

**The World Association of Lesson Studies (WALS) International Conference 2016**

<b>Presentation Code</b>	3A
<b>Title</b>	How to Enhance the Professional Learning through Lesson Study – African Experiences in Effective Administration and Facilitation of Lesson Study
<b>Presenter/s</b>	<p>Moderator:</p> <ul style="list-style-type: none"> <li>- Mr. Atsushi MATACHI, Senior Advisor (Basic Education), Japan International Cooperation Agency (JICA), Japan</li> </ul> <p>Panellists:</p> <ul style="list-style-type: none"> <li>- Mr. John Livingstone Makanda, Coordinator of Secondary programme, Center for Mathematics, Science and Technology Education in Africa (CEMASTEAM), Kenya</li> <li>- Mr. Antoine MUTSINZI, Acting Director, Teacher Development and training Unit, Rwanda</li> <li>- Mr. George CHILEYA, Senior Curriculum Specialist, Mathematics, Curriculum Development Centre, Ministry of General Education, Zambia</li> </ul> <p>Discussant:</p> <ul style="list-style-type: none"> <li>- Prof. Yumiko ONO, Naruto University of Education, Japan</li> </ul>
<b>Type of presentation</b>	Plenary Symposium
<b>Strand</b>	Developing Professional Learning Communities
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Room A)
<b>Abstract</b>	<p>Japan International Cooperation Agency (JICA) has supported more than 25 countries in the world in introducing Lesson Study. JICA organized plenary symposiums in the WALS International Conference 2014 in Indonesia and 2015 in Thailand.</p> <p>In WALS 2016, JICA is organizing a symposium that discusses issues of professional communities and professional learning in Africa. In particular, this symposium will focus on the two aspects: management and facilitation of Lesson Study (LS).</p> <p>This symposium will discuss effective ways of managing LS and enhancing professional learning through LS by bringing together three panellists from Africa, namely, Kenya, Rwanda and Zambia. In terms of the aspect of management of LS, the following issues, for example, will be discussed: how to sensitize school managers on the significance of LS, how to motivate teachers to participate in LS, how to secure time for LS, etc.</p> <p>In terms of the aspect of enhancing professional learning, such issues as how to prepare teaching and learning materials for effective lessons, how to observe research lessons, what and how to discuss a lesson during post-lesson discussions, etc.</p> <p>In Kenya, LS has been implemented at primary education level in</p>

	<p>the last 5 years led by Quality and Standards Officers who learned LS in Japan.</p> <p>In Rwanda, School-Based INSET (SBI) has been implemented at lower secondary level in the last 3 years. Various types of school-based activities including LS have been implemented as SBI.</p> <p>In Zambia, LS has been implemented at both primary and secondary levels in more than 10 years. At the beginning, LS was introduced in one of the 9 Provinces, which has been expanded to all the 9 Provinces up to now. “Kyozei-Kenkyu” practices have been introduced where teachers study teaching and learning materials intensively for the preparation of LS.</p> <p>The symposium will be structured as follows:</p> <ul style="list-style-type: none"> <li>- A brief introductory presentation to describe overviews of projects on Lesson Study supported by JICA;</li> <li>- Short presentations about experience in Lesson Study by the Panellists;</li> <li>- Discussions between the Panellists about effective management and facilitation of LS; and</li> <li>- Q&amp;A with the floor.</li> </ul> <p><b>Keyword(s):</b> Continuous Professional Development (CPD), School-based INSET, Kyozei-Kenkyu</p>
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<b>Presentation Code</b>	3Ba
<b>Title</b>	Using Lesson Study Approach in Finland to Improve Teacher Efficacy and Pedagogical Practices.
<b>Presenter/s</b>	Olli-Pekka Malinen
<b>Affiliations</b>	Niilo Mäki Institute (Finland)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Red)
<b>Abstract</b>	Substantial evidence shows that teachers in Finnish schools need new models of professional development. Compared to teachers in most other developed countries, Finnish teachers spend fewer days engaged in professional development activities, and the format of these activities does not effectively support teacher efficacy and professional learning. In OECD TALIS 2013 study 36.6% of Finnish lower secondary school teachers reported that they had never received feedback in their current school (OECD, 2014a, p. 357). The TALIS 2013 results also indicate that the Finnish teachers have

	<p>very few opportunities for mentoring and peer observation In Finland only 5 percent of lower secondary teachers had engaged in these activities in the past 12 months, making Finland the country with lowest participation (OECD, 2014a, p. 102). Another underutilized form of professional development in Finland is work-related individual and collaborative research. Only 8 percent of Finnish teachers reported participating in this kind of professional development during the past 12 months participation, which was also the lowest reported participation among all participating countries and regions (OECD, 2014a, p. 102).</p> <p>Lesson Study is a school-based professional development model that has strong potential to address these problems. It is one of the leading approaches to professional development in East Asia, and it is rapidly spreading across many Western countries. Perhaps surprisingly, in Finland no school is currently using Lesson Study. In a proposed project the feasibility and the effects of Lesson Study in Finnish schools will be tested in the proposed project, with a pilot that involves 12 schools around the country. The funding decision for the project will be made in September 2016. At the end of the pilot, the partner schools will have built the Lesson Study capacity to facilitate the class-level implementation of the national curriculum reform and to improve pedagogical practices to meet the needs of all students. As a result of the project, several consultative teachers at the national Valteri Centre for Learning and Consulting will become trained Lesson Study coaches who can spread the Lesson Study model to new schools. The author's own institution, Niilo Mäki Institute, will also create a selection of training material and professional development courses that support the implementation of Lesson Study around the country.</p>
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<b>Presentation Code</b>	3Bb
<b>Title</b>	How Schools Can Institutionalize Lesson Study in Practice: Lessons from an Elementary School in Iran
<b>Presenter/s</b>	Nahid Naserinejad and Forouzan Farnia
<b>Affiliations</b>	Pishgaman Taghva Educational Institute (Iran)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Red)
<b>Abstract</b>	A growing research literature has indicated that for an authentic professional development to take place, teachers need to learn collegially and while doing, exchange experiences and collaborate with each other rather than passively receiving the knowledge on

	<p>teaching excellence. However, in Iran, most of the teacher professional development programs are mainly lecture-based. The practice-based approaches such as conducting workshops and developing teachers through hands-on learning methods as well as active learning are observed here and there, yet they are not widely incorporated.</p> <p>This paper tries to clarify a case of elementary school from north Tehran, Iran to examine how school can institutionalize a new professional culture in practice. Qualitative research and a case study method were applied for data collection and analysis. From this study it can be seen how the teachers had interesting and useful topics to talk about in their breaks and the school was becoming a learning organization. It took a while for our teachers to sit together and exchange their experiences comfortably in a safe environment. Our classes which used to be like isolated islands, got connected. The collaborations rose among teachers of different grades and the sharing of experiences led to the improvement of the students' learning. The parents felt that something has changed, that the new teacher at the beginning of the academic year works hand-in hand with the teacher of the previous grade and a spirit of connection and collaboration has been created across the school.</p> <p>Throughout the process of lesson study, the teachers learned to assist each other in performing better and realized the value of collaboration. They learned better ways of providing and receiving constructive feedback and the importance of acquiring the new methodologies in teaching and more importantly sharing them with each other. Our teachers learned that observing each other's classes would help them to use their own teaching competencies and skills better. We realized the importance of effective communication, giving and receiving constructive feedback, collaborative learning and empowering the teachers by involving them in the decision-making process. Finally, we learned that the one-size-fits all solutions won't solve any of our problems and we needed to craft our own ways of growing out of our limitations and problems.</p>
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<b>Presentation Code</b>	3Ca
<b>Title</b>	The Role of Facilitators in a Swiss Lesson Study Professional Development
<b>Presenter/s</b>	Anne Clerc and Stéphane Clivaz
<b>Affiliations</b>	HEP du canton de Vaud (Switzerland)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Developing professional learning communities: models and practices
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Forum Seminar 1)
<b>Abstract</b>	<p>The purpose of this paper is to analyze the role of the two authors acting as facilitators in a lesson study group in Lausanne, Switzerland. This lesson study was a professional development in mathematics for a group. The two authors, one mathematics education and one teaching and learning specialist, worked with this group of eight-grade 3-4 generalist teachers on lesson study cycles in the field of mathematics during two years. The 37 meetings (about 90' each) have been videotaped and transcribed and will be the basis of the analysis. In this paper, we will cross the data from our research log with the analysis of the interactions conducted during the planning sessions and the debriefing sessions. The two authors were conducted to adopt various roles: facilitator, trainer, researcher or even teacher. However, these roles were not always made explicit. Yet, they interacted with the teachers' expectations and with their knowledge of the process and therefore had consequences on the lesson study's process itself. This paper will analyse the facilitators' role in interaction with the teachers' role. These roles will be compared with the ones described by Takahashi in Japan and in US schools (Takahashi, 2014; Takahashi &amp; McDougal, 2016). This analysis will allow identifying potential tensions at stake and distinguishing the influence of the various roles in the run of this particular lesson study.</p>

<b>Presentation Code</b>	3Cb
<b>Title</b>	The Knowledgeable Other as Final Commentator in Lesson Study Colloquia
<b>Presenter/s</b>	Lai Har Judy Lee
<b>Affiliations</b>	Ministry of Education (Singapore)
<b>Type of presentation</b>	Paper presentation

