PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

From a CyberSmart School to CyberSmart Community: The 4Es of Implementation

Author(s) : Venus Tan, Angelia Zhang
Presenter(s) : Venus Tan, Angelia Zhang

Cyber Wellness (CW) education is an integral part of every school. As the schools move into ICT MasterPlan 4, there is a need to establish a Cyber Wellness program that is relevant and effective.

This presentation will be on how the CW team implemented innovative CW education programmes that involve key internal stakeholders (students, teachers, parents) and external partners. The school's CW programme has received accolades from Ministry of Education and SiTF and funding from iMDA under Better Internet x Youth Call-for-Proposal. Participants will be able to get inspirations on the various approaches to make CW education relevant and interesting. They will learn about the E^4 implementation processes of the CW program namely: Empower Students Ambassadors, Envision Educators, Engage Parents and Enrich the Community.

The CW program adopts different approaches to empower student ambassadors for them to apply what was taught to them and to drive cyber safety messages to their peers. Opportunities were created for them not only to share in schools but also to showcase their efforts at external exhibitions and road shows. Through various engagement sessions for teachers and parents, there was a common understanding on current and potential CW issues and they were able to provide support to the students when the need arises.

With an established program and involvement from various stakeholders, the school has extended this outreach to the community. External partners were roped in to deepen our student ambassadors' understanding of CW issues through training sessions. They were challenged to come up with initiatives to create greater awareness of these issues among their peers and in the community. Through these sessions, student ambassadors shared the CW concerns faced by them and their peers. Thus, they were able to come up with meaningful peer advocacy projects which students are more receptive to. This is evident as the student population acknowledged that the programmes were meaningful and interesting in school-wide surveys. The stakeholders also expressed similar views in the surveys conducted for them.

The team faced several challenges from the start such as working within the constraints of funding, manpower and support from stakeholders. Another challenge was to align the timeline for the different programmes to suit internal stakeholders and external partners. The biggest challenge was keeping up with the ever-emerging trends of CW issues and updating the content of the programme to keep it relevant.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES
31 May 2018, Thursday

"Help, teacher! I am drowning in this sea of information!" Supporting Students in the Development of their Curation Competencies

Author(s) : Samuel Tan, Pauline Quek
Presenter(s) : Samuel Tan, Pauline Quek

Navigating through and making sense of massive amounts of information available at their fingertips can be a very daunting process, especially for primary school students. They struggle with multiple viewpoints, agendas, norms and interwoven networks to analyse and make sense of this information (Mihailidis & Cohen, 2013).

The process of digital curation is complex. Deschaine and Sharma (2015) defined effective curation as a 'multistep, developmentally sequenced endeavour; each step leads to the next, with greater and greater refinement of content resulting from the reflective and recurrent process'. They defined the following five phases of digital curation: collection, categorisation, critiquing, conceptualisation, and circulation.

Lim, Chen and Liang's study (2013) suggested that Singapore youths' participation in new media can be described as school-driven. School plays a central role in the way they participate and engage in their online activities. One school-driven activity that students commonly participate in is online information collection for research or to help them complete their assignments.

Since the school plays an important role in driving students' online activities, how are schools preparing students to thrive in this online environment? In particular, how are teachers equipping students with the skills and knowledge to navigate online effectively to access digital content relevant to their search purpose, evaluate digital content for its validity and reliability and then organise the filtered digital content for ease of retrieval?

This paper proposes that teachers have an important role in developing students' curation competencies as a means of equipping students with 21st Century competencies.

This study, therefore, aimed to understand how students developed digital curation competencies and the pedagogical strategies that would support their development. The research questions were:

1. How do students curate for digital content before the lessons? How do the lessons change the way they approach digital content curation?
2. What design considerations do teacher have when designing lessons to foster the development of students' curation competencies?

