

Session Code P11

Presenter(s): 1. Lee Suan Ling June
2. Ng Chee Keong
School: Bedok Green Primary School
Title: Keeping Students engaged through mobile learning
Subject Area: English Writing and Mathematics

Synopsis: Purpose of this mobile learning project was to identify the relationship between the students' engagement level and the use of mobile devices for learning.

The Primary 3 students piloted a programme to use mobile devices as a tool to enhance their learning beyond their classrooms. They were taught how to use the different functions of the mobile devices as well as applications like Pic Collage and QR reader.

Armed with the newly acquired skills, the P3 students worked collaboratively during English Language and Mathematics lessons to meet the requirements of their tasks; honing their 21st CC skills in the process. Students were observed to be teaching and helping each other out, thus demonstrating Self-Directed Learning.

Session Code P12

Presenter(s): 1.Lim Chun Ling
2.Yin Jian
School: MacPherson Primary School
Geylang Methodist School(Primary),
Title: Self-Directed Learning in an ICT-enabled Environment – A Project in Chinese
Language Flipped Classrooms
Subject Area: Mother Tongue Languages, Communication, Collaboration, Information Skills and
Pedagogy

Synopsis: The research aims to develop in students the competencies for self-directed learning (SDL) as well as to improve learning efficiency and cultivate interest in learning Chinese Language. A group of teachers from seven schools collaborated and experimented on the use of SDL in a total of six Flipped Classroom lessons. The SDL learning framework and the Flipped Classroom Pedagogical Model were used to create ICT-enriched learning experiences suited for teaching vocabulary in the classrooms. When a classroom is flipped, students learn the vocabularies from the pre-recorded videos assigned by teachers prior the lessons. That has allowed students to acquire more pre-requisite of vocabulary learning. By doing so, time is freed up for teachers to focus on higher-order thinking processes through purposefully designed activities in the classrooms. The learning activities help students to create, collaborate and put into practice what they have learnt as well as evaluate their own learning independently, both from the pre-recorded videos and in the classrooms.

The online assessments provided immediate feedback to both the students and teachers. With the data collected, teachers make informed choices on whether to re-run or re-teach part of the vocabularies content or to provide more in-depth classroom activities and discussion.

Session Code P13

Presenter(s): Long Hian Kum

School: St Hilda's Primary School

Title: Enhancing Students' Mathematical Problem Solving Processes Through The Flipped Classroom Pedagogy

Subject Area: Mathematics

Synopsis: Improving students' competencies in Math problem solving is an arduous task. The thought processes involved; that of making relationships, deductions and assumptions etc can prove challenging for many primary school students. In the light of this context, the Flipped Classroom Pedagogy was undertaken so as to allow students the opportunity to self-direct and learn at their own pace. A mini study was conducted to ascertain the efficacy of the Flipped Classroom Pedagogy (Bergmann and Sams, 2007) in enhancing students' mathematical problem-solving processes.

This mini-experimental study was targeted at Primary 6 (aged 12-13 years) students. A sample size of 122 students and 36 parents were involved in the study. The Flipped Classroom Pedagogy involved the recording of a voice on an iPad screen to create video lessons that students can access. Four teachers recorded their explanations on Math word problems which students can access and make sense of at their own pace.

The research methodology adopted for the study consisted of a) surveys which students and parents participated in b) quantitative comparisons of students' grades (grades are on a descending scale of A*,A,B,C,D and E) between the preliminary exams which students sat for before intervention and the PSLE exams which students sat for after intervention. Data collected from students' survey revealed that 84.4% of them agreed that the approach had improved their comprehension of Mathematical concepts and Math problem solving skills. 79.5% of the students also highlighted that the approach had given them the impetus to attempt solving other Math problems. 88.9% of the parents surveyed pointed out that the video clips aided their children in their understanding of Mathematical concepts. 80.6% of the parents surveyed also found that their children were more motivated to try to solve other sums after viewing the video clips. The results in the surveys corroborated with analysis of students' Math performance over the two exams highlighted earlier. 71.3% of the students made progress in their grades, suggesting an improvement in their problem solving abilities.

