

RESEARCH WITHIN REACH

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THE BIG IDEA

How Teachers Teach and
How Students Learn

CLASSROOM PERSPECTIVES

Zooming In On Practice

PEOPLE

The Core of Teaching
and Learning

The Heart of Classroom Pedagogies



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We believe education research can be practical and relevant to the classroom. *SingTeach* was initiated in 2005 to bridge the gap between research and practice for you, the teacher.

Published quarterly by the Office of Education Research at the National Institute of Education, Singapore, *SingTeach* is an e-magazine dedicated to improving teaching and enhancing learning. Each article is crafted with teachers in mind.

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Dr Dennis Kwek
Associate Dean,
Strategic Engagement
Office of Education Research

Each time a teacher steps into the classroom, his or her goal, more often than not, is to deliver a lesson that enables the most effective student learning to occur. In this case, effective lesson delivery refers to the ability to teach and engage the students, and optimize their learning experiences over time.

To be able to do that, however, is no mean feat but providing teachers with the right resources, support structures and adequate knowledge of what goes behind classroom lessons can give them the confidence that they need to actively contribute to positive student learning outcomes. This contribution comes in the form of what is known as the “Instructional Core”.

The Instructional Core essentially refers to Teachers interacting with Students in the presence of Content (or subject matter). In any learning setting, these three essential components—Teacher, Student, Content—will always be present, be it in a classroom, at home or in bible camp for instance. Key to the Instructional Core is the *interactions* between

these three components that enable effective teaching and learning to occur. By understanding the relationship between these three elements and how they influence each other, we can get a glimpse into what teachers and students do daily in the formal school setting that we would call “education”.

In this issue of *SingTeach*, we delve into the heart of Singapore classrooms, and focus on how our teachers teach and how our students learn educational content. The Big Idea article, “How Teachers Teach and How Students Learn”, will further unravel the definition of Instructional Core, and how it affects both teaching and learning.

The rest of the issue highlights reflective teaching as a key role in improving classroom practices, an NIE flagship research programme that actively examines the Instructional Core, and the importance of this programme from the perspective of the Ministry of Education. Four teachers also share with us how they constantly better their classroom teaching.

Finally, I hope that you, as part of the teaching fraternity, will be inspired to take teaching and learning in your own hands as you embark on a journey of professional learning that ultimately shapes the lives of our young learners. I also hope that this issue will enable us to think further and deeper into how we teach and how our students learn, so as to improve the pedagogies that we use.

ONLINE EXCLUSIVES



TIP BITS

Enhance Classroom Instructions and Students' Learning in 5 Ways

CONTRIBUTION

Pattern Generalization: An Introduction to Algebra at the Secondary Level

HOW TEACHERS TEACH AND STUDENTS LEARN

Are good teachers and teaching the keys to classroom improvement? While those factors do contribute to effective teaching and learning, guest editor of this issue Dr Dennis Kwek also believes that beyond just the person (teacher) and the act (teaching) lies the heart of truly effective classrooms—the instructional core. He shares with us what that is and how it affects both teaching and learning.



Imagine the comfort of a home: *A mother teaches her young child to speak a certain language.* Bring it back to the classroom and the scene is not any different—a teacher teaches the students a particular subject or topic.

“No matter how and where you look at them, learning happens at *any* environment and situation, and the factors involved in every learning are always the same three—the knowledgeable other (teacher), learner (student) and content (topic),” explains Dennis who is also the Programme Director of the Schools, Leadership and System Studies Priority Area of Research in the Centre for Research in Pedagogy and Practice. “That is essentially what is known as the instructional core.”

RESEARCH ON THE INSTRUCTIONAL CORE

It is the heart of all teaching and learning, to put it simply.

Leading NIE's CORE Research Programme, Dennis and his research team aim to observe, analyse and understand what happens in Singapore classrooms. "To understand instructional core, we look very closely at how teachers work with students in helping the latter acquire knowledge," he explains.