<b>Strand</b>	Developing professional learning communities: models and practices
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm ( Forum Seminar 1)
<b>Abstract</b>	<p>Researchers in lesson study have highlighted the importance of having a knowledgeable other to provide teachers with a different perspective on the lesson study work and insights into the subject matter content (Lewis, Perry, Hurd, &amp; O'Connell, 2006). The knowledgeable other usually provides the final comments to highlight characteristics of the observed research lesson and to tie them back to research in order to put the observations in context of broader issues and big ideas related to teaching and learning (Murata, 2011). In order to provide effective final comments, the knowledgeable other needs to synthesize the observations and data shared by teachers to present a coherent picture of the students' learning experiences within the research lesson. This requires him/her to not only have good knowledge of the addressed topic but to also have the ability to draw upon classroom experiences and to concretize the interconnection between theory and practice. The provision of effective final commentary can help teachers to rise above the specific observations and data gathered during the research lesson to examine broader issues related to teaching and learning, and to form habits of mind with regard to inquiring into the teaching and learning process. Despite the importance of the role played by the knowledgeable other, there is lack of research on the work of knowledgeable others and the nature of final commentary in the lesson study literature (Takahashi, 2014). This paper aims to contribute to the existing body of knowledge through a discussion of three aspects of practices related to final commentary: (1) Practice-theory link-making, (2) Questions for teacher reflection, (3) Resources for further exploration. Informed by the author's previous research on lesson study and current work serving as knowledgeable other in primary science lesson studies, these strategies will be discussed in light of how the Lesson Study protocol may be used to develop science teachers' habits of mind as a means of developing themselves to be leaders of inquiry in the science classroom as envisioned by the Science Curriculum Framework.</p>

<b>Presentation Code</b>	3Cc
<b>Title</b>	Practice-based Learning in Phenomenographic Perspective
<b>Presenter/s</b>	Airi Rovio-Johansson
<b>Affiliations</b>	University of Gothenburg (Sweden) Gothenburg Institute of Research
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Developing professional learning communities: models and practices
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Forum Seminar 1)
<b>Abstract</b>	<p>This study wishes to enrich our theoretical understanding of the phenomenon of learning in practice-based learning, when two professional designers from different countries produce a prototype for an exhibition in a week-long work shop. The aim is to investigate how prior learning and knowledge is shared and used in teamwork, in order to explain how it support the production process of a prototype. A non-dualistic approach to the participants experiences of learning as a change, constitute the framework in trying to understand how learning is made possible in cooperation of professional designers. The theoretical framework of phenomenography is applied in the analysis of semi-structured interviews realized during the work shop. The phenomenographic analysis of four interviews resulted in three qualitatively different categories of learning, namely learning as: (a) learning as a member (identity confirmation) of a profession; (b) learning of new elements in design work; and (c) changing the way of thinking in professional design work/professional development. Research, knowledge and understanding of practice-based informal learning outside existing educational systems are limited. There is a lack of knowledge of how participants' prior learning and knowledge, emanating from different professional education in different countries, can be identified, utilized and shared in various professions, work places and manual and non-manual production processes. The limitations of this study consist of: (1) the number of participants and (2) data collected with one qualitative method on one occasion, which was the only possibility in this study. Research, knowledge and understanding of practice-based informal learning outside existing educational systems are limited. Accordingly, further studies are called for on pairs in joint working processes; as well as more participants in the studies; and several professions.</p>

<b>Presentation Code</b>	3Da
<b>Title</b>	How does Lesson Study Contribute to Teachers' Collective and Individual Learning
<b>Presenter/s</b>	Hanne Aas and Nina Vasseljen
<b>Affiliations</b>	Norwegian University of Science and Technology (Norway)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Creating knowledge in practice; action research and other practice based research approaches
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm ( Forum Seminar 2)
<b>Abstract</b>	<p>This paper presents an analysis of teachers learning outcome in a Norwegian school-based research and development project with Lesson Study as method for teachers' professional development. In January 2015 we started a school based research &amp; development-project in cooperation with two Norwegian elementary schools. It is a 3-year interactive action research project. Because Norwegian elementary school is characterized by teachers teaching more than one school subject, the teachers do Lesson Study in interdisciplinary teams. Our research question is: How does Lesson Study contribute to teachers' collective and individual learning?</p> <p>The analysis is based on two assumptions about learning:</p> <ul style="list-style-type: none"> <li>-Learning is considered a social process where language constitutes both a central tool in the learning process and the place where new knowledge and experience materialize.</li> <li>-Learning can occur in different levels; from superficial, characterized by consensus and a lack of critique, and deeper, where the team-members critically examine their own beliefs and practices, make tacit knowledge visible and are open to alternatives.</li> </ul> <p>We use a mixed methods research design (Johnson &amp; Onwuegbuzie, 2004) with following instruments for collecting data:</p> <ul style="list-style-type: none"> <li>• Surveys prior to, halfway, and at the end of the project period</li> <li>• Audio recordings of preparation meetings and teachers' meetings</li> <li>• Structured logs</li> <li>• Methods for analyzing data: <ul style="list-style-type: none"> <li>• Sociocultural discourse analysis (Mercer, 2004)</li> <li>• Constant comparative method (Strauss &amp; Corbin, 1998)</li> </ul> </li> </ul> <p>The logs confirm that teachers' experience increased professional competence through shared practice, extended collective planning and new knowledge about pupils' competences, needs and learning processes.</p>

	<p>Despite teachers' agreement on the usefulness of Lesson Study, audio records show variation of learning and reflection levels among the teacher teams. When a teacher asks questions that challenge current practice, it rarely develops to deeper levels of learning. Comparing logs and recordings, the majority of teachers seem to focus on affirming one another and merely trading existing learning resources. Their professional knowledge seems remain tacit and they do not challenge existing practice &lt;br /&gt;</p> <p>The aim of this project is to improve instruction by generating professional knowledge, not by developing a bank of exemplary lessons. Due to this, we have challenged the teachers to exploratory discussions by using Vygotsky's methodology of double stimulation (Engeström &amp; Sannino, 2010). Preliminary findings related to this action show tendencies towards deeper levels of learning.</p>
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<b>Presentation Code</b>	3Db
<b>Title</b>	Rigor in Teachers' Practical Epistemology: A Case Study of Japanese Lesson Studies.
<b>Presenter/s</b>	Yuta Suzuki
<b>Affiliations</b>	The University of Tokyo (Japan) Graduate School of Science
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Creating knowledge in practice; action research and other practice based research approaches
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm ( Forum Seminar 2)
<b>Abstract</b>	<p>The aim of this study is to examine rigor in teachers' practical epistemology, based on a case study of Japanese lesson studies. Donald Schön explored practical epistemology of professionals (Schön, 1983). His consideration illuminated that professionals, at the fields, developed their rigorous reasoning which differed from the reasoning of scientists. Within schools, teachers discuss the lessons, improve the curriculum and strengthen their professionalism through the lesson studies. The discourse of lesson studies are resource for professional development as well as subsequence of professional development (Lewis, Akita, &amp; Sato, 2010). The lesson study is the locus to examine the nature of the practical epistemology of teachers, especially how rigorous their reasoning are. This study is based on a variety of data obtained from intensive fieldwork in a Japanese school over a period of three years. The data include observational data of research lessons, lesson studies, ordinary activities, interviews with teachers and administrators, and relevant school and classroom documents. This study examines the discourse of the lesson studies, focusing on the following original discursive modes of practical reasoning (Suzuki, 2012): (1) Is the alternative teaching approach better? (2) What is the best way of teaching X? (3) Did the children learn what the teacher intended them to? (4) Did the teacher teach what the children actually learned? (5) What did the teacher learn from watching the children learn? and (6) Did the teacher learn from watching the children learn? This classification that examined the modes of teachers' practical reasoning on children's learning in the lesson helps us to examine the rigor in practical epistemology. This study tries to provide suggestions to deepen our understanding of teachers' practical epistemology in the lesson studies for professional development.</p>

<b>Presentation Code</b>	3Dc
<b>Title</b>	Lesson Study: A school's approach in building a sustainable LS culture.
<b>Presenter/s</b>	Pooganentren Nagalingam and Kai Wai Hsu
<b>Affiliations</b>	Hillgrove Secondary School
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Leadership, management and policy aspects of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm ( Forum Seminar 2)
<b>Abstract</b>	<p>Many schools have implemented lesson study as a key professional learning initiative to improve teaching and learning either in their subject department / levels (year groups) / faculty. Our presentation aims to provide an administrator perspective of how lesson study can be implemented as a whole school initiative. This paper focuses on a school's lesson study journey. Hillgrove Secondary School is on its 8th year of its Lesson Study journey. Implementing lesson study as a whole school initiative is challenging and complex. Many schools have tried various approaches and strategies to ensure Lesson Study becomes a sustainable practice for teacher professional development. We will share our implementation model on lesson study in a secondary / middle school context. We will highlight some of the initial impediments e.g. generating buy-in / getting resources etc. The paper will also discuss how we managed to address them. The implementation model will focus on various strategies to ensure sustainability through the management of resources, collaborating with stake holders, strategies to generate buy-in, training and development programmes and leadership and management processes. Sharing will also include the processes implemented to review the lesson study programme e.g. measurements / indicators of success.</p> <p>This presentation will add value to schools administrators who are keen in ensuring their Lesson Study journey is sustainable and anyone planning to introduce lesson study in their schools.</p>

