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

SESSION 4

Presentation Code	4A
Title	Plenary on Deepening Critical Reflections in Lesson Study
Presenter/s	Christine Kim-Eng Lee, Manubo Sato, Lynn Paine, Elaine Munthe
Type of presentation	Plenary Symposium
Strand	Developing Professional Learning Communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Alumni Auditorium)
Abstract	**Chairperson**: Christine Lee National Institute of Education, Nanyang Technological University This plenary seeks to examine what it means to promote deeper and critical reflections among teachers engaged in lesson study. Plenary speakers Lynn Paine from the United States and Manabu Sato from Japan have extensive experience working with schools and teachers not just in their respective countries but also in China and elsewhere. They will explore ways of "creating authentic reflections" among teachers and overcoming "contrived collegiality" and transforming "invisible practice" to "visible practice". **Discussant**: Elaine Munthe, University of Stavanger, Norway **Paper 1**: Reflecting on teacher learning through teachers collaborative learning opportunities: Taking context into account **Speaker**: Lynn Paine, Michigan State University, USA **Abstract:** Lesson study and other forms of related teacher learning activities depend on many things, collaboration and reflection being two key dimensions. This presentation draws on research in China and the US to explore the ways in which context affects forms of collaboration and the kinds of reflection that supports teacher development. Chinese schools and districts have long endorsed group activities that bring teachers together to plan, teach/observe, reflect, and revise lessons (Paine, Fang and Jiang, 2015; Han and Paine, 2010). In the US education system only more recently have sites for such kind of lesson-study work emerged, both in the preservice and in-service experience of teachers (Bieda, Cavanna, and Ji, 2015; Lewis, Perry and Hurd, 2006; Lewis, Perry and Murata, 2006; Fernandez, 2002). Earlier research has raised the problems of "contrived collegiality" (Hargeaves, 2000; Wang and Paine,

	2003). Contexts are powerful influences on the time, structures, norms and resources for collaboration, as well as what kinds of reflection is possible. This paper looks across types of contexts—national, cultural/micro-political, and preservice/inservice—to examine the challenges of creating authentic reflection, rather than reflection for the purposes of performance, and consider the ways it can deepen teachers' learning to support student learning. **Paper 2**: Circular Staircases of "Design–Practice–Reflection" in the Lesson Study of School as Learning Community **Speaker**: Manabu Sato, Gakushuin University & University of Tokyo, Japan The lesson study of "school as learning community" which has made an impact to reform schools within Japan and other Asian countries is composed of three circular staircases of "design-practice-reflection" of experiences of learning and teaching. Through this process, the lesson study provides enhanced lenses which enable teachers to transform "invisible practice" to "visible practice" and opens an avenue through which teachers can transform themselves from "impossible professional" to "possible professional". Learning for both students and teachers is least useful when it is hidden and private while it is most powerful if it becomes public, dialogic and communal. Therefore, the focus of LS in SLC is not teaching but learning and not planning and evaluation of teaching but the design and reflection of learning. The main purpose of LS in SLC is to build a thoughtful and reflective learning community both within classrooms and staffroom. When the work of communities of professional practice is created, individual experience becomes communal, and distributed expertise in practice, mission and responsibility can be shared, and practical wisdom can be developed. Design, practice, and reflection are all captured with uncertainty, the very feature of which is the main locus where professional learning community is originated.

Presentation Code	4B
Title	Enhancing Chinese Students' English Competence through Lesson Study –Based on a Competence Framework
Presenter/s	Qiang Wang, Shaoqian Luo, Zehang Chen, Xin Ma, Xiaofang Qian and Xiaohui Sun
Affiliations	Beijing Normal University (China)
Type of presentation	Symposium
Strand	Lesson study in different cultural, subject and learning contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Red)
Abstract	Enhancing Chinese Students' English Competence through Lesson Study –Based on a Competence Framework WANG Qiang (Chairperson) How to improve the quality of English education in schools has been a primary concern in China. In the past 15 years, much effort has been made to improve the quality of teaching along with the 21st century curriculum reform but many classrooms are still found largely teacher-centered with little attention paid to student learning. Based on a newly developed English competence framework focusing on improving students' language performance including linguistic and cognitive domains in English language learning, we introduced this framework to Chinese primary and secondary school English reading classes through lesson studies. The general procedure consists of developing and administering diagnostic tests, test-result analysis, and instructional design to improve weak areas, implementation and post-tests. This symposium reports three stories of three English teachers on how they used the competence framework to improve their students' English reading performance and what have been achieved. The lesson study practices were carried out by school teachers with the support from university researchers. **The organization of the symposium** The symposium consists of five parts, a 15-minute introduction to the research background, including the English competence framework, research design and procedures. This is followed by three 15-minutepresentations on three lesson studies in the form of stories based on various data collected illustrating the changes in teacher's instructional design and students' language performance. Time will also be given to audience interaction. A 15-minute summary along with a discussion of the insights gained from these lesson studies will be offered by the discussant.

	Story 1: From Closed, Controlled to Critical and Creative Thinking *CHEN Zehang, QIAN Xiaofang* This story illustrates how a high school English teacher Ms. Han, with the help of university researchers, transforms her teaching from focusing on students' lower order thinking skills to developing their higher order thinking skills in reading lessons. A narrative and various data sources including different phases of lesson plans, class observations, interviews, tests, teacher's reflections, and project reports were all used. After three rounds of lesson study, Ms. Han's students improved in the identified need-to-improve areas from the pre-test and displayed abilities in critical and creative thinking with more coherent language performance. All these happened after the teacher's realization that the students are able to think critically if they are given the opportunity and inspired to do so. The success story of Ms. Han's class suggests that to substantially develop student's' abilities, teachers must first understand that her ways of teaching may have limited the development of her students thinking. **Story 2: From Isolated Knowledge Pieces to Structured Woven Pictures** *LUO Shaoqian, SUN Xiaohui* This story demonstrates how a high school English teacher, Ms. Lin, helps students develop structured knowledge to aid comprehension of a reading lesson as her students were found weak in this area by the pre-test based on the English competence framework. Data sources were episodes of class observations, interviews, pre-and-post tests, documents, teachers' written reflections, and project reports. The following findings are presented: 1) Students' performance on reading comprehension improved; 2) Students' ability to internalize what they learned improved. All these result are from the teacher's improved ability to weave together isolated knowledge from a text. This story informs us that students' language development in comprehension and production depends on their teacher's ability to organize and restructure the information in the text. **Story 3: From Doing Blank-filling Exercises to Creating Coherent Texts** *MA Xin* This story tells how a high school teacher, Ms. Ding, applied the English competence framework in her reading lesson to improve her students' ability to express themselves in a meaningful and coherent way. The need-to-improve areas were identified from a

	pre-test. Ms. Ding then focused her lesson study on changing her instructions from test-oriented to more meaningful teaching through repeated instructional designs and teaching practice. Data collected includes Ms. Ding's lesson plans, reflections and pre- and post-test results, and episodes of classes at different phases. The following findings are presented: 1) Students' learning interests enhanced; 2) their reading skills improved; and 3) their written English was more coherent. This story shows that teacher change has an impact student learning and students' language performance is closely related to the teachers' teaching methods. **Discussant:** *LUO Shaoqian* **What Have We Learned from the Projects?** The Competence Framework to Improve Students' English Learning is on improving students' language performance including linguistic and cognitive domains in English language learning, it is a framework that aims at not only the language abilities, but also abilities to think critically and creatively. The above three stories are examples of how the Competence Framework benefits both teachers and students in that (1) teachers' allowing students to think will definitely enhance learners' ability to think critically; (2) teacher's ability to organize and restructure text information will boost students' logic and comprehension of the text; (3) teacher change will have an impact on student learning and becoming more coherent language users.

