth Koh, National Institute of Education, Singapore

Co-Principal Investigators Jimmy Seah, Poi Cheng School, Singapore; Helen Hong, National Institute of Education, Singapore

Researcher Aileen Shibani Antonette Michael Xavier, National Institute of Education, Singapore



(Left to right) Jimmy, Elizabeth, Helen and Shibani want to help students understand their teamwork competencies.

WHEN YOU order fast-food delivery, how does the restaurant deliver your hamburger right to your doorstep on time? Many may not give much thought to it, but it involves many people—from the customer service staff to the delivery man—working hand in hand.

Be it prompt food delivery or a school group project, teamwork is needed to make things happen.

What is a Good Team Player? “Teamwork is a very important quality for any kind of situation,” says Dr Elizabeth Koh, an NIE Research Scientist. “It is an important competency for the 21st century!”

That teamwork is needed for success in many endeavours seems obvious. But what exactly do we mean when we talk about teamwork? Do students know what makes a good team player? Elizabeth, Teaching Fellow Helen Hong and their research team are now working to help students gain a better idea of what it means to succeed as a team.

Teamwork through Discussions To capture a snapshot of how students work in groups, the research team developed an online platform where students can chat with their classmates.

They then posed a dilemma-based question to these students, who were organized in groups of three or four. These dilemmas, such as an

environmental issue, are open-ended questions with no clear right or wrong answers.

“There is no one correct answer so students have to discuss in their groups using online chat to come up with the best solution,” Elizabeth says.

At the end of the task, the students rated themselves on their own teamwork competencies, as well as their group mates’.

Dimensions of Teamwork So, what does teamwork look like? The researchers may have an answer. “Based on literature and our pilot tests, we came up with six dimensions of teamwork based on the literature and pilot tests,” explains Elizabeth. “Two are social-emotional and the other four are more cognitive ones.”

A factor such as *team emotional support* (how one encourages the other) is categorized under the social-emotional dimension.

The cognitive dimension includes, among others, *coordination*, or how one shares information and informs others about what they are doing.

Being Self-Aware At the end of the rating exercise, these students were given a micro-profile of their teamwork competency. This gives them a general idea of how they functioned within a team for a task, and helps them with the reflection process.

Some students rated themselves quite accurately on teamwork. “However, there are others who have a very different view from others of themselves. They either rated themselves too low or too high,” Helen says.

“During the reflection session, students said they didn’t know that their peers saw them differently from how they saw themselves,” Elizabeth says. “It gave them the opportunity to think about how they had performed and better themselves.”

The research team is currently examining the chat text and hopes to develop a system that will include text analytics in the micro-profile. This will take time, but both Elizabeth and Helen hope that this approach of enhancing their self-awareness will help students become more effective team players in the classroom *and* in life. ■

Survival Skills for the 21st Century

PROJECT TEAM

Principal Investigator Mingfong Jan, *National Institute of Education, Singapore*

Co-Principal Investigators Seah Lay Hoon, *National Institute of Education, Singapore*; Tan Ek Ming, Shoon Ming Hui, *Ministry of Education, Singapore*

BEFORE THE ADVENT of industrialization, humans needed hunting and farming skills to survive. In the 20th century, basic literacy such as reading and writing skills became important. What about the 21st century? What skills would be needed for our students to thrive?

The Century of Knowledge This century is the century of knowledge, specifically knowledge production and creation, according to Dr Mingfong Jan, a Research Scientist in NIE.

“It’s the ability to produce knowledge by critically thinking about the information available and not just taking them at face value; that is the ability required to survive well in a 21st century global economy.”

In schools, the focus was on teaching subject content and facts to students. But now, educators are starting to emphasize on skills as well.

Solving Problems Together “If you think in the context of the 21st century, there are certain abilities that make someone a producer of knowledge and not just a consumer. Knowing how to solve problems as a group and knowing how to argue would be 21st century skills,” says Mingfong.

To help students develop these skills, Mingfong and other researchers invented a card game called *Green City Blues*. In the game, students take up the roles of a government official, medical doctor or a scientist and work together to investigate the cause of death of a citizen in Green City.

The game is designed in such a way that students must collaborate and debate among themselves to solve the mystery as they each hold different pieces of crucial information.

Mingfong’s goal is to help students become critical consumers and producers of knowledge. “In other words, they cannot see facts as facts; they have to see facts as information that must be viewed from multiple perspectives,” he says.

Trajectory for Problem Solving Something interesting that the research team did was recruiting adult participants to play the card

game. They wanted to understand whether adults would perform better than the secondary school students and why.

