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Educational
Equity

Big Idea

Equity in Singapore Education

Singapore is known for providing high-quality education but how is it doing in terms of educational equity, or ensuring that every student is given the opportunity to maximize their educational potential?

The Programme for International Student Assessment (PISA) rankings on 15-year-old students' math, science and reading skills are closely followed by educators and policymakers.

What some may not know is that the study also looks into equity issues, such as the relationship between social backgrounds and learning outcomes of students.

The Organisation for Economic Cooperation and Development (OECD) Deputy Director for Education and Skills Andreas Schleicher said in 2013 that Singapore is "a strong performer in (education) quality, but only an average performer in equity" (Ng, 2013).

So what is equity in education?

Educational Equity

According to Dr Teo Tang Wee, an Assistant Professor from the Natural Sciences & Science Education Academic Group in NIE, equity is not to be confused with equality.

"Equality means everyone would have equal access to resources, but we know that is not possible," says Tang Wee.

Even if all schools are similar, every student comes into the classroom with a different set of "capital".

In explaining the different types of capital, Tang Wee makes reference to the OECD's definition (OECD, 2008) of educational equity. It emphasizes two aspects: fairness and inclusion.

> My research has always been focusing on what I see as the marginalized groups—people whom we seldom talk about and research about.
>
> *- Teo Tang Wee,*
> *Natural Sciences & Science Education*
> *Academic Group*

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RESEARCH within REACH

Fairness

In a fair system, factors such as race, gender, ethnicity and socioeconomic status should not pose any obstacle to someone's ability to achieve their best educational potential.

Tang Wee categorizes the factors into four types of capital (Bourdieu, 1986): cultural, social, symbolic and economic (see box story below).

Different Kinds of Capital

According to Dr Teo Tang Wee, students possess four kinds of capital in varying degrees:

Cultural capital: This refers to students' family backgrounds. For example, what kind of experiences or resources can their families provide even before they start schooling?

Social capital: People often enrol their children into famous or Ivy League schools for the purpose of social networking. "It's got to do with much more than what the degree offers," says Tang Wee.

Symbolic capital: In the context of education, this may refer to the qualifications gained by students, such as a degree from a famous university.

Economic capital: This refers to the financial situation of students and their families.

Inclusion

Another dimension of equity is inclusion. No one should be excluded from an education that endows them with the literacy and numeracy skills that enable them to communicate well and perform the basic functions (such as counting change) in everyday life.

It is not just about being able to read and write, says Tang Wee. What is important is that all of us have the ability to gather and use information to make important decisions in our daily lives.

Equity in Singapore

Having spent some years overseas, Tang Wee thinks that Singapore is doing well on some fronts in terms of equity. For example, schools here are well-funded across the board. "This structure is much more equitable compared to other countries where some of the school funding comes from taxpayers who are living within the same district," she says.

Describing herself as an equity researcher in Science education, Tang Wee shares, "My research has always been focusing on what I see as the marginalized groups—people whom we seldom talk about and research about."

As can be seen from the other articles in this issue, such groups range from those with special needs, to those from disadvantaged backgrounds, and even international students who may have to overcome numerous challenges to "fit in" the Singapore education system.

Tang Wee's research focuses on academic tracking. Explicit forms of tracking would be high-stakes exams such as the Primary School Leaving Exam. But there can be implicit forms of tracking as well, such as curriculum differentiation.

"When we talk about tracking, we often talk about providing curriculum differentiation that caters to different needs. In my work, I'd like to highlight these more implicit forms of differentiation that can sometimes advantage certain groups of students over others."

Structure and Agency in the Classroom

Along with other NIE researchers, Tang Wee embarked on the project "Examining Normal Academic/Technical Students Science Learning from a Sociological and Cultural Lens" involving 39 Singapore schools and 4,582 lower secondary Normal Academic (NA) and Normal Technical (NT) students.

Two schools were selected to be case-study schools. The researchers observed and video-taped two Secondary 1 and 2 NA and two Secondary 1 and 2 NT classes in each school, making it eight classes in total.

Tang Wee and her colleagues are looking out for the interplay of structure and agency in these classrooms. Structures can be physical (such as the seating arrangement in class), and social and cultural (such as classroom norms and rules).

References

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Organisation for Economic Co-operation and Development (OECD) (2008). *Ten steps to equity in education* (Policy Brief, OECD Observer). Retrieved from http://www.oecd.org/ publications/ Policybriefs

Agency of teachers and students refer to their power to make decisions in the classroom.