A case study approach was adopted. Data was collected from one class of Primary 5 students and one teacher. Students' responses in pre-post tests and surveys enabled us to understand shifts in students' proficiency in curating for digital content. Using the pedagogical paradoxes framework, teachers' design of lessons, reflection and their responses during the interviews were analysed to understand the kinds of conflicting demands and contradictory considerations that teachers faced when designing lessons to foster the development of students' curation competencies.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

ICT Integrated Lesson Design for Composition Writing of Lower Primary Malay Language Pupils

Author(s) : Siti Suraidah Rahim, Nor Zakiah Arif, Mardiana Mosnee, Nurliyana Ismail, Nurmah Zainal, Muhammad Firdaus Rahmat, Rahmat Subadah, Dr Suryani Atan, Fikir Amin Md Said, Faridah Jaafar

Presenter(s) : Siti Suraidah Rahim, Nor Zakiah Arif

Writing composition can be challenging for lower primary pupils. They are observed to be grappling with sentence construction, limited vocabulary and spelling. However, with suitable ICT integrated lesson design, we were able to improve Primary 3 pupils' writing ability. In this presentation, we will share our ICT integrated lesson design that consisted of pre-writing, writing, and post writing strategy. This was conducted as a Lesson Study by a networked learning community made up of teachers from four Primary schools. In addition, the lesson design harnessed the affordances of technologies to create opportunities for collaborative learning.

Vygotsky argued that "social interaction precedes development; consciousness and cognition are the end product of socialization and social behavior" (Heidar, 2016). Through collaborative learning, teachers are able to conduct student-centred lessons where pupils will learn from their peers the thinking process behind this productive skill and read models of correct sentence structures. Our lesson design usually began with teachers explicitly showing examples of how stories were developed from introduction to ending. Peer learning took place collaboratively using ICT platforms where High and Middle Progressing pupils were able to guide Low Progressing ones to edit the sentences constructed by their peers. Teachers were strongly encouraged to conduct differentiated instructions in their lessons customised to pupils' different needs. These processes were made possible with the affordances of ICT.

Therefore, the variety of functions and features in the enhanced iMTL portal were leveraged to create such lessons. Using the Collaborative Canvas and customised online Writing Rubrics, teachers were able to design lessons customised for different groups. These ICT tools enabled pupils to construct sentences based on a given picture or a series of pictures. Whether in pairs or in groups, peer guides or group leaders were able to guide their partners or group members before sharing their groups' product with other groups for a second level editing involving peer editing or simply giving constructive feedback. From our observations, peer evaluations could improve pupils' ability to construct grammatical sentences and help them produce work that is free from spelling or vocabulary errors.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES
31 May 2018, Thursday

Saya Boleh Membaca (I Can Read)

Author(s) : Noorhidayah Md Taib, Mohamad Shalleh Sujaee, Noranika Murni Dol Karim, Nur Maizurah Rosle
Presenter(s) : Noorhidayah Md Taib, Mohamad Shalleh Sujaee

Developing good reading skills is an area that Normal Technical (NT) students may find challenging for several reasons. Some students find reading unenjoyable, others lack the self-confidence and self-directedness to practise their reading skills. As a result, these students suffer from poor performance and interest in reading.

This presentation will share how a team of Malay teachers from Compassvale Secondary developed Saya Boleh Membaca, an app to help NT students improve their reading competency and find joy in reading.

With the emphasis on reading skills, the app, which is available in Google Playstore and can be downloaded for free on Android devices, is designed to enable students to read specified graded syllable and read text with good pronunciation and flow. The app consists of ten graded texts or "levels". Through several practice cycles and positive reinforcement, students could progress to the next level, which created a sense of achievement or "fun factor". The reading cycle could also be done at home, allowing students to improve their baseline reading competency anytime, anywhere. Each week in class, the teacher would sit before the students to follow up on their reading before encouraging them to read a higher graded text in the app. Alternatively, the teacher might request students to record their reading using the recording function of their mobile devices, and send the audio file to teachers for monitoring and feedback.

The teachers tried and tested the app this year to support 6 Secondary Three and 5 Secondary Two NT students who struggled to read well. These students were selected based on their 2016 End-of-Year oral reading marks. The team collected pre-intervention and pose-intervention data in the form of teacher's marked script and students' recorded audio. Evidence from the lesson observations, students' feedback and assessment of students' works suggested that using the app helped to develop students' reading competency through self-directed learning (SDL). For SDL, students were able to work on their reading at their convenience. Many students said that they had an enjoyable experience using the app and continued to read the graded reading texts over many cycles, even after the trial had ended. Some read the texts on their own while others read them with their parents assisting them.