Indeed, this was the case. The adults spent time identifying the problems, which are sometimes ill-structured. They also laid down rules for working together. Mingfong explains, “Students tend to just go ahead and nothing will come up initially about how the team would work together, or how to build consensus about what the problems are.”

From this, Mingfong and his team tried to trace the trajectory of how problem-solving skills develop over time as students mature into adults.

If the opportunity arises, Mingfong hopes to make the game available online, so that students can access it even out of school.

“The fact that kids like to play games together and they can learn something from playing games would give us an opportunity to make education happen in a setting outside of school,” he notes.

What is more, the skills that learners learn from the game will not be lost when they leave school. As Mingfong says, “It would be useful for whatever situation they encounter when they are exposed to multiple perspectives.” It certainly sounds like something that will stand the students in good stead in this age of knowledge. ■



Mingfong is helping students become critical consumers and producers of knowledge to survive in the 21st century.

We Read with WiREAD Re

PROJECT TEAM

Principal Investigator Albert Lim, *Ngee Ann Secondary School, Singapore*
Co-Principal Investigators Jennifer Pei-Ling Tan, *National Institute of Education, Singapore*;
 Muneira Daud, Jacqueline Yew, Yeo Zhongwei, *Ngee Ann Secondary School, Singapore*
Collaborator Tay Siu Hua, *Ministry of Education, Singapore*
Researchers Christin Jonathan, *National Institute of Education, Singapore*;
 Simon Yang, *EduLab, Singapore*



The research team behind WiREAD—a collaborative learning environment that helps learners read texts critically.

“THE INTERNET is like the *Wild Wild West*,” says Mr Albert Lim, Principal of Ngee Ann Secondary School. But students often accept what they read online without questioning the accuracy or intent of the sources.

“It is important to teach students to be discerning of what they read,” Albert continues, “and to not take things at face value.”

Critical literacy is a vital 21st century competency. Yet, teachers face two big hurdles when nurturing students’ critical reading skills.

“During lessons, we guide students to think about and discuss texts more deeply,” explains Mdm Muneira, the school’s English Head of Department. But once they are out of the classroom, students do not always continue such productive discussions.

“It is very challenging to track students’ reading progress and engagement on a weekly basis so that we can support them better,” she adds.

To address these challenges, the school partnered with NIE researchers, and with the support of MOE’s Education Technology Division, WiREAD was born.

More than Technology WiREAD is an online collaborative reading environment with social media features that allow students to view, post and critique a variety of texts with peers.

“It is more than a technology platform,” explains NIE Research Scientist Dr Jennifer Tan. “At its heart, WiREAD is about transformative learning through dialogue.”

This sharing of perspectives pushes students to critically reflect on their beliefs, and find evidence to justify their viewpoints. Such engagement with texts reflect the key learning outcomes of Singapore’s secondary English curriculum.

Data-driven Learning and Teaching To provide timely and formative feedback to students and teachers, the research team uses learning analytics, which can capture patterns of students’ participation, dialogue and social-learning networks on WiREAD.

Students will be able to view visual data on their critical-reading networks, engagement and achievement levels. They can then modify their behaviours to improve learning outcomes.

For instance, not all networks are productive for learning. Research has shown that students with high and low levels of achievement and motivation usually form distinct clusters that hardly interact.

“Such information can help teachers foster collaboration groups that are diverse, and with key members that can help their peers learn better,” says Albert.

He believes other schools might benefit from such a project. “This can be done through the sharing of WiREAD lesson packages, professional development approaches and implementation strategies,” adds Ms Tay Siu Hua, Senior Head, Technologies for Learning Branch in MOE.

Most of all, the team hopes that through this project, students will internalize the critical-thinking skills they have learned and apply them in their lives. ■

Ed Making Music Collaboratively

PROJECT TEAM

Principal Investigator Pamela Grace Costes Onishi, *National Institute of Education, Singapore*

Co-Principal Investigators Larry Francis Hilarian, *Caleon Imelda Santos,*
National Institute of Education, Singapore

Researcher Tan Puay Yon Clarence, *National Institute of Education, Singapore*

NIE RESEARCH Scientist Dr Pamela Grace Costes Onishi came from a musical family. She was formally trained in classical music as a child, while her father, uncles and cousins all learned to play music by joining bands.

She observed something interesting: They could play music by ear even better than her, the one who was “properly” schooled in music. She began to wonder, must music lessons always be about formal learning, such as reading notes?