But more than just looking at how our teachers conduct lessons, it is the *interaction* between teachers and students, teachers and content, and students and content that makes the research interesting and important.

How do teachers interact with students? How do teachers design the content to make it interesting for students? How do students engage with those content and acquire knowledge?

"So to understand the instructional core, we aim to answer three questions—how teachers teach, why they teach the way they do and how students learn," Dennis shares. "As such, these questions are the underlying philosophies of what the CORE Research Programme at NIE is about since 2004."

REFLECTIVE TEACHING A PART OF INSTRUCTIONAL CORE

What happens after Dennis and his team observe and analyse Singapore classroom practices?

"While we can't directly improve teaching practices, we hope to help teachers re-look at the way they teach to enhance their students' learning," he says. "We want to give back to teachers a range of resources that can help in their teaching."

One way to do that is through the videos of the classroom that the team recorded in the duration of the programme. The researchers will watch these videos with the teachers involved and discuss about the various things that the teachers have done well and areas where improvements can be made.

(Read more about Anglo-Chinese School [Junior]'s journey of reflection in "Zooming In On Practice" on page 10.)

"These videos serve as a reflective platform for teachers who will work closely with our team of researchers that consists of both former teachers and teaching fellows," Dennis adds.





MAKING AN IMPACT IN CLASSROOMS

While instructional core is at the heart of teaching and learning, making an impact—albeit gradually—in Singapore classrooms is something Dennis has been hoping to achieve since the onset of the CORE Research Programme.

At the beginning of the programme, the team focused on informing education policies based on their research findings. “Today however, we are not only informing policymakers but also curriculum designers during curriculum reviews which happen every 6 years,” Dennis shares.

At the same time, the team is also exploring how they can inform teacher training programmes at NIE. They are also working closely with Master Teachers from the Academy of Singapore Teachers (AST) to translate research findings into professional development materials for teachers.

“The idea behind this plan is that, we hope to see changes in the instructional core because of either the teacher training programmes at NIE or our work with AST,” Dennis adds.

True to its name, the CORE Research Programme is indeed a study that is important and fundamental to Singapore’s education system. With reflective practitioners who are well-equipped with the know-hows of classroom instructions, teaching and learning can definitely be more effective. ■

DEDICATED WORKSHOPS FOR TEACHERS

According to education researcher Meredith Gall (1970), teachers ask students an average of about 350 questions in a single day. However, effective questions that benefit both the teacher and students do not occur at random. In fact, it takes deliberate planning and thinking for effective questioning sessions to occur in the classroom.

And our teachers are well aware of that.

“During our sharing sessions with some teachers and head of departments, it emerged that questioning techniques is the most important thing teachers want us researchers to engage them in,” Dennis shares.

To ensure that the teachers and students benefit most from Dennis’s research study on the instructional core, his team is currently developing a series of workshops that look at enhancing teachers’ questioning skills.

“This is also one way we can give back to the teachers and students who have been involved in our study,” he adds.

However, Dennis says that these workshops are not intervention programmes. “We are not trying to change practices directly – we are only focusing on improving the way they teach that will ultimately impact students’ learning.”



About the Guest Editor

Dennis Kwek is Programme Director of the Schools, Leadership and System Studies Priority Area of Research in the Centre for Research in Pedagogy and Practice located under the Office of Education Research at NIE. He is also the Principal Investigator of the CORE Research Programme and his research interests include Asian philosophy and pedagogies, classroom interactions, and pedagogical research.

Reference

Gall, M. (1970). The use of questions in teaching. *Review of Educational Research*, 40(5), 707-721.

Refining Classroom Pedagogies from the Ground



The goal of NIE's CORE Research Programme is not simply to document and identify effective pedagogies, but ultimately to improve teaching and learning in Singapore. We speak to teacher-trained Research Associate Edmund Teo to find out more about the significance of CORE in Singapore's education landscape.