The app is unavailable for iPhone. The app is also work-in-progress and features, such as in-built voice playback and recording functions, may be added in future.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

Inculcating Digital Citizenship Skills among Students with Special Needs (SEN)

Author(s) : Ng Wai Keng Yvonne, Tan Ching Ting Denise, Teo Wee Chung
Presenter(s) : Ng Wai Keng Yvonne, Tan Ching Ting Denise

The advent of technology has enhanced the teaching and learning of both mainstream and special needs students. With more seamless and increased connectivity to the Internet, it is imperative to inculcate digital citizenship skills among students, especially students with special needs (SEN). While the launch of Singtel Cyber Wellness Toolkit has provided special needs (SPED) schools with materials to educate students, it is only limited to classroom teaching and this is insufficient to raise the Cyber Wellness acumen among students with special needs (SEN).

This work-in-progress paper will share how the teachers in a SPED school worked together to inculcate the necessary digital citizenship skills among SEN students to thrive as responsible, respectful and positive digital learners. Using the Universal Design for Learning (UDL) Framework, the SPED school implemented a school-wide Cyber Wellness education plan that included weekly school-wide assembly talks, Cyber Wellness lessons during ICT lessons, Cyber Wellness E-trail, parents talk and Cyber Wellness student ambassadors. The themes, namely, Managing Online Relationship, Handling Inappropriate Online Content, Online Time Management and Protection from Online Bullying, were the chosen focus areas in the school-wide Cyber Wellness education plan. Applying the UDL guideline to provide options for expression and communication, ICT teachers used multiple media such as Google Classroom, Kahoot, Quizizz, Book Creator, and videos for learners to communicate what they know.

To evaluate the effectiveness of the school-wide Cyber Wellness education plan and Cyber issues management processes, the ICT Committee in the SPED school adopted a case study approach. Several students with Mild Intellectual Disabilities (MID) were selected to participate in this study. Students' feedback, ideas and teachers' observations were collected and further analysed. Using the data collected, the ICT Committee reviewed and refined the Cyber Wellness education plan and Cyber issues management processes.

One challenge faced when collecting data was tracking the students' online activities to check if the feedback given was congruent to what they practise in real life. In addition, the different home support received by the students might also impact the retention and practice of digital citizenship skills.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

Empowering through the Use of Technology: Magic Carpet (MC), Eye-gazing Technology (EGT) & Communication Application on Mobile Device

Author(s) : Pauline Cheng, Vinoth Kumar
Presenter(s) : Pauline Cheng, Vinoth Kumar

This project aimed to use devices like Magic Carpet (MC) and Eye-Gazing Technology (EGT) to enhance existing sensory integrated environment to enable students with autism and multiple disabilities to develop communication and social skills, share space with friends and learn together in that environment.

AWWA School has 92% of its students with high and moderate support needs, with physical and sensory impairments which affect their learning process. Using ICT tools motivate and engage students, develop them to be self-directed learners as they give instant feedback and thus enhances the quality of the learning sessions. With the combination of ICT devices such as MC, EGT and communication applications, teaching and learning can now be more effective and engaging, leading to better student-learning outcomes.

The EGT is a peripheral eye tracker that enhances computer accessibility with the speed, power and accuracy of gaze interaction. It replaces the standard mouse and keyboard, using only the eyes, thus empowering students with severe multiple disabilities to engage in self-learning. The MC, on the other hand, is an innovative interactive floor projection system that enables students to engage with games and images simply by moving on or over the projected surface. It is easily customised to individual needs with a wide range of application.

Learning would take place in the environment, as identified students were able to express themselves using the EGT and communication apps, and enabled them to generalise social skills learnt. With a better understanding of the students, teachers and Occupational and Speech Therapists were able to collaborate to enhance the effectiveness in ensuring students learned. 10 out of 15 students showed significant improvement in using the EGT for participation and communication. Teacher feedback had also shown positive results in the interaction and social skills in the identified group in class.

