



***EZ LEARNING SYMPOSIUM  
20 March 2018***

***Our Singapore Classroom – Research in Practice***

The East Zone Centre of Excellence for Research (the R@EZ) hosted at Temasek Junior College was launched on 20<sup>th</sup> Aug 2007. This zonal centre aims to provide support for our East Zone colleagues who are keen to leverage upon research to hone their craft of teaching in areas of curriculum design, pedagogy and assessment to enhance Teaching and Learning in their schools. The COE is also broadening our support to build the capacity of key school personnel in areas of curriculum leadership. The East Zone Learning Symposium provides opportunities for teachers to share their research findings from their teaching experiences, innovative pedagogies and good practices to enhance Teaching and Learning in their schools.

R@EZ Steering Committee, warmly welcomes education officers to this year's EZ Learning Symposium. We hope that you will have an enriching and meaningful afternoon.

**Programme**

1.00 – 2.00 pm	Registration
2.00 – 2.05 pm	Welcome address by Mrs Low Ay Nar Principal, TJC, Chairperson, R@EZ
2.05 – 2.20 pm	Opening address by Guest of Honour, Mr Teoh Tiong San, Director, Standards and Research Branch, AST (MOE) Presentation of certificates
2.20 – 3.15 pm	Keynote address by Prof David Hung, Associate Dean, Office of Education Research, NIE
3.15 – 3.45 pm	Tea Break
3.45 – 4.20 pm	Concurrent Breakout Sessions A
4.20 – 5.00 pm	Concurrent Breakout Sessions B

**Keynote Address:**

Prof David Hung, Associate Dean, Office of Education Research, NIE

**Research to Practice Translation: Bringing impact by participating in communities**

Synopsis:

In this presentation, I argue that the translational pathway from research to practice cannot be forged without teachers. Research capacity cannot be divorced from people capacity. In education, research impact is the growing of communities around learning innovations. I will propose the SCAEL model which is a theoretical and practical approach to scaling up/out educational innovations. Considerations in leadership support, teacher learning, and students' outcomes will be discussed in conjunction with case examples on how this process is enacted. The SCAEL model illustrates why and how teachers' participation in PLCs and NLCs is inextricably linked to educational change. Case examples in math, science, and other 21st Century literacies will be discussed. The presentation will also discuss how teachers' challenges in implementing educational innovations can be supported through apprenticing and ecological leadership within the considerations around community, conditions for change, culture building, and carry over effects. The SCAEL model is consistent to the leadership from the middle movement which is espoused by prominent change proponents in the field.

## Concurrent Session-A

Session Code	Name of the Presenter(s)	School	Title	Subject	Venue
1A	Vanessa Vinodhen Seah Cheng Hong Jeffrey Lian	Junyuan Secondary School	Using Visible thinking (See-Think-Wonder) routine to help students in answering data based questions for biology.	Biology	520
2A	Leow Ling Ling	Poi Ching Primary School	Differentiated Learning in Science using tiered worksheets, WebQuest and Kahoots!	Science	519
3A	Zaimah Mohd Ali Halimaton Abdullah	Bedok Green Primary School	Kiub Ayat	Malay Language	320
4A	Yin Jian Sylvia Foo	Geylang Methodist Primary School	Integrate Thinking Routines and ICT Tools to Promote E-Oral and Writing Skills.	Chinese Language, ICT	319
5A	Tan Chai Yan, Sheryl Panny Ong	Poi Ching Primary School	Wow! Wow! Splash!	English	421
6A	Nur Hafizah Bte Mohammad Yunos Shabana Yasmin Mabel Zhang Ee-laine Oh	Bedok View Secondary School	Dare to Compare.	Geography	524
7A	Rossana Ros Chan Yong Hong	Damai Secondary School	Enhancing student learning and performance in the interpretation of historical sources by involving them in Thinking Aloud and Error Analysis.	History	523
8A	Nor Shida Hatu Bte Nazar Khan Che Fauziah Abdullah	CHIJ (Katong) Ngee Ann Primary School	Mathematical Manipulation! – Teaching Mathematical Vocabulary to increase word problems test scores.	Mathematics	214
9A	Ng Sze Kiat, Irene Sim Hwee Khoon	White Sands Primary School	Teacher as Learning Designer – aligning HBLT (Hook Book Look Took) with SLS (Student Learning Space) Pedagogical Scaffold: Case study of a mathematics lesson in Percentage.	Multi-Disciplinary	424
10A	Yap Meng Wei, Kelvin Huang Yaling	Changkat Changi Secondary School	Using Formative Assessment Strategies to Develop Students into Self-Directed Learners.	Mathematics	420
11A	Robin Paik Shi Yang	Meridian Secondary School	A Longitudinal study of the impact of learning of Linear Graphs using real-life scenarios.	Mathematics	521
12A	Jennifer Pei-Ling Tan Noriff Elyn Mohammed Ariffin	Anglican High School	CoVAA: Using Collaborative Video Annotation to Enhance Students' Conceptual Understanding and Promote Self-Regulated Learning.	Multi-Disciplinary	419
13A	Nursahidah Bte Mohammed Ali Emelyne Quek Jiang Li	Tampines JC Meridian JC	Empowering students' voices in a flipped peer feedback classroom.	Project Work	423

### Session Code 1A

Presenter(s): Mrs Vanessa Vinodhen  
Mr Seah Cheng Hong  
Mr Jeffrey Lian  
School: Junyuan Secondary School  
Title: Using Visible thinking (See-Think-Wonder) routine to help students in answering data based questions for biology.  
Subject Area: Biology

**Synopsis:** In our lesson study, we are interested to see how making students thinking visible through the use of the visible thinking routine of 'see-think-wonder'. Through this visible thinking routine, we envision that it would provide greater insights with grounded interpretation and help students to manage their inability. Our method consists of a two-step approach. The first step was to teach the content using our prepared slides and notes. The second step was to introduce the visible thinking worksheet. The worksheet consisted of a graph. The questions in the worksheet was divided into three components, See, Think and Wonder. While the students worked in pairs, the teacher observer would walk around to observe and listen to the discussion of the students in answering the questions. We also used the concept of 'case pupils' in conducting our lesson study. We identified three main groups of students within 3N1. Basically a lower ability group of students, a middle ability group of students and a high ability group of students. Their answers to the questions were recorded and teacher observers took down notes.