Session Code P14

Presenter(s): 1.Mohamad Zakie Aiksan

2.Lee Wei Jian Isaac

School: St Hilda's Primary School

Title: Flipped Classroom (Physical Ed)

Subject Area: Physical Education

Synopsis: This research project is on the use of Flipped Classroom model in the teaching of Physical Education. It was initiated after the teachers relayed concerns over students not getting enough practice time during lessons. As more time was spent on the teachers giving instructions, it resulted in a truncated practice time. In this research, our main objective was to achieve at least 70% of a 1 hour PE lesson to be practice time and to have at least 80% of the students who are able to demonstrate the key teaching points of a specific skill taught. While we strived to increase practice time, we also acknowledged that it was important to ensure the effectiveness of the lesson was not compromised. The findings of the research project were enlightening. The students indeed had more time during PE lessons to explore and practise the skills they had learnt. Prior to their lessons, the students watched videos at home which taught them the specific skills to be practised in school. These videos were mainly created by their PE teachers themselves and were designed based on their students' abilities and styles of learning. Reflecting on this research project, many external factors need to be considered and addressed before we can effectively apply this model and achieve what a Flipped Classroom model is designed to achieve.

Session Code P15

Presenter(s): Gordon Chua Koon Leng
 School: St Hilda's Primary School
 Title: ICBL in Science
 Subject Area: Science

Synopsis: This study addresses a specific concern among students learning science in the Singapore based primary school context. In order to enhance their learning experience and improve their skills in scientific explanation, the Investigative Cased Based Learning approach is adapted with the use of ICT and Formative Assessment tools like CER and KWL. Towards the end of the study where the focus shifts towards summative assessment, the use of 2 Tier MCQ, a modified test instrument (a "reflective" or "two-tier" MCQ) which comprises items from the traditional MCQ with an added second tier which is essentially an open-ended segment which requires students to explain the thinking behind their choice of the answer key. The study sample comprises two primary four classes.

Session Code S11

Presenter(s): 1.Chua An Ting
 2.Chang Qi Yin
 3.Qi Yan Ping
 School: Bedok North Secondary School
 Title: Using lesson study to enhance lesson plans to improve students' reading and writing skills.
 Subject Area: Chinese Language

Synopsis: This research aims to find out the effect of lesson study to the teaching of Chinese Language. It focuses on the work of a team of 8 Chinese teachers who participated in regular team dialogue sessions to improve the quality of their lesson plans and delivery of lesson. The study was carried out to examine how teachers can improve students' reading and writing skills through clearer instructions and better questioning techniques.

Using lesson study protocol as the basis of their learning, the team succeeded in improving teachers' lesson preparation, which helped to stimulate students' thinking and enhance students' learning experience, and eventually improve students' reading and writing skills.

Findings from the study will be represented with teachers' – teacher and observer – personal reflections, students' work and students' examination results.

Session Code S12

Presenter(s): 1. Ong Lay Kheng
 2. Shabana Yasmin
 School: Bedok View Secondary School
 Title: Self-directed Learning in Geographical Investigation
 Subject Area: Humanities- Geography

Synopsis: In line with guiding students to be the self-directed learners, C2015 outcomes, teachers in Bedok View Secondary School redesigned part of the Secondary Three Geographical Investigation component in the topic of Weather and Climate to include a higher degree of self-directed learning. This project demonstrated that students who engaged in independent research and video-filming as forms of self-directed learning, were able to better understand the usage of weather instruments in collecting fieldwork data. Students' assessment results also registered significantly better test scores in components where self-directed learning was implemented. This session will highlight the shift from didactic teaching to self-directed learning and in the process, enhance 21st century skills. The presenters will share the steps and processes taken to design the project as well as relevant lesson resources.

The project aims to assess if Secondary Three students will gain a better understanding of using weather instruments through independent research and making of videos. At the end of the project, students should be able to recognise the requirements to accurately deliver an instruction video on using weather instruments (elements of effective communication). They should also gain a better understanding of the process of using weather instruments to collect fieldwork data.

Session Code S13

Presenter(s): 1.Chen Xinyi
2.Salahudeen Sayed Mobarak
School: Broadrick Secondary School
Title: Design and Develop a T&L Mechanism Resource Package for Secondary 3 Normal Academic Level
Subject Area: Design and Technology

Synopsis: In the Mechanism topic, students often face apprehension as they are unable to visualise the concept. This often results in students underperforming in their theory exams.

