JOYFUL TEACHING

The Singapore Teaching Practice Stories

Volume 5

Featuring stories of how teachers drew on the STP to facilitate effective inquiry-based learning in their classrooms

What's inside

SHIFTING NOTIONS OF QUESTIONING FOR DEEP LEARNING

Mrs Cindy Soon is a Senior Teacher in Geography at CHIJ St. Joseph's Convent. A firm believer in inquiry-based learning, Cindy nurtures self-directed learners who continually reflect on the 'whys' behind what they do and how they think.

Cindy shares a lesson, which involves an inquiry into the factors for rural-urban migration, to explain how questions can be used to spark curiosity and to enhance student learning.

Interviewer: Cindy, as a firm believer in inquiry-based learning (IBL), could you please share with us a lesson where your students learnt through inquiry?

Cindy: I designed an inquiry-based lesson that used the Teaching Action engage, explore, apply to facilitate my students' learning of the reasons that motivate people to migrate from rural areas to urban cities.

The lesson began with students being placed in groups of five and six. I **engaged** them with the inquiry question: 'Is moving to the city always a good decision?', which was accompanied with visual resources (see Figure 1) of rural and urban scenes. These visual resources were included to arouse my students' interest in the topic to be taught, thereby activating their curiosity, voice and agency in learning.

Figure 1 *Selection of visual resources depicting rural and urban scenes to spark students' curiosity*

Mrs Cindy Soon
Senior Teacher/Geography
CHIJ St Joseph's Convent

'I encourage my students to **generate questions** and **take ownership** of their learning because I believe that it is the best way for them to **think more deeply** about what they are learning.'

The resources gave students an insight into why people in other places might see and construct the world differently. This insight encourages them to value different perspectives, a key competency in the 21st Century Competencies. I then guided my students to use the pictures to **explore** possible pros and cons of moving to a city. To ensure that they are clear about what was expected of them, I provided my students an example of how perspective-taking looks. I assumed the role of one of the characters in the pictures and unpacked the question: 'Why would my life be better off if I were to move to the city?' using the '5Ws and 1H' question frame.

For the rest of the lesson, students referred to the resources in groups to discuss if the people depicted in the pictures were likely to migrate to a city. In the next lesson, they participated in a fishbowl activity*. Through this exercise, my students had the opportunity to deepen their understanding of the factors that drive decisions to migrate.

To **apply** their learning, I instructed the students to write their considered responses to the question: 'Is moving to the city always a good decision?'.

A **fishbowl activity** is a strategy for organising group discussions. Students form two circles (one inner and one outer circle). In the inner circle, or what we call a 'fishbowl', students will carry out a discussion. Students seated in the outer circle listen in to the discussion and take notes. Each person in the inner circle will take turn to present what they deliberated on earlier in their respective groups. Those in the outer circle may seek clarification by posing questions to their classmates in the inner circle. If a student from the outer circle wishes to add to a point being discussed in the inner circle, s/he will tap on the shoulder of any student in the inner circle, exchange places, and make his/her point. After which, the student moves back to the outer circle.

Interviewer: What made you decide to use IBL to engage your students?

Cindy: Some form of inquiry has always been a part of my pedagogical practice. Students have different 'personal geographies' and hence, varied needs. IBL became a way for me to help students explore what they know and seek the unknown, and in the process build upon their prior knowledge. When the Geographical Inquiry Process was introduced by the Curriculum Planning and Development Division in the secondary school Geography Teaching and Learning syllabus, it fuelled in me a renewed fervour in IBL. This is because the framework validated my practice and deepened my understanding of IBL. Students get to analyse information presented in the light of questions posed to arrive at their response to the questions. Students then reflect on their learning based on the inquiry process or conclusion drawn. In the process, students are challenged to examine their own cognition, emotions and actions, thus becoming self-reflective thinkers. I personally prefer this way of learning over conventional rote learning and application. This spurred me on to experiment further with IBL.

Interviewer: What are your personal beliefs about the role of questions in the process of facilitating learning?

Cindy: I think a lot about things and tend to reflect on what I do and why I do them. The way I learn has convinced me of the value of the constructivist approach to learning. As an educator, I play the role of a More Knowledgeable Other (MKO) as conceptualised by Lev Vygotsky. Using questions to deepen learning is thus a key strategy that I employ to ensure that students are learning in their Zone of Proximal Development (ZPD). With effective questioning, I help to guide students to approach an issue from different angles to help make visible their thinking. In the process, students are equipped with the critical and inventive thinking skills to be future-ready.