### Session Code 2A

Presenter(s): Ms Leow Ling Ling  
School: Poi Ching Primary School  
Title: Differentiated Learning in Science using tiered worksheets, WebQuest and Kahoots!  
Subject Area: Science

**Synopsis:** To cultivate a positive learning culture in differentiated Science classrooms, teachers could purposefully create opportunities for their students to experience success when they learn according to their abilities, explore and collaborate. Using the correct subject vocabulary, they can also communicate their findings via group presentations. Lastly, teachers can check for students' understanding using Kahoots (an interactive Formative Assessment tool). Such learning experiences can motivate the students to want to do better and also add joy to their learning.

This presentation captures how teachers creatively integrate ideas of differentiated instruction, Google Sites (WebQuest) and exploration of real fruit and seed specimens to engage their students to think critically during the teaching and learning of the Primary 5 Science topic "Reproduction in Plants - Dispersal Methods and Patterns of Seeds and Fruits".

### Session Code 3A

Presenter(s): Mdm Zaimah Mohd Ali  
Mdm Halimatun Abdullah  
School: Bedok Green Primary School  
Title: Kiub Ayat  
Subject Area: Malay Language

**Synopsis:** The title of our innovation is Kiub Ayat (KA). Kiub Ayat (KA) are coloured coded cubes used as a Teaching and Learning (T&L) tool to teach sentence construction. Each cube represents nouns, pronouns, verbs, adjectives or phrases to form complete sentences. Based on our school's students profiling survey, our students have indicated that they are dominantly visual and kinaesthetic learners. Second, from their test scores, we have concerns that the students have difficulties in constructing grammatically correct sentences in composition writing. Hence, our team developed the cubes to teach grammar rules for sentence construction. The research project was targeted at the low progress students.

In the development of this tool, we also wanted to promote the joy of learning in sentence construction for our students. The theoretical underpinning for this idea is Noam Chomsky's (1928) concept of Transformational Generative Grammar (TGG). TGG refers to the understanding of the grouping of words in a particular context; in our case, would be on Subject Verb (S-V) Agreement. In explaining the S-V rules, it is useful that the cubes are colour-coded so as to appeal to our visual learners. Our kinaesthetic learners also enjoyed using the cubes as they get to throw the cubes according to the colour sequence, similar to throwing dice in a game. After explaining the grammar rules, the students throw the cubes in sequence using Cooperative Learning Strategy. The use of Think-Pair-Share and Round Table strategies became effortless as the students became engaged in constructing sentences for their compositions.

### Session Code 4A

Presenter(s): Mr Yin Jian (ST/CL)  
Mrs Sylvia Foo (HOD/MT)  
School: Geylang Methodist Primary School  
Title: Integrate Thinking Routines and ICT Tools to Promote E-Oral and Writing Skills.  
Subject Area: Chinese Language

**Synopsis:** This research project is based on the theory of Making Thinking Visible. When we started the project, the main purpose of research is to find out an approach to integrate Thinking Routine and ICT Tools to teach E-Oral skill. Along the way, we realized we could also use similar approaches to enhance the writing skills for our student, which is another area of concern that the department needs to work on it. As a department, we created a few Thinking Routines for Writing as well as Reading Comprehension. During the research and teaching practises, we introduce a few Collaborative ICT Tools to the Thinking Routines, to enhance the teaching & learning experiences. After one year of constant review and implementation, we saw positive impact on teaching and learning. It is apparent in both academic achievement and learning motivation.

## Session Code 5A

Presenter(s): Ms Tan Chai Yan (Sheryl)  
Mdm Panny Ong  
School: Poi Ching Primary School  
Title: Wow! Wow! Splash!  
Subject Area: English

**Synopsis:** To incorporate the use of ICT tools in Lower Primary classroom, a team of Primary 1 teachers has conducted an EL lesson study on the use of iPad applications – Stage Interactive Whiteboard and Camera Document. This lesson is later modified to incorporate both English and Mathematics with the use of the stated applications.

During the conduct of the first lesson, the teacher carried out a Shared Book Reading on the big book ‘The Enormous Watermelon’, focusing on the parts of a fruit and adjectives used to describe the fruit. Next, the students carried out an experiential activity on ‘Watermelons’ using their four senses, namely sense of sight, touch, smell and taste. Finally, the teacher carried out an ICT lesson using the applications -Stage Interactive Whiteboard and Document Camera to reinforce the vocabularies learnt.

After a few lessons on the use of the applications using iPads, the students are able to take photographs with the iPads and then label the various parts of the fruit. They also familiarise themselves with the spelling of words as they type out each of the vocabulary taught.

The lesson is later modified to include Mathematics’ learning objectives. The students are required to take pictures of their favourite fruits (various fruits provided by teacher) and create a simple class-based picture graph on “Favourite Fruit Chart of Class 1J”. After which, in their groups, they are to create two questions for the picture graphs and pose them on the interactive whiteboard, the students from other groups are to solve the questions.