Installation of the technology required professional knowledge. As a result, training was provided for staff before project implementation on maintenance of the system, as well as training of students to overcome the fear of using technology.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

Learning Primary Mathematics through Programmable Robots

Author(s) : Tan Xiao Ting, Tay Chor Lin, Wendy Yap, Melissa Teo, Foo Seau Yoon
Presenter(s) : Tay Chor Lin, Wendy Yap

In this eduLab project, Educational Technology Division worked closely with teachers from Monfort Primary School to iteratively design and implement an ICT-enabled pedagogical practice that used programmable robots to facilitate and support Primary Four students' inquiry of mathematical concepts through Activity-Based Learning approach.

The project team had observed students' difficulties in analysing mathematical situations and constructing logical arguments. These difficulties could be due to an over-reliance on rote learning or procedural-based learning during mathematics lessons. Hence the team sought to find out whether and if so, how programmable robots could be used meaningfully to enhance Primary students' mathematical reasoning, especially in applying mathematical concepts to real world contexts.

A total of 36 Primary 4 students were involved in this project. The project team designed 7 lessons and implemented them over a period of 2 weeks. Results from the pretest and posttest showed that there was a large effect size in terms of improvement in students' mathematical reasoning. Findings from the focus group discussions also revealed that the students enjoyed mathematics lessons involving programmable robots and were able to better connect the relevance of mathematics to real life.

This presentation will focus on the following key aspects:

- Use of educational design research (McKenney & Reeves, 2012) to systematically collect and analyse data from each cycle of lesson design and implementation in order to advance the project team's understanding of the pedagogical practice and how it can be better designed in the subsequent cycle
- Findings on student learning outcomes and the variations in teacher orchestration of learning (Stein & Smith, 2011) during lesson enactments that have influenced classroom learning
- Development of design principles (Edelson, 2002) to articulate the features of the ICT-enriched pedagogical practice that are integral to bringing about the desired learning outcomes in a particular classroom context
- Learning points and challenges faced by the project team in using programmable robots for the learning of mathematics

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES
31 May 2018, Thursday

Properties of Circle with Geogebra

Author(s) : Thong Chee Hing, Woo Huey Ming, Chua Bee Hong, Lee Poh Ching, Ishak Hassan, Lew Wei Sern Vincent
Presenter(s) : Thong Chee Hing, Woo Huey Ming

Our ICT-enabled innovation project sought to address students' difficulties in applying the properties of circles to geometry problems. Teachers have observed that students often use rote memorisation and apply mechanically the properties when they have little understanding of how these properties are established. Students also have difficulties in providing the correct reasoning and justification when many steps are involved in the geometry problems.

To strengthen students' conceptual understanding of the properties of circles, the project team used GeoGebra, an open source mathematical software, to design and develop a set of 9 GeoGebra apps. These apps allow students to discover the properties of circles in an experiential way so that they learn better and accept the geometric properties more readily (Lim, 1992).

Through the use of the apps, students engaged in guided inquiry to explore, investigate and understand the 'why' behind the properties of circles. The teacher further guided students in exploring and investigating 'what-if' situations to involve them in mathematical reasoning that required the deeper use of mathematical language, methods and knowledge. The project team believes that this guided inquiry approach would deepen students' understanding of the properties of circles, lead to better retention of the concepts as well as enhance the development of mathematical processes and 21st Century Competencies.

This presentation will showcase the set of 9 GeoGebra apps and other supporting teaching materials (e.g. lesson plans and worksheets), share the lesson design principles and discuss how these apps were used during the lessons and the students' artefacts that were generated. The presenters will also discuss the challenges encountered in the lesson enactments and the impact of this ICT-enabled pedagogical practice.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

Students as Learning Designers

Author(s) : Melvin Chan, Tan Yoke Hong, Tan Wee Liat
Presenter(s) : Soh Yu Bin Ellie, Lee Xin Yin

In tandem with the changing demands and nature of the 21st century world, there is an increasing need towards building an active, dynamic and reflective classroom environment where the ownership and pace of learning reside primarily on the students being the directors of their learning process. Knowledge Building Pedagogy (KB) and Problem Based Learning approach (PBL) facilitate well the movement towards this transformative shift. This presentation will share how the Humanities and Mother Tongue Departments in TWSS have adopted these two approaches facilitated by information technology to bring about a change in student learning. It will also highlight the potential for cross pollination and integration of key notions of these two pedagogical approaches.