<b>Presentation Code</b>	3Ea
<b>Title</b>	Leading the Introduction and Development of Learning Study in an English Secondary Academy
<b>Presenter/s</b>	Lucy Austin
<b>Affiliations</b>	Ormiston Victory Academy (United Kingdom)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Leadership, management and policy aspects of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Room 2)
<b>Abstract</b>	<p>Since the initial stages of implementing Learning Study our context has changed significantly. The Academy has: moved premises; had one change of Principal and several other changes in Senior Leadership. Whilst the teacher leading on Learning Study has: moved from part-time teacher with Teaching and Learning Responsibility (TLR); to full-time Curriculum Leader; to Senior Leader; to part-time teacher with TLR. In amongst these changes and many other curriculum developments, we have reached the stage of now offering teachers an in school Learning Study CPD option which they can follow for one year. Lesson and Learning Study has an appeal to English teachers but it does not take long before they begin to realize the significant inherent differences between it and more traditional experiences of CPD. For these teachers to remain invested in this approach a shift in mind set is required which not everyone is necessarily prepared or able to do. However, where this does occur the changes in expectations of future CPD from the professionals involved can be profound. After five years we are starting to see an impact on teachers. Within this case study I explore whether the 'impact' is it everything we expected it to be and what have been the successes, trials and tribulations to date? This article is presented as a case study and uses my personal reflections on the approaches used thus far to implement Learning Study within our specific context as well as a review of data concerning the continuing professional development within our academy along with interviews with those who have and have not taken part. Ultimately we discover that with increasing pressures on time and the need for schools to be data driven, teachers and education leaders have less capacity or ability to take perceived risks. Learning Study is an emerging form of CPD in the UK and even when implemented does not yield a wealth of quantitative data which can be used to prove the impact it can have; consequently implementing Learning Study is perceived as a risk within our profession. Managing the perceptions of this risk is part of the leadership and management challenge of implementing Learning Study within our culture.</p>

<b>Presentation Code</b>	3Eb
<b>Title</b>	District Leadership and Lesson Study: A Longitudinal Survey in Florida
<b>Presenter/s</b>	Bryan Wilkinson and Aki Murata
<b>Affiliations</b>	Florida State University (United States of America)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Leadership, management and policy aspects of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Room 2)
<b>Abstract</b>	<p>Florida is the first state to promote lesson study as a statewide professional development model for implementing the state standards and improving instruction and student achievement, using part of the \$700 million Race to the Top (RTTT) grant. Despite the large number of districts and schools practicing lesson study in Florida and across the country, there have been few systematic studies of district policy and practice for promoting lesson study. The project team conducted a longitudinal online survey of Florida districts in 2013, 2014, and 2015 to examine the district policies and practices for promoting lesson study and the changes in these policies and practices over time. The following research questions were addressed:</p> <ol style="list-style-type: none"> <li>1. How did the district policy and approaches to promoting lesson study and number of schools practicing lesson study change over time?</li> <li>2. What variation exists among districts in the scale level of lesson study?</li> <li>3. What district policy and leadership practices are associated with the scale level of lesson study?</li> </ol> <p>In summer 2013, 2014, and 2015, professional development coordinators of all 68 districts in Florida were invited to participate in a longitudinal online survey. A total of 53 districts participated in the survey in 2013 (78%), and 58 districts participated in 2014 and 2015 (85%). District characteristics of the participating districts were similar to the state averages.</p> <p>The survey data showed that the levels of district requirement, designated leadership position, and funding have decreased from 2013 to 2015. Accordingly, the number of districts that plan to sustain lesson study in the future decreased over the years. However, when the districts reported the actual number of schools that practiced lesson study, more schools were reported to have practiced lesson study in 2015 (749 schools) than in 2014 (668 schools). We also observed a major variation in the level of scale (percentage of schools within districts that are practicing lesson</p>

	<p>study) across districts.</p> <p>The examination of district policy and leadership associated with scale level of lesson study showed that both lesson study requirement and support (i.e., funding for teacher time) are critical. In addition, having a sustainability plan as an indicator of district long-term commitment to lesson study was found to be key to scaling up lesson study across the district. Policy and leadership implications for scaling up lesson study practice will be discussed based on these findings.</p>
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<b>Presentation Code</b>	3Ec
<b>Title</b>	Sustaining Learning Study in Hong Kong schools
<b>Presenter/s</b>	Yuefeng Zhang
<b>Affiliations</b>	The Hong Kong Institute of Education (Hong Kong)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Leadership, management and policy aspects of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Room 2)
<b>Abstract</b>	<p>Learning Study has been implemented for teacher professional development in Hong Kong since 2000. Guided by variation theory, Learning Study has three unique features. First, it focuses on student learning of the object of learning in planning, teaching and reviewing lessons. Second, variation is used as a pedagogical tool for lesson design in the hope of enabling students to discern the critical features. Thirdly, teachers collaborate together throughout the process of planning, teaching and reviewing lessons (Lo, et al., 2005). However, sustaining Learning Study may be inhibited by many challenges, including teachers' pressures from the examination-oriented system, heavy workloads, pressures from parents and lack of support and trust among staff (Zhang, 2015). How to sustain Learning Study in schools is yet to be explored. This presentation reports a study investigating the Learning Study practices in two Hong Kong schools (a primary school and a secondary school), which have adopted Learning Study for teacher professional development for over 10 years. The study utilized qualitative research methods including interviews with school leaders and teachers (2 leaders and 4 teachers from each school) and observation of Learning Study activities to identify the forces facilitating and inhibiting Learning Study in the schools. &lt;BR&gt; Content analysis (Northcutt &amp; McCoy, 2004) of the data from interviews and observations was conducted and the data were coded with the theoretical framework in Markee (1997), which categorizes the contextual factors facilitating and inhibiting the sustainability of Learning Study into four aspects: features of Learning Study, macro-context (e.g., socio-economic development, education reform, teacher education), school leadership practices (e.g., understanding and developing staff in the school; designing organization and cultivating a learning culture; managing internal and external resources) and teacher characteristics (e.g., personality, motivation, past experience). The presentation enriches our understanding of the development of Learning Study in Hong Kong schools and provides insights in sustaining education reforms like Learning Study.</p>

<b>Presentation Code</b>	3Fa
<b>Title</b>	Conceptual Understanding in Column Subtraction Algorithms – Critical Features and Aspects
<b>Presenter/s</b>	Marie Björk, Paul Stensland and Anna Stridfält
<b>Affiliations</b>	Sjöstadsskolan School (Sweden)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Learning studies
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Purple)
<b>Abstract</b>	<p>Analysis of Swedish students understanding of mathematical concepts and procedures in calculation with column algorithms has shown that student use procedures without reflecting or using conceptual thinking (Bentley, 2008).</p> <p>The school "Sjöstadsskolan" is a Swedish elementary school where teachers, since 2010, have used learning study as a model to develop knowledge about students' understanding of specific learning objects and also how teaching could be designed in relation to this. Teachers at the Department of Mathematics have identified difficulties to teach written column algorithms in which you subtract a number (the subtrahend) containing higher digits in the position of tens and ones comparing to the minuend, i.e. <math>423 - 215</math> or <math>302 - 273</math>.</p> <p>The aim of the study was to investigate critical features regarding correct use of column subtraction algorithm and how to design a lesson in order to get these features possible to discern.</p> <p>The study was conducted with 70 students in year 4 by four mathematics teachers, with support from one of the supervisor at the school. Three lessons were made in accordance to the iterative learning study model. The result showed a better improvement after the third lesson compared to the first two lessons, particularly regarding students in need of special education.</p> <p>A number of critical features were identified:</p> <ol style="list-style-type: none"> <li>1. The value of the positions</li> <li>2. "Changing" is made from the nearest position to the left</li> <li>3. The remaining value after "changing" a position is a ten/hundred/thousand less than before</li> <li>4. The commutative law</li> <li>5. The relationship between "changing up" (addition) and "changing down" (subtraction)</li> </ol> <p>Different forms of artifacts were used to vary the critical features, both written column algorithms and manipulatives.</p> <p>A discussion regarding a critical aspect concerning column algorithms as a structured way to handle the position system when making calculations. Another critical aspect, the ten-base system as</p>

	one of many base-systems is discussed as a possible, new learning object. Varying bases might enable the awareness about some critical features of the ten-base system.
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<b>Presentation Code</b>	3Fb
<b>Title</b>	Boosting the Tertiary Students' Participation in Research Class through Group Investigation Teaching Model
<b>Presenter/s</b>	Tono Suwartono
<b>Affiliations</b>	Muhammadiyah University of Purwokerto
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Learning studies
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Purple)
<b>Abstract</b>	<p>This study aimed to enhance the tertiary student participation in research class through Group Investigation (GI) teaching model. It was conducted in a collaborative lesson study project. In the study, the author, who was the teacher of Research in Language Teaching course, acted as the model teacher; while a colleague helped plan lessons, served as a classroom observer, and engaged in evaluation. Questionnaires were administered to gather data on student perception of research course before and after GI was applied in instructions. Observation by the colleague was done to collect data on student learning behavior. Test was administered to see learning outcome. Qualitative data from open-questionnaires and observation were analysed inductively by identifying common themes. Quantitative data were analyzed using descriptive statistics. According to initial questionnaires, students' perception of research course was still negative. However, after the project team had implemented GI, students' team work (inquiry) gradually improved from lesson to lesson, as particularly indicated by reduced task complaints at the beginning of every lesson. Even though performance of presenting team seemed persistently unequal across members, there has been a slight progress in overall presentation quality from time to time, especially in terms of calmness, problem of reliance on texts and slides, eye-contact, coverage of material, and mastery. The project team made a dramatic change possible in Lesson 4 only after initiating an effort to give students chance to have group discussion prior to Q/A session and mention his/her name while raising hand for reactions. This effort turned out to be powerful! A considerable change in the part of audience was that they learnt better, as can be seen from students' attention to presentations, dynamic group discussion prior to Q/A sessions, and more varied reactions. It was likely that such discussion before Q/A sessions enabled students to share ideas and develop self-confidence. Furthermore, mentioning identity while attempting to put forward feedback might seem</p>