## Session Code 6A

Presenter(s): Ms Nur Hafizah Bte Mohammad Yunos  
Mdm Shabana Yasmin  
Ms Mabel Zhang  
Ms Ee-laine Oh  
School: Bedok View Secondary School  
Title: Dare to Compare.  
Subject Area: Geography

**Synopsis:** This research project aims to help Secondary 4 Express students describe comparative line graphs through a task modelling strategy. The intervention was chosen to fit the learner profile as students were familiar with the task modelling strategy and have used it to describe single line graphs in the previous year. In addition, literature review showed how human behaviour can be learnt through observation. Modelling therefore, serves as a guide for action resulting in changes in behaviour. (Bandura, 1977).

The project aims to assess if Secondary 4 Express students will be able to do the following through the task modelling strategy:

- Compare and accurately describe the different line graphs across different categories and timeframes
- Accurately annotate the significant time periods for comparison across different line graphs
- Use comparative adjectives to describe a pattern or trend
- Understand the mark allocation for each comparison made
- Calculate the degree of difference

The following research questions guided the teachers in the project:

1. Does the task modelling strategy result in higher test scores for comparative line graph?
2. Do students find the task modelling strategy useful for describing comparative line graph?

The intervention has helped students achieve better test scores on comparative line graph questions. 2 out of 3 4E classes registered better pass rates and distinction rates after the intervention. Qualitative data also showed that students had greater understanding in answering comparative line graph questions. Students found the task modelling strategy useful and realised that the skill was manageable and not as difficult as they initially perceived. The weaker students benefitted most from the intervention because of its clear structure and multiple practices. Students had increased confidence in managing comparative line graph questions after the intervention.

### Session Code 7A

Presenter(s): Ms Rossana Ros  
Mr Chan Yong Hong  
School: Damai Secondary School  
Title: Enhancing student learning and performance in the interpretation of historical sources by involving them in Thinking Aloud and Error Analysis.  
Subject Area: History

**Synopsis:** There are several learning gaps that History students face in their attempts to answer source-based history questions. Many students have difficulties mastering the disciplinary thinking needed to do well in the subject. As such, they are often unsure of what the question requirements, the success criteria, how to go about answering the question and writing quality answers. To address these learning gaps, a team of History teachers in Damai Secondary carried out a series of Action Research studies from 2015-2017 to investigate if Thinking-Aloud and error analysis strategies would help our students bridge their learning gaps and improve their performance in source-based questions.

In the research process, both single and double-loop learning were evident in the work produced by students. By applying the Rasch model analysis, the study found that by collectively applying the Thinking-Aloud approach to historical sources and implementing specific marking codes when reviewing students' work, a higher probability of student success in constructing valid answers was observed. This gave currency for further research into the adaptation of this Assessment for Learning tool for teaching other source-based and essay skills in History.

### Session Code 8A

Presenter(s): Mdm Nor Shida Hatu Bte Nazar Khan  
Mdm Che Fauziah Abdullah  
School: CHIJ (Katong) Primary  
Ngee Ann Primary  
Title: Mathematical 'Manipulation'! – Teaching Mathematical Vocabulary to increase word problems test scores.  
Subject Area: Mathematics

**Synopsis:** This research is about helping low progress learners make sense of word problems via the teaching of mathematical vocabulary, hence increasing their test scores in this section. Low progress students seem to have more challenges solving word problems probably because they are not very familiar with mathematical terms or vocabulary. Through this research, we embarked on effective strategies to expose students to mathematical terms and vocabulary. We also used ICT tool to enhance the skill. We conducted explicit teaching of key words / phrases / sentences to elicit their understanding of Word Problems. These students were given opportunities to practise in groups and individually.

Before the intervention, these low progress students (the experimental group) did not perform very well in the pre-test with majority of them failing the test. After the intervention, they had proven that the strategies had worked with their improved scores in the post-test (same as the pre-test). The key takeaways from this project are that opportunities were provided to these low progress learners to identify key words / phrases through explicit teaching and guidance. As language is the main barrier, they were taught the skills to identify the key words / phrases to assist them in deciphering and breaking down the information. The intervention proved to be beneficial as the students became more confident to walk the talk. Best of all is that the main strategy conducted was really something that every Mathematics teacher can perform, giving him / her the opportunity to use the '5-Talk Moves' to get the students to communicate their thoughts using mathematical key terms or vocabulary.

## Session Code 9A

Presenter(s): Mrs Irene Ong  
Mrs Teo-Sim Hwee Khoon  
School: White Sands Primary School  
Title: "Teacher as Learning Designer – aligning HBLT (Hook Book Look Took) with SLS (Student Learning Space) Pedagogical Scafoold: Case study of a mathematics lesson in Percentage"  
Subject Area: Multi-Disciplinary

**Synopsis:** In this presentation we share how White Sands Primary School, embarks on a whole school Lesson Study (LS) approach where each staff is a member of a lesson study team. A LS workshop was held to give all teachers an overview of lesson study. The professional learning goal and research theme for the school were crafted during the workshop. The structure and schedule for the year were then drawn up for 16 teams for the following subjects: English, Mathematics, Science, Mother Tongue, Physical Education, Art and Music. A Celebration of Learning Conference was held after seven months to share our learning in the LS journey.

LS has provided teachers the opportunities for professional dialogue and is instrumental in improving our practice in teaching and learning. It has also supported a culture of trust, a drive for improvement and a shared responsibility for student outcomes among the staff.

Singapore is now into its fourth Masterplan (mp4) in Information and Communication Technology (ICT) which is about sharpening and deepening of ICT practices to prepare our students to be future ready and responsible digital learners. For teachers, this means they need to be able to design learning experiences and environments and harness ICT, with regard to the curriculum taught, pedagogies used and assessments done to inform the learning of the students. The teacher as a Learning Designer plans the learning tasks and designs the experiences and environments, made possible by the range of ICT tools for the learning to take place, resulting in greater student engagement.