When contemplating ways to deepen teaching and learning, educators tend to explore strategies that have proven to be effective in overseas education systems and attempt to incorporate them within the local classroom.

Given Singapore's unique social, cultural and historical context, however, approaches that are effective in other education systems may not yield similar results when applied locally.

In fact, Edmund Teo, a Research Associate with the CORE team, believes that efforts to improve teaching and learning in Singapore schools must begin with an understanding of past and present practices in local classrooms.

UNDERSTANDING THE GROUND

The CORE project, a longitudinal study of classroom practices in Singapore, started in 2004 and is currently in its third phase.

"We begin each phase by documenting lessons across multiple primary and secondary schools in Singapore," shares Edmund. These lessons span a range of subjects including English Language, Science, Mathematics, History, Literature, Music, Character & Citizenship Education and Social Studies.

However, the research does not focus on subject content per se. "CORE aims to improve teaching and learning so when analysing the lessons, we pay close attention to how teaching occurs and the impact of teachers' practices on students' learning," Edmund explains. "We then try to identify practices that facilitate student learning, which may be common across different subjects."

To supplement lesson observations, the CORE team conducts surveys, interviews and focus group discussions with teachers and students. In doing so, the research team establishes an understanding of teachers' instructional beliefs and priorities as well as how students can be better engaged as learners.



“What the CORE team brings to the table, rather, are insights about classroom practices from an academic perspective”



IMPACTING TEACHING AND STUDENT LEARNING

“After the findings are ready, the research team organizes follow-up sessions with teachers, where we share insights gleaned from the data collected,” Edmund says. “We also engage them in conversations about how these insights relate to their practices and students’ learning.”

Apart from discussing the findings and insights, teachers also share what worked well for them and areas where they would benefit from professional development opportunities.

“Several teachers expressed that participating in CORE has made them more mindful about how they teach and how their students learn,” Edmund adds. This awareness prompts teachers to reflect on how they can refine their teaching to better engage students and improve learning outcomes.

MULTIDISCIPLINARY APPROACH TO IMPROVING CLASSROOM PRACTICES

While the CORE team is keen to work with teachers to improve their craft, Edmund is cognizant that the team’s expertise is *not* in informing teachers how to teach better.

“Honestly, that expertise lies with teachers themselves and the MOE academies. What the CORE team brings to the table, rather, are insights about classroom practices from an academic perspective,” Edmund clarifies.

So what can be done to use the insights from CORE to improve classroom practice?

Edmund ventures that teachers, researchers and pedagogical specialists should form a professional learning community that pulls together their different areas of expertise to develop teaching and learning resources that improve student learning.

TEACHERS AS AGENTS, NOT CONSUMERS OF RESEARCH

Before taking up the Research Associate post in 2016, Edmund, who has been a teacher for over 17 years, held the view that he was a mere consumer of research.

His stint with CORE, however, has not only enriched his understanding of how research informs practice, but also prompted him to rethink the role of teachers in education research.

“I have come to realize that if I am to consider myself a professional educator, it is not enough for me to passively consume research and adopt practices that others suggest I adopt,” says Edmund. “In fact, as a professional educator, I need to engage in research to reflect on and refine my own practices.”

Although it has been 2 years since Edmund became an education researcher, he remains a teacher at heart and hopes to eventually return to teaching, where he would use the insights gained from CORE to deepen his practice.

“For one, I would be more deliberate in forming a teaching and learning community among teachers in the school, where we engage in collaborative research to collectively improve our craft,” Edmund shares.

Beyond that, Edmund is also keen to include parents within the education community. “After all, it does take a village to educate a child and in Singapore, we are fortunate that parents want to be involved in the education process. They simply need to know how they can contribute,” Edmund adds.

If schools and parents can work together to support the education of every child, students would eventually reap the benefits of efforts to improve teaching and learning. ■



About the Interviewee Edmund Teo

Edmund Teo has been a Research Associate with the Centre for Research in Pedagogy and Practice since 2016. A qualified teacher, Edmund joined the education service in 1998 and has over 17 years of experience as a junior college and secondary school English teacher. He is passionate about working with schools to improve teaching and learning and looks forward to returning to teaching.