	<p>awarded. Interestingly, final questionnaires have shown students' overall positive reaction as revealed in their voices. Students have supported the teaching model applied in the research course. Out of five items only one received negative response from around a half of class participants. In the meanwhile, with regard to learning outcome, test result was unfortunately still less than expected. However, with current valuable process that both GI teaching model and collaborative lesson study could bring in the research teaching, it would unquestionably give promising learning outcome as well.</p>
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<b>Presentation Code</b>	3Fc
<b>Title</b>	Choosing kitchen utensils : Sub-project in the comparative study on Lesson and Learning Studies in Sweden and Tanzania
<b>Presenter/s</b>	Carole Pardue and Eva Mårtensson
<b>Affiliations</b>	Mariaskolan (Sweden)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Learning studies
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Purple)
<b>Abstract</b>	<p>Home and Consumer studies in Sweden is a subject aimed at teaching food preparation and consumer issues with focus on health, economy and the environment. Food preparation was our choice for study because it is a major part of the curriculum and few learning studies focus on practical work. Therefore the aim of this study is to examine and develop teaching in food preparation and especially the use of kitchen utensils.</p> <p>Focus of the enquiry</p> <p>Observations made prior to this study show that a large number of pupils are not aware of the advantages of using the appropriate utensils. Making appropriate choices can improve their performance and facilitate their cooking practice. Handling utensils effectively and safely is also a central part of the core content and the performance standards for Home and Consumer Studies.</p> <p>Research methods</p> <p>To find out what can facilitate or hinder the effective choice of utensils, four test lessons with different designs were carried out in grade 6 (12 years old). Videos of the lessons and pupils evaluation sheets gave information for analysis which indicated how teaching could be changed to support their learning.</p> <p>Analytical and theoretical framework</p> <p>Analysis of the videos and evaluation forms helped to identify critical aspects of the learning object. Our assumption was that a critical aspect was related to the kind of instructions pupils were given: written, oral, or a combination of both. Another aspect was that an understanding of the technical terms in the recipe – such as slice, peel, grate and cube – was essential for a rational choice of utensils. Results showed that pupils chose more appropriate utensils after teacher and pupils had read the recipe and discussed which utensils were suitable for each task. Laying out the utensils in the kitchen before the pupils started cooking also contributed to the more efficient use of utensils. Pupils who took part in this lesson reported that they felt more confident in their choices of utensil and could work more effectively. In subsequent lessons, this method led to fewer problems, more effective food preparation and saved time. Repetition of technical words and utensils connected with these words aided learning, especially when these techniques and utensils could be used during preparation of several different dishes.</p>

<b>Presentation Code</b>	3Ga
<b>Title</b>	Students Answering their Own Questions: Voices from the High School Chemistry Classroom
<b>Presenter/s</b>	Arlene de la Cruz
<b>Affiliations</b>	University of the Philippines (Philippines) National Institute for Science and Mathematics Education Development
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Impact of lesson study on student learning
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Room 3: 2.1-2.3)
<b>Abstract</b>	<p><i>“Mas napapa-isip ako sa pagsagot sa tanong ko”</i> (Celyn, 15) (I think more of answering my own questions). <i>“Nasasagot yung hindi naming naiintindihan”</i> (Ann, 14)</p> <p>The above 2 statements are part of the several explanations given by third year high school chemistry students during an interview on why they would rather ask questions and answer them instead of the teacher. This presentation discusses the results of the second and third cycles of one of the two high school chemistry lesson study groups in NISMED’s three year lesson study project in a public school in Metro Manila. The focus of the discussion is on the interview responses of the students after the second cycle of the study.</p> <p>The interview questions are the following:</p> <ol style="list-style-type: none"> <li>1. What was your reaction when you were told to make your own question regarding the activities in your chemistry class?</li> <li>2. What was your reaction when you were told to answer your own questions?</li> <li>3. Was it difficult for you to ask question and answer your questions? Explain.</li> <li>4. Which do you prefer: the teacher asking questions or yourself asking the questions? Explain.</li> <li>5. Did you learn science when you were given an opportunity to ask and answer questions? Explain.</li> </ol> <p>It also includes some comments on teaching and learning science using the voices raised in the classroom, the students’ questions and answers, and lesson study as a professional development activity and research opportunity in teaching science.</p>

<b>Presentation Code</b>	3Gb
<b>Title</b>	Use of Modelling Instruction as an Approach to Teaching the Physical Properties of Ionic and Covalent Compounds
<b>Presenter/s</b>	Brian Tan, Syed Aliff Syed Alwi, Min Sen Lee, Wei Jie Heng
<b>Affiliations</b>	Bedok North Secondary School (Singapore)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Impact of lesson study on student learning
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Room 3: 2.1-2.3)
<b>Abstract</b>	<p>Chemical bonding is a topic that is difficult for students to grasp because it is hard for students to visualize atoms and the forces of attraction between them. The aim of this project was to understand how students perceive ionic and covalent bonds, and relate electrical properties of ionic and covalent substances to their lattice structures, by making thinking visible using whiteboarding and the modelling instruction approach. Whiteboarding supports teachers in engaging students' prior understandings, and helps students relate factual knowledge to scientific concepts. &lt;BR&gt;The lesson study approach was chosen, and the department collaboratively considered the learning objectives, planned the lesson and enacted the student learning activities, with a teacher facilitator leading the guided inquiry, and students having to whiteboard their understanding using models of particles. In groups of three, using their proposed models, the students suggest explanations to the phenomena observed i.e. light bulb lighting up when connected to a circuit containing salt solution, and the light bulb not lighting up when connected to a similar circuit containing sugar solution. The teacher questions these explanations and encourages inter-group discussions to refine and deepen their understanding.</p>

<b>Presentation Code</b>	3Gc
<b>Title</b>	Improving Students' Autonomy in Learning Analytical Chemistry Subject through Creative Problem Solving and Lesson Study
<b>Presenter/s</b>	Yusnidar Yusuf
<b>Affiliations</b>	Uhamka University (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Impact of lesson study on student learning
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Room 3: 2.1-2.3)
<b>Abstract</b>	<p>This study was meant to improve students' autonomy in learning analytical chemistry subject through Creative problem solving and lesson study. The study was conducted in Pharmacy Study Program, and the participants were the students of semester IV A, B and C. This study involved a team of analytical chemistry and sciences lecturers who collaborated with more than six observers. The data of this study were gained from observation, documentation, questionnaire, and interview. The method used in this study was Classroom Action Research by implementing Lesson Study design. The teaching strategy used in this study is the modification of Creative problem solving method. The data showed that there was improvement of students' autonomy in learning analytical chemistry. Moreover, they enjoy learning. Through lesson study along with the application of creative problem solving method, the classroom atmosphere was more conducive. Their involvement and participation in learning also improved. The lecturers who facilitated the subject also improved their teaching strategy in order that the students achieve the goal of learning. Thus, it can be concluded that the application of Lesson Study design along with Creative problem solving method can improve students' autonomy in learning analytical subject as well as lecturer's strategy in facilitating the students to reach the goal of learning.</p>

<b>Presentation Code</b>	3Ha
<b>Title</b>	How Teachers' Learning Influence Children's Understanding at GagasCeria Preschool Bandung – Indonesia
<b>Presenter/s</b>	Ami Aminah
<b>Affiliations</b>	GagasCeria School (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Early years education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Green)
<b>Abstract</b>	<p>When creating a lesson plan, teachers need to understand the content that will be given to children. In practice, there are several obstacles for teachers to master the learning content, such as different interest among teachers, lack of time to explore the content, and difficulties in putting the learning content into a context that is easily understood by children. Gagasceria Preschool has a strategy to overcome the obstacles above. The strategy is set out in the implementation of the curriculum at the stage of preparing the lesson plan. Before creating the lesson plan, teachers should do the process of brainstorming. Brainstorming is intended to enrich and map teachers' thoughts and insights to suit the learning needs of children. With this activity, the teacher can express ideas and deepen their understanding on the learning content that will be studied with the children. The brainstorming stage is carried out by exploring various books and media related to the learning content, mind mapping, and sharing the ideas with other classroom teachers. In this case study, the author will explain how the three stages of brainstorming activities helps teachers deepen their knowledge about the learning content that will be studied among the children. This case study was conducted in Gagasceria Preschool Bandung – Indonesia.</p>

<b>Presentation Code</b>	3Hb
<b>Title</b>	Revising the Nuri Curriculum in Korea: Challenges and Recommendations
<b>Presenter/s</b>	Mugyeong Moon
<b>Affiliations</b>	Korea Institute of Child Care and Education (South Korea)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Early years education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Green)
<b>Abstract</b>	<p>The purposes of the study are to examine issues and needs regarding the implementation of the national Nuri curriculum for children at age 3 to 5 in Korea, and to provide recommendations for revision in terms of the general and the specific learning domains as well as explanatory guidelines and materials for teachers. In particular, the study attempted to strengthen theoretical backgrounds and recent trends of curriculum development, to fortify alignment with primary school curriculum as well as the Standard Childcare Curriculum for 0 to 2, and to provide a more teacher-friendly curriculum.</p> <p>Two surveys were conducted respectively with 1,250 practitioners and about 50 experts regarding challenges of and needs for the implementation of the Nuri curriculum and directions and specifics of revision. A group of experts in the field provided in-depth discussion and reviews on the general and each learning domain. Furthermore, two regional workshops were held in order to discuss proposed recommendation for revision.</p> <p>Based on major findings of surveys and expert meetings, a range of recommendations for revising the Nuri curriculum, such as including desirable image of child, emphasizing integral provision of care and education, reducing amount of learning contents, appropriating the difficulty level of contents by age levels, setting an overall goals rather than individual goals for each learning domain, providing detailed guidelines for child assessment, and so on.</p>