"We are trying to identify in this OER study what the structures are and how the students and teachers are exercising their agency within these structures."

Part of the Solution

For Tang Wee, equity is also about every student having a voice and the chance to participate in class. But many teachers have little time to sit down and listen to students about their needs or their feedback about the teaching.

The research team decided to introduce co-generative dialogue (also see "Co-generating Possibilities in Classrooms" in this issue) in one of the case study schools. For this, a teacher, a researcher and a number of students sat in a group to discuss issues of concern to the students.

"We set the ground rules first," says Tang Wee. Participants were told they should be authentic and open-minded. "The purpose of the dialogue was to highlight issues they were concerned about and propose actions for change. It's not supposed to be a complaint session where they just tell us all the problems."

The students suggested solutions which the researchers and teachers then implemented in the next few lessons.

What the researchers wanted was to give ownership of classroom issues back to the students. "It's better that those solutions are coming from them than from us," says Tang Wee. "Because of the generation gap, I doubt we really fully understand what is going on in the classroom!"

Predictors of Students' Science Inference Skills

For the two case-study schools, the researchers also tested students thrice on their science inference skills at specific intervals during a year. They then followed up with a survey to find out more about the "science capital" of these students.

One significant predictor of the lower secondary NA and NT students' science inference skills is having family members who encourage them to do well in science.

"This has important implication for policy making," says Tang Wee. "It means that parents have to be more involved in the science education of their children if they want them to develop good science inference skills."

Tang Wee also shares the main aim of her study—to find out and understand the many implicit, maybe even invisible forms of structure hindering the learning of their students.

"Are teachers aware of these things that are happening? We look at things which are often taken for granted to be true, things which are very explicit. But we unpack them and say, 'Hey, there are these more complex and nuanced things happening, do you see it?'"

Tang Wee hopes teachers will be more aware of the implicit forms of structures that might be hindering their students' learning.

Teo Tang Wee is an Assistant Professor from the Natural Sciences & Science Education Academic Group in NIE. Her current work involves two groups of learners in the local Science education contexts—preschool children and students in lower track classrooms. Her research work in lower track Science classrooms focuses on issues of equity in learning using a cultural and sociological lens.

Research

Inclusive Education for All Students

Educational equity comprises many different aspects, including appropriate access to education and inclusion. It can be a challenge for teachers to be inclusive in a class of 40 where some students may have greater needs than their peers. But it is not impossible.

The right to education is one of the tenets of the United Nations Conventions on the Rights of the Child that Singapore has ratified. Within Singapore's context, this takes the form of ensuring that each student has access to an appropriate environment—be it in a mainstream or specialized environment—whereby his or her opportunities in education can be maximized, Associate Professor Kenneth Poon explains.

When talking about educational equity, inclusion is another aspect that researchers look into, especially in mainstream education. That includes children with special needs who possess the academic merit to attend mainstream secondary schools.

> *The more positive experiences the teachers have in supporting students with special needs, the more positive they feel and the more inclusive they become.*
>
> - Kenneth Poon,
> *Office of Education Research*

Kenneth Poon is Assistant Dean for Research Translation at the Office of Education Research at NIE. He is also an Associate Professor with the Early Childhood and Special Needs Education Academic Group at NIE. His research interests are in autism spectrum disorders, early intervention and early childhood assessment.

Supporting Students with Special Needs

Kenneth acknowledges the challenges of achieving educational equity. For his previous project on students with special needs, he sought to understand how they were being supported in two secondary schools identified for their exemplary practice of nurturing students with special needs.

He found that teachers were usually able to provide adequate support if they received the required training.

"They appreciated the training, because they realized that they could do something to support students with special needs, and that it doesn't require heroic efforts to do so," says Kenneth.

Apart from the training, teachers were also empowered when there was support from the school leadership. Kenneth notes that school leaders who are supportive usually drew upon their schools' mission statements of giving every student a chance and maximizing their potential.

"When the leaders drew upon that mission, they materialized it in terms of the structures they provided within the schools," he explains. "We saw inclusion being facilitated in schools from our meetings with them."

Teachers Who Believe in Them

As a psychologist by training and a researcher in early childhood and special needs education, Kenneth is an avid reader of autobiographies penned by authors with autism spectrum disorders (ASD). These authors frequently cite their teachers as the ones who made the difference in their lives.