One of the tools in mp4 is the SLS (Student Learning Space) Pedagogical Scaffold which is a design tool to guide teachers in deciding on teaching processes for active learning experiences with technology. It comprises three design phases. There are four active learning processes in the design of learning activities with technology. WSPS has been using the HBLT (Hook Book Look Took) lesson framework to guide teachers in lesson planning. It is simple yet effective and has been found to be well-suited to meet the learning needs of WSPS pupils. The HBLT was originally developed by Richards and Bredfeldt (1998) and subsequently adapted by Renandya and Tedjaatmadja (2012).

Our team found similarities in both and designed a lesson to address a common misconception in percentage using both the SLS Pedagogical Scaffold design process and the HBLT framework. This common misconception is that pupils are often not able to identify the base when the original number was increased or decreased. Learning activities that promote active learning processes using a Google site together with Google Slides and the Padlet and Linoit applications to support collaborative and self-paced learning were designed for a class of Primary 6 pupils. The main idea of the lesson is to design an ICT lesson to address the misconception using LS and in the process develop teachers professionally. In this presentation, we will share how we aligned both the HBLT framework and SLS design tool using LS as a platform to sharpen and deepen our ICT practices. We will share our pupils' artefacts and reflections as well.

### Session Code 10A

Presenter(s): Mr Yap Meng Wei, Kelvin  
Miss Huang Yaling  
School: Changkat Changi Secondary School  
Title: Using Formative Assessment Strategies to Develop Students into Self-Directed Learners.  
Subject Area: Mathematics

**Synopsis:** We have all been beneficiaries of the use of formative assessment in improving both our classroom teaching as well as our students' learning through the effective use of feedback to bridge teaching and learning gaps. However, the ultimate goal of education is to ensure that our students are equipped with the relevant skills to self-regulate their own learning in order to keep pace with the ever-changing educational landscape in Singapore.

From our perspectives as teachers, we felt that students are too dependent on us to regulate their learning for them. Hence, in our PLT journey this year, it propels us to explore some of the formative assessment strategies from the Seven Strategies of Assessment For Learning (Chappuis, 2015). The strategies structured around three essential questions – “Where am I going? Where am I now? And How can I close the gap?” that resonates with our resolve to provide students with the opportunities to assess their own learning and that of their peers in order to practice the skills needed to become independent and self-directed learners. In particular, two of the strategies that we adopted present students with explicit learning targets or goals to help students self-assess their current position in relation to those targets/goals and equip them with the skills to bridge the gap between the two.

### Session Code 11A

Presenter(s): Mr Robin Paik Shi Yang  
School: Meridian Secondary School  
Title: A Longitudinal study of the impact of learning of Linear Graphs using real-life scenarios  
Subject Area: Mathematics

**Synopsis:** The longitudinal study is a continuation to a lesson study that was conducted on a class of Sec 1E students in their learning of straight line graphs, in particular to the concept of gradient using non-conventional teaching pedagogy in mathematics. Students were grouped into pairs and were tasked to sketch graphs, determine the gradients and explain the physical meaning of the y-intercept based on the scenarios. 6 months later, a test on linear graphs was administered to all students and their results were recorded. Preliminary analysis of the data suggested a statistically significant difference between the two groups, Experimental Group ( $M = 7.05$ ,  $SD = 2.00$ ) and Control Group ( $M = 5.69$ ,  $SD = 1.76$ ),  $t(151) = 3.76$ ,  $p \leq .02$ ,  $CI.95 -2.04, -0.69$ . Cohen's  $D$  was also determined to be  $>.4$ , which further suggested that the teaching pedagogy was in the zone desired effects (Hattie, 2008). In addition, students in the Experimental Group were observed to be more competent in the answering of linear graph questions pitched at the national exam levels (Experimental Group ( $M = 2.18$ ,  $SD = 1.04$ ) and Control Group ( $M = 1.79$ ,  $SD = 1.03$ ),  $t(151) = 2.04$ ,  $p \leq .02$ ,  $CI.95 -0.77, -0.01$ ). The findings from the study seem to suggest that students learn linear graphs best when real-life scenarios were used in the lesson.

In addition, the notation of any classroom teacher can be a researcher, to search for better ways of teaching and learning, is being showed in the study.

### Session Code 12A

Presenter(s): Dr Jennifer Pei-Ling Tan  
Mdm Noriff Elyn Mohamed Ariffin  
School: Anglican High School  
Title: CoVAA: Using Collaborative Video Annotation to Enhance Students' Conceptual Understanding and Promote Self-Regulated Learning.  
Subject Area: Multi-Disciplinary

**Synopsis:** CoVAA is a web-based collaborative video annotation and learning analytics platform, and a joint research project between NIE, AHS and ETD. The aim of the presentation is to share with participants, the extent to which CoVAA is effective in enhancing teachers' video-based pedagogy, deepen students' conceptual understanding, and foster their collaborative and self-regulated learning skills during school-based lab sessions, or used as part of flipped classroom learning.

Extant literature (e.g., Bergmann and Sams, 2012; Abeysekera & Dawson, 2014) highlights that schools are increasingly adopting video-based flipped classroom pedagogy because of its potential for moving content coverage to outside of classrooms and freeing-up class time for collaborative knowledge construction through purposefully-designed social learning interactions with peers and teachers. However, an associated challenge is that flipped classroom pedagogical enactments tend to vary substantially, resulting in uneven and inconclusive empirical evidence about the extent to which the 'promises' of deeper and richer student learning outcomes are in fact achieved.

This serves as the impetus for CoVAA, a time point-based video annotation tool integrated with interactive comments features and learning analytics/diagnostics modules, designed for teachers to (i) choose/upload video learning resources, (ii) embed purposefully-designed pedagogical scaffolds/prompting questions, and (iii) continuously monitor learning progress and adapt pedagogical strategies to stimulate students' deep socio-cognitive engagement, rich peer interactions and social knowledge construction around key disciplinary concepts of interest.

