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education research: the five lessons

■ contents

Editorial

Professor David Hung
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The third tranche of the Education Research Funding Programme (ERFP) had seen many good and exemplary research done by NIE researchers. Over the 5 years (2013–2017), the third ERFP managed by the Office of Education Research (OER) sought to strengthen the foundation for educational research, and its development and innovation in existing and emerging research areas.

In seeking to understand the lessons derived from these research, OER conducted a synthesis of our findings over the 5 years and identified the kinds of innovations for pedagogical change that would improve our education system. Five key lessons were drawn from our research. In this issue, we highlight five research projects that demonstrated and showcased these lessons.

The first project shows how changes in teachers' epistemic beliefs can occur by building on their *heartware* or passion for teaching. The second one highlights the importance of deepening the connections between theory and practice by shifting learning designs from a focus on high stakes assessments to purposeful learning.

For good innovations to spread, school leaders are the key catalysts to do this, and supportive leadership create the positive conditions and cultures for teachers to experiment and innovate with changes to their practice. Our project on the ecological model of scaling exemplifies this lesson. The following project is about deepening student ownership for their own learning and our research show that student agency can be encouraged through self- and peer-assessments, and developing competencies for peer interactions such as teamwork. The last project showcases a deepening of connections between in- and out-of-classroom learning in order to develop life-long, life-wide, life-deep and life-wise learning.

All these point towards the notion of purposeful learning—connecting learning to purpose, and by doing so, shifts the emphasis of learning away from the purpose of examination preparation or performance to learning for passion and interest. This would fundamentally refocus education for life-long, life-wide, life-deep and life-wise learning.

To read more about our third tranche research synthesis and consolidation, you may access the publications at: *http://www.nie.edu.sg/research/publication/oer-research-consolidation-report* and *https://www.nie.edu.sg/research/publication/oer-crpp-innovations-for-pedagogical-change*

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The Heart Way to Teacher Leadership

PROJECT TEAM

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IS IMPARTING KNOWLEDGE from teacher to student all there is to education?

One research study conducted by Senior Research Scientist Dr Tan Liang See and her co-Principal Investigator Dr Letchmi Devi Ponnusamy have shown that what happens *behind* this transfer is the crucial part.

By Teachers, For Teachers For teachers to know if teaching is optimized for students' learning, it is often effective for them to experience it firsthand.

In a professional development programme (PD) conducted by aRts (STAR), Singapore Teachers' Academy, potential teacher leaders begin as *learners* who learn from experts—international speakers renowned in their respective subjects.

They are not only practitioners but also *experimenters* when they bring new ideas back to their own classrooms and provide scaffold to accommodate their students' needs.

Next, they are *inquirers* as they reflect on and study their own practices. Subsequently, they critique each other's work within their community as *assessors*.

Lastly, they conduct workshops for fellow teachers at the cluster level with their personal insights thus far, hence playing the role of a *leader*.

"By interpreting one set of information received at the workshop for different roles and purposes, teachers use the same information in various perspectives actively so it's a life-deep experience," Liang See says.

Life-deep, Life-wise, Life-long Teachers are also wiser as they reflect on their own practices, make appropriate changes and share insights with their peers.

They learn the strategy of "making thinking visible" which guides students to think about their own thinking. "Previously, art teachers simply instruct the class to draw a picture. Now, they introduce various artists' works to students and analyse the uniqueness of the artwork before class activities begin," Liang See says.

"Students have a deeper understanding of a song they've listened to or an artwork they've come

Liang See believes that learning should be life-deep, life-wise and life-long.

across—this can provide contexts for and allow them to find meaning in their learning."

She also hopes that teachers' learning experience would be a life-long one, noting that many of the participants return to the teacher leader PD programme every year as there is always something new to learn.

"The head and the heart of our teachers are connected but the head needs nourishment, so the pedagogy needs to be deepened and widened in order for teachers to have a lot more choices," Liang See explains.