Interviewer: What considerations go into crafting appropriate inquiry questions?
Cindy: A teacher needs to craft inquiry questions in line with the focus of the unit of the lesson. This necessitates robust subject mastery. Additionally, the teacher must know how that content can be made digestible for students.

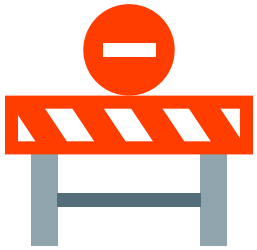
Inquiry questions must also enable the student to deliberate on something, rather than elicit a closed superficial response. Thus, when coming up with inquiry questions, I would first ask myself if the questions would allow for debate.

Our Singapore Curriculum Philosophy echoes my personal belief that learning experiences must be designed based on our children's needs. The selection and sequencing of content must be developmentally appropriate, and aligned with their learning needs. Another consideration would be the sequence of learning. Here, I would need to think about when and how to provide scaffolds, and the degree to which my students can work independently. To this end, the Teaching and Learning syllabus provide valuable guidance. Coupled with an understanding of my learners' profile, I will be more successful in facilitating their learning within their ZPD.

Essentially, crafting appropriate inquiry question is a demonstration of pedagogical content knowledge, where a teacher's understanding of subject matter and goals immaculately intersects with the teacher's understanding of teaching, and of students and learning.

In addition to crafting appropriate inquiry questions, it is equally important that the teacher allows the students to raise their questions on top of responding to the teacher's inquiry questions. The teacher can then guide students to categorise their questions into broader concepts that link to the subject content in Geography.

Interviewer: What were some challenges that you faced when using questions to deepen learning?



Cindy: Students new to my lessons were most likely experiencing IBL for the first time; I always provide time and space for them to get used to learning using this approach. The transition is usually tough for them because many are used to a more didactic way of teaching and receiving notes from a more knowledgeable adult.

To encourage them to generate questions and take ownership of their learning, I normally began with modelling what I expect of them. For example, for students to be comfortable with providing constructive criticism, I would play devil's advocate in an oral inquiry. In a fishbowl activity, I might direct students to question their peers' input or responses. Alternatively, I might ask probing questions in a bid to get students to review their thinking. In the process, I constantly referred back to a shared framework, say the Socratic Method of Questioning, to help them analyse the inquiry that goes on in class.

Change does not happen overnight. In the meantime, the awkward silence following some of my questions is quite daunting and challenging for me. Silence could mean a breakdown in communication or that students are too fearful to speak up. At times like this, I remind myself of the importance of 'wait time' to allow my students to internalise what I had taught them. These have been important moments of personal development for myself as I hone my social-emotional competencies in terms of self-awareness and self-management.

With feedback from the class, I persevere and try my level best to meet my students' learning needs. At times, this has necessitated recapitulating how I might approach the questions. In this way, I can assure the class that I am with them, thereby strengthening teacher-student relationship. Through the process, I am building trust between my students and me. This contributes to a positive classroom culture. Students can then think positively and focus on their successes while growing from their failures. All these entail adopting a growth mindset, where I remind myself that it is all right to take calculated risks because teachers are growing too.

Interviewer: How would you know your students have learnt after your lesson?

Cindy: Through formative assessment (FA), I can check for my students' understanding. An example of FA that I administer regularly is individual exit passes. I would invite students to respond to questions such as 'What do I now know'? and 'What else do I want to know?'. They could type their responses (see Figure 2). After the lesson, I would analyse the students' exit passes and address the key points, gaps in understanding or questions in the next lesson.