"It's usually that one teacher who believed in them, understood their strengths and weaknesses, and then built upon their strengths," Kenneth says.

To him, that underlines the importance of a teacher, and how the relationships between teachers and students are significant in making the school a more equitable place.

In Kenneth's ongoing study on helping teachers to support youth with ASD in secondary schools, he looks at how a professional development programme can help the teachers provide such support.

"In this programme, we want to build a sense of understanding—not just the cognitive but also the affective understanding—of what it is like to be a child with ASD, or to be a parent of a child with ASD," says Kenneth.

This helps them develop empathy in supporting the students as well as when working with their families.

Another part of the programme is to help the teachers develop a framework instead of individual strategies.

There is no one formula as every student with special needs is so different, says Kenneth. "We try to introduce a broad framework whereby it can be tweaked by the teachers, so that they can customize it for their students."

Kenneth and his team adopted an ecological approach for teachers to help them think about adapting their pedagogical practices and even the way they interact or talk to the students.

Through this approach, they could even adapt the physical environments of the classroom, or tap upon available resources, such as the fellow classmates, to further support those students with special needs.

Empowering Teachers to Be Inclusive

"Sometimes teachers who face students with special needs feel overwhelmed by not knowing what to do or they think that they have a lot to do," says Kenneth.

The professional development programme helps teachers understand special needs so that inclusion becomes more common.

"We know from international research that the more positive experiences the teachers have in supporting students with special needs, the more positive they feel and the more inclusive they become," Kenneth notes.

Therefore, to make schools a more equitable place for all students and especially for those with special needs, the teachers need positive experiences when supporting such students.

This is where the support of school leadership and appropriate professional development for teachers come into play.

"Teachers should therefore have positively scaffolded experiences in teaching students, or in supporting the development of students who are disadvantaged in different ways."

If these teachers can eventually progress to becoming mentors to such students, the benefits will be far-reaching. "A relationship between a student with ASD and treating the teacher as a mentor, and the teacher seeing the strengths of the person and working very hard to help build on those strengths, I think that makes a big difference."

Creating Effective Learning Engagement

Teachers need to consider factors that may affect students' engagement in learning, Associate Professor Kenneth Poon says. This involves thinking about the broad principles of distractions, be they sensory or social. It could be anything that causes students to become disengaged.

While some think that a student with special needs should sit at the front of the class for better learning, it might not always be the case. This is especially so if other students frequently approach and talk to their teachers who are standing in front, thereby creating distractions.

"In considering the physical settings of the classroom," Kenneth explains, "we need to think more broadly in terms of principles rather than very specific 'cookbook-recipes' sort of strategies to help these students."

Classroom

A Culture of Care

In mainstream schools, there are some students with special needs who might need a little more attention and care. We speak to two Allied Educators about how they help these students keep up with the rest.

Autism, dyslexia, attention deficit hyperactivity disorder and visual or hearing impairment – these are some special needs of students in schools where Mr Syed Muhammad Alkaff and Ms Nadira Ahamed Basir work as Allied Educators (AEDs) in Teaching and Learning (TNL).

Not all of these students were diagnosed when they first started school. Sometimes, it takes a period of observation by their teachers before schools realize they need more help.

"If undiagnosed students show signs of disabilities, the AED will suggest that their parents let them go for medical examination," Syed, who works in St Hilda's Secondary School, shares.

"These students are placed in the same class as their other friends who have no special needs," adds Nadira from Ahmad Ibrahim Secondary School. "But the good thing is, they don't see their disabilities as a problem to learn!"

AEDs such as Syed and Nadira feel that their role is to provide additional support for these students, so that they can keep up with their peers in the mainstream classroom.
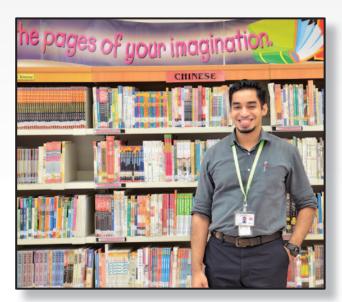
No One Left Behind

"My role is to assist in classroom management," shares Syed. On a typical school day, he joins the English Language and Literature classes with some students who are identified

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>
> *- Nadira Ahamed Basir,*
> *Ahmad Ibrahim Secondary School*

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- Syed Muhammad Alkaff,
St Hilda's Secondary School

to have special needs. Teachers are generally able to handle them, but his presence helps teachers run lessons with fewer distractions, Syed says.