Results from the first trial involving 4 teachers and 7 classes of Secondary Three students, who used CoVAA in the learning of 2 topics in social studies and geography respectively, pointed to significant improvements in students' conceptual understanding, creativity and confidence. Students also expressed that they found CoVAA useful for self-paced learning and metacognitive reflection.

At the end of the session, participants will learn how CoVAA's techno-pedagogical affordances enabled both students and teachers to continuously monitor learning progress and adapt pedagogical strategies to stimulate deeper learning engagement through collaborative peer-based interactions around subject-specific key concepts: before, during and beyond formal class time.

### Session Code 13A

Presenter(s): Ms Nursahidah Bte Mohammed Ali  
Ms Emelyne Quek Jiang Li  
School: Tampines Junior College  
Meridian Junior College  
Title: Empowering students' voices in a flipped peer feedback classroom.  
Subject Area: Project Work

**Synopsis:** Using peer feedback in a flipped classroom is an efficient way of teaching and learning, especially in today's world that place great emphasis on innovative solutions to problems. Oral communication, one of the key components of the 21st century learning, is a prerequisite for personal and professional growth for graduates entering the realm of work. While peer feedback in the classroom learning environment has been extensively investigated, the design of a computer-based environment and integrating it in oral presentation class is sophisticated and largely unexplored. Moreover, as there is a need to redesign the instructional approach for lessons on oral presentation practices, flipped instruction practice that foster peer feedback could be explored as an alternative. This session is targeted at participants who are keen to explore how peer feedback-incorporated flipped learning for oral presentation influences students' learning experiences and self-regulation. It also attempts to share research findings about how peer feedback in such contexts can be enhanced through effective design and implementation in a computer-mediated collaborative project. Participants will gain a better understanding of the theoretical underpinnings and practical perspectives and insights into the use of peer feedback in a collaborative and flipped learning environment.

## Concurrent Session-B

Session Code	Name of the Presenter(s)	School	Title	Subject	Venue
1B	Koh Bing Qin	Pasir Ris Secondary School	Applying the Theory of Variation to Teach the Strength of Acids: A Learning Study Approach	Chemistry	520
2B	Ahmad Tarmidzi bin Mohd Kassim Edith Satiish	Eunos Primary School	Learning Electricity through Art and Science.	Multi-Disciplinary	519
3B	Noor Haida Bte Mohd Jakaria Razana Bte Abdul Rahman	Chongzheng Primary School	The Impact of P5 Malay Language Pupils' Understanding and Application of Grammar Rules on their Performance in Affixes.	Malay Language	320
4B	Wang Jianping	Temasek Junior College	How to use pictures in Chinese Language teaching.	Chinese Language	319
5B	Huang Aili Ng Wanyi, Amanda	Changkat Changi Secondary School	A Systematic Approach to Peer Assessment through the use of Rubrics and Teacher Modelling.	English Language	421
6B	Lim Sing Ee	Pasir Ris Crest Secondary School	Let's explore talk in Geography classrooms!	Geography	524
7B	Sucillia Sukiman Jolene Ng	Junyuan Secondary School	Blackout Poems to Improve Literature Students' Critical Analysis	Literature	523
8B	Chang Cheng Liang	Poi Ching Primary School	Use of Google Spreadsheet for the Teaching of P6 Mathematics Topic – Pie Chart.	Mathematics	214
9B	Rosina Bakam Foo Yong Shiong Badariah Bte Mohamad Noor Najmon Nisha	East View Secondary School	State of the teachers' use of questioning for Assessment for Learning in their Teaching.	Multi-Disciplinary	424
10B	Ang Sock Kiang Yong Jui Jin	Broadrick Secondary School	Applying Schema Theory to the Teaching of Fractional Algebraic Manipulation.	Mathematics	420
11B	Koh Chee Kiang Tang Wai Yue Lee Cheng Soon Teo Zhan Rui	Victoria School	Making Thinking Visible in Physics Lesson through Effective Use of White boarding and Foutan Board	Physics	521
12B	Ong Chin Leng Leow Min Yu Ida Rahayu Ida Murni	Meridian Secondary School	Gratitude as an Enabler of Student Well-Being.	CCE	419
13B	Sharifah Alkaff Suresh Nadarajan Li Weixiang Daphne Noor Hafizah Bte Mohamed Alias	Temasek Junior College	Use of Intellectual Standards in teaching Biology.	Biology	423

### Session Code 1B

Presenter(s): Mr Koh Bing Qin  
School: Pasir Ris Secondary School  
Title: Applying the Theory of Variation to Teach the Strength of Acids: A Learning Study Approach.  
Subject Area: Chemistry

**Synopsis:** Chemistry is perceived to be a difficult subject at the secondary school level as it requires the understanding of abstract and intangible theories. In particular, the concept of the strength of an acid in relation to its degree of ionisation is difficult to grasp. Leveraging on the approach of the learning study cycle, we developed a lesson to address the gap in the learning of the aforementioned concept. The cycle started with the identification of the object of learning and the critical aspects of the concept that our students must be able to discern. Applying the Theory of Variation in our pedagogical design, we developed a practical-based lesson incorporating two patterns of variation, namely, generalisation and contrast. The learning study approach provided an avenue for us to engage in professional discourse that resulted in lessons that are more focused and structured. This has helped students to learn as shown in the results of the pre- and post-tests, where students were able to differentiate between strong and weak acids more effectively.