Connecting the Head and Heart She finds that many teachers have the students' best interests at heart, but some of them struggle with engaging their students. To some teachers, good teaching means relaying information but there is more to it than that.

Just as it is important that students derive their own purpose, meaning and relevance for fruitful learning, it is equally important that the drive to improve comes from *within* the teachers themselves.

Liang See adds, "Even though some participants in the study may already have many years of experience in teaching, they were very willing to learn so it's very interesting and was an eye-opener for us."

"Not only can teachers improve from good to better, but they can also grow from better to the best. There is always room for improvement."

Learning for a Purpose **Re**

PROJECT TEAM

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SCHOOLING IS a social institution with deeply entrenched shared cultural logics, identities, norms, practices. As the focus of learning designs shifts from high-stakes assessment to purposeful learning, the need to strengthen teacher competencies in innovative task designs and data-informed formative assessments is increasingly pressing.

*Wi*READ, a web-based reading and learning analytics programme that fosters students' critical reading skills, is one such project that aims to bridge the connection between theory, research and practice in the classroom.

Designing for a Purpose Leveraging collaborative networked learning technologies and learning analytics, *Wi*READ helps students acquire a richer set of 21st century literacies and learning dispositions, in addition to domain-specific skills in English language. These include critical reading skills and engagement, self-reflection and goal-setting, as well as social citizenry in learning.

"Our aim is to develop students' appreciation of learning and critical reading as a rich social practice that goes far beyond an individualistic act of reading a text and answering a few questions on a worksheet or test," says Dr Jennifer Tan, Principal Investigator of *Wi*READ.

Critical engagement with texts involves deeper understanding of the purpose, audience, context and culture—especially those that are either privileged and/or silenced.

"It also involves expressing and justifying one's ideas convincingly, and responding thoughtfully and respectfully to diverse perspectives from peers and significant others," Jennifer adds.

Designers with Purpose *Wi*READ is in its 4th year of implementation in the seed innovation school, Ngee Ann Secondary School, with continued usage beyond the official completion of the research project. This interest and uptake has also been spreading to other interested schools.

Jennifer attributes the success of *Wi*READ to the strong involvement of the seed school's Principal and key personnel, all of whom participated as co-designers of *Wi*READ in the iterative cycles of conceptualization, implementation, evaluation and refinement over the 4 years.

"Successfully bridging the theory-practice gap is a challenging endeavour. Very often, learning scientists and researchers come from a theory-driven position, and rightly so, while our teachers have to focus largely on the everyday pragmatics of classroom teaching," explains Jennifer.

"Hence, design-based research like *Wi*READ is about deepening connections between theory and practice by partnering expert practitioners upfront, so that real impact and meaningful change in learning and teaching can be experienced by our students and teachers".

Researchers with Purpose Singapore teachers often want to move beyond teaching for summative or high-stakes tests and exams. However, they also do not want to compromise on student achievement as a part of their professional responsibility.

"This is where researchers can come alongside teachers to forge a strong theory-practice nexus that can improve both students' achievement and 21st century competencies." says Jennifer.

Principal of the seed innovation school Mr Albert Lim expressed in a video interview: "The research partnership allows us to tap into [NIE's] expertise in terms of the theoretical underpinnings and learning theories, and using that to design lessons that develop 21st century skills is something that we have benefitted from." (OER, 2015).

Competencies with a Purpose Ultimately, teachers sit at the heart of effective instructional practices that yield powerful learning experiences and outcomes. Professional structures and spaces that facilitate the strengthening of teachers' competencies in innovative task design and formative assessments have to be provided.

"We saw through every iteration of our design-based research cycles that teachers' competencies, initiative and ownership of the pedagogical innovation were built up," Jennifer shares.