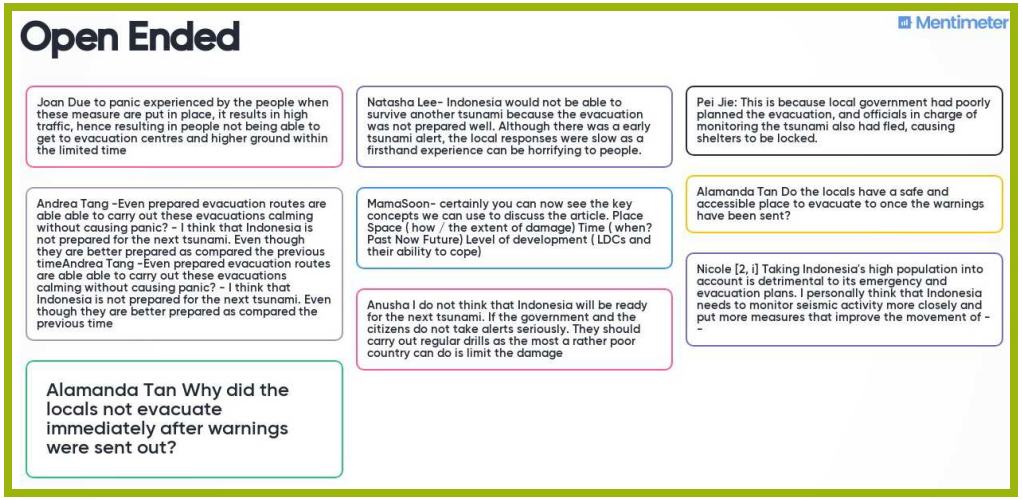
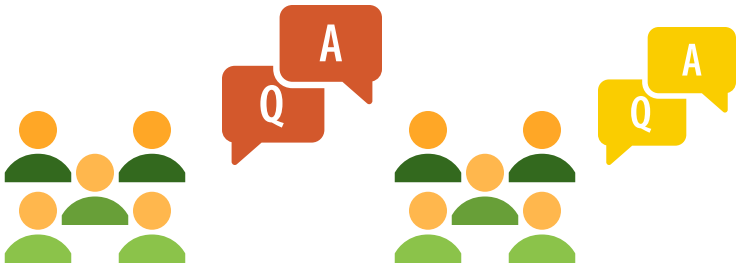


Figure 2 *Responses from Cindy's Students in Response to her Question: 'Will Indonesia be ready for the next tsunami?'*

FA also calls for me to apply different strategies when I plan my subsequent lessons to reach out to the weaker ones who may not have 'gotten it yet'. This helps to support self-directed learning in IBL. For my lesson on rural-urban migration, the FA provided me with crucial insight into the form of scaffolds that students in my Normal (Academic) class need when I use IBL.



Creating a Common Space

How can teachers facilitate the learning of concepts that students could not relate to in their lives? Teo Eng Tong shares how he uses inquiry-based learning (IBL) to help his students see the connections between their lives and what they are learning.

Interviewer: What are your beliefs about Social Studies and what are some challenges you have faced in teaching it?

Eng Tong: I believe that Social Studies is a very important subject because it prepares students to engage productively with others now, and when they contribute to society's growth in future. In an increasingly pluralistic world, Social Studies nurtures in students the values of empathy and respect for others who possess differing perspectives, as well as a disposition of care for the society. Indeed, the Social Studies syllabus emphasises empathy, respect and care as part of its key learning outcomes.

While pursuing these learning outcomes, the main challenge I have encountered is that students find the concepts taught in Social Studies abstract or distant from their immediate context. For instance, regarding relevance, it is not easy for students to relate to how learning about the organs of state can make a difference to his or her life currently. The problem is two-fold. Not only are the concepts abstract at times, and thus require more effort to learn, they are also distant and unrelatable to the students upon the start of the lesson. Consequently, students become less motivated to persevere in learning those abstract concepts.

'When students are able to connect with what they are learning, they are more likely to perceive personal relevance in what they learn and thus have their interest aroused.'

Mr Teo Eng Tong
Social Studies Teacher
Jurong West Secondary School

Interviewer: Why did you choose inquiry-based learning to deal with the challenge?

Eng Tong: IBL invites students to participate in co-construction of knowledge. This makes the students' learning experience active and the classroom interaction more dynamic, both of which can help with student motivation. A well-designed inquiry involves careful consideration of my learners' knowledge, skills, attitudes and values (KSAVs), in order for me to calibrate the inquiry such that students are able to perform it.

When students are able to progress through the inquiry process, they connect with what they are learning, since it begins with what they know, before leading them to explore that which they do not yet know. When students are able to draw connections with what they are learning, they are more likely to see personal relevance in what they learn and their interest in learning is aroused.