Presentation Code	4Ca
Title	How the Gap between Students' Understanding of Science Concepts and Teachers' Idea has Appeared and been treated in Lesson Study
Presenter/s	Kyoko Ishii
Affiliations	Tamagawa University (Japan)
Type of	Paper presentation

presentation	
Strand	Developing professional learning communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Forum Seminar Room 1)
Abstract	The discrepancies between teachers' intensions for a lesson and learners' experiences have long been a topic for discussion in science education (Driver, 1985; Redish, 2003). Studying the gap is an effective way to improve teaching. However, most teachers cannot recognize the gap while teaching. This study examined how the gap between students' understanding of scientific concepts and teachers' predictions of their understanding comes about in a class. It uses a qualitative approach to examine the researchers' observational notes compared with teachers' lesson plans during 21 research lessons presented at junior and high school levels in Fukui prefecture. For more analysis, four teachers' practices and their reflections are examined in detail. The reflection and the improvement processes of the teachers were investigated, along with their longitudinal collaborative action research reports. The results show that the students' misunderstanding appeared in group work or experiments in 13 out of 21 lessons. In the lesson plan, the teacher said to "make sure of" or "review" the students' understanding of how to approach "today's activity." At beginning of the lessons, the teacher reviewed the general understanding of the topic with the whole class. Several students agreed that they had sufficient knowledge to proceed. But it is difficult to ascertain individual understanding from a whole-class dialogue. At the experiments, the observer noted some students' confusion and misunderstanding. During the group discussion and experiments, students who do not understand can express their confusion; when this happens, teachers often believe that they have taught the material, but the message has not truly arrived for the students. Four teachers said that this experience was a turning point of their teaching in their longitudinal collaborative action research reports. They found a lesson study with colleagues and researchers is important to improve their practices. The gap between students' learning and teachers' ideas exists everywhere. A lesson study is the chance to find a gap between the teacher's plans and students' understanding. To cultivate a professional learning community, all participants must have an equal relationship.

Presentation Code	4Cb
Title	What do Teachers Mean when they say that students understand?: Collective Conceptual Orientations and Teacher Learning in Lesson Study.
Presenter/s	Aki Murata
Affiliations	University of Florida (United States of America)
Type of presentation	Paper presentation
Strand	Developing professional learning communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Forum Seminar Room 1)
Abstract	Research literature supports the effectiveness of teacher professional development that focuses collaborative investigation on student learning (see for example: Birman et al., 2000; Carpenter et al., 1989). With this general approach, teacher communities vary in their purposes and processes, and what actually goes on in each teacher group may be quite unique (Horn & Little, 2010; Savitt, et al., 2012). Each teacher community is nested within a school culture, and each individual teacher in the community also brings his/her orientation to teaching and learning (Opfer & Pedder, 2011). We investigated two lesson study groups' learning processes to unpack the interactional characteristics of the professional learning processes. In this study, we consider individual teacher's learning to be embedded within group learning, framed by lesson study. We asked the following research questions: What are the collective conceptual orientations toward student learning in two lesson study groups? How are the collective orientations maintained in the lesson study meetings? How do different orientations affect their research lessons and opportunities for students to learn? Lesson study groups in two elementary schools in a Southeastern United States district participated in the study. All planning meetings, research lessons, and debriefings were video recorded. All teaching- and learning-related materials were also collected. Meeting data were qualitatively analyzed through multiple stages to identify collective conceptual orientations for both groups. We paid special attention to talk moves when a teacher's talk deviated away from the orientation norms in each group. We then analyzed the research lesson data and teacher background data for how the group orientations were influenced and reflected. The study found that two lesson study groups differed in their conceptualization of student learning: one focused on procedural processes, and another on conceptual development. Both lesson study groups had patterns of talk moves in which teachers maintained their discussions to stay within own orientations. Facilitators played key roles in maintaining the flow of the

	conversation, while other teachers worked actively to stay within the orientation. The research lessons reflected each group's orientation in terms of student learning, and created different learning opportunities. The findings of the study suggest we cannot assume teachers' learning when they engage in collaborative professional development and discuss student learning. Additional support may be necessary to direct their learning in certain directions. Collective conceptual orientations need to be addressed at a school level.

Presentation Code	4Cc
Title	Moments of Conflict or Moments of Learning: Is it Necessary to Create Professional Conflict in Lesson Study Teams to Enable Teacher Learning?
Presenter/s	John Paul Mynott
Affiliations	Central Primary School (United Kingdom)
Type of presentation	Paper presentation
Strand	Developing professional learning communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Forum Seminar Room 1)
Abstract	As part of my doctorate research I have explored the introduction of Lesson Study as a teacher development process, into my urban primary school. In 2013, we established four Lesson Study teams who set out to explore aspects of Mathematics using the Lesson Study process to increase collaboration and reduced isolation between teachers. My research data has shown that outcomes of Lesson Study groups can be variable and this paper explores the reasons for these outcomes. By looking closely at the conversations in the post lesson reviews I have mapped moments of conflict in different Lesson study teams which has led to teacher change/ learning. This paper explores this data to pursue the question: Is it necessary to create professional conflict in Lesson Study teams to enable teacher learning? The Lesson Study process used in my research data collection is based upon Dudley's (2012) and Fernandez & Yoshida's (2004)

	Lesson Study models and follows two Lesson Study team's conversations throughout a full five lesson cycle. The exploration of each team's journey is then reviewed using a framework based on Achinstein's (2002) writings on conflict in schools and Festinger's (1957) theory of Cognitive Dissonance. Using this framework, I have analyzed the conversations of two Lesson Study teams – one successful in generating teacher learning and one less successful - and I show through their comparison the differences and similarities that can occur in Lesson Study teams. I reflect on these differences and using these comparisons, I then explore the link between the generation of professional conflict and moments of teacher learning. It is through the comparison of these two Lesson Study teams that I show how important the generation of professional conflict is to teacher learning in Lesson Study. As a Lesson Study team that fails to generate professional conflict is unable to demonstrate the same teacher learning outcomes as the one that does. This then leads to further consideration of the need to prepare teachers in professional conflict before exploring Lesson Study processes with them. So that teachers are facilitated to develop moments of professional conflict that may become moments of teacher learning.

Presentation Code	4Da
Title	Sharing and Jumping Tasks for Enhancing Chemistry Learning at High School
Presenter/s	Sumar Hendayana, Asel Supriatna, Elsa Alpha Edyani, Lia Komalia
Affiliations	Indonesia University of Education (Indonesia)
Type of presentation	Paper presentation
Strand	Creating knowledge in practice; action research and other practice based research approaches
Time/Location	Sunday 4th September 13:00-14:30pm (Forum Seminar Room 2)
Abstract	Tenth grade high school students had difficulties in learning chemistry, such as interpreting chemical reactions into correct chemical equation. They had difficulties in determining the chemical formulas and reaction coefficient. Chemical equation is an essential concept of chemistry. According to Vygotsky, there is Zone of Proximal Development (ZPD), students can achieve potential development level with some assistant and support. We expect that through sharing tasks, slower learning students can get support from others during collaborative learning to overcome their difficulties in learning chemistry. A jumping tasks is a challenge task that goes beyond the curriculum target to promote student active learning. This is a case study of 5 chemistry lessons with different topics (chemical reaction, mass conservation law, law of definite

	proportion, empirical and chemical formula, and electrolyte) for the tenth grade students. Research questions are as follows: (1) what are student obstacles in learning chemistry of those topics? (2) how to design a sharing and jumping task? (3) how do tenth grade students learn? To answer the research questions, a teacher, two teacher educators, and five graduate students collaboratively designed lessons which considering sharing and jumping task. Then, a team teaching of a chemistry teacher of attached high school and a graduate student taught the designed lesson while others observed the lesson followed by post-class discussion to reflect the lesson for feedback to next lessons. Data collection was done through lesson observation, interview with teacher and students, and student assessment. Five lessons of 5 different topics were observed and recorded by video camera and voice recorder for further lesson analysis. We interviewed a chemistry teacher and 5 student teachers of graduate students to obtain information regarding teaching perception. It was found that identified student obstacles included how to write formulae of chemical molecules and to balance the chemical equation. The lesson design included predictions of student response and its anticipation in the introduction session to encourage students to learn, sharing tasks provided students with problems in curriculum content, and jumping tasks provided students with problems beyond curriculum content. Based upon student assessment of essay test, student achievement was improved as indicated by score improvement of 85% students or 30 out of 35 students, from first to fifth lessons. The findings of lesson observation supported the improvement that slower learning students learned from others within the group, so they were motivated to learn.