"As teachers saw their inputs being incorporated into *Wi*READ in concrete ways and the corresponding evidence of learning gains, the growth in their confidence levels and a gradual transformation of their professional identities became evident—as not just implementers, but also designers of purposeful learning." ■

Reference Office of Education Research – NIE. (Producer). (2015). *21st Century Teaching and Learning at NIE* [Video]. Available from *https://www.youtube.com/watch?v=zKeOvIixwVw*

An Ecology of Educational Scaling

PROJECT TEAM

Principal Investigator David Hung, *National Institute of Education, Singapore*
Co-Principal Investigators Lee Shu Shing, Yancy Toh, Wu Longkai, Azilawati Jamaludin, *National Institute of Education, Singapore*

THERE ARE many educational innovations around but a substantial number of them do not enjoy widespread use.

This observation prompted former NIE researcher Dr Yancy Toh to embark on a research project titled *Towards an Ecological Model of Scaling*, where she sought to find out what enables an educational innovation to scale.

"Through her study, Yancy hypothesized that the components of an educational ecosystem—teachers, school leaders, classroom, culture—are what determine whether or not an innovation scales," shares project Principal Investigator Prof David Hung.

Building Teacher Capacity Prof Hung believes that shifting the focus from what the resource is about to how teachers can incorporate it into their lessons is the first step to scaling an educational innovation.

"This means that we have to equip teachers with the skills that would enable them to integrate these innovations into their lessons," says Prof Hung.

Nevertheless, even if teachers possess the know-how, efforts to test out new educational innovations in the classroom would not sustain in the long-term without the support of school leaders.

Setting the Right Conditions To encourage teachers to take advantage of the variety of educational innovations available and try out different teaching approaches, support from school leaders is key.

A supportive school leadership, which includes the principal, head of departments, subject heads and level heads, would set the conditions and cultures that facilitate teachers' efforts to experiment and incorporate new approaches into their practices.

In doing so, teachers would not be deterred from innovating with their practices and quality innovations can also spread within the education system.

Prof Hung and his team believe that a supportive culture is the key to effective educational scaling.

Buy-in from Parents Apart from developing teacher capacity and having supportive school leaders, Prof Hung also believes that buy-in from parents is necessary in enabling an educational innovation to scale.

"Take bilingualism as an example," he explains. "If parents do not embrace this concept by communicating with their children in their respective mother tongues, even the best teachers and educational resources would not make children effectively bilingual."

Likewise, attempts by teachers to experiment with alternative approaches would not be impactful without the support of parents.

Scaling in Education: A Social Process The connections between different components of an educational ecosystem illustrate that scaling in education is in fact, not a linear or mechanistic process, but a social one.

"It is not enough to simply develop the innovation and build up teacher capacity," says Prof Hung. "You also have to prepare the entire educational ecosystem to scale the innovation."

In doing so, the variety of educational innovations would be utilized more widely and teachers could eventually be incorporating these innovations into their practices for the long-term.

PROJECT TITLE

We Learn: Developing Teacher Capacities to Enable Collaborative Inquiry-Based Learning with Mobile Technologies in SingaporeSchools

Giving Students the Autonomy to Make Discoveries

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THE EDUCATION system today strives to bring out the potential in every student by promoting active forms of learning in schools. As such, the science classroom is moving away from learning by knowledge transmission to learning by inquiry.

Learning by Questioning "Instead of passively receiving information from teachers, students now contribute by asking questions on and articulating their observations of science phenomena or concepts," says Research Scientist Dr Lee Shu Shing.

To encourage the spirit of questioning, students are provided with the necessary tools and spaces in class. Students are given the agency to learn, collaborate, and articulate their understandings through peer-learning and group work.

"The key is giving the students ownership of their learning, giving them opportunities to ask their own questions and be active in their learning," notes Shu Shing's research colleague Dr Peter Seow.

"They can ask questions and we give them the resources, the technology and the tools so they can try to find answers for themselves."

Experiential Learning To encourage students to be active learners, the research team discovered that it is crucial to first engage them through real world experiences. One of the schools the team worked with redesigned their science garden to include different types of interesting plants.

"They purposefully thought about what plants to put in the garden that will catch the students' attention and get them to ask questions about," shares Peter. Some of these plants include the venus flytrap and pitcher plant.