<b>Presentation Code</b>	3Hc
<b>Title</b>	The Activities Board as Media for Helping Children to Know their Daily Activities Schedule (Best Practice in GagasCeria Preschool, Bandung, Indonesia)
<b>Presenter/s</b>	Astri Budi Yusniati
<b>Affiliations</b>	GagasCeria Preschool
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Early years education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Green)
<b>Abstract</b>	<p>Every children enter the new school year, children are experiencing a transition phase. Transitions bring changes. One of the changes that occur is the daily activities schedule. In preschool level, the class teacher has not shown daily activities schedule to children. Daily Activities Schedule on lesson plan is known only by the teacher. Yet at the end of preschool age (5-7 years), children need to be introduced to Daily Activities Schedule for preparation to elementary. According to Jean Piaget, the end of preschool-age children (5-7 years) is the transition from pre-operational to concrete operational. Children who are at this age still need things that are concrete while the Daily Activities Schedule is an abstract thing.</p> <p>So that in this study, the writer who is also a preschool teacher trying to find the right strategy to introduce the Daily Activities Schedule to children in a way that is more concrete. This paper will describe the efforts that have been made by teachers in the classroom in the form of classroom action research. Initial conditions in the classroom showed the children have difficulty understanding the class schedule. Each turn of activity, they always ask to be taken to the classroom teacher. Then the teacher did the first strategy by writing four main activities. Every time the children perform the next activity, the teacher explains the activity type. Children's understanding of the schedule of classes still need to be reminded. In this phase, more teacher provide instruction and the child is still much to confirm. This strategy has not succeeded in improving children's understanding of daily activity schedule so that teachers make improvements. Activity board is the strategy as an improvement from the first strategy. Currently the activities board become a reference to do all the activities. Children already know about the activities that will be done so the flow of activities in the days become more focused. This understanding also gives children the opportunity to remind each of them. The biggest opportunity is given to children who are leaders of the day to be directly involved to steer her classmates. This involvement also builds confidence in a friend. This has an impact on the lack of involvement of teachers</p>

	<p>in providing instruction to build the child's independence.</p> <p>What was the learning process in the classroom during this study? How was the activities board used? How did the children understand the Daily Activities Schedule using media activities board? The author will present the results of research conducted in GagasCeria Preschool, Bandung-Indonesia, in a descriptive way.</p>
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<b>Presentation Code</b>	3la
<b>Title</b>	Developing Twenty-First Century Skills through Lesson Study-Based Classroom Action Research in Plant Physiology Class
<b>Presenter/s</b>	Herawati Susilo
<b>Affiliations</b>	State University of Malang (UM) (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Further and Higher Education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Queen's Lecture Theatre 2)
<b>Abstract</b>	<p>Almost all of the 2014/2015 graduate students in biology education program at the State University of Malang were fresh graduates of S1 (undergraduate) program in Biology or Biology Education. Those who were Biology Education graduates only have teaching practice experience for a short time (between 1.5 to 3 months) and those who were Biology graduates never practice how to teach.</p> <p>Therefore, in order to develop or improve students' competence in teaching, they need to gain practical field experience. Lesson Study-Based Classroom Action Research (LSbCAR) was conducted in Plant Physiology Class (PPC) at Odd Semester of 2015/2016 to develop 21st century skills to 27 S1 biology students. Four master (graduate) biology education students through Field Teaching Practice (FTP) for 3 months implemented LSbCAR in collaboration with the author. Two students using PBL combined with the use of Concept Map, develop metacognitive skills, the ability to ask questions, the cognitive learning, critical thinking skills, and concept understanding in class of theory. Metacognitive skills measured by a test that is integrated with test for understanding of concepts, the critical thinking skills measured by critical thinking skills tests. In class of theory, understanding of concepts measured through concept maps assessment. Cognitive learning outcomes measured by the test. Two other students in class of practice using Guided Inquiry combined with the use of Flowchart develop skills to inquire, Science process skills, scientific attitudes, concepts understanding and skills to present the results of lab work. Inquiring skills assessed on the Student Worksheet is for the ability</p>

	<p>to formulate problems and formulate hypotheses. Science process skills, scientific attitudes, and skills to present the results of lab work were measured through observation. The results showed that in the theory class, there were no increase in metacognitive skills of students. Critical thinking skills improved from 54.46 to 60.59. Concept understanding increased from 43.79 to 54.66. Cognitive learning outcomes increased from 72.07 to 78.85. The ability to ask increased from 39.1 to 52.0. In class of practice, the results of Student Worksheet assessment increased from 71.5 to 77.69. Science skills increased from 79.35, to 93.03. The skills of writing flowcharts increased from 83.45 to 86.95. Concept understanding obtained from the tests at the end of learning increased from 87.5 to 91.67. It can be concluded that through LSbCAR the master students of Biology Education were able to practice how to develop Twenty-First Century Skills of students in Plant Physiology Class.</p>
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<b>Presentation Code</b>	3Ib
<b>Title</b>	The Implementation of Lesson Study through Contextual Learning Based on Forest Prototype for Postgraduate Students
<b>Presenter/s</b>	Muhfahroyin Muhfahroyin
<b>Affiliations</b>	Muhammadiyah University of Metro (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Further and Higher Education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Queen's Lecture Theatre 2)
<b>Abstract</b>	<p>The objective of the Lesson Study implementation was to improve students' learning activities and to disseminate Lesson Study for postgraduate students. Learning was conducted in collaboration with different levels of education; where undergraduate students learned Plant Morphology subject and postgraduate students learned Biology Learning Innovation. Learning was conducted contextually by using Learning Forest prototype through Lesson Study. Undergraduate students learned plant morphology, while postgraduate students learned to be planners, observers, and learning reflectors in plan, do, and see activities. This learning implementation improved students' activities and built learning communities for undergraduate and postgraduate levels. Students learned collaboratively and contextually. Postgraduate students could implement plan, do, and see in the real learning. The research results showed that students were able to implement plan, do, and</p>

	see properly. Total average of student's activity grade was 91.11%; 88.89% for plan activity average grade, 93.33% for do activity average grade, and 91.11% for see activity average grade. This good result of Lesson Study implementation was results of good planning and contextual learning. Therefore, to improve students' learning activities, lecturers can implement Lesson Study through contextual learning based forest prototype to other subject with good planning and context. Furthermore, the Lesson Study can disseminate to the postgraduate program in the real and contextual learning.
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<b>Presentation Code</b>	31c
<b>Title</b>	Strengthening Prospective Teacher of Biology on Technological Pedagogical Content Knowledge (Tpck)
<b>Presenter/s</b>	Evi Suryawati and Yenita Roza
<b>Affiliations</b>	University of Riau (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Further and Higher Education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Queen's Lecture Theatre 2)
<b>Abstract</b>	This research is conducted for strengthening Technological Pedagogical Content Knowledge (TPCK) of prospective teacher of Biology based on Indonesian National Qualifications Framework (NQF). The research is done to fulfill Indonesian government's policy on NQF where college of education graduate must meet level-6 for undergraduate program and level-7 for the educational profession program. This development research aims to design and develop a model to enhance competence and competitiveness. College of Education graduates to meet the professional, social and industrial needs. This research used ADDIE model with the stage of analyze, design, develop, implement, and evaluation. This paper discusses the preliminary study of developed models for the Department of Biology and Mathematics that conducted through a survey of 240 students from four different college of education in Province of Riau Indonesia. Data were collected through tests, questionnaires and interviews. Instrument used contains seven variables of knowledge, namely Technology, Pedagogy, Content, Technology Pedagogy, Technology Content, Technology knowledge and Technology Pedagogy Content. This instrument has been tested

	for validity and reliability. Based-on the data analysis two product were generated, the first is lesson design of an integrated learning in education and professional courses, the second is Workbooks, problem for student drill and practice and teacher competency test. Research is still ongoing to produce the model for strengthening TPACK for prospective teacher of Mathematics and Science Teacher.
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<b>Presentation Code</b>	3J
<b>Title</b>	Lesson Study in Special Education in Singapore
<b>Presenter/s</b>	Christina Michael, Christine Lee, Pete Dudley, Martina Kueh Bee Huah, Mardina Bte Mohd Ithnin, Desiree Tay Sirui, Shanice liang, Ester low, Gladys Khoo
<b>Affiliations</b>	Ministry of Education (Singapore)
<b>Type of presentation</b>	Symposium
<b>Strand</b>	Special needs and inclusive education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Blue)
<b>Abstract</b>	<p><b>Paper 1:</b> Supporting the Adoption of Lesson Study for Special Education Schools in Singapore. <i>(Christina Michael &amp; Michael Chua, Special Education Branch, Ministry of Education, Singapore)</i></p> <p>There are limited opportunities for professional development for special education teachers in Singapore. Special Education Branch, Singapore Ministry of Education has pioneered the adoption of Lesson Study by special education schools in response to the need for more school-based professional development that are contextualized and adapted to the needs of these schools serving a diverse range of disability profiles of students. The goal is to build a collaborative community of inquiry-based practice that is teacher-led. Lesson Study, as one of the approaches used to achieve this end, serves to develop teachers' craft of teaching and their inquiry into their practice. The Singapore Ministry of Education in collaboration with the National Institute of Education implemented a tiered model of professional development to support the implementation of lesson study in special education schools. The model systematically deepens teachers' understanding of the nature and purpose of Lesson Study as well as its principles and processes. Teachers also learn about the dispositions and habits of mind necessary to observe student learning and interpret data to improve lesson design and student learning. In the final phase, a team of teachers in a school is supported in the implementation of a lesson study cycle from planning, observation, enactment and</p>

reflection by external resource persons. A network among participating schools is developed through sharing sessions, visits to local mainstream schools and participation in WALS-JTB Lesson Study Immersion Program. This paper will share the efforts made in advancing lesson study as an approach to the professional development of special education teachers in Singapore and the lessons learnt.