Presentation Code	4Db
Title	How do We Create Jumping Task to Advance Students' Understanding?
Presenter/s	Kazuo Kobayashi
Affiliations	University of Fukui (Japan)
Type of presentation	Paper presentation
Strand	Creating knowledge in practice; action research and other practice based research approaches
Time/Location	Sunday 4th September 13:00-14:30pm (Forum Seminar Room 2)
Abstract	How do we create jumping tasks to advance students' understanding?" was one of the big questions at The 3rd International Conference of School as Learning Community. Meeting the challenge of answering this question successfully is very important for teachers to improve the quality of their lessons because jumping tasks are essential for facilitating deep learning. But teachers tend to have difficulty in creating and scaffolding authentic jumping tasks, especially in daily lessons. Thus, the objective of this study is advancing concrete practices for discussions in answering this big question based on using the case study approach in Japan.

Presentation Code	4Dc
Title	An Analysis of the Types of Questions in the National Examination and Students' Perception of Test Types Involving Critical Thinking and Reasoning Skills
Presenter/s	Pupung Purnawarman, Nahadi Nahadi and Farida Sarimaya
Affiliations	Universitas Pendidikan (Indonesia)
Type of presentation	Paper presentation
Strand	Creating knowledge in practice; action research and other practice based research approaches
Time/Location	Sunday 4th September 13:00-14:30pm (Forum Seminar Room 2)
Abstract	This paper discusses several issues surrounding the types of questions used in the National Examination for high school students in Indonesia, especially relating to critical thinking and reasoning.

	Test questions in the recent National Examination were analyzed and were compared to similar questions developed by PISA and TIMSS as the benchmarks. Document analysis techniques were used and rubrics were developed to analyze questions in the National Examination. Questions analyzed in this study covered the questions from a recent National Examination on three subjects tested in the exam, namely English, Sociology, and Chemistry. These subjects were chosen as they represent the three majors in Indonesian high schools (Language, Social Sciences, and Natural Sciences). Test items of each subject were analyzed to determine the extent of the application of the principles in relation to students' critical thinking, reasoning, and habits of mind. In addition, test prototypes were developed by applying the critical thinking and reasoning aspects and were tried out in some schools which implemented Lesson Study program. Schools implementing Lesson Study program were chosen as in West Java province Lesson Study activities help teachers emphasize student-centered learning activities that promote critical thinking and reasoning in the Plan-Do-See phases of lesson study. To check students' perception of the test prototypes, a set of questionnaires were distributed to the students in participating schools. Results of the study indicate that more than half of the test questions in the National Examination apply the principles of critical thinking and reasoning aspects. Additional findings indicate that students in the school implementing Lesson Study program prefer the types of questions that involve higher order thinking and reasoning skills. Implications of study findings to future teaching practice are that teachers should increase the proportion of critical thinking and reasoning aspects in teaching-learning activities and facilitate students to get accustomed to test questions involving critical thinking and reasoning skills.

Presentation Code	4E
Title	Lesson Study - Engaging, Embedding and Expanding
Presenter/s	Alan Eathorne
Affiliations	Meadowdale Primary School (United Kingdom)
Type of presentation	Workshop
Strand	Leadership, management and policy aspects of lesson study

Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk Room 2: 1.4-1.6)
Abstract	With the recent trend in schools towards the use of Evidence Based Teaching (EBT) as a method of developing schools and its use as a vehicle to creating the self-sustaining school model, Affinity Teaching School Alliance wanted to ascertain how many schools were engaging in EBT. In particular this project aimed to find out how and why some schools had begun using EBT and why some schools were not actively engaged. The project found that there were a number of real and perceived barriers that were stopping schools becoming engaged in EBT approaches such as Lesson Study. By analyzing findings from an initial audit, and by using the experience of schools who were actively using Lesson Study, the Teaching School Alliance was able to create a 'Getting Started in Lesson Study' program that supported schools to get through the barriers and begin to use Lesson Study within their school as a tool for school development. Through interpretivist approaches, this study was able to show that as well as schools becoming engaged with Lesson Study these approaches were also becoming the basis of culture change within the school. This enquiry is part of Manchester Metropolitan University's 'Evidence Based Teaching: advancing capability and capacity for enquiry in schools' project for the National College for Teaching and Leadership. This workshop aims to encourage individuals to reflect on and discuss possible strategies for expanding the use of Lesson Study across a Multi Academy Trust, Teaching School or group of schools. The workshop will draw upon the experiences we have had in our teaching school in engaging a group of schools who were, up until that point, not using Lesson Study. It will allow time for colleagues to reflect on their group of schools and consider why some may not be engaged and plan for what they could do to aid this. We will discuss the possible barriers to schools using Lesson Study and possible solutions we have observed and how to build a research and sharing culture between schools. There will be - Small group sharing of ideas (mind mapping) considering possible barriers and solutions to them before feeding these into a whole group mind mapping activity. - Working from participants' questions or issued raised - Individual action planning activity (to take back to context considering 'How might I get other schools involved in using Lesson Study?)

Presentation Code	4Fa
Title	Case Study of a Learning Study Project
Presenter/s	Sau Mei Chan and Farah Hasinah Binte Abdul Wahab
Affiliations	Northland Primary School (Singapore)
Type of presentation	Paper presentation
Strand	Learning studies
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Purple)
Abstract	A Learning Study, as opposed to a Lesson Study, always adopts the 'object of learning' as the starting point of a research question (Cheng & Lo, 2013). Its systematic method of inquiry invariably follows the sequence of planning, implementation and evaluation of the research question. Collaborative in nature, it presents teachers with an authentic learning experience to jointly construct pedagogical knowledge with the aim of enhancing effectiveness in student learning. Furthermore, Learning Study seeks to incorporate the Variation Theory and embed formative assessment strategies in the design of a lesson to bring the object of learning into focus. Variation Theory posits that learning is dependent on discernment, and discernment is, in turn, a function of variation. Specifically, the Variation Theory asserts that differences in students' prior knowledge, and teachers' management of the object of learning, as well as the use of different patterns of variation in the giving of examples, can have a significant bearing on students' learning. According to Marton (2009), a learner cannot fully understand a feature of an aspect without experiencing a systematic variation in the feature of that aspect. The application of Variation Theory, coupled with the use of formative assessment strategies, can considerably sharpen the focus of a lesson and better enable teachers to discern students' learning on the spot. The presentation will illustrate a case study which traces the learning journey of a group of primary school teachers who embarked on a learning study project to teach a Primary 5 (11-year-old) class the skill of inferencing. The learning of inference skills is by far one of the major stumbling blocks for many readers, and this seriously hampers their understanding when reading. This presentation will demonstrate how the group of teachers determined the point of hindrance to making correct inferences in the learning study project using results from a pre-test. In addition, the presentation will illustrate in detail how Variation Theory and the use of formative assessment strategies were woven into the lesson design so as to effectively address the students' learning

	needs in the skill of making inferences. The presentation will also demonstrate how effectively the students acquired the skill of inferencing by presenting the findings of the post-test. In addition, the presentation aims to capture the major learning points by this group of teachers whose collaboration not only enabled them to develop professionally, but also served to enhance their students' learning.