“CORE aims to improve teaching and learning so when analysing the lessons, we pay close attention to how teaching occurs and the impact of teachers’ practices on students’ learning”

ONLINE EXTRAS!

Is Singapore’s education system all about “drill and practice”? Find out more in the online version of *SingTeach!*



ZOOMING IN

On Practice

Constantly developing oneself is often high on many teachers' priority lists. To better develop her classroom practices, a former teacher with Anglo-Chinese School (Junior) joined a study by an NIE researcher which uses videos to delve deeper into her classroom instructions and how they can be improved.

CLASSROOM TEACHING ON VIDEO

Ms Ang An Lian collaborated with a researcher from the Office of Education Research (OER) at NIE on a research project in 2017. The project, which is part of a larger research study under the CORE Research Programme, aims to study how teachers teach in classrooms and how students learn as a result of the teaching. This involves video-recording the lessons, watching the videos, and lastly, discussing about and reflecting on what happened in those videos.

While some practitioners may have reservations about watching themselves teach, An Lian feels that the benefits from watching such videos far outweigh the awkwardness that might come with it.

To fully benefit from this exercise though, An Lian shares, "It is important to watch the videos a few months *after* the recording instead of doing so within the next few days." The time gap will naturally allow the teachers to view the recordings in a more objective manner due to the detachment from the lesson objectives by the time the videos are played.

"When I watch the videos a few months later, I feel more distanced and less self-conscious," shares An Lian. "I also mentally tell myself to observe myself in the video as how I would a beginning teacher, so I take the lessons as they are, and I am less biased."

REFLECTIVE TEACHING THROUGH VIDEO ANALYSIS

As reflection was the main part of the research project, An Lian had worked closely with OER Research Associate Fatema Anis Hussain who conducted three conference sessions with her to analyse and discuss how she teaches through the videos.

Fatema would pause the videos at specific sections and ask An Lian targeted and meaningful questions such as “Is there a reason why you did this hand gesture?” and “Did you notice this student throwing out some questions?” This way, An Lian was also able to re-think her actions and at the same time, also observe her students’ behavior in class from a third-person perspective.



“I was able to spot certain things which I didn’t see before,” shares An Lian. “We always have blind spots as teachers so it’s always important to go back and review the lesson and see how best we can improve.” For example, she realized through the videos that she tends to overuse certain words and that her PowerPoint slides were too wordy.

Watching parts of the video instead of the full version allows for a more targeted approach and is especially useful for teachers who are typically busy with teaching and after-school activities.

“When you’re teaching it’s very different from actually sitting down and watching every single person in the video,” An Lian adds. Overall, she finds Fatema’s constructive dialogue and probing questions helpful in guiding her to go deeper into analysing and reflecting on her practice.



About the Interviewee

Ang An Lian is currently Assessment Policy & Practice Officer with the Curriculum Policy Office at the Ministry of Education, Singapore. She was formerly a Character & Citizenship Education teacher at Anglo-Chinese School (Junior).

A REFLECTIVE JOURNEY

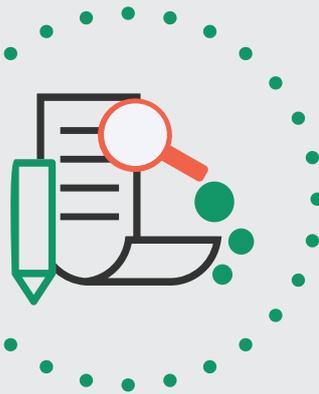
At the end of the conference sessions, Fatema also held mini focus groups with the students involved in the videos for feedback on An Lian’s lessons. To minimize any potentially biased opinions from the students, An Lian was not present at that session.