The positive results in 2014 shows that the research mechanism lessons have indicated positive influences in all 7 ways in the support of meaningful learning. The following 4 aspects showed a greater influence than the others:

1. Drawing connections to students' prior knowledge and experiences;
2. Diagnosing students understanding in order to scaffold the learning process step by step;
3. Engaging students in active learning so that they apply and test what they know;
4. Providing clear standards, constant feedback and opportunities for work.

The D&T PLT Team has refined the development of a T&L Mechanism Resource Package for Secondary 3 Normal Academic. Two research lessons were conducted with the primary aim to increase the proficiency and engagement levels of students taking mechanism module, as well as to validate the 'Seven ways for support of meaningful learning by Linda Darling' in our research lessons.

Session Code S14

Presenter(s): 1. Low Siok Hong
2. Tan Lee Hwee
3. Tan Chee Kian
School: Dunman High School
Title: Are Activity-Based Lessons Effective In Increasing The Level Of Engagement Of Students In Learning Mathematics?
Subject Area: Mathematics

Synopsis: Sobel and Maletsky (1988) used the three D's: Dull, Deadly and Destructive of all interest to describe many mathematics lessons. The most frequently used strategy in mathematics classrooms was the teacher-centred (chalk and talk) approach (Agyei & Voogt, 2011) in which teachers did most of the talking and students were passive recipients of the information provided. As a result, students became bored easily, did not enjoy mathematics lessons and this affected their attitude toward learning mathematics.

To improve the situation, the team explored the use of activity-based lessons (which aligned with the constructivist premise that students were engaged in constructing knowledge) in teaching the topic "Algebra". Since most students found Algebra difficult due to its abstract nature, the team introduced the use of manipulatives called algebraic tiles to facilitate students' understanding in the group activity on "factorisation by grouping".

Qualitative research was chosen as a research design for this study and the research methodology is Action Research. The team planned for one cycle and to gain a holistic overview of the context in this study, the team chose participant observation, individual interviews and students' written documents as the methods for data collection.

Session Code S15

Presenter(s): 1. Sucillia Sukiman
 2. Muhammad Izzan Mohammad Yusoff
 3. Vanishree Vengadasalam
 4. Makoto Kawaguchi

School: Junyuan Secondary School

Title: Rubrics to Develop Self Efficacy in Literature

Subject Area: English Literature

Synopsis: Our lesson study subject was selected after a review of the Secondary 4E students' performance in the EOY Exam 2014. After analysis of the results, we came up with possible root causes for students' lack of ability to discern the expectations and requirements for each question and part questions of the paper. Among the various possible root causes, and supported by our literature review, we narrowed it down to the Research Question, 'How can we help students to answer literature questions more effectively with the aid of rubrics?' From this RQ, we have identified the key strategy that we would use; 'Using Rubrics to Scaffold Students' Understanding of Questions'. To ensure our approach is aligned to resources available and disseminated by CPDD, we based our rubrics on the current available rubrics by the Lit Unit (CPDD). We customised the rubrics to better serve the learning needs of our students. The hypothesis of this Lesson Study is that students will be able to answer literature questions more effectively with the guide of customised rubrics meant to facilitate self-directed learning. The assumption of this study is that formative assessments using the afore-said rubrics will augment students' confidence in answering the questions. Subsequently their success in attempting those questions will in turn increase their self-efficacy.

Session Code S16

Presenter(s): 1. Lisa Toh
 2. Tan Kah Ooi
 3. Khadijah Aziz
 4. Rachel Teo

School: St. Hilda's Secondary School

Title: Design Based Inquiry – A pedagogy to develop critical and inventive thinkers

Subject Area: Integration of three sciences

Synopsis: The Microbial Fuel Cell (MFC) programme was introduced to Secondary 2 high-progress students in 2015. Aligned to MOE's 21st Century Competencies (21CC) framework, the MFC programme adopts the Design Based Inquiry (DBI) approach to develop scientific literacy in the students, focussing on the inculcation of Critical and Inventive Thinking skills and Communication, Collaboration and Information skills. In the 10-week MFC programme, students collaborate in teams to explore, design and test out various conditions in the working models of MFCs to produce electricity. Through the exploration to optimise the amount of electricity from various resources, students learned to forge connections between the three sciences (Biology, Chemistry and Physics). More significantly, they gained invaluable insights into real-life scientific processes where the learning is dynamic. Students also learn to respond and manage uncertainties that may arise unexpectedly. Besides the use of an assessment rubric based on 21CC, the multi-pronged feedback approach involving teachers' and peers' feedback through an ICT platform, and students' reflection, have helped students become more aware of the desirable dispositions of a Thinking Scientist. Preliminary findings suggest the effectiveness of DBI on the cognitive and social development of students, which are important aspects in preparing them for the future workforce.