He also conducts "pull-out" sessions where he takes this group of students out of class. "We will sit somewhere else and I focus on them," he explains. "It is a small group so they feel more secure and I can check if they don't understand certain things."

Nadira's approach is slightly different. "Students who have difficulties in catching up in the classroom will be 'pulled out' to the back of the classroom with me," she says. She will then focus her attention on them while the teacher carries on with the teaching.

However, it isn't just about students who have learning difficulties. "The partially visual impaired students need more attention," Nadira adds. "They can't really see what the teacher writes on the board."

To ensure that no child gets left behind, Nadira will sit next to that student and write down whatever was written on the board for him or her. "It means a lot to them and they can sense whether you are genuine when you help them."

Levelling the Playing Field

Equity is about fairness, Syed says. "It is different from equality; it is giving students a level playing field."

For students with special needs or learning difficulties, extra attention can make a huge difference.

"When I pull them out, they get to ask questions that they possibly won't ask in the class," Syed notes. "Their mistakes also get spotted (by me) easily when they might have gone under the radar in the classroom."

Such pull-out sessions provide these students the opportunity to improve their learning at the same rate as their peers in spite of their disabilities. "I just give them a bit more attention and just make sure that they know what is going on, because sometimes they say they understand, but sometimes they are just too shy to ask questions," says Nadira.

Showing Care and Concern

For these two AEDs, they see supporting students emotionally as part of their job too.

During her secondary school days, Nadira and her classmate used to coach their schoolmates from the Normal (Technical) stream in Science and Math. "In Secondary 4, these students did very well," she shares. "That was when it really dawned on me that if you give these students that extra help, concern and care, they can really do well!"

Today, she enjoys teaching Normal (Technical) classes and sees these learners as friends rather than her students.

"I always try to get to know them personally and know what their interests are," she says. Because of her friendly approach, she tends to have students coming to her for counselling as well.

"A lot of kids have problems at home, but they don't show it. Sometimes, they get aggressive in class, so I bring them out of the class but I don't scold them," Nadira says. "I ask them what happened and they will start to break down."

"It means a lot to them if you just ask them: *Is everything fine? Do you need help?*"

"The culture of care works especially for students with special needs," Syed says. "I will always talk to them as a person as best as I can rather than as a superior to subordinate."

"You will find that if you walk around and observe the classes at St. Hilda's, you won't see much scolding going on," he adds. "There's a lot of conversation and reasoning going on with the kids. The teachers find that building rapport and leveraging on that relationship with them is much more effective than scolding them."

Syed Muhammad Alkaff and **Nadira Ahamed Basir** are Allied Educators (Teaching & Learning) at St Hilda's Secondary School and Ahmad Ibrahim Secondary School respectively.

By supporting these learners with genuine care and concern, AEDs like Syed and Nadira are key actors in the Singapore education system who help ensure that students with special needs will have the chance to thrive and learn in school along with their classmates.

Co-generating Possibilities in Classrooms

As a teacher, is there a way for you to encourage honest conversations with your students about issues in the classroom? Some educators have been trying out co-generative dialogues with their students.

Co-generative dialogues, or co-gens, are structured conversations that offer a safe social space for participants to come together and discuss their perspectives on what is happening in class. It is especially useful in an inclusive and educationally equitable classroom because every student is given the opportunity to express their thoughts.

"Co-gen is about understanding what individual students' and teachers' strengths and weaknesses are, understanding and trying to make sense of what individuals need and can do," says Associate Professor Sonya N. Martin from the Seoul National University.

As part of her research, Sonya has been conducting co-gens in different educational settings. She was in Singapore in July 2015 and gave a talk at NIE about conducting co-gens in classrooms. We bring you an excerpt from her talk, in which she explains what co-gens are and also their characteristics.

Excerpt from the talk on "Co-generating Possibilities for Success in Science Classrooms"

"The big goal, and the thing that makes co-gen different than talking to people or doing an evaluation is the idea that it's a forward-moving conversation. We come together to talk about some experience we shared, but it's with an expectation that we're going to co-generate together a plan for improving that.

Then, we move forward and we implement that action and we come back again and reflect on it. This should occur in cycles over time.