Presentation Code	4Fb
Title	Snip, Snap, Snout: Is This Tale Really Told Out?
Presenter/s	Ann-Christin Mouantri, Annika Nordahl, Johanna Adellian and Johanna Jonegård
Affiliations	Sjöstadsskolan School (Sweden)
Type of presentation	Paper presentation
Strand	Learning studies
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Purple)
Abstract	We are currently conducting a Learning study in the subject Swedish, in year 7 at Sjöstadsskolan. The title of the study is Snip, snap, snout – is this tale told out? The Pisa-results of Swedish pupils in the subject Swedish has deteriorated continuously over the years. The results at Sjöstadsskolan are relatively good, but we see a discrepancy between our pupils reading comprehension and their ability to write. When analyzing texts, written by pupils, we have found that pupils in all ages have difficulties writing narrative readable texts, including beginning, content and ending. A pre-test, resembling the Swedish national tests, was conducted in year 7. The test indicated that a relatively large amount of the pupils had difficulties writing an adequate ending to a narrative text. We therefore formulated two main questions: What is critical to be able to write a narrative text with a functional ending? How can teaching be designed in relation to this? The aim of the study is to improve the pupils´ ability in writing functional and interesting endings to narrative texts and also to explore how teaching can make it possible for pupils to develop this ability. The theoretical framework of the study is variation theory. The study is currently indicating that the pupils' ability in writing functional endings in texts, are improving.

Presentation Code	4Fc
Title	How to Make It Look Real, Art-Work, Grade 1
Presenter/s	Gunilla Pettersson Berggren and Elisabet Sand
Affiliations	Sjöstadsskolan School (Sweden)
Type of presentation	Paper presentation
Strand	Learning studies
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Purple)
Abstract	This paper presents a learning study on primary school art work at Sjöstadsskolan, Stockholm, Sweden. Sjöstadsskolan has used the learning study model as a teacher driven way of developing teaching and learning, since 2009. A group of art teachers and a mentor collaborated to identify the critical aspects in teaching the topic depicting three-dimensional objects, for instance a pot or a jar. The Swedish curriculum states as a core content: Tools for producing pictures: Different elements that make up a picture: color, form, line, surface, foreground and background. From the pre-test it was found that the student´s ability to create pictures of a jar full of pencils varied a lot. Some students lacked tools of how to depict the roundness, some used tricks from comic books or films and some asked for guidance in ”making it look like real”. The object of learning was expressed as: The ability to depict a three-dimensional object standing on a flat surface. The first lesson in the learning study cycle was based upon a still life, where the teacher tried to point out the lines, the shadows, the colors, the form and foreground and back-ground. Far too many aspects were addressed and the revised lesson number two focused more on the surface and the foreground. The third lesson showed major improvements in the post-test results, due to cutting down on the aspects shown and varied. According to variation theory the critical aspects should be varied in a powerful way in order for students to discern. The most important critical aspect was seen as: How the object meets the surface. When the students perceived the difference between a three-dimensional object and a two-dimensional one, they could clearly see the difference how they met the surface. When the students were able to discern the curved line from the pot meeting the table, they could more easily focus on that part of their drawing. This study is an example of the importance to work with younger students´ ability to depict and not take for granted that students would develop capability on their own. Another conclusion from this study is that teachers can improve teaching and student learning by structured collaborative work.

Presentation Code	4Ga
Title	How to Evaluate the Effectiveness of Teaching Methods? A Fundamental Issue for Pre-Service Teachers Forming Lesson Study Teams
Presenter/s	Sveva Grigioni Baur and Shannon Morago
Affiliations	Haute Ecole Pédagogique (Switzerland)
Type of presentation	Paper presentation
Strand	Impact of lesson study on student learning
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk room 3: 2.1-2.3)
Abstract	"How evaluate the effectiveness of teaching methods? A fundamental issue for pre-service teachers forming Lesson Study teams" The international collaboration between the University of Teacher Education, State of Vaud (HEP) and Humboldt State University (HSU) is in its fifth year of production. Two professors, one from each institution involved in the project, have formed every academic year a Lesson Study team consist of 6 pre-service teachers. Each team is coached by both faculty members. The Lesson Study team develop a natural science lesson with two guidelines: 1) the lesson must especially engage marginalized or foreign language learners and 2) it must be place-based and culturally linked to the population of pupils. The students enact the lessons a total of six times. During the Lesson Study, students learn how to use this collaborative process in order to improve the relevance of their lesson through the monitoring of pupils reactions and feedbacks. As they modify their lesson plan on collecting data and making observations during the lesson, they have to build a precise schedule. The construction and gradual modification of the observation grid is an important collaboration skill that evolves all along the Lesson Study process. The two faculty members carry out a research work on a common interest related to Lesson Study and to the role of natural science teaching on the integration of diverse learners and to the evolution of students' intercultural and professional skills that are modified by this collaboration. The aim of this oral presentation is to point out the main features of the evolution of pupil observation schedules, which represent a significant progression of student professional skills. The grids are compared and their effectiveness is discussed. Students who participate to this international collaboration are interviewed on their experience and on the professional benefits they have notices on their practices. All the results collected by the faculty members are put in perspective for the assumption of significant teaching

	professional benefits.

Presentation Code	4Gb
Title	The Impact of Lesson Study on Students Learning Activities at the University of Cokroaminoto Palopo
Presenter/s	Rusdiana Junaid, Rustan Santaria, Hafirah Patang and Magfirah Thayyib
Affiliations	The University of Cokroaminoto Palopo (Indonesia)
Type of presentation	Paper presentation
Strand	Impact of lesson study on student learning
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk room 3: 2.1-2.3)
Abstract	Lesson Study has been implemented at the University of Cokroaminoto Palopo (UNCP), South Sulawesi, Indonesia since 2013. The focus has been in two faculties, namely the Faculty of Teacher Training and Education, which involved four study programs and the Faculty of Science, which involved two study programs. Since the implementation of the *lesson study* at this university, considerable research have been undertaken by the role model lecturers, such as the improvement of lecturers' collegiality, the implementation of certain teaching models, methods, and strategies through *lesson study* activities, and the change of the lecturers' mindset. However, none has looked at the impact of *lesson study* on the students learning activities. Therefore, this paper aims at giving an overview of the impact of *lesson study* on the students learning activities at the University of Cokroaminoto Palopo. It highlights some of the main differences in the students learning activities across several subjects both before and after *lesson study* was implemented. The focus of the inquiry is "*What are the effects of lesson study on the students learning activities*?" This study involved 16 role model lecturers from 6 different study programs. Data were collected through an open-ended questionnaire, observers' field notes, and an observation checklist. The open-ended questionnaire was distributed to the 16 role model lecturers. The observation checklist was focused on activities and interaction between the role model lecturers and the students in the *open class* sessions. Data collected were analyzed quantitatively and qualitatively. The results of the data analysis shows that there are at least six major impacts of *lesson study* on students learning activities. They are: 1) increasing the students' collaborative engagements, 2) promoting the students' learning autonomy or creating self-regulated learners, 3) improving the students' critical thinking, 4) stimulating mutual respect among the students, 5) developing the students' creativity, and 6) Elevating the students' self-confidence.