Students were also given the opportunity to pull out a sweet potato plant and experience for themselves the usefulness of roots in keeping a plant in place. They learn what the different functions of roots are through such activities.

Stop Underestimating Students As students become active participants in their own learning,

science lessons become something they look forward to.

"With all these experiences, students continue wanting to explore, and this deepens and widens their scientific understanding," shares Shu Shing. In fact, the way the students have taken to inquiry methods in the classroom seems to have surprised their own teachers.

"Sometimes, teachers have the mindset that their students are not able to do certain things," Peter says. "However, we found that students, when given the opportunity, were able to cope well with not only the responsibility of constructing their own knowledge, but also with vagueness and uncertainties."

As Shu Shing puts it, "Knowledge is not just in the textbook; it is everywhere. While exams have right or wrong answers, there is a spectrum of answers in the real world."

Shu Shing and Peter discovered that independent learning improved students' learning experiences.

Learning through Co-Curricular Activities

PROJECT TEAM

Principal Investigator David Hung, *National Institute of Education, Singapore*
Research Fellow Chong Sau Kew, *National Institute of Education, Singapore*

LEARNING CAN occur anywhere and not just within the confines of a timetabled classroom. One such platform conducive for learning includes the school's co-curricular activities (CCAs) that students voluntarily participate in. What then is the relationship between the two kinds of learning—in and outside of classroom—and how can we reconcile them?

Benefits of Co-Curricular Activities Compared to formal classroom curriculum, many tend to view CCAs as a form of unstructured learning with minimal impact on students' academic development. The idea of CCAs providing students with little opportunities for reading and writing is also not uncommon.

One Research Fellow from NIE begs to differ. "Prior to joining OER, I have studied about the different ways in which students use literacies in their schools and the type of literacy practices that they engage with are actually more diverse *outside* of classrooms than those in classrooms," explains Dr Chong Sau Kew.

CCAs such as Infomedia Club or similar activities on media production, according to Sau Kew, open up an array of literacy learning opportunities for students. For example, when students create video clips, they also learn how to edit scripts and write succinctly to communicate with the audience.

"Students tend to be given more spaces in their CCAs to explore and discuss with their peers," she says. "So, if you compare their learning experiences within and beyond the classroom setting, there is quality learning too in the latter."

Learning Beyond the Classroom In schools, the concept of aerodynamics is typically taught at Secondary 3. However, some lower secondary students may get a head start in this topic as a result of their participation in their CCA—Design and Innovation Club.

"Some of the students we interviewed shared their experiences of building miniature F1 cars for their racing competitions and to do that, they need to understand the concept of aerodynamics and put it into practice," shares Sau Kew. "This is a very complex and abstract topic but the students implicitly acquired this knowledge through this CCA, well before they were formally taught at Secondary 3."

CCA and Classroom Learning While some CCAs such as Infomedia Club, and Design and Innovation Club may prepare students for classroom learning, Sau Kew also cautions against generalizing this phenomenon.

"Learning in CCAs is situated and highly context dependent. While learning transfer between CCAs and classrooms sometimes occurs, activities in different CCAs offer different opportunities for learning in classroom," she explains. "What is transferred to classroom learning (from CCA) then often depends very much on the kind of activities that students are exposed to or interact with in their CCA."

For instance, some CCAs may potentially prepare students for life *after* schooling instead of enhancing academic curriculum while they are at school.

However, Sau Kew also notes that it may not be easy for some to spot the connection between learning in CCA and academic curricula. "Some of the teachers who participated in this project shared that they can't see the learning connection between the two. But surprisingly, it was the students who saw the connection across the two contexts."

Moving forward, Sau Kew and her team also hope to further explore and understand this issue of transferability, and research the ways in which CCAs and classroom learning can best be integrated. ■

Events by Office of Education Research

NIE Hosts 31st International Congress for School Effectiveness and Improvement (ICSEI)

NIE had the privilege of hosting the 31st *International Congress for School Effectiveness and Improvement* (ICSEI) from 8 to 12 January 2018.