Fatema asked students questions like “How can the lesson be improved?” and “Do you think that whatever was taught was relevant?”

The information gathered was later shared with An Lian, giving her the opportunity to further better her teachings. As a result, An Lian had re-assessed the way in which she runs her lessons. For example, she now reminds herself to be more conscious of her body language and her students’ body cues such as when they need help.

“The reflections help me fine-tune the way I plan and conduct my lessons. It also made me more aware of the needs of my students as a practitioner,” she says.

But more than just improving on her practices to enhance students’ learning, An Lian also feels that it is crucial for teachers to be role models. “We have to be reflective of our teaching if we want our students to also be reflective thinkers themselves. And teaching is a craft that you improve over time with reflections and more practice.” ■



In their own words

Improving Teaching for Better Learning

It is no surprise that highly effective teachers can have an enriching effect on students' lives and their lifelong educational aspirations. Those teachers often possess a passion for the subjects they teach and are constantly exploring the different ways to better their classroom practices, an effort towards enhancing their students' learning. Four teachers share with us how they continuously develop themselves for the benefits of their students.

“There is a deep wealth of pedagogical knowledge within the teaching fraternity and much of it is available to us almost every day—we can hone our craft through the open sharing of strategies and professional discussions with our colleagues. This vital exchange of knowledge contributes to both our development as an educator in the classroom and growth as a fraternity. There is also the need to be aware of the constant changes to the national and global landscapes, and consider how they will affect our students. This will help us to make the crucial connections from what we teach to the real-world and future-world applications, keeping our teaching current and relevant.”

Mr Colin Sim

*Year Head (Secondary 3)
Bowen Secondary School*

“As a beginning teacher, I strongly believe that having a good class rapport is vital. Once the rapport is built, it is easier to manage the class and deliver an effective lesson. Students also tend to learn better in a student-centred lesson. Thus, it is essential to engage them by including collaborative learning, physical movements and visual representations during lessons. This will also cater to the different types of learners. Lastly, it is important for us educators to continuously learn. Obtaining a degree is not the end of a learning journey; you have to constantly update yourself with current pedagogies that shape young minds by attending various courses and learning from your colleagues. Ultimately, the key indicator of an effective classroom teaching is the ability to monitor students' improvement progressively.”

Ms Nadiah Razni

*Malay Language Teacher
Westwood Secondary School*



“ITE students are kinaesthetic, visual and technically-inclined learners. To get the best out of them, we often engage our students through various ways including using visual aids, videos and games. It is sometimes challenging for our lecturers to create all these resources on their own. Hence, it makes perfect sense that teachers collaborate, and share resources and new ideas among ourselves. Generally, our students will display greater interest in the classroom when the settings are more authentic and they can relate to the contents on a personal basis. Theoretical concepts are sometimes abstract and irrelevant; thus, I will present real-life examples such as case studies and realistic data to capture their attention and focus. Attending professional courses, focus group discussions and seminars regularly also allow me to stay in touch closely with the industry.”

Mr Jeremy Shiu

Lecturer
Institute of Technical Education (College West)



“There are two things that I find is key to better teaching. First, *learning from within*. Living in this time-starved era/profession, it is important to put aside some time to discern the vital few from the trivial many. As such, I make it a point to make time daily for personal reflection and brainstorm on how to improve myself. I also keep a record of all these reflections in a journal for easy review whenever needed. Second, *learning from others* (colleagues). It is crucial to also create space during curriculum regularly for conferencing with fellow colleagues. We conduct scheduled peer lesson observations to gather thoughtful and explicit evidences of teaching. I could gain meaningful feedback on how to improve and or expand teaching strategies and practices. Observers of my lessons may generate different instruction modes or teaching approaches from the ones I made, and such interactions and discussions with my colleagues help me to develop a repertoire of teaching competencies.”