Community Music Apparently not! Pamela and her research team, made up of Dr Larry Francis Hilarian and Dr Caleon Imelda Santos, are at the forefront of exploring how students can learn music via other approaches. Specifically, they are interested in community music.

Community music is any kind of music that people engage in together and informally. An example would be popular music. Pamela and her team believe that music such as this and the way it is picked up throws light on how music can be taught and learned in class.

The team got two musicians who play Arabic and Latino musical instruments to coach a group of students from the music elective programme.

“Basically they just make music on the spot—that’s the whole point. The musicians don’t teach you anything about reading notes,” says Pamela. Instead, the musicians performed, and the students watched them, and started to make music with them.

Guided Into Learning The musicians responded to the students’ interest level and proficiency. For example, one of them changed his material on the spot when he saw that the students learned a piece very quickly. If a student was bored, the musicians would provide something more challenging. The learners were encouraged to imitate, improvise and experiment.

Describing the musician’s approach, Pamela says, “I don’t know if you can call it teaching. We don’t really call it teaching because the whole



Clarence and Pamela believe that one is not required to be able to read notes to create music.

point of community music is that they are just *guiding* the students into learning.”

Learning by Playing Playing community music also means that students are learning how to make music together.

Pamela explained that for such music, students are compelled to listen to the parts played by their peers, in order to play theirs well. In music, this is called “interlocking”. “Yours will not make sense without the other parts. Together, you create a whole melody—that in itself is collaborative.”

Learning by informed doing is an effective way to understand music concepts. It may even translate into certain habits of thinking and dispositions that will help students as 21st century learners. “It’s really for them to be more aware of others, and it also helps broaden the mind,” says Pamela.

“Everybody is saying the arts can teach 21st century competencies but nobody knows how that happens. So we want to see how that works and to use that pedagogy approach in learning Math or Science or other subjects. That is part of the ultimate goal.” ■

Making the Shift: Towards a 21st Century Curriculum Re

PROJECT TEAM

Principal Investigator David Hung, *National Institute of Education, Singapore*
Co-Principal Investigators Chiam Ching Leen, Jennifer Pei-Ling Tan, *National Institute of Education, Singapore*; Paul Chua, *Ministry of Education, Singapore*

MORE AND more schools in Singapore are now offering the International Baccalaureate (IB) Diploma programme.

Regarded as the “global benchmark” of 21st century curricula, the IB curriculum educates students to be creative, curious, collaborative, risk taking and inquisitive. It also represents a big change for Singapore students who are used to a more content-based curriculum.

The Big Shift Making this important transition with them are their teachers and the school leaders. Prof David Hung, the Associate Dean of the Office of Education Research in NIE, and his research team are keen to find out how the different parties are navigating the major change together as a school.

“The shift between the two different curricula is a big one,” says Dr Jennifer Tan, a Research Scientist at NIE. “Yet, there are very few studies that actually try to understand in-depth the experiences of the whole school.”

The team will try to capture the transition experience and journey of the different parties in one Singapore school, and to document the “processes, enablers, challenges and outcomes of the shifts,” shares Jen.

Change Experience For Jen, what motivates her to look into this transition is her keen interest in developing a unique Singaporean model of 21st century education.

“Rather than shifting to an international model, we want to shift to a uniquely Singapore 21st century education model,” says Jen. “What we want is to draw up shift principles that the team can share with other mainstream local schools, Singaporean-trained teachers, and Singaporean-nurtured students.”

Dr Lynn Chiam, a Research Fellow at NIE, is interested in the co-learning that happens between local teachers and the foreign teachers who are trained to teach the IB curriculum.

Because of their different teaching experiences, values and backgrounds, these teachers bring

different tacit knowledge and perspectives to the table. “Such tacit knowledge needs to be shared so that it can benefit students and help them with the curriculum transition,” says Lynn.

Besides students and teachers, Senior Teaching Fellow Mr Paul Chua notes that any reform efforts in schools should also focus on other stakeholders in the school. “One of our objectives is to look at the school leadership and management and how they respond to the change situation,” shares Paul.

Uniquely Singaporean Lynn hopes their research will eventually spread from one to more schools so that we can understand how different schools in Singapore manage major curriculum shifts differently.

From there, the team envisions an intervention model with some strategies that can help students, teachers and school leaders.

“It will be a model of change enablers that we hope we can take from school to school and student to student,” says Jen.

Hopefully, this will help them make the shift to an education model that is, as Jen describes, “sensitive to our national needs, our national identity and culture, and our national aspirations—not international, not traditional, but the next Singaporean aspirational 21st century competencies model”. ■



Prof Hung (second from left) and his team study the change experiences of students, teachers and school leaders as they shift to a 21st century international curriculum.