This year's congress, themed *Deepening School Change for Scaling: Principles, Pathways and Partnership*, sought to generate discussions on the factors that drive educational innovation and how efforts to foster school improvement can be spread across multiple schools.

More than 700 local and international participants from over 40 countries attended the Congress, including Australia, Canada, China, Philippines, South Korea, U.K. and U.S.

Mr Ng Chee Meng, Minister for Education (Schools) and Second Minister for Transport, graced the Opening Ceremony as the Guest-of-Honour and had the opportunity to interact with eminent thinkers and researchers in educational effectiveness and innovation.

ICSEI President Professor Andy Hargreaves also delivered a presidential speech at the Opening Ceremony, during which he presented the ICSEI Life Membership Award to immediate past president of ICSEI, Professor Michael Schratz.

Here are the highlights of this year's Congress:

- Four Keynote Presentations
- Keynote Symposium – *The Singapore Story*
- Keynote Panel Discussion – *Improving and Leading Schools for the Future Economy and Society*
- Conference Debate – *Educational Innovations must be Disruptive to be Effective*
- State of the Art Session – *School Improvement for Equity and Excellence: Rhetoric, Possibility or Reality?*

The 4 keynoters and their presentation titles are as follows:

- Dr Alicia Grunow (The Carnegie Foundation for the Advancement of Teaching) – *Heart and Rigor: Learning to Improve in America's Schools*
- Associate Professor Carol Campbell (University of Toronto) – *Influential Educators: Leading Educational Improvement*
- Ms Lucy Crehan (Education Consultant and Author) – *Seeing is Believing: The Role of Teacher Knowledge and Beliefs in the Scaling of Effective Teaching Strategies*
- Professor Kiyomi Akita (The University of Tokyo) – *Improving Quality in Education through Lesson Studies*

Alongside the main plenary sessions, there were over 300 scheduled presentations that took place during parallel sessions held between Days 2 and 4 of the Congress. These presentations took the form of general papers, symposia, workshops, roundtables and Innovate sessions.

The congress concluded with a half-day school visits programme, where participants had the opportunity to visit various local educational institutions and learn about how the Singapore education ministry's vision of "Thinking Schools, Learning Nations" is enacted in individual institutions.

Ed Research Highlights

ICSEI 2018: Workshop on Publishing in Academic Journals

As part of the *International Congress for School Effectiveness and Improvement* (ICSEI) held at NIE, a workshop on how to publish in academic journals was conducted on 11 January 2018.

The session was led by Lyndsey Dixon, Regional Journals Editorial Director for Asia Pacific at Taylor & Francis, who explained how to select the right journal to publish in and the peer review process, and addressed questions by authors.

Editors of NIE journals, Prof Christine Goh, Assoc Prof Daniel Tan and Dr Dennis Kwek, together with Co-Editor of ICSEI's flagship journal, *School Effectiveness and School Improvement*, Prof Roel Bosker from University of Groningen, were also part of the panel discussion. They shared more about the three NIE journals and fielded questions from the 20 participants at the session.

You can find out more about how to publish with NIE journals *Asia Pacific Journal of Education*, *Pedagogies: An International Journal*, and *Learning: Research and Practice* here: *http://www.nie.edu.sg/research/publication*

Education in the City: Helping Children Cope with Stress

The Office of Education Research (OER) has partnered the National Library Board (NLB) to organize a series of talks themed *Education in the City*.

This series aims to showcase education research perspectives to give the public a deeper understanding of issues in education and provide tips on what can be done to help our children.

The first public talk, titled "Helping Children Cope with Stress", was held on 3 November 2017 at the National Library Building. Speakers from OER's Research Centres, Research Scientists Dr Wong Hwei Ming and Dr Fannie Khng, presented on topics such as effects of stress on children, the role of parents in helping children manage stress, mindfulness and breathing exercises to relieve stress.

The talk concluded with a Q&A session moderated by Dr Dennis Kwek, Assistant Dean of Research Communications at OER where members of the audience posed questions to the speakers on the effectiveness of deep breathing exercises in helping children manage stress and how parents can help their children better manage educational pressures.