Presentation Code	4Ha
Title	Lesson Study and Pupil Voice: Creating the Space for Empowerment
Presenter/s	David Allan, Ella O'Doherty, Paul Smalley and David Boorman
Affiliations	Edge Hill University (United Kingdom)
Type of presentation	Paper presentation
Strand	Impact of lesson study on student learning
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Green)
Abstract	This paper looks at the use of lesson study in primary schools in England as a powerful tool for changing teachers' perceptions and for empowering children in their learning. It draws on a Bourdieusian framework to illustrate the capacity for lesson study to challenge existing school inequities that can arise from an imbalance of cultural, and often social, capital. It is argued that the combination of an intense focus on two/three case pupils and a post-lesson discussion involving those pupils provides a critical space for disaffected children to challenge the current hegemonic capital of others. The research draws on data collected in the north-west of England through 28 interviews with teachers and observation of ten post-lesson discussions. Bourdieu's concept of capital is used to analyze teachers' perceptions of pupil hegemony and to frame lesson study as a potential vehicle for generating equality in the classroom. Thus, lesson study is seen to promote a dialogic space for critical thinking in order to facilitate a growth in children's self-esteem. As such, previously disengaged children are empowered to contribute to the teaching and learning process.

Presentation Code	4Hb
Title	Impact of a Lesson Study Project on Teachers' Professional Development and Pupils' Learning
Presenter/s	Julien Buchard and Daniel Martin
Affiliations	Haute Ecole Pédagogique Vaud (Switzerland)
Type of presentation	Paper presentation
Strand	Impact of lesson study on student learning
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Green)
Abstract	The aim of this paper is to build a theoretical framework through a literature review to evaluate lesson studies embedded in the scholastic context of Lausanne, French-speaking Switzerland. Firstly, we provide an overview of the methods used worldwide to measure the effects of Lesson Study on teachers and pupils. In order to do this, we did a comprehensive literature review and conducted semi-direct interviews with members of the Lausanne Laboratory Lesson Study (3LS) at the University of Teacher Education, Lausanne. Our respondents evoked some reasons to explain the limited number of well-controlled evaluation procedures in Lesson Studies forwarded by Cheung & Yee Wong (2014). Secondly, we briefly define the goals of Lesson Study. Thirdly, we introduce theoretical models (especially based on the works of John Hattie and Helen Timperley) to provide food for thought on the most effective ways to measure the impact of Lesson Study on teachers and pupils. One of the key elements taken into consideration was effectiveness of teaching. This is related to the quality of feedback, curriculum alignment and metacognition. In addition, the quality of learning was also identified as an important element as it tests pupils' knowledge and learning processes. The link between teaching including teacher preparation through the lesson study project meetings and learning was also explored. Lastly, we suggest ways of storing and analyzing lesson study data notably project meeting recordings, research lessons as well as pre- and post-interviews during the experiment, lesson plans, surveys as well as pupils' productions and teaching aids. We do this in order to keep track of the effects of the process and short-term, mid-term and long term measures.

Presentation Code	4Hc
Title	Teacher Collaboration through Lesson Study to Improve the Understanding of Student Learning
Presenter/s	Wullan Novianasari
Affiliations	GagasCeria Primary School (Indonesia)
Type of presentation	Paper presentation
Strand	Impact of lesson study on student learning
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Green)
Abstract	Mathematics teachers in GagasCeria Primary School at one point feel they have problems in teaching mathematics to children. At that time, each math teacher only teach one level. Although the school's curriculum has been created as a spiral, the teacher felt there were concept development that feels jumping between the levels. This happen because strong understanding of the material only at the level the teacher teaches. The school encourage teachers to master material before and after level where he/she teach to help the learning process more effective. Lesson Study is one of the ways chosen to seek a solution of the problems experienced because it can facilitate discussion between cross-level teachers. Together as a team, mathematics teacher carry out a series of lesson study. Every teacher in the team conducted an open class once in 6 months. Teams work together to plan a lessons. One of the concepts discussed is the geometry (two-dimensional figure). In teaching geometry, one of the targets of learning mathematics in national exams for primary school are the students able to calculate the area and perimeter of a combined two-dimensional figure. Initially the students have difficulties to identify basic shapes that form a combined figure, making it difficult to calculate the area and perimeter. The team trying to find its core, the concept of which is related in a previous class. Later it was found that in the previous class they have to play a lot of forms and identify basic shapes (square, rectangle, triangle, circle, half and quarter circle), recognize the concept of area and perimeter. From these findings, the team determines the learning objectives to be achieved in each grade. Through this better stages of learning, students have more understanding about the concepts and more easily complete the final test in grade 6 (national exams). With the collaboration, each member of the team can solve problems that arise. The cross-level discussion helps teachers to understand materials other than the material she/he teach in her/his level. In addition, the collaboration also develop team members to better understand the curriculum, studying material, and learning strategies. It also has an impact on the achievement of children in learning.

Presentation Code	4I
Title	What Is to be Learned and How to Design for Learning? Experiences from Three Learning Studies.
Presenter/s	Ulla Runesson, Keith Wood Jenny Svantesson Wester Helene Bergentoft and Clare Lindström
Affiliations	Jönköping University (Sweden)
Type of presentation	Symposium
Strand	Creating knowledge in practice; action research and other practice based research approaches.
Time/Location	Sunday 4th September 13:00-14:30pm (Queen's Lecture Theatre 2)
Abstract	Learning study is a form of theory informed action research. Results from three Learning studies — English as a foreign language, Physical education and Mathematics — will be used to illustrate how Learning study, by focusing on the object of learning and guided by variation theory, can give insights into critical aspects of learning and how lessons could be designed to make learning possible. **Two Tenses are Better than One - Using Contrast and Complexity to Develop Grammatical Understanding** (*Clare Lindström, Jönköping University, Sweden)* When teaching new subject content, common pedagogical procedures include separating and presenting content 'one thing at a time', and also using simplified explanations and examples. Using results from a Learning Study (LrS) on English grammar with Swedish 6th grade pupils, the aim of this paper is to critically reflect on these teaching conventions and to discuss how they were challenged in the LrS. The object of learning in this LrS was the ability to use the English progressive aspect (PROG) in a syntactically and semantically accurate way. The PROG was first presented in the present tense, which is seen as the 'simplest' tense. This is an established way of teaching the PROG and is found in many teaching handbooks. However, the results indicate that using only the present tense prevented the pupils from discerning the full meaning of the PROG. When the past tense was included and also presented first, pupils achieved a deeper understanding, as suggested on post-lesson assessments and by the quality of pupil discussions during the lessons. The pupils also responded favorably when confronted with examples of grammatically incorrect sentences, challenging the teaching convention that discourages showing incorrect examples.

	Better Running. What must be Learned? *(Helene Bergentoft, University of Gothenburg, Sweden)* Teaching of physical education in upper secondary school is aimed at students developing their ability to move, though is it unclear what the ability to move can imply (Nyberg & Larsson 2014). In teaching, the development of movement or the ability to move is, to a limited extent, the object of learning. Neither is it driven by a pedagogical idea, it is rather the activity that is at the centre of the lesson (Eriksson et al., 2005). A Learning study with 94 students were conducted at two upper secondary schools in Sweden. Together with seven teachers teaching physical education and health, five lessons have been implemented based on the framework of the variation theory. A phenomenographic analysis has been made of the running test that constituted the study's pre- and post-test. Clear differences could be discerned in the following areas: 1) the placement of body part in relation to one another, 2) the direction of kinetic energy and 3) the centre of gravity. The result of the analysis describes five qualitatively different way to know or experience body posture whilst running, as a) rotating torso, b) active arm oscillation and relaxed shoulders, c) heel insertion, d) sitting, and e) as a tilted tower. A running movement consists of many different aspects. The results show that some of these aspects seem especially important to discern to develop a powerful personal body posture whilst running. These critical aspects, needs to be discerned simultaneously. **The Two-Way Communication during Teaching – Crucial for Discernment of Critical Aspects.** (*Jenny Svanteson Wester, Fenestra Centrum, University of Gothenburg, Sweden)* To help students to learn effectively, the teachers should, according to the variation theory, identify the critical aspects that the students must discern in order to learn and see an object of learning in the intended way. The aspects that are critical for the students' learning are the ones that they are not yet aware of. In the Learning study with the variation theory as the framework, the interactive nature of the classroom turned out be crucial for the students' learning outcome. In the third cycle the teacher encouraged the students to communicate about the content and by doing so the teacher and the students were given an opportunity to jointly enact patterns of variation where students' misconceptions, or way of looking at the content, could be, not only visualized, but also problematized and the critical aspects could explicitly be discerned. The students also got the opportunity to more explicitly express what they had discerned and they were able to justify their

	answers more distinctly. In this presentation I will illuminate how critical aspects is articulating through the interaction during teaching in the learning study.