### Session Code 2B

Presenter(s): Mr Ahmad Tarmidzi bin Mohd Kassim  
Mrs Edith Satiish  
School: Eunus Primary School  
Title: Learning Electricity through Art and Science.  
Subject Area: Multi-Disciplinary

**Synopsis:** “Why are my students unable to remember and apply their knowledge?” This is a common refrain amongst our teachers whenever we discuss our students’ learning. This was especially so for the Primary 5 topic of electricity where our students had difficulty understanding circuits and the flow of electricity. While we wanted to bring in more hands-on activities in our lessons, the limitations of curriculum time was always a challenge. In 2016, we chanced upon CircuitScribe which allowed students to draw circuits using a pen with conductive ink. Then in 2017 we collaborated with the Art teachers to plan and implement a semester-long project for our Primary 5 students to first learn the concepts of electricity and then create an art piece with a working electrical circuit, using CircuitScribe components. This was funded using the Coyote Fund from the school. Through the art-making process, students had the chance to apply their knowledge of electricity in the designing of their art work and troubleshooting of their circuits. Students’ responses for questions on the topic of electricity were analysed at SA1 and SA2 to inform teachers on whether students’ understanding of the topic has improved through the art-making process. In addition, students were also assessed on how well the LED bulbs enhanced the overall aesthetic quality of their art work.

### Session Code 3B

Presenter(s): Miss Noor Haida Bte Mohd Jakaria  
Mdm Razana Bte Abdul Rahman  
School: Chongzheng Primary School  
Title: The Impact of P5 Malay Language Pupils  
Understanding and Application of Grammar Rules on their Performance in Affixes.  
Subject Area: Malay Language

**Synopsis:** The complex process of affixation brings about confusion among pupils especially those who do not read widely or lack the exposure to the language. An analysis of P5 ML pupils' performance in the different components at SA1 2016 showed that pupils underperformed in the affixes component. The Malay Language teachers collaborated on a lesson study project to understand pupils' learning of affixes. The research aimed to answer the following questions.

1. Does teaching pupils Malay grammar rules increase their ability in using accurate affixes to form semantically correct sentence.
2. Do pupils' understanding and application of Malay grammar rules lead to better scores in the affixes component at SA2 of the Malay Language paper?

The target group for this research was 26 primary 5 high progress pupils. Prior to the implementation of the public lesson, pupils went through three mini lessons. Each lesson focused on an aspect of the Malay grammar rule that is important for the understanding of the rules of affixes. Pupils were taught to identify the word class in a sentence using the grammar rules to help them determine the correct affixes.

### Session Code 4B

Presenter(s): Miss Wang Jianping  
School: Temasek Junior College  
Title: How to use pictures in Chinese Language teaching.  
Subject Area: Chinese Language

**Synopsis:** In the teaching of Chinese, there are many things that teachers would convey to students while analyzing passages, such as vocabularies, structure of the passage and the gist of the passage. In fact, knowing how to integrate these aspects into one's teaching style has become one of the biggest challenges faced by Chinese Language teachers. Additionally, students also tend to have difficulty in essay question analysis. Some students misunderstand what the questions are asking for, especially the key words, while others lack structure in their essays, resulting in inconsistency in their narratives. From my study, I found charts useful in helping students develop their reading and writing skills. Charts can be used effectively in the study of passages through teacher guidance, so that students can clearly understand and summarize the content and develop greater understanding of vocabulary, paragraphs, structure, subject and techniques. Charts were also found to be useful in helping students with essay analysis, as it develops their ability to analyse composition questions logically.

### Session Code 5B

Presenter(s): Miss Huang Aili  
Miss Ng Wanyi Amanda  
School: Changkat Changi Secondary School  
Title: A Systematic Approach to Peer Assessment through the use of Rubrics and Teacher Modelling.  
Subject Area: English Language

**Synopsis:** In line with Changkat Changi Secondary School's PD focus on Assessment and our English Department's PD focus on Writing, a group of teachers in the EL Lower Sec Professional Learning Team embarked on a research project with the aim of addressing challenges that students and teachers face in the assessment of writing. Through a systematic approach to peer assessment, we hope to give students greater ownership in their learning through a more effective feedback process, which benefits both teachers and students.

The team adopted strategies from Professor John Hattie's Visible Learning research, in particular, Strategies 1 (Provide a clear and understandable vision of the learning target), 2 (Use examples and models of strong and weak work) and 3 (Use effective feedback to provide value to students' learning). Teacher modelling and the adaptation of Daniel Wilson's Ladder of Feedback were also used to complement the strategies. Over the course of the year, lessons on peer assessment were carried out in various upper and lower secondary classes, with improvements and adaptation of lesson resources made to address the needs of the different profile of students.

### Session Code 6B

Presenter(s): Ms Lim Sing Ee  
School: Pasir Ris Crest Secondary School  
Title: Let's explore talk in Geography classrooms!  
Subject Area: Geography

**Synopsis:** Vygotsky (1978) theorised that language use and thinking are dialectically interconnected, and their development is only made possible in a social community. This means that learning (to think and communicate required by any discipline) takes place through the essential aspect of classroom talk. This research explores the state of talk in 2 Geography classrooms in Pasir Ris Crest Secondary School and how it may be influenced by varied question types. In particular, do question types promote domain-specific talk that exhibits the desired knowledge and thinking within the Geography discipline?

This research also explores the idea of 'geographical thinking' and its relationship with talking, as developing conceptual understanding and domain-specific knowledge in students' thinking and talking is an important task for geography educators. Importantly, the research hopes to add gravitas to the importance of disciplinary literacy knowledge in improving classroom instructional practices, and aspires to highlight potential challenges that confront promoting thinking and talking in Singapore classrooms.