Session Code S17

Presenter(s): 1. Dr Siti Munira
2. Mr Goh S Y
3. Mrs Cheong Peck Yoke
4. Mrs Chan Pin Hong
School: Tanjong Katong Girls' School
Title: A lesson study on Using the Flipped Classroom approach to develop Self-directed Learners
Subject Area: Chemistry

Synopsis: In a traditional Chemistry classroom, the teacher often teach the Chemistry theories and concepts before going to the laboratory to carry out laboratory experiments. Students would then be given assignments to work on as homework which the teacher would then mark and give feedback in class. The whole process is not only lengthy but students are often over reliant on their teachers for knowledge acquisition.

To encourage self-directed learning, students learn content at home before practicing or discussing what they learned together in a physical classroom. They are given online e-learning resources such as Youtube videos or videos prepared by teachers, to learn a new topic. Pre-lessons assignments are given to guide student in their learning. Students are given a period of time to learn and master content before lesson. They can learn at their own pace as they can replay the videos many times at home.

During the subsequent lessons in class, activities are designed by the teachers to assess student learning. The teacher will provide feedback and correct student misconceptions. Teachers can assess the extent where students are able to apply what they have learnt. More time is used for clarifications as students begin to take ownership on their own learning. The learning environment is reversed as the teachers are no longer the deliverer of content knowledge but a facilitator of student learning.

Session Code S18

Presenter(s): 1. Koo Ching Ching
2. Hilary Pang
3. Yeo Ling Seem
School: Tanjong Katong Girls' School
Title: Using Flipped Classroom Approach to Free Up Curriculum Time for Problem Solving and to Promote Greater Ownership of Learning in Students
Subject Area: Additional Maths

Synopsis: Problem Solving is a core skill in Mathematics Learning and requires students to apply the concepts they have learnt flexibly. It is essential for students to have ample teacher-facilitated opportunities during curriculum time to master this skill. It is also important for students to acquire the essential background knowledge before lessons in order for them to be able to focus on problem solving during curriculum time. This PLT examines the effectiveness of using the Flipped Classroom approach to teach Trigonometric Graphs to Secondary Three Additional Mathematics students in Tanjong Katong Girls' School. A survey was used to collect data on students' and teachers' use of the Flipped Classroom approach as well as their feedback. The results showed that not all teachers were comfortable with the use of the Flipped Classroom approach as they were unfamiliar with its use and purpose, and used the approach only for selected classes. Feedback from teachers who tried the approach indicated that most students had acquired the essential background knowledge before the lesson and this did allow them to spend more curriculum time on problem solving. Feedback from students was mixed, with some students appreciating being allowed to learn at their own pace and other preferring the traditional method of teaching. The conclusion can be drawn that the Flipped Classroom is a viable approach but requires a more structured and consistent implementation. Following a more detailed account of the implementation of the Flipped Classroom, some recommendations for adjustment of the implementation of the Flipped Classroom will also be presented.

Session Code JC11

Presenter(s): Khaw Hwee Ju

School: Victoria Junior College

Title: Lesson Study on Laws of Electromagnetic Induction

Subject Area: Physics

Synopsis: This study examined the effects of Lesson Study (Lewis, 2002; Stepanek et al., 2007) on students' understanding of Electromagnetic Induction and teachers' professional growth within a Junior College professional learning community.

The physics team comprising seven teachers with 5 – 30 years teaching experience collaborated to plan a tutorial for implementation after students have gone through formal instruction during lecture. A 5-step thinking routine was designed to guide the students working in team to make visible their thinking during discussion and enable them to solve and present their solutions to the tutorial problems on individual whiteboards.

Three research lessons were carried out with observations by teachers using prepared templates to records students' thinking and the classroom interactions. A colloquium was conducted after each lesson to evaluate students' learning and to revise the lesson plan for the next lesson in the interactive cycle.

Analysis of students' assignment and feedback from teachers revealed that lesson study had a positive impact on teachers' belief in fostering cooperative work in problem-solving activities to encourage students' self-reflection and working interdependently.

The presentation will conclude with a discussion on the implications on teaching and learning and what effective instructional strategies to be used for future cohorts.