Presentation Code	4J
Title	Lesson Study - Strengthening Lessons through Teacher Collaboration with a Focus on Different Educational Needs of Pupils
Presenter/s	Sui Lin Goei, Brahm Norwich, Tijmen Schipper, Tirza Bosma and Madeline Vreeburg
Affiliations	VU University Amsterdam (The Netherlands) The University of Exeter (United Kingdom)
Type of presentation	Symposium
Strand	Special needs and inclusive education
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Blue)
Abstract	The studies in this symposium are focused on professional learning of teachers in secondary education through Lesson Study (LS). Central research question is: To what extent teachers focus on different educational needs of pupils in classroom situations when participating in a LS?. In LS classroom observations and team discussions are used to focus on pupil learning. The studies in this symposium borrowed from the UK model where 'case pupils' are used (Dudley, 2013) who represent different ability groups in the classroom. Structure of the symposium **Paper 1**: Lesson Study – Learning adaptive teaching through teacher collaboration *Tijmen Schipper* (Windesheim University of Applied Sciences), *Sui Lin Goei* (VU University Amsterdam) *Siebrich de Vries* (Groningen University) & *Klaas van Veen* (Groningen University) (The Netherlands). This study examines to what extent Lesson Study enhances adaptive teaching competence in mainstream secondary education. The concept of adaptive teaching competence can be defined as "the ability of teachers to adjust their planning and teaching to the individual learning processes of students" (Brühwiler & Blatchford, 2011, p. 98). Since classrooms have become more diverse, adaptive

	teaching seems inevitable, yet turns out to be complex. Lesson Study may well address this issue due to its explicit focus on pupil learning. The main research question in this study is: to what extent does LS enhance teacher professional growth in terms of adaptive teaching competence, and which elements in LS facilitate or constrain this process? After the completion of Lesson Study cycles, 22 teachers from different schools were interviewed. The interviews were analyzed using the Interconnected Model of Professional Growth (Clarke & Hollingsworth, 2002). The results show that teachers become more aware of pupils' educational needs, but facilitating conditions seem to be essential in addressing these needs. **Paper 2:** Lesson Study – Learning to differentiate through teacher collaboration (*Tirza Bosma & Sui Lin Goei, VU University Amsterdam, the Netherlands).* The second study aims to explore how six Dutch Language teachers design innovative lessons for differentiated instruction in an inclusive setting in the Netherlands, using Lesson Study as their collaborative vehicle. At present, the educational (support) needs of our pupils have changed, both because of our changing society and as a result of the call for inclusive education, which urges teachers to increasingly adapt their instruction to the needs of all pupils. However, teachers in secondary education in the Netherlands as yet do not typically incorporate differentiated instruction in their lessons. We provide a case study based on discourse analysis of the recorded meetings of Dutch Language teachers participating in a modified Lesson Study approach (Goei, 2013), as implemented in a preparatory vocational secondary school in the northwestern part of the Netherlands. Discourse analysis was framed regarding elements of differentiated instruction according to Tomlinson et al. (2003). The results demonstrated a development through Lesson Study in teachers' consciousness of pupils' learning needs and how these needs could be met. The contribution of Lesson Study to the process of collaboratively designing differentiated instruction is described and ideas for further research are suggested. **Paper 3:** Lesson Study – Learning from Pupils' Perspectives through Teacher Collaboration (*Madeleine Vreeburg & Sui Lin Goei (VU University Amsterdam, the Netherlands).* Lesson Study research typically focuses on the learning activities and processes of the pupils. However, the interest and opinions of the pupils are often not included or involved. This study focuses on the feedback from (case) pupils on their perspective of the

	delivered research lessons and their ideas for subsequent teaching. Case-pupils' feedback was systematically elicited by their teachers involved in a Lesson Study through small semi-structured interviews held immediately after the delivered research lesson (Dudley, 2013). The rest of the pupils was asked to fill in a short survey containing the same questions. The questions were derived from NCSL (2005) and were translated into Dutch. Case-pupil interviews and classroom surveys were gathered through teachers participating in nine LS teams from 2013-15, six LS teams from 2014-15, and from five LS teams from 2015-16. Results show that pupils report they value to be an active partner in the learning process, they appreciate an explicit instruction, preferably combined with active and structured learning. Also their suggestions to improve the delivered lesson are quite explicit and exact. Teachers involved report that the formative information they elicit from the pupils contributes to redesigning the next lesson.

Presentation Code	4Ka
Title	Literacy Practices in Teacher Professional Development: A Shift to Learners' Independent and Collaborative Learning in South African Primary Schools
Presenter/s	Noel Manganye
Affiliations	University of Limpopo (South Africa)
Type of presentation	Paper presentation
Strand	Developing professional learning communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk Room 1: 1.1-1.3)
Abstract	The purpose of this paper is to present literacy practices in teacher professional development, a shift from teachers' lesson presentation method to learners' independent and collaborative learning in South African primary schools. The study used observation and interview methods to collect data from teachers and learners in South African classrooms. The findings show that independent and collaborative learning are more effective in learners understanding of complex lessons in English Second Language context. Therefore, teachers need to move from the traditional way of teaching in which they would provide notes, use presentation method and other front of the classroom practices to sitting down with learners to facilitate their independent and collaborative learning. The implication is that South African teacher training institutions should design programs for in-service teachers

	which will enable teachers to understand their role and instructional responsibilities. However, this study is important since it highlights pertinent issues on teacher professional development literacy in disadvantaged basic education primary schools in South Africa.

Presentation Code	4Kb
Title	Standardisation of SBQ Marking Conventions for More Effective Learning
Presenter/s	Helen Hiang Huang Tan and Yuslina Mohamed Salleh
Affiliations	Coral Secondary School (Singapore)
Type of presentation	Paper presentation
Strand	Developing professional learning communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk Room 1: 1.1-1.3)
Abstract	In teaching Source-based Questions (SBQ) skills for Social Studies and History, teacher's feedback on students' written work would impact their learning. As teachers did not have a common set of marking symbols, feedback was often unclear to students. Secondly, it has been observed that students remained passive in receiving feedback. This Lesson Study (LS) seeks to explore how the standardization of marking symbols can provide more effective feedback to students. Through the symbols, students develop the ability to do self-correction as they can better understand the requirements of the various skills. Thus, they also become active receivers of feedback. Research has shown that teachers' feedback following assessment is important in students' learning and "feedback should be used in which students benefit from it and they are encouraged to take more responsibility for their learning". Thus, "embedding grading as a part of a student's learning experience can have benefits that go beyond learning specific subject-matter content". Students will eventually become "more aware of their own strengths, progress, and gaps". The LS was carried out on two mixed-gender classes of Secondary One History (13 years-old) and Secondary Three Social Studies (15 years-old). It entailed the collaboration among teachers in using the marking symbols for assessing SBQ exercises over four weeks. Teachers explained the marking symbols to students when their works were returned to them. Subsequently, students marked their own works during which, teachers observed the process and data was collected and analyzed. From sample works marked by teachers and students, teachers' observations and a survey carried out at the end of the LS cycle, the perception data showed that majority of students and teachers found the self-assessment tool useful as students found a way to internalize the requirements of answering SBQ. Teachers find their teaching more effective as students become engaged and responsible in improving the quality of their assignments.