Ed Research Highlights

Launch of NIE's New Journal *Learning: Research and Practice*

The Office of Education Research (OER) is proud to announce the launch of the third NIE journal in March 2015.

Published twice a year by NIE and international publisher Taylor & Francis, *Learning: Research and Practice* aims to be the journal of choice for outstanding research that pushes the boundaries of what we know about learning.

The intent is to support distinct and progressive research that responds to the problems of current educational practices and traditional views of learning.

Learning joins the stable of NIE publications that include two other journals. The *Asia Pacific Journal of Education* focuses on educational policies and systems, while *Pedagogies: An International Journal* examines change and innovation in classroom learning and teaching. *Learning* complements its sister journals by providing a much-needed perspective on the often misunderstood science of learning.

Edited by Prof David Hung, Associate Dean of OER, and his team of Associate Editors, the journal is supported by an editorial advisory board that includes eminent and international scholars such as Nancy Law (University of Hong Kong), Paul Kirschner (Open University) and Chin-Chung Tsai (National Taiwan University of Science and Technology).

"I was completely taken in by the all-star lineup of researchers in the inaugural issue," says Prof Kirschner. "If this is a predictor of the future, this journal will be a topper!"

Prof Peter Reimann from the University of Sydney adds, "There is nothing as practical as a theory. This new journal aims to go beyond the 'what works', engaging with educational practitioners in a way where evidence is theoretically reflected."

The inaugural issue features these articles and authors:

- *Gesture as Model Enactment: The Role of Gesture in Mental Model Construction and Inference when Learning from Text*
Mitchell J. Nathan, University of Wisconsin-Madison, USA; Chelsea V. J. Martinez, Highland Community College, USA
- *Becoming Aware: Towards a Post-Constructivist Theory of Learning*
Wolff-Michael Roth, University of Victoria, Canada
- *Learning from Productive Failure*
Manu Kapur, National Institute of Education, Nanyang Technological University, Singapore
- *Argumentation as Core Curriculum*
Deanna Kuhn and Wendy Moore, Columbia University, USA
- *Different Roads Lead to Rome: The Case of Principle-based Cognitive Skills*
Alexander Renkl, University of Freiburg, Germany
- *Reorienting Educational Technology Research from Things to Problems*
Thomas C. Reeves and Patricia M. Reeves, University of Georgia, USA

Any enquiries about the journal can be directed to learning.journal@nie.edu.sg. More information can be found at: <http://www.tandfonline.com/r/lrp>



Events by Office of Education Research

First Cluster Roadshow on Education Research

To pave the way for more research collaborations between NIE and Singapore schools, the Office of Education Research (OER) embarked on its first Cluster Roadshow on 22 January 2015 at Catholic Junior College.

The objective was to initiate dialogue about learning and teaching needs with the audience, made up of 40 Principals and Vice-principals of schools in the S5 Cluster, and the Cluster Superintendent, Mr Ong Kong Hong.

OER wishes to work with the schools to identify their most pressing needs and find the right people and ways to partner them for research and development (R&D) work.

During the roadshow, Prof David Hung, Associate Dean of OER, and Mr Paul Chua, an OER Senior Teaching Fellow, introduced the research expertise available in NIE and explained how schools might benefit from research collaborations.

They also showcased four intervention projects implemented successfully in schools, such as the Critical Web Reader, an online tool that supports inquiry-based learning in Social Studies.

The audience was positive about the roadshow and suggested some areas that researchers may want to explore. “We found the video about the intervention projects informative and it got my Principals and Vice-principals excited about taking up the opportunity to collaborate with NIE,” says Mr Ong.

Prof Hung and Paul are glad to see that schools are receptive to working with NIE. “We will follow up by identifying an educationally meaningful area of need and collaboratively work with the cluster,” says Prof Hung.