**Paper 2:** Lesson Study for Teaching of Moral Values to Teenagers with Mild Intellectual Disability. (*Lisa Goh, Esther Low, Gladys Khoo & Shanice Liang, Grace Orchard School, Singapore*)

Schools need to do their very best to nurture each child so that they can reach their fullest potential, grounded on sound values and character (MOE Singapore, 2016). Grace Orchard School which is a special education school for students with mild intellectual disability and/or autism envisions its students to be individuals who are anchored in values and prepared for life. The school places much emphasis on the provision of Character and Citizenship Education (CCE) for every student, with CCE lessons and related activities accounting for 12.5% of its curriculum time. Lesson Study was introduced as a professional development platform to help teachers improve the quality of the CCE lessons as they play a significant role in developing the right values in the students. The following questions were core to our lesson study: what are the essential features of a good CCE lesson and how can we help students who struggle with abstract concepts and social competencies understand the underlying values within CCE lessons? This paper will provide a narrative of the lesson study journey taken by the school in a non-academic area. It will also suggest a model, with specific examples, for teaching moral values to students with mild intellectual disability in a manner that is meaningful and engaging for them. It will highlight the impact of the lesson study experience in and beyond the classroom, for the individuals and communities of learners (both teachers and students) within the school. This experience confirms the school's belief in lesson study as a suitable and viable professional learning platform for teachers.

**Paper 3:** Learning from collaborative, reflective and iterative lesson study with special education students in a school in Singapore. (*Teo Lay Heong, Jennifer, Desiree Tay Sirui, Mardiana Binte Mohamed Ithnin, Martina Kueh Bee Hua, Lily Yip, Tanglin School, Singapore*)

This paper will explore (a) teachers' perspectives of lesson study

	<p>used to develop a series of lessons to teach goal setting in a social emotional learning program, and (b) students' responses during the enactment of the research lessons. Goal setting is selected because it is a significant outcome that is valued by people with disabilities for adult living and has been found to improve task performance through developing the sense of control, ownership and autonomy. Students with disabilities require opportunities to learn the skills necessary to make sound choices, evaluate decision and solve problems. This lesson study cycle involves 6 teachers who met for planning, observation and discussion of the research lessons and the whole cycle was documented. Four students, aged 15 years old, with mild intellectual disability and an IQ range between 50 and 70 were also interviewed. Documentation of this process allows for critical reflection on teacher professional learning and student learning development in the next iteration. Findings revealed that teachers need to adopt an inquiry stance through restructuring their knowledge and beliefs and integrating new information in their practice. Through an iterative process of collaborative observation and analysis, greater insights into the needs of their students, the curriculum and teaching strategies emerged. This experience demonstrated that lesson study as a model for teacher professional development has engaged the teachers meaningfully with inquiry into teaching and holds much promise for social emotional education but its implementation is not without obstacles.</p>
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<b>Presentation Code</b>	3Ka
<b>Title</b>	Innovation in educational system of Kazakhstan through Lesson study
<b>Presenter/s</b>	Arman Imansharipova
<b>Affiliations</b>	Nazarbayev Intellectual school of Astana of the AEO (Kazakhstan)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Innovative uses of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Rm 1:1.1-1.3)
<b>Abstract</b>	Due to changes in the modern educational system of Kazakhstan, new requirements are being imposed on our school teachers

	<p>(Nazarbayev Intellectual School). Lesson analysis has shown me that I need to change my teaching style and collaboratively work with my colleagues. Lesson Study helps me to rethink both my teaching practice and that of my colleagues. My participation in the workshop held by Dr.Hiroyuk KUNO, Nagoya University, Japan can help me to focus on this form of research. In our school we teach science subjects in English as a second language of communication. That is why it is one of the problems in our school to develop communication skills in parallel with other Learning skills. The general problem selected by the group of science teachers and me at my school is formulated as “How to Develop Communication Skills at a Science Lesson?” For the purpose for solving the problem, our Research Team has implemented CLIL at Science lessons. Lesson Study helped to focus on this Learning. That is why the aim of our research was the following: To develop students’ communication skills at science lessons through Lesson study. Expected results: Creating a collaborative environment; Teachers from the Science Department have been invited to take part in the Lesson Study, which involves some specific steps: Group members have learnt special literature about the Lesson Study; We have identified the research class and three candidates among students who will be on at the forefront at the research lesson – a highly motivated student, B-middle, C-low motivated; We have planned a series of research lessons to be observed; We have identified teachers who will teach research lessons, while others shall observe and make some written notes; Teachers have interviewed some students to get their views and opinions about research lesson’s effectiveness; They carried out discussion after lessons. The following methods have been used: Case student method used in Biology, Transcription method – in Physics, Seating map method, time-sequential method – in Chemistry Lessons. In interview and reflection teachers shared with difficulties and advantages in different methods. Having looked through the video tutorials together with teachers, we have analyzed what we have succeeded in and what difficulties we have coped with and what we are to improve now. Upon the analysis results, we have concluded that the Lesson Study helps us to develop communication skills among our students at our lessons. The article describes the Professional Collaboration Growth developed through the Lesson Study. The article reflects the main stages of the Lesson Study, completed via the methods of information analysis and observation, interview, survey, and reflection. Reflection is one of the main characteristic of the Lesson Study, which allows my colleagues to see their strong and weak points in their teaching &amp; learning practice. To analyze the effectiveness of the Lesson Study, teachers were asked to carry out the questioning survey: 1. What changed since you have implemented the Lesson Study in your teaching practice? 2. Do you</p>
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	<p>consider that the Lesson Study Research is effective in the teaching practice? 3. Describe the advantages and disadvantages of the Lesson Study Methods. 4. In your opinion, which method is the most effective? 5. Why Lesson study – collaborative approach to learning? How does the Lesson Study allow you to change your teaching practices? In your opinion, what is so special? While analyzing the teacher's answers, I have made the following conclusions: Lesson Study allows teachers to see the strengths and weaknesses of their teaching, and make some corrections in their practice; Lesson Study is a most effective way of Professional Development; Lesson Study helps to improve student communication and other Learning skills at our lesson;- Lesson preparations take longer time than usually and teacher needs more time for observing the lessons than usually.</p>
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<b>Presentation Code</b>	3Kb
<b>Title</b>	Improving and Evaluating CPD with Lesson Study
<b>Presenter/s</b>	Gabriele Isak and Barbara Hanfstingl
<b>Affiliations</b>	University College of Teacher Education (Austria)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Innovative uses of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Rm 1:1.1-1.3)
<b>Abstract</b>	<p>“Lesson study” is a heterogeneous complex of variety of research, namely humanities, social sciences, behavioral sciences, and even educational technologies. However lots of such lesson studies have commonality. That is they use speech transcripts from lessons or observational data of lessons. Needless to say such data are linguistic and qualitative. Qualitative study also has a long tradition. It is highly developed with methodological accumulation which can be applied to various research topics. But methodological outcome of qualitative study has been rarely used in lesson studies. On the other hand, lesson study has developed its own various methods of data analysis that could be applied in qualitative studies. But they are not well known to qualitative researchers. This gap in communication between lesson study and qualitative study is not beneficial for both studies.</p> <p>The study asks the following research questions:</p> <ol style="list-style-type: none"> <li>1. What are the similarities and differences of both research frameworks and data analysis methods?</li> <li>2. What kind of research methods, methodology, frameworks of qualitative study can be applied in lesson study, and vice versa. The author discusses the above topics citing the important literature on lesson study and</li> </ol>

	<p>qualitative study. As the analytical and theoretical framework, the epistemology and ontology of qualitative research methodology are applied in this study. Lesson study can be seen as a particular type of qualitative study. As for qualitative study, data analysis methods, conceptual/theoretical frameworks, and methods of presentation of findings of qualitative study can be effectively applied in lesson studies. At the same time, those of lesson study would be used in qualitative studies. It would be beneficial if we could promote such interactions between both studies.</p>
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<b>Presentation Code</b>	3Kc
<b>Title</b>	Lesson Study and Qualitative Study: The Significance of their Interaction
<b>Presenter/s</b>	Takashi Otani and Yoshiaki Shibata
<b>Affiliations</b>	Nagoya University
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Innovative uses of lesson study
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Rm 1:1.1-1.3)
<b>Abstract</b>	<p>Background to the topic</p> <p>“Lesson study” is a heterogeneous complex of variety of researches, namely humanities, social sciences, behavioral sciences, and even educational technologies. However lots of such lesson studies have commonality. That is they use speech transcripts from lessons or observational data of lessons. Needless to say such data are linguistic and qualitative.</p> <p>Qualitative study also has a long tradition. It is highly developed with methodological accumulation which can be applied to various research topics. But methodological outcome of qualitative study has been rarely used in lesson studies.</p> <p>On the other hand, lesson study has developed its own various methods of data analysis that could be applied in qualitative studies. But they are not well known to qualitative researchers. Such dis-communication between lesson study and qualitative study is unbeneficial for both studies.</p> <p>Research questions/focus of the enquiry</p> <p>So this research tries to discuss followings.</p> <p>How common and how different both research frameworks and data analysis methods are.</p> <p>What kind of research methods, methodology, frameworks of qualitative study can be applied in lesson study, and vice versa.</p> <p>Analytical and/or theoretical framework</p>