Through the technological tool known as the Knowledge Forum (KF), KB creates an authentic collaborative learning space for students that encourage ideation and curatorship of their next learning moves. This is done via their continuous co-iteration of ideas generation, refinement, connection, referencing and synthetisation of the varied thoughts and diverse understanding (within and across groups) through the support of the KF scaffolds and analytics. Coupled with the observations, analysis and reflections by the students and the teaching fraternity, it has been observed that this practice of empowering students as learning designers in a KB technology-enabled environment facilitates the growth in students' disciplinarity thinking and discourse, metacognitive disposition and community-orientated personality. The implementation of KB in the lower secondary classes has led to an empirically significant improvement in the quality of the students' discussion and written work which will be shared during the presentation.

Besides the KB pedagogy, the school is also currently embarking on the PBL approach in supporting and fostering this culture of active learning: students' being the process owners and developers of their own learning. With its procedural-based methodology within a technology-supported collective environment (i.e. the incorporation of cognitive scaffolds and reflective practices brought forth by the affordance of technologies), it has been observed that students are able to confidently and more accessibly design their own learning practices through structured and organised processes and procedures. Similar to KB, the findings have also shown how this correlates to the growth of subject disciplinarity (processes and skills) and metacognitive development for the students.

Endowing them the opportunity to be agents of their own learning processes allows our students to be prepared and ready to face and thrive in the VUCA environment.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES
31 May 2018, Thursday

The Use of Drones in Geographical Fieldwork Studies within a Technology-driven Learning Environment: Implications for Teaching Practice

Author(s) : Dr Chong Sau Kew, Edwin Chew
Presenter(s) : Dr Chong Sau Kew, Edwin Chew

With the fourth Information and Communication Technology (ICT) Masterplan in education, digital, electronic and mobile technologies and their consequent proliferation of information and literacies are fast becoming integral in Singapore schools (Ministry of Education Masterplan for ICT in Education 1 to 4). An important goal of this masterplan is to prepare students as future-ready and responsible digital learners by providing them with quality ICT-enabled learning and design within the technology-rich authentic learning environment. With the rapid advancement in technology and the ease of its access, drones or unmanned aerial vehicles are gaining much currency in educational and school settings. This paper demonstrates a case of how one teacher taps into the use of drones to engage, reinforce and expand students' learning of aerial view and the skill of sketching in the fieldwork studies of Geography or Geographical Inquiry. It reports the findings of part of a broader study that investigates how affordances in learning contexts such as fieldwork can enhance students' participation in instructional education.

Drawing on New Literacy Studies and multimodality as theoretical frameworks, and an ethnographic perspective to research, the researcher observed and studied how the teacher reinforced students' understanding of the geographical concepts of field mapping and geographic phenomena using drones that were largely manoeuvred by students. Interviews with students were conducted to gain an insight into their outdoor learning or fieldwork experiences, including the relevance of this to their learning of Geography as a disciplinary academic subject. Artefacts such as students' sketched work were examined to reveal the extent of students' understanding and uses of their geographical concepts taught, and the educational potential of drones.

Using discourse analysis, the findings revealed how drones as a semiotic resource in the school setting provided a novel way of generating students' interest in the learning of Geography, particularly with those who were seen as academically less inclined. Drone technology also enabled students to participate in an investigation-driven and interactive learning environment that afforded multiple pathways for learning. Finally, integrating drone technology into geographical fieldwork studies not only enabled students to gain a better understanding of concepts linked to field mapping, cartography and geographic phenomena (e.g. flash floods) but also evoked their awareness of the ethical concerns of flying drones within their school zone and beyond. The paper concludes with some challenges of using drones in schools and suggests ways to overcome them.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

Mastery with Strategic Use of ICT

Author(s) : Wong Swee Oi
Presenter(s) : Wong Swee Oi, Indpal Kaur Jagit Singh

Strategic use of technology enhances the teaching and learning of mathematics. Selective digital and physical tools were utilised to explore ICT-based learning designs that support quality teaching and learning in Mathematics. The intent was to heighten the capabilities of technology in thoughtfully designed ways and structure time to support students' learning, experiences, communication and problem-solving in Mathematics in the 21st century.