Presentation Code	4L
Title	Dutch Lesson Study-Examples Of Mathematics Teacher Learning in a Professional Learning Community
Presenter/s	Nellie Verhoef Verhoef, Stéphane Clivaz Mark Timmer and Tom Coenen
Affiliations	University of Twente (The Netherlands), Lausanne University of Teacher Education, Switzerland
Type of presentation	Symposium
Strand	Developing professional learning communities: models and practices
Time/Location	Sunday 4th September 13:00-14:30pm (Queen's Lecture Theatre 1)
Abstract	This symposium presents the effects of Lesson Study on Dutch mathematics teacher learning in a Professional Learning Community. Six mathematics secondary school teachers from different schools collaborated since 2009. Each teacher was given an eight hour weekly reduction in teaching load from their management to participate. Next to the teachers, the Lesson Study team consisted of four staff members of the University of Twente: a mathematician, a mathematics teacher trainer, a PhD-candidate and the researcher (the leader, chair of the symposium). All staff members had specific roles in the Lesson Study team. Teacher instruction was directly connected to students' understanding of mathematical concepts in secondary school (Skemp, 1976). Student understanding suggests subtle processes that occur in learning in which operations over time become thinkable concepts that exist outside a particular time (Tall, 2013). This symposium reveals teacher learning on three different mathematics topics: the derivative in analysis; the transition from the trigonometric relationships; and combinatorial reasoning. **Paper 1:**The Introduction of the Derivative: The Use of Icons *(Nellie Verhoef)* The Lesson Study team investigated Tall's (2013) philosophy of long-term mathematical thinking in relation with Bruner's (1966) framework of representations in the context of the derivative. The research instruments consisted of three lesson plans, field notes of student observations and written reports of the discussions at the teachers' school, and the plenary reflections at the university (Lewis & Hurd, 2011). The study shows that the well-thought-off choice of an icon influences operational symbolism positively when the icon was simple chosen (without any extra information) (Verhoef, Coenders, van Smaalen, Pieters, & Tall, 2014). The choice of an icon, a dove tail at the graph, seems to hide a line segment inside

	from the top to the bottom of the arrow, which may give rise to the idea that the concept of the derivative is inseparable from a difference quotient. Subsequently, the difference quotient gives rise to the differential quotient with which dividing by zero appears as an obstacle. The arrow as a line segment and a v-sign on top may give rise to the assumption that there is a continuous move, because the direction is given and it resembles a vector used in physics. The line segment with halfway a dot is the first step to the relational understanding of the concept of a vector field as a basis for understanding differential equations in a later phase (Figure 1). Figure 1: Different representations of arrows **Paper 2:**The Transition from the Trigonometric Relationships *(Mark Timmer)* The Lesson Study team developed the transition from triangle trigonometry to circle trigonometry using static as well as dynamical icons (Chin & Tall, 2012). The research instruments consisted of teachers' lesson plans and video-tapes of (a) the enactment of the research lessons, (b) the post-lesson discussions at school and (c) the reflection meetings at the university. Two teachers used a windmill as an icon. The windmill elicited the use of symmetry and coordinates and helped students to reason about trigonometric characteristics. The use of computer applets stimulated the insight of the (co)sine as a function in calculus (Zengin, Furkan, & Kutluca, 2012). In this study we used lesson study to introduce daily classroom practices in learning communities whereby teachers learn from the students' understanding (Verhoef & Tall, 2011). The results show that the teachers are more able, step by step, to understand how the students learn (Verhoef & Timmer, 2013). This study shows (agreeing with Chin and Tall (2012)) that in the case of trigonometric relationships involving ratios in right-angled triangles to functional representations of trigonometric functions appropriate for the calculus, teachers need to reflect on classroom activities to become sensitive to the issues that will arise in their classrooms (Cheung & Wong, 2014). **Paper 3** *(Tom Coenen)* Research outcomes on combinatorial reasoning showed the various difficulties and pitfalls that students experienced (Batanero, 1997; Eizenberg, 2004; Hadar & Hadass, 1981; Lockwood, 2011). From this, a teaching method was designed on the topic of combinatorial reasoning problems, starting from thirteen problems as discussed in Batanero (1997). The teachers were asked to fill out a small exit questionnaire regarding their learning process. As much as possible, members of the Lesson Study team observed one case-student

	(Dudley, 2012) and the dynamics of the group as a whole. The field notes of the live observations functioned to stimulate the discussion after the lesson at the school directly. Especially for combinatorial reasoning problems, teachers discovered that coaching students to use their common sense and to build up their confidence can be more valuable for them than theoretical insight. However, for the chosen topic, acting out a problem proved to provide more insight than the use of pictures (Coenen, Hof, & Verhoef, 2015).

Presentation Code	4Ma
Title	Developing Kazakhstani School Culture with Lesson Study
Presenter/s	Zukhra Idrisheva and Kyzzhibek Abdramanova
Affiliations	Center of Excellence (Kazakhstan)
Type of presentation	Paper presentation
Strand	Lesson study in different cultural, subject and learning contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk Room 4: 2.4-2.6)
Abstract	The joint University of Cambridge and Center of Excellence AEO Nazarbayev Intellectual Schools in-service teacher training programme was introduced in January 2012. Within the programme Lesson Study was conceptualized as one of the drivers for transforming teaching practice. Along with other potentials, Center of Excellence trainers believe that Lesson study provides an opportunity for teacher reflection, critical friendship, sharing good practice and collaboration. Therefore, the aim of this paper is to evaluate the implementation of Lesson Study in Kazakhstani schools, particularly its influence on school culture improvement. Identifying how lesson study develops school culture in Kazakhstani context, the presentation will also reveal challenges within this process. AEO “Nazarbayev Intellectual Schools” and the administration (mayor) of Kyzylorda region according to the joint memorandum approved 22 innovative schools, which are implementing and distributing new ideas of the changes in the educational system. In February 2016, the regional Department of Education and the Center of Excellence in Kyzylorda attached to these schools “magnetic schools”, to improve the professional network was established "Competence Center". Among coaching leaders of each innovative school, coordinators were appointed to carry out the work of the center. The branch of the Center of Excellence in Kyzylorda and "Competence Centre" has jointly designed an annual action plan, suggesting steps to implement the “Lesson study” approach in practice. School culture has become a central concept in implementing Lesson study to change how schools operate and improve educational results. The results of the surveys taken from the coach-leaders, coordinators of these schools show positive impact of the Lesson study to the school culture. The issue of improving lesson plans, lesson observation, lesson analysis, raised during the interview with school leaders. Form the Lesson study reflective accounts of the coordinators the apparent improvement was seen in holding professional dialogue, a shift of the focus-observing students instead of the teacher, giving constructive feedback. This paper also includes barriers and the achievements in the implementation of the lesson study. The next step of the research is "How to improve the observation skills of Lesson study group members?"

Presentation Code	4Mb
Title	Mongolian Classroom Discourse In Historical And International Context: Through Lesson Analysis Of Mathematics Lessons
Presenter/s	Dulamjav Norjin, Altangoo Ochirbat and Ganbaatar Tumurbaatar
Affiliations	Nagoya University (Japan)
Type of presentation	Paper presentation
Strand	Lesson study in different cultural, subject and learning contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk Room 4: 2.4-2.6)
Abstract	Mongolia shifted from socialism to democracy and capitalism in 1990 and also sought an educational reform in the 2000s. Mongolian National University of Education (MNUE) implemented "OUTREACH" project in cooperation with University of Exeter, UK between 2005 and 2008. This project aimed at training teachers from rural regions to let them develop themselves as professionals at their workplaces, learn research skills and improve their methods. This was the first time when action research was introduced in Mongolia. Mongolia also introduced the lesson study in mathematics, physics and chemistry in rural elementary and secondary schools through cooperation with Japan International Cooperation Agency between 2006 and 2013. This was the first full-scale introduction of lesson study in Mongolia. Basic criterion for good lesson in secondary education is pupils' participation. But how can we measure pupils' participation in a lesson? What would affect to the pupils' participation in a lesson? How does the change of social system relate with the pupils' participation in a lesson? In order to discuss above mentioned research questions, the author uses the "Transcript Based Lesson Analysis" as one of the research methods for pupils' participation. Analytical and/or theoretical framework The Institute of Teacher Professional Development (ITPD) of Mongolia collects best lesson videos from each school of whole country every year and ITPD puts some criteria for their lessons and chooses good practices and lessons. We chose videos of 4 mathematics lessons, which got higher points by experts and transcribed them, and counted some variables from each transcript. We identified some variables (number of utterance by teachers and pupils; number of open and closed questions; number of words of pupils' utterances) to collect data and do quantitative and qualitative analysis.