## Session Code 7B

Presenter(s): Mdm Sucillia Sukiman  
Miss Jolene Ng  
School: Junyuan Secondary School  
Title: Blackout Poems to Improve Literature Students' Critical Analysis.  
Subject Area: English Literature

**Synopsis:** The Lesson Study was designed to examine the impact of introducing Blackout Poems in Literature lessons in Lower Secondary classrooms. The research focused on students' ability to reconstruct from a given text; an original poem based on selected words or phrases they have identified as key to describe the theme, mood or atmosphere of that text. The study spanned across two academic terms in 2017 with students from four Sec 1 Express, two Sec 1 Normal Academic, four Sec 2 Express and three Sec 2 Normal Academic Literature classes. Data collection included pre and post tests, teacher observation forms, a research lesson and re-teach lesson. The team postulated that data analysis showed an increase in student performance after the introduction of Blackout Poems as an intervention strategy. Originating from the newspaper, Blackout Poetry involves the selection of words that one desires to retain and the deletion of other words to create poetry from a piece of text. The focus of Blackout Poetry, therefore, is that one will only have the words, letters, punctuation and spaces in the selected piece of text to work with. Blackout Poetry in itself is the act of taking apart a text, as well as putting together and transforming the text into a different genre. In his article, Ladeheim (2013, p. 50) argues for the place of Blackout Poetry in the Literature classroom as this act of textual deconstruction and reconstruction "fosters opportunities for students to think deeply and critically about [the] experience, about its implications for not only taking texts apart in search of meaning but also for creating texts in search of understanding".

Our data showed that students across classes and streams have showed an improvement in their Post Test after the intervention strategy of introducing Blackout Poems as part our teaching and learning resource. The strategy helped to develop skills in literary criticism which included the ability to identify themes, mood/atmosphere, and use textual evidence to support their opinions on the said themes, mood and atmosphere of a given text.

## Session Code 8B

Presenter(s): Mr Chang Cheng Liang  
School: Poi Ching School  
Title: Use of Google Spreadsheet for the Teaching  
of P6 Mathematics Topic – Pie Chart.  
Subject Area: Mathematics

**Synopsis:** The project is part of our Poi Ching School Learning Team research area. One of the P6 Learning Team had embarked on the use of Google Spreadsheet in the teaching of the topic Pie Chart. The research project was chosen as a consensus from the P6 math teachers as we pondered how ICT can be infused into teaching a P6 math topic.

- The project tapped on (1) the collaborative power of Google Spreadsheet (being a part of Google Suites) to collect data simultaneously from pupils; and (2) the graph-plotting function.
- Authentic data (pupils' modes of transportation to school) are keyed in by the pupils in the class; With the data, a pie chart is automatically plotted and projected on the screen. Pupils see the changes to the pie chart as real-time data is being keyed in. Pupils observe the distinct features of a pie chart eg. The entire population will be represented by a complete circle.
- Pupils had a chance to explore plotting their own pie chart with different representations of the same data set, whereby they come to a conclusion that even though there are so many ways of representing the same set of data, they will eventually arrive at the same pie chart.
- The project is a team result of a team effort by the P6 Math teachers, which each teacher given a different task ranging from sourcing for appropriate pie-chart questions, to preparing/pre-programming the Google Spreadsheet, to printing worksheets for pre-test & post-test.
- The team was given fully supported by the school leaders and SSD, in terms of having periods in the staff timetable reserved for the purpose of Learning Team discussion and lesson delivery.
- Teachers get a chance to make use of ICT in enhancing pupils' learning
- With the help of ICT tool (Google Spreadsheet in this case), pupils get a chance to engage in exploratory learning – how seemingly different representations of the same data set can yield the same pie-chart.
- Some tips how to carry out this project:
- Be daring to give ICT a try!
- Learn to work with Google Spreadsheet
- Learn to create graphs & pie-charts on Google Spreadsheet
- Knowledge on use of MS Excel to create spreadsheet and generate graphs will be a bonus.

The project is basically a lesson study on the use of Google Spreadsheet in the teaching of P6 Mathematics Topic—Pie Chart.

Google Spreadsheet is a viable tool for engaging pupils in learning the Math Topic: Pie Chart.

Tapping on the collaborative nature of Google Spreadsheets authentic real-time data can be entered by the pupils simultaneously. The data captured can then be used to plot pie charts. Moving forward, Google Spreadsheet has to potential to be used in teaching other Mathematics topics too.

### Session Code 9B

Presenter(s): Mdm Rosina Bakam (LT/TL)  
Mr Foo Yong Shiong (SSD)  
Mdm Badariah Bte Mohamad Noor (ST/ML)  
Mdm Najmon Nisha  
School: East View Secondary School  
Title: State of the teachers' use of questioning for Assessment for Learning in their Teaching.  
Subject Area: Multi-Disciplinary

**Synopsis:** This Action Research project explored the use of questioning as an Assessment for Learning (AFL) strategy by teachers in the school. Through a qualitative approach comprising lesson observations of teachers in the English, Mathematics, Science and Social Studies classrooms and post-lesson interviews with these teachers, the study sought to illuminate how questions were used to stimulate student thinking, uncover students' current level of learning and in turn, inform pedagogic decisions.

One key finding of the study was the impact of questioning models on student learning. Teachers who actively adopt questioning models in their classroom assessment practices were found to be more effective in eliciting student understanding, supporting students in their progress, developing students' cognitive capacity, and guiding students towards deeper learning. The study concludes by providing practical insights on how to strengthen teachers' questioning in the classroom, and recommending areas of focus for teachers wishing to leverage questioning to enhance student learning.

Some key findings of the project include the following:

- Teachers' use of questioning models, such as Bloom's taxonomy, Socratic questioning, Paul's wheel of reasoning, improves the quality of embedded formative assessment in the classroom, leading to deeper student learning.
- It is critical to include a range of question types, from factual to thought-provoking, for a balanced and more holistic assessment of student learning.
- There is room to continue strengthening and reinforcing good questioning techniques among teachers, including sufficient wait-time, re-directing of questions and getting students to generate questions.