IBL is also my teaching strategy of choice because the process of inquiry achieves many Social Studies learning outcomes effectively. For instance, the process of inquiry demands careful examination of evidence, which helps develop source analysis skills. Group and class discussions also happen frequently, placing a demand on students to exercise empathy and respect for the perspectives of others, leading to the growth of these desired values as emphasised in the Social Studies syllabus' student outcomes.

Interviewer: Could you share with us a lesson in which you used IBL to help your students see the relevance of Social Studies?

Eng Tong: It was a Social Studies lesson on the concept of 'common space'. A 'common space' is where diverse groups of people interact with one another. In this lesson, I used the Teaching Action engage, explore, apply.

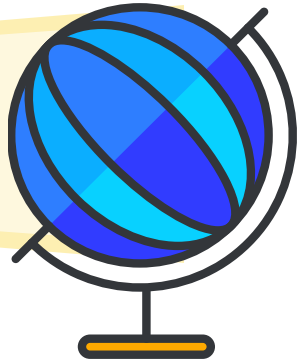
Before delving into the concept of common spaces, I invited my students to reflect on the use of some spaces in school such as the classroom, canteen and toilet. I used these familiar school spaces for discussion because they allowed students to draw on their prior knowledge to co-construct new knowledge. Being able to draw on their personal experiences encouraged my students to persevere in the learning task, because they realised that they had the relevant experiences to enable them to engage deeply in the discussion topic.

In that lesson, one student shared his view that the canteen was only used for consumption of food. His perspective was expanded upon by another student who shared that it could also be used for socialising and building ties, with or without food. By putting their experiences together, my students realised that spaces could be used in many ways, even beyond their intended or stereotypical use.

I also used 'apply' as a means to persuade students of the relevance of their learning. In 'apply', students work on applying their learning to new contexts or to solve real-world problems. Application helps students to consider how their world may be reinterpreted through fresh lenses (what they had just learnt) or to reflect on how their learning can make a difference to their world. In my lesson, students tested a definition of 'common space' that they had derived at in the stage of 'explore', by applying it to three new spaces (void deck, shopping malls, and the Inter-racial and Religious Confidence Circles) to decide if those places could be considered common spaces.

Through application, my students began to look at their world differently. I could tell because even after the lesson, they continued to approach me to talk about common spaces. I remember being asked to weigh in on whether a student lounge which was open to the entire student population could be considered a common space.

If 'engage' could be understood as connecting student's experiences to what they were about to learn, 'apply' would be about using what they had learnt in their real life.



Interviewer: How did the use of IBL in that lesson achieve the learning outcomes in the Social Studies syllabus?

Eng Tong: In every step of engage, explore, apply, my students engaged in co-construction of knowledge through group and class discussions. Since it was an inquiry, much of what was discussed was new and unexplored. As such, no one student could claim to be an expert, and thus they had to pay greater attention to what their classmates were saying. In the process, they learnt the importance of valuing and respecting the views of others, both of which are important character outcomes of Social Studies.

During 'explore', my students had to formulate a definition for 'common space' in their groups. Through listening to and synthesising different perspectives, students build on the nuances to add layers to the definition of a common space. In that lesson, one student shared her view that one characteristic of a common space was that it was provided by the government to foster harmony in the society. However, another member felt that common spaces could be created by individuals who had similar goals. The group then had to discuss how they could resolve these conflicting viewpoints before finally agreeing that government provision of space should not be a criteria for defining a common space.

Figure 1 *Screengrab from a Singapore Teaching Practice video featuring Mr Teo's lesson*
Click here to view the video!

During 'apply', a discussion arose about the rock-climbing wall in Funan Mall. A student shared about how strangers from different backgrounds came to the shopping mall to interact and took turns to be on belay for one another. This challenged the student's conventional thinking that shopping malls were spaces solely used for retail purposes, causing him to be momentarily confused. From this example, we can see how discussions can serve as opportunities for students to see that accommodating opposing viewpoints could lead to the sharpening of our understanding, and thus grow their appreciation of the need to consider multiple viewpoints.

Finally, application is also beneficial for Social Studies because it nurtures the disposition of care in students. Application connects learning to the real world. It gives students the chance to ponder the implications that their learning has on the world, and/or to take a shot at solving real-world issues. These take them a step closer to becoming concerned citizens.

Interviewer: There is a perception that IBL is not 'efficient'. What would you say to that?