Publication

NIE Journal Improves in Impact Factor

NIE's flagship journal, *Asia Pacific Journal of Education* (APJE), achieved an impact factor of 0.785 in 2016. This is a new high for the journal and represents a 25 per cent increase from its 2015 impact factor of 0.531.

According to the 2016 Journal Citation Reports recently released by Thomson Reuters at the end of 2017, APJE is now ranked 160 among 235 journals in the "education & educational research" category.

The impact factor is commonly used as a measure of the frequency with which the "average article" in a journal has been cited in a particular period. An impact factor of 0.785 means that the average article published between 2013 and 2014 was cited 0.785 times in 2016.

APJE is currently helmed by Lead Editor and NIE Director Professor Tan Oon Seng. He is assisted by Editors Professor Christine Goh, Dean of Office of Graduate Studies and Professional Learning, and Associate Professor Liu Woon Chia, Dean of Office of Teacher Education.

More information about the journal is available at: *http://www.tandfonline.com/cape*

New Publications

NIE Research Brief Series

The latest 2017 research briefs from the *NIE Research Brief Series* are now publicly available for download on the NIE website. This series features research projects on nurturing positivity, teacher leadership and more.

Conceived as a channel for communicating NIE's research findings to policymakers, school leaders and researchers, the research briefs aim to translate research findings to impact policy and practice.

For download or more information about the research briefs, please visit *www.nie.edu.sg/research/publication/nie-research-brief-series*

## OER Knowledge Bites Volume 5 and 6 Available Online

The 5th and 6th edition of Knowledge Bites are now freely available for download at the OER website.

Both volumes are based on a research sharing seminar that was organized by OER in collaboration with the Academy of Singapore Teachers.

Volume 5, *Science Education in Singapore: Where to Next?*, reviews the state of science education in Singapore and highlights the challenges that the local science classroom faces. Volume 6, *Math Education in Singapore: Where to Next?*, sought to generate discussions on the state of mathematics education in Singapore classrooms and how the teaching of mathematics can be transformed to enrich students' learning.

OER Knowledge Bites aims to share and discuss education research and issues in the Singapore context. It is also a platform for education researchers to share ideas in a way that is accessible to policymakers, educators and members of the public.

Download the PDF versions of these editions at: *http://www.nie.edu.sg/research/publication/oer-knowledge-bites*
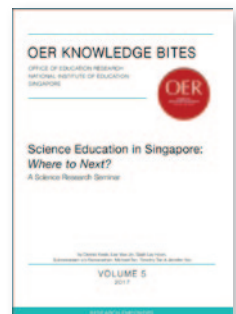
![Ed] Research Highlights

CONGRATULATIONS TO our colleagues whose research projects were approved for funding in the 17th, 18th and 19th Request for Proposals (RFP) by the Office of Education Research.