Vocabulary Growth of Young Students Over 13 Months in a Seamless Chinese Language Learning Environment

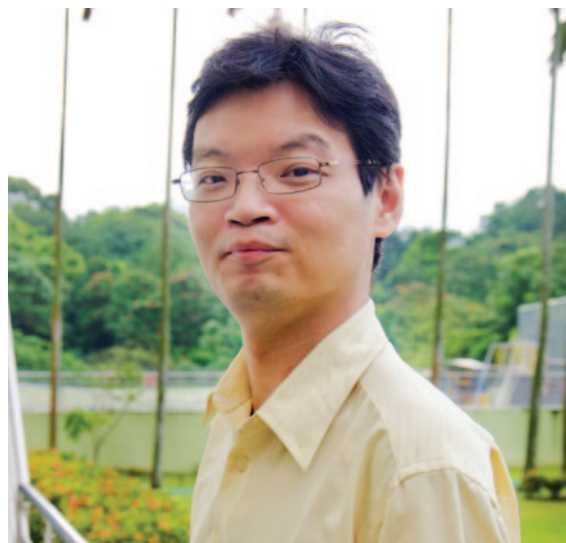
Presented by Wong Lung Hsiang

What is seamless learning? It is the kind of learning that spans across locations, times, technologies or even social settings. A Senior Research Scientist at the Learning Sciences Lab in NIE, Dr Wong Lung Hsiang has been exploring the possibility of seamless and mobile learning in Singapore classrooms.

He recently gave a talk on MyCLOUD, an ICT-mediated seamless Chinese Language learning environment that has been deployed in local schools since 2011. He presented the learning outcomes of 37 Primary 3 and 4 students, with a focus on their vocabulary growth as reflected in the 1,043 social media-like linguistic artefacts created by them over 13 months.

Using a corpus analysis tool, Lung Hsiang analysed the vocabulary usage patterns of the students across time and different learning spaces. He also drew implications for the audience on how they can maximize the learning effectiveness of such a largely self-directed language learning approach.

This talk is organized by the Seamless Learning Task Force from OER. More information about the research task forces is available at: <http://www.nie.edu.sg/office-education-research/research-and-development-framework>



Ed Research Highlights

CONGRATULATIONS TO our colleagues whose research projects were approved for funding in the 12th Request for Proposals by the Office of Education Research.

Project No.	Project Title	Principal Investigator
DEV 04/14 WLK	Establishment of a Maker Space to Promote Students' Interests in Science and Technology as well as Playful Learning	Wu Longkai
DEV 06/14 LYH	NA: Improvement of Learning, Innovations in Teaching (NA: ILIT)	Leong Yew Hoong
DEV 07/14 TTL	Mathematics is Great: I Can And Like (MAGICAL)	Toh Tin Lam
OER 12/14 MT	Characterising Epistemic Engineering Practices in a School Makerspace	Tan Lip Thye, Michael
OER 14/14 WLH	LI-nterChange: Towards a Contextual- and Social-mediated Seamless Language Learning Practice with Multiple Learning Pathways	Wong Lung Hsiang
OER 16/14 SLH	Understanding How Teachers Design Lessons in Response to the Language Demands of Science	Seah Lay Hoon
OER 17/14 KBK	Core Research Programme: Baseline Investigation of Science Pedagogy	Kwek Beng Kiat, Dennis
OER 18/14 AD	An Experimental Evaluation on the Effectiveness of a Web Based Training Program in Functional Behavioral Assessment and Interventions with Special Education Schools in Singapore	Dutt Anuradha Salil Kumar
OER 19/14 TK	Fostering Cross-cultural Communication and Understanding in the English Language Writing	Tamas Kiss
OER 20/14 CCY	Secondary Quantitative Analysis of Core Research Data (2004-2010): A Multilevel Study of Academic Achievement and 21st Century Competencies	Chan Chee Yeen Melvin
AFR 03/14 LWS	A Preliminary Study of Assessment Progression: Evaluation of Assessment for Learning Lessons and Summative Assessment Tasks in General Music Programme (GMP)	Leong Wei Shin
AFR 04/14 LNH	Metacognition and Mathematical Problem Solving – Teaching and Learning at the Primary Levels (MetaMaps (Primary))	Lee Ngan Hoe

The full list of projects is available on the NIE website (www.nie.edu.sg) under *Research@NIE*.

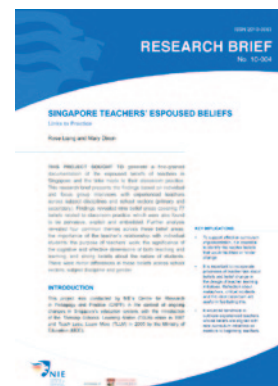
New Publication

NIE Research Brief Series

The latest NIE Research Briefs are now available online. They provide succinct summaries of significant findings and their implications from six NIE research projects which were completed in 2014.

The *NIE Research Brief Series* is a channel for communicating NIE's research findings to policymakers, school leaders and researchers. They are aimed at research-to-practice translation, that is, the dissemination, implementation and diffusion of research findings that impact policy and practice.

To access the complete list of research briefs, please visit: <http://www.nie.edu.sg/research-publications/nie-research-brief-series>





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