Eng Tong: I've heard teachers saying that it is 'time-consuming', so why spend an hour for students to arrive at the definition of 'common space' when the teachers can achieve it in a minute? If we begin by considering our lesson objectives, we would realise that certain skills and dispositional outcomes favour inquiry as the instructional strategy of choice. In Social Studies lessons, I find that inquiry into real social issues creates the drive and room for the development of important skills and values. If we consider the whole spectrum of learning experiences that IBL offers, we may see that there is much that it achieves efficiently.

I would end off by sharing what our former Acting Minister for Education, Ng Chee Meng, said at the Singapore Economic Policy Forum, 2016.

'When learning becomes a journey of discovery and exploration, students will naturally develop an intrinsic motivation to learn and create. By giving them the opportunity to apply knowledge and skills to understand and solve real-world issues, it will help them uncover passion, nurture talent...and put joy into learning.'

If we believe that development of passion and talents, and putting joy into learning are our pursuits, I would highly recommend IBL, for it creates the journey of discovery and exploration with which to achieve those outcomes!

Putting Students at the Heart of Inquiry

'As a Science teacher, I believe in inspiring my students to be curious explorers who seek to discover new things and explanations for any phenomenon they observe.'

Ms Li Lilian
Science teacher
Teck Whye Secondary School

Through the use of a discrepant event, (which involves the discovery of the science behind preparing salts), Ms Li reveals how she put her students at the centre of her inquiry lessons.

Interviewer: Why did you choose to use inquiry-based learning to teach the topic 'Salt Preparation'?

Lilian: I noticed my students tended to memorise the steps of salt preparation and couldn't always explain clearly the reasons behind their choice of specific methods of preparing salts. Additionally, as this topic is content-heavy, I observed that students were often not as engaged during lessons when I adopt a didactic approach in class.

Through inquiry-based learning, I hope to nurture my students as inquirers who are curious and want to explore the things around them.

Interviewer: What were your considerations when designing this lesson to facilitate inquiry-based learning?

Lilian: When designing this lesson, I considered my students' prior knowledge as I wanted to build on their knowledge of acid reactions for them to co-construct knowledge about the methods of preparing salts. I also noted that it would be important to allocate sufficient time for students to co-construct knowledge through discussions, so that they could comfortably explore and formulate explanations for the phenomenon observed. This was why it was critical for me to manage the pace and momentum of this lesson.

For this lesson on 'Salt Preparation', I decided to use a discrepant event to arouse my students' interest. I was deliberate in my selection of the demonstration to stimulate my students' curiosity in their learning. The demonstration had to challenge their schemas, yet, is something that they can explain using their existing knowledge of acid reactions. My intention was to excite my students and trigger their curiosity to derive explanations for the discrepant event.

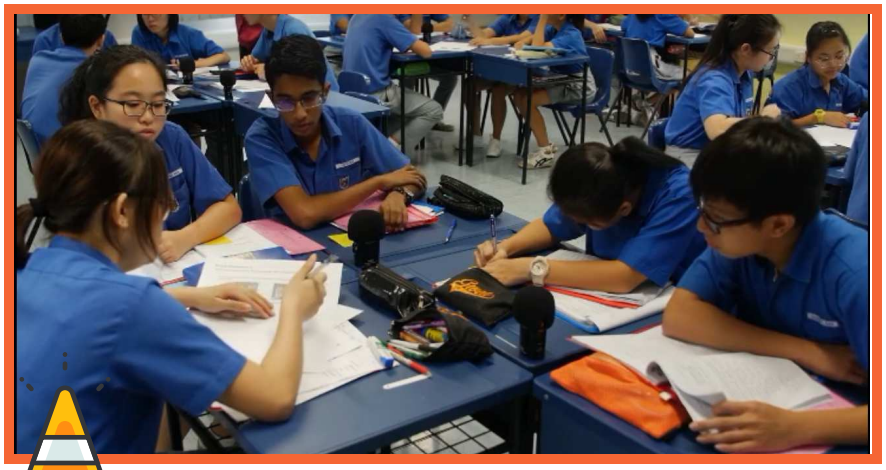


Figure 1 *Screengrab from a Singapore Teaching Practice video featuring Ms Li's lesson*
Click here to view the video!

Interviewer: Can you share how you designed the inquiry lesson?