RFP	Project No.	Project Title	Principal Investigator
17	OER 27/17 KKT	A Study on the Implementation Status of the Physical Education (PE) 2014 Syllabus in Singapore Schools	Koh Koon Teck
18	DEV 02/17 XHC	Enhancing Developmental Screening in Early Childhood Settings: Adapting and Testing a Singapore Version of the Ages & Stages Questionnaires, Third Edition (ASQ-3)	Xie Huichao
18	DEV 03/17 EK	Developing My Groupwork Buddy for Geography	Koh Ruilin Elizabeth
18	OER 12/17 NWL	Flipped Linear Algebra and Calculus for Pre-Service Teachers (FLACPT)	Ng Wee Leng
18	OER 13/17 CM	Development of a Computerized Adaptive Test (CAT) for the Activities and Participation Rating Scale (APRS) in Singapore	Chen Mo
18	OER 14/17 NEL	Transitioning from Kindergarten to Primary School – Exploring the Links between Children's Self-regulation Skills, Socio-emotional Competence and Academic Outcomes	Ng Ee Lynn
18	OER 15/17 LSS	Teacher Inquiry about Pedagogical Practices: A Case Study of a Singapore school	Lee Shu Shing
18	OER 16/17 YPD	Immigrant Teachers in Singapore Schools: Trajectories, Identities, and Integration	Yang Peidong
18	OER 17/17 SH	Preschooler's School Engagement to Teacher's Questions and Comments during Interactive Book Reading: A Child-Centered Approach using Electro-Dermal Bracelet	Sun He
18	OER 18/17 WLK	Bridging School-Based Formal and Informal Learning Spaces: A Case of Advancing Interest-Driven Education in Singapore Schools	Wu Longkai
18	OER 19/17 LKE	Building a Culture of Collaboration and Listening Pedagogy in Classrooms through Lesson Study for Learning Community: An Exploratory Study in a Primary School in Singapore	Lee Kim Eng, Christine
18	OER 20/17 TTL	CAlculuS for TEaching and Learning: An Exploratory Study	Toh Tin Lam
18	OER 21/17 ISC	Nurturing Positivity and Resilience in Singapore Schools: Development and Evaluation of an Arts-Based Positive Psychology Intervention Toolkit	Caleon Imelda Santos
18	OER 22/17 CSL	Cultivating Cosmopolitan Virtues through Critical, Aesthetic and Ethical Engagements with Literature	Suzanne Choo Shen Li
18	OER 23/17 CCY	Core (2018): A Quantitative Study of Teaching and Learning in Singapore Classrooms	Chan Chee Yeen Melvin
18	OER 24/17 HS	Effectiveness of Teacher Leaders in Singapore Schools: Context, Construct and Causality	Hairon Salleh
18	OER 25/17 TTW	Science Teachers and Teaching of Special Education Needs Students	Teo Tang Wee
18	OER 26/17 KN	Parents' Perception of "Play" and "Holistic Development" in the Early Years	Nirmala Karuppiah
18	AFR 02/17 TSC	Improving Science Instruction through Teacher Noticing and Reflective Dialogues	Tan Seng Chee
18	AFD 04/17 TS	Toward Effective Multimodal Meaning-Making with Visual Data in Geography through Productive Classroom Talk	Tricia Seow
18	AFD 05/17 ZW	Enhancing Maths Curriculum Through Team-Based Learning	Zachary Walker
18	AFD 06/17 CBH	Enhancing Orchestration of Mathematical Learning Experiences through Productive Teacher Noticing	Choy Ban Heng
18	AFD 07/17 TPL	Development and Use of a Web-Based Collaborative Video Annotation and Analytics Environment to Enhance Blended Teacher Professional Development (CoVAAPD) in Physical Education	Jennifer Pei-Ling Tan
19	OER 28/17 TCL	Uncovering What Matters in Collaborative Inquiry Learning: Impact of Teachers Engagement in Learning Analytics on Their Intervention to bring about Knowledge Building Discourse	Teo Chew Lee
19	OER 29/17 MM	The Place of Sebutan Baku in Students' Spoken Malay	Mukhlis Abu Bakar
19	OER 30/17 HPY	Vice-Principals in Singapore: Key Leadership Roles, Enablers and Constraints	Jeanne Ho
19	OER 31/17 NYH	Development of the Youth-Theory of Mind (Y-ToM) Singapore Version	Nah Yong Hwee
19	OER 32/17 TYC	Facilitating Flow in Band: Learning with Joy in the 21st Century	Leonard Tan
19	OER 33/17 JH	Teacher Learning with Classroom Assessment in Singapore Schools	Jiang Heng
19	OER 34/17 TSS	Navigating Diversities and Differences in Singapore Schools: An Exploratory Study of Students' Intercultural Mindedness	Teng Siao See
19	AFR 03/17 TLS	Examining Teachers' Conceptions and Use of Reflection to Understand Their Own Practice	Tan Liang See
19	AFR 01/18 AB	Towards Responsive Professional Development for Singapore Music Teachers - Phase 3: Investigating Efficacy of Video-Based Professional Development	Alfredo Bautista

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

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