	<p>As analytical and theoretical framework, epistemology and ontology of qualitative research methodology are applied in this study.</p> <p>Research findings and/or contribution to knowledge</p> <p>Lesson study can be seen as a peculiar type of qualitative study. And as far as it is qualitative study, data analysis methods, conceptual/theoretical frameworks, and methods of presentation of findings of qualitative study would be effectively applied in lesson studies. At the same time, those of lesson study would be used in qualitative studies. It would be beneficial if we could promote such interactions between both studies.</p>
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<b>Presentation Code</b>	3L
<b>Title</b>	Expanding Learning Community and Lesson Study in Fukui: Findings from LSIP
<b>Presenter/s</b>	Toshiya Chichibu, Hiroyuki Watanabe and Yu Kimura
<b>Affiliations</b>	National Institute for Educational Policy Research (Japan)
<b>Type of presentation</b>	Symposium
<b>Strand</b>	Developing professional learning communities: models and practices
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Queen's Lecture Theatre 1)
<b>Abstract</b>	<p>This symposium tries to explore the school culture and the lesson study system in Fukui. Why did we choose Fukui? We did so because this prefecture has a high level of lesson study and educational performance in Japan. National research shows that Fukui Prefecture has continuously yielded very good results in scholastic ability and physical strength among children. Almost all schools in Japan conduct a lesson study, but the frequency and strategy of the lesson study differ among prefectures. For example, in some schools, lesson studies are conducted without a lesson plan discussion and with a poor post-lesson discussion. In lesson studies in Fukui, teachers prepare lesson plans carefully, discuss them with their colleagues, observe the research lesson, and discuss it with all the teachers in school. External advisers from municipalities in Fukui are dispatched to lesson studies to facilitate discussions and improve research lessons. Now, Fukui Prefecture is known as one of the best prefectures in Japan in terms of education. More than</p>

	<p>2,000 teachers from all over the country visit the prefecture to observe classes and learn about the education system in Fukui.</p> <p>&lt;BR&gt;The Lesson Study Immersion Program (LSIP) was planned for Singaporean educators interested in learning how a lesson study was implemented in Japanese schools in the 2015 academic year. In this program, Singaporean participants observed how a lesson study was carried out in Japanese schools in Fukui: from the conduct of research lessons to post-lesson discussion. Translation was provided for the participants and they had the opportunity to discuss their observations further and ask questions to experts in Japanese lesson study. After the LSIP2015, the participants were asked to provide feedback, and they stated that, while observing, they were impressed by the research lessons and post-lesson discussions in Fukui schools. This symposium tries to present (1) Fukui schools' management and teaching methods, (2) the partnership between Fukui schools and the University of Fukui, and (3) analysis of the feedbacks from the LSIP2015 participants. Fukui Schools' Management and Teaching Methods Hiroyuki Watanabe, Fukui Prefectural Board of Education, Japan. The central cultural feature of Fukui schools is their collegiality. Teachers in Fukui schools help each other; they communicate and collaborate actively. In the elementary schools, grade teams constitute teachers' basic communities, while, in the middle schools, subject teams play the same role. Teachers attending grade teams or subject teams discuss curricula as well as unit plans and homework schedules. Moreover, they share ideas regarding instruction methods or student information. &lt;BR&gt;With the collaboration of their teachers, students can share their schools' visions. For instance, they can maintain high levels of discipline. They can also follow the school schedule; thus, almost all students are able to take their seats and to learn on their own before lessons begin. Desks are set and bags are arranged on shelves in a highly organized manner. In addition, the students maintain good posture during lessons and clean their classrooms by themselves. The principals of Fukui schools manage their schools according to the PDCA cycle. They develop their management plans with lesson study in the school year and revise them according to the lesson study outcomes or to those of school evaluations. Lesson study in Fukui schools is part of the school management system. The Partnership between Fukui Schools and the University of Fukui Yu Kimura, Fukui University, Japan</p> <p>The DPDT (Department of the Professional Development of Teachers) in the University of Fukui's Graduate School of Education implements "school-based" teacher education. Our mission and activities cultivate PLCs (professional learning communities). They include the improvement of lesson study in our partner schools, building reflective institutions for the sustainable development of</p>
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	<p>PLCs for reflective practitioners, and nurturing new teachers in the age of knowledge society. During this symposium, we will make a presentation regarding the system of partnership between Fukui schools and the DPDT. We will focus on the results of collaborative research between the department and a partner elementary school that has developed its lesson study process as one of its professional development activities. This elementary school started its children-centered lesson study efforts by collaborating with the DPDT. The school's teachers observe and take note of how children learn in the classroom. Moreover, they discuss the relationship between the children's learning and their teaching efforts using observation notes and tags, which they describe in their records of children's learning during their lesson study. Longitudinal teachers' initiatives and efforts to cultivate professional learning communities in the school have contributed to the development of this lesson study style. Analysis of the Feedbacks from LSIP2015 Participants Toshiya Chichibu, National Institute of Educational Policy Research, Japan&lt;BR&gt;The feedbacks of LSIP participants showed that they were impressed by their observation of Fukui schools. The first point among their findings was that Fukui schools had an "open classroom culture," which made lesson observation easy. Teachers in Fukui were willing to observe their colleagues' classrooms, and they did not hesitate to allow their colleagues to observe them. The second point was that Fukui teachers had "open mind to accept critiques" of colleagues. They made the effort to accept criticism without threatening others. In the post-lesson discussion, the teachers tried to share their findings within the scheduled time. The third point concerned the management of the post-lesson discussion. The facilitator managed the discussion well. Fukui schools have a supportive and collaborative culture that encourages the expansion of the learning community through lesson study.</p>
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<b>Presentation Code</b>	3Ma
<b>Title</b>	Lesson Study as Professional Culture in Japanese Elementary School: A Historical Perspective on Elementary School Practices.
<b>Presenter/s</b>	Keisuke Fukaya
<b>Affiliations</b>	Chubu University (Japan) College of Contemporary Education
<b>Type of</b>	Paper presentation

<b>presentation</b>	
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Rm 4:2.4-2.6)
<b>Abstract</b>	<p>Lesson study as a professional culture in Japanese education has a long history. During the Meiji era (1868-1910), it was necessary that Japan absorb and learn from the educational methods of the West in order to create a modern educational system better suited to the needs of the modern state. Lesson study also enabled Japanese teachers to realize, reflect upon, and sustain meaning in their classroom environment, and in pupil learning activities. This pedagogical awareness transpired as a result of the accumulation of formal lesson study, but it also arose out of the informal reflection of individual teachers. The way of viewing pupils as described in Isomura's geography lesson plans, for example, was achieved through continuous reflection on teaching (Sarkar Arani et al., 2010). It would appear, therefore, that lesson study came to constitute an essential aspect of school culture and teachers' professional development by the late Taishō (1920's) and early Shōwa (1930's) eras, and the educational journals served to deepen mutual exchanges between schools throughout Japan. Certainly, the culture of lesson study was formed through classroom instruction of teachers at schools across Japan. School teachers taught lessons based on their individual views of education, and they openly shared their views on educational improvement both inside their schools and with society at large (Sarkar Arani et al., 2010).</p>

<b>Presentation Code</b>	3Mb
<b>Title</b>	The Global Circulation of Lesson Study and Its Impact on the Japanese Discourse: Meta-Analysis of Japanese Literature on Lesson Study
<b>Presenter/s</b>	Takayo Ogisu
<b>Affiliations</b>	Nagoya University (Japan)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Rm 4:2.4-2.6)
<b>Abstract</b>	<p>This paper tries to explore what changes global circulation of lesson study has brought to the discourse produced in Japan about lesson study. After Stigler and Hiebert wrote about lesson study in English in 1999, “Japanese lesson study” has quickly been circulated worldwide. A lot of discourses about lesson study have been produced both inside and outside Japan, and its mechanisms and effectiveness have been well explored. However, we know little about what happened to its origin—how Japanese stakeholders have reacted to such recognition from the rest of the world and how they shape or reshape their ideas about lesson study.</p> <p>Exploring the changes in the Japanese discourse about lesson study helps us understand the dynamic process of global circulation of an educational practice—lesson study—and reminds us that lesson study is still evolving. This paper is a part of larger study about global circulation of lesson study, in which I am exploring when, by whom, and why lesson study has been borrowed/lent. The current paper presents the results of meta-analysis I conducted based on the 126 articles and books on lesson study published in Japanese language after 1999. In order to understand the general characteristics of this body of literature, I categorized them based on (1) geographical area, (2) subject matter, (3) education level, and (4) main argument, and then conducted quantitative analysis to identify how discourses have changed over almost two decades. As a result, I could divide this period into three phases: first phase (1999-2004), second phase (2005-2009), and third phase (2010-). I also conducted qualitative text analysis in order to identify what actually have been discussed in each phase. It turned out that the nature of discourse has changed gradually. First phase discourses are characterized with intentions to identify “true” and “authentic” lesson study by referring to “problematic” practices in other places. In the second phase, it became the one trying to establish and disseminate a lesson study model that can easily be implemented in other countries. And finally, in the third phase, people came to discuss the importance of pursuing mutual learning relationships with other countries through lesson study.</p> <p>The above results suggest that global recognition of lesson study</p>