### Session Code 10B

Presenter(s): Ms Ang Sock Kiang  
Mr Yong Jui Jin  
School: Broadrick Secondary School  
Title: Applying Schema Theory to the Teaching of Fractional Algebraic Manipulation.  
Subject Area: Mathematics

**Synopsis:** Many Normal Academic (NA) students find algebra rather challenging and difficult, in particular, the manipulation of fractional algebraic expressions. This is supported by findings from the diagnostic test conducted on Secondary 2 NA students which showed that they have difficulties simplifying fractional algebraic expressions, especially in terms of placing of brackets and handling of negative signs.

In an attempt to address this weakness, the team looked into applying the Schema Theory in designing our lessons so we can better help our students learn mathematics by activating their prior knowledge.

With the above in mind, the Mathematics Professional Learning Team (PLT) conducted a lesson study to strengthen the teaching and learning of simplification of Fractional Algebraic Expressions in our Secondary 2 NA stream.

Based on Schema Theory, the learner actively builds schema and revises them in light on new information. Memory is driven by structure as well as meaning. The most important implication of Schema Theory is the role of prior knowledge in processing. In order for learners to be able to effectively process information, their existing schemas related to the new content need to be activated. The use of analogies and comparisons help draw attention to learner's existing schema and to help them make connections between existing schema and the new information. Thus, the applying of Schema Theory in our design for our mathematics lessons helps to enhance the learning of simplification of fractional algebraic expressions.

Results from our study show that the Schema Theory is able to improve our students' ability to perform simplification of fractional algebraic expressions. The AfL Strategy of 'Exit Pass' was also employed in the process.

## Session Code 11B

Presenter(s): Koh Chee Kiang (Mr)  
2.Tang Wai Yue (Mdm)  
3.Lee Cheng Soon (Mr)  
4.Teo Zhan Rui (Mr)  
School: Victoria School  
Title: Making Thinking Visible in Physics Lesson through Effective Use of White boarding  
and Foutan Board  
Subject Area: Physics

**Synopsis:** To make the learning of Physics more authentic, engaging and visible, we vision that students have to be exposed to investigative group hands-on activities. This align with studies that suggest concrete learners make greater improvement in subject mastery with more reflective (Saunders & Sheperdson, 1987) and positive attitude (Lawson, 1995) in science learning. We noted that activities that facilitate group discussion using White boarding and an in-housed designed Foutan board would facilitate deeper understanding of the topics that students usually faced difficulties in.

We designed task activities that required students to work in small group to complete the assignments and present their understanding and findings using Whiteboard to the rest of the class. This process fits into the 5E Learning Cycle Model and in particular enable the teachers to access the thinking of the students during the Elaboration and Evaluation.

In Physics, the electricity topics can be quite abstract for many students. To help students relate the circuit design to questions and make their learning more visible, we implemented the Foutan board activities. To better suit our task, we designed and made our in-housed Foutan boards. This activity is an adaptation of the Foutan board activity used by Cornell University "Xraise Outreach for CLASSE" Wilson Lab (CNS Institute for Physics Teachers 2011 Revised).

The outcomes were positive. Students showed a better understanding in the topics. They were more confident in forming and communicating explanations and they showed a higher level of efficacy through keener interest and motivation.

Participants will have a good understanding of the tasks we developed to support concrete learning. They would benefit from our experience and adapt to their own class/school context.

### Session Code 12B

Presenter(s): Mr. Ong Chin Leng  
Miss Leow Min Yu  
Ms Ida Rahayu  
Ms Ida Murni  
School: Meridian Secondary School  
Title: Gratitude as an Enabler of Student Well-Being.  
Subject Area: CCE

**Synopsis:** Project Meridian Gratitude is an action research project undertaken with the aims of increasing positivity, improving social relationships, and increasing pro-social behaviours among students. It involves the use of CCE lessons to cultivate the character strength of gratitude. Gratitude is chosen as it is closely associated with Meridian school values and is readily concretized through a variety of expressive and reflective activities. In order to enhance the effectiveness of our lessons, we collaborated with NIE research scientist who has developed an evidenced-based gratitude intervention package. This package entails 6 lessons on gratitude taught across 10 weeks. As a pilot project, we involved 6 classes of students (2 classes each from 3E, 3NT, and 2NA). One class from each stream would be the experimental group where the lesson package would be delivered, while the other class would serve as a comparable control undergoing lessons from the usual CCE curriculum. Teachers teaching the experimental group were given a familiarisation training on the content and delivery of the package. To measure the outcome of this project, students were assessed on self-report questionnaires on school life satisfaction, depression, relatedness to significant others, school resilience, and altruism, among others.

Results showed that Project Meridian Gratitude increased students' wellbeing across all streams. Notably, it improved students' school life satisfaction, relatedness with teachers and friends, academic resilience, social resilience among their school mates, and altruism. Furthermore, it buffered effects of factors causing a decrease in life satisfaction and an increase in depressive symptoms. However, many of these effects were more pronounced in the express stream. Future work should include collection of qualitative evidence, which may be helpful in explaining these differential effects across streams.

### Session Code 13B

Presenter(s): Ms Sharifah Alkaff  
Mr Suresh Nadarajan  
Ms Li Weixiang Daphne  
Ms Noor Hafizah Bte Mohamed Alias  
School: Temasek Junior College  
Title: Use of Intellectual Standards in teaching Biology.  
Subject Area: Biology

**Synopsis:** To better prepare students to analyze and solve real-world problems in the 21st century, students must be equipped with critical thinking skills. This project aims to investigate whether exposure to Intellectual Standards (IS) can foster a culture of critical thinking in the Biology classroom. The Year 4 Integrated Programme (IP) Biology lessons were designed to allow the teachers to purposefully pose questions which probed student thinking and strengthened their reasoning skills, focusing on four of the nine IS – accuracy, precision, logic and depth. Our results show that there was a general improvement in their ability to answer questions using the skills learnt through IS. More studies need to be done to ascertain students' perceptions towards IS to tease out more relevant insights.