Students have difficulty understanding decimals as it is similar to whole numbers, in that both are expressed in a base ten place value system. Comparatively, the notations and naming conventions differ in significant ways, thereby resulting in students being confounded by the complexities of decimals. Accordingly, lessons on decimals were designed under the guidance of Education Technology Division officers. These lessons were based on the Active Learning processes with technology, incorporating authentic everyday examples and representations of the real world to stimulate and anchor learning. To further explore and develop visual imagery, and dynamic manipulation of diagrams – a customised interactive Geogebra applet was created with the help of ETD officers to provide practice and to support students' development of mental imagery to build links for fractions, decimals and whole numbers. In addition, documentation of learning for discussion, reflection, development and refinement facilitated prompt feedback and assessment of learning to inform subsequent pedagogical moves. Accordingly, the Singapore Student Learning Space, a Ministry of Education online platform that promotes students' Self-Directed Learning and Collaborative Learning was espoused. The platform and resources can support students' needs, interests and help them to be responsible future-ready learners. Strategic use of technological tools can support learning of mathematical procedures and skills as well as the development of advanced mathematical proficiencies, viz. problem-solving, reasoning, and justifying (Roschelle et al., 2010).The lessons and resource created were then trialed in six Primary Four classrooms over six periods.

The presenters will share the limitations and challenges encountered so as to inform future teaching and learning. Generally, the teachers faced challenges in accessing the ICT equipment for mathematics learners. This is in line with the findings of Miller et al. (2008), that recommended Professional Development for Mathematics teachers in the use of ICT in mathematics and support in the use of ICT by learners.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES
31 May 2018, Thursday

Using Technology and Classroom Talk to Improve Mathematical Explanation

Author(s) : Eric Wu Jianrong, Mabel Chia Wey Ching
Presenter(s) : Mabel Chia Wey Ching, Dr Alison Tan

In line with the Singapore Mathematics Framework to develop mathematical reasoning, communication and connections (CPDD, 2013), this study explored the use of classroom conversations and teacher talk moves (Zwiers & Crawford, 2011; Chapin, O'Connor, & Anderson, 2009) to improve students' conceptual understanding of Factors and Multiples. With the additional aims to increase motivation and help students link mathematical concepts to real life experiences, the study infused the learning of mathematical concepts with baking in what was called The Culinary Math Project at Ahmad Ibrahim Primary School.

Two Primary Four classes and two Mathematics teachers participated in this study. One was a mixed-progress class while the other was a lower-progress class. A total of 53 students were involved in the study, which adopted a pre- and post-test design to assess the progress of the students before and after the project. The first stage of the project aimed to develop an awareness of the concept of multiples by requiring students to work in groups to ascertain the number of pastries to make based on the number of group members and pastry pieces they each desired. Students then had to figure out how to divide the pastry sheet into the desired number of equal parts, considering that two parts are required to make one pastry. The second stage aimed to develop an understanding of the concept of factors. Students now used play-dough as a faux pastry sheet to explore the number of rows and columns to cut in order to obtain the desired number of equal parts. Stage three is the actual baking day during which students cut real pastry sheets to make edible pieces they can bring home. In the pre-baking stages, teachers employed talk moves to guide, clarify and deepen student thinking.

All student group interactions were supported by cognitive scaffolds and recorded using interactive whiteboard technology via the Educreations app. All lessons were video-recorded. An analysis of the recordings revealed that all students actively engaged in group discussion, even the more introverted ones. The peer coaching and dialogic interaction helped students acquire new levels of understanding. The post-test results at the end of the project showed significant improvements in the students' written answers. Our findings suggest that the use of talk moves and dialogic interaction among students can promote reasoning and communication which help to build students' conceptual understanding in Mathematics.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES

31 May 2018, Thursday

Life of a Self-organising Knowledge Community: What it Takes to Transit from Learning to Network Learning

Author(s) : Dr Teo Chew Lee
Presenter(s) : Dr Teo Chew Lee

The impact of network learning on teachers has been established extensively in research. However, we often hear remarks such as "a network just takes a few passionate people together...". Such common-sense remark, though cannot be refuted, has seriously undermined the potential of productive network learning and its underlying mechanism explained by learning sciences. Network learning involves turning professional development into collaborative, innovative network through engineered interactions to optimise knowledge-flow and to streamline unstructured knowledge-processes. The effort to optimise knowledge-flow within the network is relatively under-recognised. Many focused merely on getting together to talk. This makes the identification of network with productive knowledge-flow important as they can help uncover unknown functional features for future implementation.