Mrs Jusuf Leow Hui Mei

Teacher
North Vista Primary School





The Core of Teaching and Learning

Now into its third iteration, the CORE Research Programme is one of NIE's flagship research programmes and have traditionally involved representatives from the Ministry of Education (MOE) as part of the research guiding processes. We speak with two of them, Lead Research Specialist Dr Ng Hui Leng, and Lead Curriculum Specialist Dr Ridzuan Abdul Rahim, about their thoughts on and hopes for this programme.



How would you explain the CORE Research Programme and how does it benefit teachers?

Hui Leng: The ministry's main goal is to help our students learn effectively. As such, understanding what goes on in the instructional core—the heart of where teaching and learning takes place—and how to improve it, are important priority research focus areas on MOE's Education Corporate Research Agenda. The CORE Research Programme, which focuses on studying teachers' classroom practices, not just in the academic subject areas but also in areas such as Physical Education, Art, Music and Character & Citizenship Education, plays an important role in contributing to our knowledge in these research focus areas.

Ridzuan: In a nutshell, this research looks at how teachers teach, how students learn, and how they interact with the content (academic or otherwise). One of the outcomes of this research programme is to help teachers reflect on their teaching using the data collected from actual classrooms. These data provide teachers with the opportunities to discuss their instructional core experiences, giving them a platform to work on developing and improving their overall classroom practices.

About the Interviewees

Ng Hui Leng is Lead Research Specialist and **Ridzuan Abdul Rahim** is Lead Curriculum Specialist. They are both with the Ministry of Education, Singapore.



Q What do you think is important for teachers to know about the CORE Research Programme?

Hui Leng: From the research policy perspective, an important first step to be able to improve classroom teaching and learning is robust research that creates generalizable knowledge about what makes some practice “works” or not in the classroom. So, one important thing for teachers to know about the CORE Research Programme is that its research is rigorous. They can then be assured that the findings from the research are trustworthy and potentially usable.

Ridzuan: From a practice perspective, it is very clear that the research is all about improving classroom practices. We have also identified some key information about our current practices from the data collected. However, when education researchers publish their findings, they tend to use academic terms that may be unfamiliar to teachers or may require further work to translate and implement in the classroom. The information gleaned from this research has been useful in informing our curriculum work.

Q Do you think good teachers and teaching are keys to classroom improvement?

Ridzuan: We need to define what is good teaching. To me, good teaching involves not just addressing the cognitive aspect of student learning, but also the social, emotional and motivational aspects. To teach well, the teacher must be able to acknowledge, understand and address these aspects. Therefore, to enact good teaching by pulling these aspects together, the teacher first has to be aware of and second, be competent in addressing these aspects. Without these skills, it will be difficult for anyone to practise good teaching. And that’s the good news actually—doing this research allows us to tease out the practices that constitute good teaching and subsequently, help teachers to develop these competencies.

Hui Leng: To add on, competencies must be built over time. It is thus very important for teachers to always have the desire to learn—this is an essential first step towards being an effective teacher. For teachers to improve their classroom practices, they need to continually learn through various avenues. This could include self-reflections, observations of one another’s lessons, and reading about what researchers have found. It is through such continual learning and a deep desire to continue developing and improving one’s practice that one can work towards teaching well.

Q What do you hope can be achieved as the CORE Research Programme continues on?

Hui Leng: I think the success indicators of this research programme lies not only on its ability to yield new knowledge about how teachers teach in classrooms, but also how these findings can be translated into actual improvements in practice. It will be a job that will not end. But if every single project under this programme can shed some light on some aspects of what would help students learn better, no matter how small, and then together, all the projects contribute to our understanding of effective practice in Singapore classrooms, we would have made a significant step towards classroom improvements.

Ridzuan: I hope that more teachers can be involved in the CORE Research Programme. By getting involved, they will be able to delve deeper into the factors that can help them improve their teaching and ultimately, students learning.

For more information about and/or on how you can be involved in the CORE Research Programme at NIE, please contact Principal Investigator Dr Dennis Kwek: dennis.kwek@nie.edu.sg

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