	not only raised awareness among Japanese stakeholders about the uniqueness of Japanese education tradition, but also prepare them for using lesson study as a tool to exchange educational practices and ideas globally.
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<b>Presentation Code</b>	3Mc
<b>Title</b>	Three Lesson Study Methods Developed in Japan with their Characteristics and Pedagogical Implications
<b>Presenter/s</b>	Shizuo Yoshizaki
<b>Affiliations</b>	Japan Women's University (Japan) Research and Development Center for Teacher Education
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Peter Chalk Rm 4:2.4-2.6)
<b>Abstract</b>	<p>Three lesson study methods developed in Japan with their characteristics and pedagogical implications Dr. Shizuo YOSHIZAKI (Professor, Japan Women's University)</p> <p>Lesson study has a long history in Japan and many lesson study methods are based on four phases: lesson planning, practice, evaluation, and improvement have been developed. Lesson study has also been considered central to teachers' professional development for a long time. The key concepts in lesson study are fellowship, collaboration, and apprenticeship.</p> <p>In this paper, I discuss three lesson study methods that were developed collaboratively by educational researchers and teachers. Each method has its own characteristics and pedagogical implications.</p> <p>The first method is Mizukoshi's (1987) "Model of Anticipating Students' Thought Processes." In this method, teachers predict students' responses prior to teaching and make students' thought process model. Teachers can then create the unit plan based on said model. This method helps teachers do lesson planning. Furthermore, this method increases teachers' knowledge regarding the subject-matter, the pedagogy, and their students.</p> <p>The second method is called the "stimulated-recall procedure," which was developed by Yoshizaki (1997). In this method, students are videotaped from the back of the classroom. They are also required to recall their cognitive and affective processes during the lesson when they view the recording. This method helps teachers elicit significant information from the students' reports and reflect on their instructional practices. This method can also alter teachers' knowledge regarding subject-matter, pedagogy, and their students.</p> <p>The third method is called "workshop-style lesson study," as developed by Murakawa (2010). Here, observers of the lesson collect data by writing memorandums on tag paper. After the lesson, observers are divided into groups of three, four, or five members to summarize the observation data. Four different methods (i.e., enlarge lesson plan sheet method, matrix sheet method, conceptualized sheet method, and K-J method) are used for data summarization. This method helps teachers collect crucial</p>

	<p>information on how to improve their pedagogy. This method also changes teachers' understanding regarding subject-matter, pedagogy, and their students.</p> <p>To conclude, the first method focuses on the lesson planning phase, while the second and third methods respectively focus on the lesson practice the lesson evaluation phases. However, it is crucial that every method will contribute to the lesson improvement and the professional development of teachers.</p>
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<b>Presentation Code</b>	3Na
<b>Title</b>	Implementing Japanese Lesson Study on Filipino Teaching Community: Developing Problem Solving and Mathematical Reasoning Abilities among Grade Five Pupils
<b>Presenter/s</b>	Cristina Agliam
<b>Affiliations</b>	Clementi Town Secondary School (Singapore)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/ Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Collaborative)
<b>Abstract</b>	<p>Teachers in traditional Science classrooms tend to use the lecture format and logical, sequential problem solving as their key instructional methods. These methods often honor only certain learning styles of the learners, while neglecting others. The 4MAT (4 Mode Application Technique), which was developed by Bernice McCarthy in 1987, is an 8-step, sequential instructional model that helps teachers to tap on the unique learning style that each learner brings to the classroom, while helping them to develop in other ways of learning. The 4MAT model is based on Kolb's Experiential Learning model and the concept of brain hemisphericity. The purpose of this study is to examine the influence of the 4MAT teaching model on learner engagement in the Science classroom. A team of Science teachers utilized the 4MAT framework to design two lesson units (one in Biology and another in Chemistry) that appeal to all four types of learners – innovative learners (Type 1), analytic learners (Type 2), common sense learners (Type 3) and dynamic learners (Type 4). The lessons were presented to the learners using both the right and left mode operating techniques, so that all four types of learners can learn using their individual type</p>

	<p>of learning style, and yet have the opportunity to also develop other learning styles. In the research lessons, it was observed that learners were more engaged affectively, behaviorally and cognitively. Results using t-test indicate that students from the project fared better than regular groups in terms of their performance in end-of-unit assessments. Qualitative data collected in the form of written responses from the students in the project validated their positive response to the 4MAT model of teaching. Besides the research findings, the presenters would also be sharing their learning points in the various phases of Lesson Study and the challenges encountered by the research team.</p>
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<b>Presentation Code</b>	3Nb
<b>Title</b>	Learning Studies in Sweden and Tanzania – Similarities and Difference in Objects of Learning and Critical Aspects
<b>Presenter/s</b>	Inger Eriksson and Viveca Lindberg
<b>Affiliations</b>	Jönköping University (Sweden)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Collaborative)
<b>Abstract</b>	<p>Learning studies (LS) and Lesson studies have a common interest regarding development of teaching. Lesson study is basis also for LS, combined with ideas from design experiments (Marton 2014). One of the difference between the two is that in LS pre- and posttests are often used to get an input value of students' knowing, as well as a learning outcome value after a certain intervention is performed. According to Pang and Marton (2003), one of the five steps of a LS is ascertaining students' actual knowing, by an analysis of students' conceptions or a pre-lesson test. Since these tests are emphasised as an essential ingredient in LS, the purpose of this paper is firstly to describe findings from a review of Swedish and Tanzanian LS (theses) in relation to the kinds of tests used and their purposes, and secondly to problematize such tests as method for exploring students learning.</p> <p>Comparative analyses of the information about the pre- and post-tests in relation to the learning object(s) in focus as well as of the purposes or functions of these tests were made in order to find patterns used for categorisation of types of pre and post-tests on the one hand, and functions of these on the other. Initial findings indicate that the pre and post-tests used vary from traditional paper and pen tests to semi/structured interviews, observations and video recorded lessons. Also the purposes for which they are used seem to vary. Furthermore, the language and praxis of testing</p>

	<p>seems to have been adopted in several studies without the necessary basis of test-construction. However, the idea of mapping students' actual knowing as a of departure for specifying the object of learning, and for identifying possible critical aspects for learning and instruction is clearly motivated. While some studies used learning studies in order to measure their effects, others have an interest in changing teaching in order to enhance learning. While the former types of LS need to elaborate the relation between the learning object(s) and the test(s) constructed (validity issues), as well as consider the statistical basis for their analyses, the latter types of LS could benefit from using a language better fit to these kinds of purposes. If the purpose is to become aware of students' various ways of understanding the learning object and thereby the challenges for teaching then the issue is how to explore students' knowing. In these cases LS can give substantial contributions to issues of formative assessment.</p>
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<b>Presentation Code</b>	3Nc
<b>Title</b>	Lesson Studies of CMOs Charter Schools: How CMOs affect Charter Schools' Lesson
<b>Presenter/s</b>	Takaaki Horai
<b>Affiliations</b>	Takada Junior College (Japan)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 10:30-12:00pm (Newman Collaborative)
<b>Abstract</b>	<p>The purpose of this study is Examine the function of the charter school network as a learning community and examine the influence of Charter Management Organizations (CMOs) on lesson plans developed in charter schools. CMOs are non-profit organizations that establish charter schools and operate them. Since this trend is akin to privatization of education, this study discusses the impact of privatizing education by considering the charter school network and the lesson studies of charter schools under CMOs.</p> <p>Although charter schools are public schools, they are not restricted by the many regulations of the state, county, or even district for public entities. Easing the regulation on charter schools has made, CMOs become key players in sharing better educational practices using the charter school network and in providing various resources, such as curriculum development, class instructions, and personnel management, and in improving the learning environment.</p> <p>This study focuses on how CMOs create a charter school network and how the network affects charter school lessons, specifically in use of resources, curriculum design, and teaching methodologies. First, the number of charter schools and the recent data on CMOs are presented to understand their development. Second, the privatization framework and the data on charter schools as well as CMOs are discussed. By conducting a data analysis, the study then examines the process by which CMOs force charter schools to adopt their viewpoints with regard to the autonomous lesson plans developed by the charter schools.</p> <p>The following are the findings from this study.</p> <ol style="list-style-type: none"> <li>1) CMOs help charter schools develop better lesson plans (in mathematics, language, and computer-assisted instructions) and promote professional skills by providing them rich resources. Charter schools run by CMOs are important contributors to training and development, particularly in low economic areas.</li> <li>2) Each charter school operated by CMOs is part of a huge network of such schools. Therefore, these schools are able to share their autonomous lessons or educational experiences with other public schools to improve the quality of education across the state.</li> <li>3) However, there exist hierarchical relations or power structures</li> </ol>

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	<p>between charter schools and CMOs that influence decision making, personnel management, and school operations in their entirety. Charter schools are officially independent; however, their lessons are greatly affected by CMOs' decisions or their network pressures and, consequently, they may have to replace their autonomous lessons to comply with the CMOs' decisions.</p>
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