This paper aimed to understand the knowledge-flow in a teachers' network for its strength and weakness as a knowledge creation community.

It reports on a 2-year trajectory of a network learning community that was first seeded in 2009. The group collectively explored knowledge building practice. The network was designed according to a set of knowledge building principles. This network was not coordinated within a formal structure such as zonal, cluster-based, or subjects-based but was mainly interest-based.

The asynchronous online discussion and text messaging provided an integrated technological space for teachers to generate and synthesise ideas, crossing the boundaries of time and space. Knowledge Forum, especially, enabled the team to break the hierarchical structure and allowed for open communication with one another.

Teachers' discourse archived on Knowledge Forum was analysed for the intensity of knowledge-flow regarding 1) Distribution of knowledge through measures of centrality, 2) Emergence of ideas through the evolution of the network of ideas, 3) Autonomy of members through contribution patterns.

Analysis of the data showed two visible impacts of the community: 1) Increased willingness to ride through the mess and to collaborate and learn in principled manner, and 2) Individuals becoming more convinced of their cause as they interacted directly with one another, and 3) Structural gaps such as the lack of experts within one school were managed via the network, stretching school's involvement in the network.

One challenge remains - Many teachers "would rather live with a problem they cannot solve than with a solution they do not fully understand or control". The plan is to involve students in the community and get them to explain complex ideas such as "What idea-improvement looks like in my class" to the teachers.

PAPER PRESENTATIONS

CONCURRENT SESSION 3 SYNOPSES
31 May 2018, Thursday

Harnessing ICT to Support Collaborative Critical Inquiry in Professional Learning Communities

Author(s) : Lin Li, Chan Wen Ling
Presenter(s) : Lin Li, Chan Wen Ling

Critical Inquiry (CI) is a systematic and rigorous approach that teachers can use to help them examine, reflect on, and improve their practice (Reid, 2004). Singapore teachers typically engage in collaborative CI within school-based professional learning communities (PLCs).

A survey conducted with teacher-leaders and School Staff Developers found that while the application of CI methods such as Learning Circle, Action Research, Lesson Study, and Learning Study were prevalent in Singapore schools, the level of understanding varied greatly among teachers. To help teachers better understand the need for inquiry in teaching and common CI methods, an online course on Critical Inquiry in Professional Development (PD) was developed. The course was complemented by a facilitation toolkit for school leaders, teacher-leaders, and PLC leaders, to support a PLC-, department-, school-wide PD programme. Hence, the course facilitated self-directed and collaborative modes of professional learning as teachers could access the course content at their convenience and/or use it to fuel generative discourse in PLCs.

This presentation will focus on the team's reflection on design considerations for effective online courses. The presentation will also include what was learnt from pilot schools about their experience using the ICT-enabled learning environment to foster a culture of critical inquiry in PLCs.

To provide teachers with engaging, meaningful e-learning experiences, the team took into account principles of andragogy (Knowles, 1984) and how effective PD has to be sustained, collaborative, job-embedded, and relevant (Desimone, 2009; Guskey, 2002). Reflection questions interspersed throughout the course encouraged teachers to link theories with classroom practice. Feedback gathered from pilot schools showed that the teachers found the content succinct and easy to grasp, and quizzes with answer explanations helped them to check for understanding.

The online course is on One Portal All Learners (OPAL), the learning and content management system used by all MOE staff. Bite-sized videos created using Powtoon enabled teachers to view the content on their mobile devices. This mode of digital learning provided teachers with greater control of their own learning, as teachers could access the PD content anytime, anywhere, at their own pace. It also facilitated the "flipped classroom" approach, allowing more time for collaborative learning activities and discussions during PLC sessions. Future plans include exploring the use of programs like Articulate 360 to increase the interactivity of the online course.