Lilian: I used a discrepant event to trigger my students' curiosity and to create cognitive dissonance. In the previous lessons, students learned that soluble salts (students observed aqueous solutions) were produced in acid reactions. The demonstration chosen for this lesson is a discrepant event that taps on what the students learnt in the previous lesson about soluable salts being produced in acid reactions, where they observed aqueous solutions. Instead of producing soluable salts, the demonstration I chose will produce insoluable salts, where students can expect to see suspension of solids. From this demonstration, I engaged my students in group discussions and guided them to construct explanations to account for the discrepancy observed, which would hinge on my students' prior knowledge. This encouraged them to co-construct a valid explanation for the phenomenon they just observed. By using a situational context that was relatable and meaningful to my students, I aroused their interest, and in turn motivated them to want to find out the science behind the discrepancy observed.

'I wanted to correct my students' mindsets, to nurture them to be inquirers who enjoy learning and exploring their natural world.

Interviewer: What were the challenges faced, and how did you overcome them?

Lilian: One of the biggest challenges I faced was the mindset of the students. They thought that the explanations for scientific concepts are derived from their textbooks and are fixed. They would not ask questions about what they observed, or if the context for the explanations in the textbook were similar to the experiment they conducted. I wanted to correct such a mindset.

As some of my students were weak in expressing themselves and had low self-esteem in themselves, they found it difficult to explain their thoughts about the phenomenon observed and required more time for discussion. Thus, I adjusted my pace and momentum of the lesson to provide more time to facilitate group discussion, hoping that they could gain greater clarity and understanding of the topic. I was heartened to observe that they were able to build on each other's responses, and such discussions deepened their understanding of the topic. With deeper understanding, my students gained confidence in articulating their thoughts clearly and with greater conviction.

I believe in nurturing them as inquirers so that they can enjoy learning and exploring the world around them. Hence, I started planning purposeful questions to get my students to explore the 'Why' behind the phenomenon observed. When my students realised that the explanations could not be found in the textbooks, they had to go back to the fundamentals to account for their observations.

Inquiry lessons naturally take up more curriculum time compared to the didactic approach to teaching. Determined to make them effective, I would reflect on and improve the way I structure subsequent inquiry-based learning lessons. It is critical that my students consolidate their learning, so I regularly provide opportunities for them to share their learning points or doubts. The rich discussions during lessons prompt my students to think like scientists and to formulate explanations for scientific phenomenon with data and facts. This way, the learning becomes more meaningful for my students as they have time to reflect on their mistakes and to identify their learning gaps.

Interviewer: What is one tip that you have for teachers who would like to design similar lessons to facilitate inquiry-based learning?

Lilian: If I have to share one tip, it would be for teachers to practise wait time when facilitating inquiry-based learning. Active involvement of students in learning is essential to help them develop critical thinking skills, and inquiry-based learning promotes active involvement of students in learning. Sometimes, teachers might be quick to provide the explanations for the phenomenon observed instead of allowing students to discover the answers on their own. As such, the opportunity for students to develop critical thinking is lost.

Over the years, I have learnt to understand my students' learning preferences and readiness in using inquiry to learn science. Teachers should seek to understand their students' learning preferences and be flexible to adjust instructional plans when delivering inquiry lessons.

Figure 2 *Ms Li giving wait time when facilitating inquiry-based learning*

It takes time to perfect the design and delivery of inquiry lessons that engage students in learning, but the results are rewarding. It gives me a sense of satisfaction when I see my students asking questions to derive new explanations for their observations. That's the essence of inquiry-based learning.

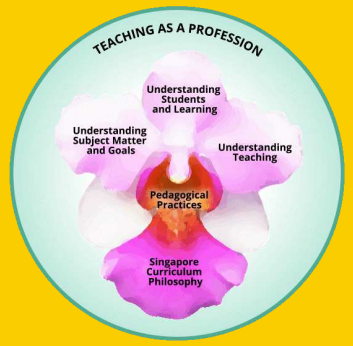
'Teachers should seek to understand their students' learning preferences and be flexible to adjust instructional plans when delivering inquiry lessons.'

Feeling
Inspired?

Do you have a great classroom story to share too?

Scan the QR code to share with us classroom anecdotes on how you have drawn on the STP for teaching and learning.

Enact . Share . Inspire



Brought to you by the STP team

moe_stp@moe.edu.sg