There are some rules associated with it. The role of the structure of the dialogue is to move beyond complaints or criticisms to say, well, what can we do about that? What can be done to improve how we interact with each other, with the explicit goal of improving our Science teaching and learning?

One important thing is that we use video often. It's a really important reference. When our pre-service teachers are in the classroom for the first time, so many things can be happening that they never notice. When we come together to reflect without the video, it's really difficult for them to have an accurate memory of what happened or to have any real perspective on their own practices. So we find the videos really useful for that. For young children, second-language learners, and students with disabilities, it's a really powerful tool for them, like memory recall.

We tend to have some rules. Most teachers begin their co-gens by talking about rules with students. It's something that provides some boundaries and support for the type of dialogue we want to promote.

The first one is no one voice should be privileged. In that, we're trying to address some of the hierarchies in terms of age, between adult and children, the most popular and least popular kid, and so on.

There are a lot of power differentials that can exist in the normal structures in classrooms and the society. So, the idea is that we want to make space for each other's voice. We try to make rules to make sure it happens, to make sure each person is given the opportunity.

However, participants may choose not to speak. You are not required to speak in co-gens. In our work with second-language learners and students with disabilities, that's

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> *Seoul National University*

one thing we look at: the degree to which participation is present. That helps us think about what are the types of tools and resources we need to provide these learners, in the event that they are thinking something and need to express themselves but have trouble doing that.

We try to focus on co-generating an understanding of how people feel, and what's going on. There might be some expression of critical thoughts, but we move beyond that to co-generate a plan: What can we do to improve this?

We usually invite students to come during lunch, or before or after school. We try to do it around food, because it seems to be a motivator for kids! For people to come together to eat in a relaxed environment—it's like a social activity. And also, we're taking up their time, so you'd want to be thoughtful about what you're asking them to give up.

We do co-gens over time, but they have to be done consistently. One of the things is if too much time had lapsed between the first meeting where you've made a plan and you're implementing it and if you don't come back to review that, students and teachers, everyone begins to take it less seriously and your dedication will fall off, so we think consistency is really important.

Co-gens can take many forms. They can be one-to-one, such as a pre-service teacher and an in-service teacher; or small groups, like a university faculty member and his tutorial group, or a whole class.

We once had a whole group of high school students participating in co-gens after school, for the professional development for new pre-service teachers. They were talking about things like, if you were my teacher in my school, these are some hints I have for you; things I'd like to tell you about.

We do a lot of auto-ethnography and autobiographical reflection with our teachers. In order to express yourselves in these conversations with other people, it's important to reflect on your own beliefs about learning, teaching, and how you think people learn Science. In our work with second-language learners and students with disabilities, it's important for teachers to reflect on the biases and prejudices they hold about what's possible for these students to learn, because we're looking for more open dialogue with them.

We often talk to students and teachers about how the co-gen should carry the spirit of authenticity in all of their conversations. This is part of the structure that allows some of the difficult conversations to occur but we still move forward. The idea is that the dialogue should be ontological, that people are sharing their perspectives and that they're being heard. At the end, we evaluate: How effective was this dialogue? Were people experiencing changing perspectives? Am I hearing what you're saying?

It should be educative; people should be learning from one another. You don't have to agree with someone. The goal of co-gen does not have to be that we take differences and make them same, but we appreciate where you're coming from. So, I can maintain a different perspective, but in order for us to have shifted ontologically, I should be able to appreciate that you hold a different perspective and that it is as valid as mine.

The next and most important aspect of co-gen is that it should be catalytic, that we try something different. If we just come and keep talking and talking, then nothing is changing. The most important thing is that you identify problems; you come up with some plan of action together and you go back to the classroom and you try it. And then you hold each other accountable to that, by coming back and having that dialogue again."

Sonya N. Martin is Associate Professor in Science Education at Seoul National University in the Republic of Korea. Currently, she is the Principal Investigator (PI) of a project in Korea examining the challenges of schools and teachers serving immigrant students in Korean science classrooms. In addition, she is Co-PI on a project examining the impact of Confucian ideology on interactions and discourse in science classrooms in Korea, China, Hong Kong, Japan and Taiwan.

Online Exclusives

Confident Teachers Make for Confident Learners

Working with Parents to Support Students

Maximizing the Potential of Special Students

International Students and Their Science Learning Experiences

Enhancing Educational Equity in Singapore