	For chosen lessons, frequencies of pupil`s utterance are relatively high but average of number of utterance a time was only 1-2 words. That showed us pupils' participation and expression skills are very underdeveloped and teachers' questions were inappropriate and not well planned. Finally we examine influences by educational methodology from socialist era to the elementary and secondary lessons in Mongolia through our research results. We believe it would make a contribution for the international comparative lesson studies, especially in transitional countries, from the historical perspective.

Presentation Code	4Mc
Title	The Individual In Collaborative Processes Framed by Lesson Study
Presenter/s	Charlotte Skott and Hanne Møller
Affiliations	University College Capital (Denmark)
Type of presentation	Paper presentation
Strand	Lesson study in different cultural, subject and learning contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Peter Chalk Room 4: 2.4-2.6)
Abstract	Potentials of Lesson Study (LS) as a method for teachers' professional development (TPD) are well documented and convincing in the form of both examples from Japan and LS's embodiment of identified principles for promising TPD approaches (Hennessy, 2014), such as teacher collaboration and an experimental conception of teaching. However, such LS qualities are not automatically delivered, and research agrees that cultural transfer is complex, since good ideas from one culture do not necessarily lead to good practices in another culture. Research into the essential conditions under which LS contributes to TPD varies across different cultures. One strand of research focuses on 'the right way' to do LS, either by examining the ways Japanese teachers perform LS (Takahashi & McDougal, 2016) or by exploring how LS is used differently in other countries compared to Japan (Fujii, 2013). Another strand of research focuses on the identification of connections between aspects of LS and teachers' development of knowledge or competencies (Perry & Lewis, 2009). The objective of many such studies is to suggest potentialities of LS by focusing on what teachers learn, and these studies tend to document rather than account theoretically for teachers' learning. We focus on how teachers learn in a Danish LS project by using a

	theoretical framework based on a participatory perspective on teachers' learning called Patterns of Participation (PoP) (Skott, 2013). In PoP, a teacher's learning is conceived as changes in her participation in classroom interactions, which are simultaneously influenced by her symbolic interpretations of meaning in the emergent interactions and by her re-engagements in former and present practices. Our research question is: How does a teacher develop her participation when engaging in collaborative LS processes? PoP's focus on the individual teacher allows us to investigate the long-term participation of one mathematics teacher and one Danish-as-a-Mother-Tongue teacher from a public school. We collaborated with four teams of teachers and conducted two LS cycles per team. We used methods from discourse analysis (Fairclough, 2003) to investigate changes in the two teachers' participation in planning, teaching/observing and reflecting in two research lessons. Our analyses suggest that the LS frame constitutes both a venue for the participants' joint negotiations of new practices and a challenge to the teachers´ professional identify formation. On the basis of such micro-analyses of LS interactions, we aim to contribute new insight into how to scaffold teachers´ learning when engaging in LS.

Presentation Code	4Na
Title	Lesson Study on Primary 1 Students' Oral Communication Skills
Presenter/s	Sook Kuan Chau and Pey Chyi Lai
Affiliations	National Institute of Education (Singapore)
Type of presentation	Paper presentation
Strand	Lesson study in different cultural, subject and learning contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Collaborative)
Abstract	With the aim to enhance the students' communication skills in Mother Tongue Languages, the Ministry of Education, Singapore implemented the "Interaction Resource Package for Primary Schools" in 2012 in all primary schools. The Primary 1 resource package focused on teaching students to use short phrases and proper sentence structures for simple oral conversations. While using the resource package during classroom teaching, teachers observed that the content did not meet the needs of the Primary 1 students who wanted to express their thoughts further. As such, a group of Chinese Language teachers conducted a lesson study to

	find out how teachers could make changes to the syllabus to help the students learn more effectively. The paper presents an account of how the research team modified the lesson content of one of the units in the resource package, “My Family”, based on Piaget's theory of cognitive development (1953) and Mercer’s findings on attachment (2006), where “open-ended questions” were included to encourage the students to have more engaging conversation. The research team hypothesized that the Primary 1 students were able to describe their interactions with their family members and have the reasoning ability to explain “why they especially like one of them”. During the first research lesson, the teacher provided scaffolding with audio visual aids to help the students grasp the vocabulary and proper sentence structures. The research team observed that the students were able to construct proper sentences when guided, but were rather dependent on the lesson handouts during conversation with peers. During the second research lesson, cooperative learning strategies and peer evaluation were added to the lesson procedure making the lesson more student-centered. The research team observed that the students were able to engage in conversation with peers confidently and fluently without the handouts. Quantitative data were collected through pre- and post-tests and the data analysis showed that there was a significant increase in the students’ oral test scores after the research lessons. The findings and discussions in this lesson study will be relevant to all classroom teachers. They suggested that students can learn effectively if teachers are mindful of the learning needs of the students and incorporate learning activities which are thoughtfully crafted. Teachers should also be given more flexibility to make changes to the syllabus when the need arises.

Presentation Code	4Nb
Title	A Lesson Study to Explore the Use of Picture Books to Enhance Spoken Interaction in Chinese Language amongst Mixed Aged Group Students
Presenter/s	Wai Foong Corinne Fan
Affiliations	Punggol Green Primary School (Singapore)
Type of presentation	Paper presentation
Strand	Lesson Study In Different Cultural, Subject And Learning Contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Collaborative)
Abstract	Teaching and learning amongst mixed-aged group students is seldom seen in Singapore. This paper documents the participation

	in a lesson study through the use of Picture books to enhance spoken interaction in their second language (Chinese language) amongst mixed aged group students (Kindergarten 1 students, 4-5 years old and Primary 1 students, 6-7 years old). Through the two cycles of the Lesson Study, the teachers learn that students from different mixed- aged groups are able to work together and interact with one another in a given classroom settings. It is interesting to find out that the student who has a higher ability in the spoken language would normally lead the group discussion and this does not normally means that the student to lead the discussion has be of an older age. However, when it comes to group work or group discussion, the teaching approach that best suits this mixed aged group of students of 4-7 years old would be giving them explicit instructions and through cooperative learning. Through cooperative learning, teachers assigned different roles to students in each group and through guided and explicit teaching and the use of picture cues, the different characters in all the groups are able to retell the story.

Presentation Code	4Nc
Title	Practice of Lesson Study on the Lessons of English and Kazakh Languages at Nazarbaev Intellectual School IB.
Presenter/s	Tatyana Mashinets and Zhadina Seisenbayeva
Affiliations	Nazarbaev Intellectual School IB (Kazakhstan)
Type of presentation	Paper presentation
Strand	Lesson study in different cultural, subject and learning contexts
Time/Location	Sunday 4th September 13:00-14:30pm (Newman Collaborative)
Abstract	The Lesson Study is a new approach of pedagogical activity for Kazakhstan teachers of the mainstream schools. At the same time, the Nazarbaev Intellectual Schools for gifted children where some of their teachers are engaged in various types of research, do not have extensive experience of it. One of the reasons is their participation mostly in Action Research which is better known among our pedagogical community. A group of interested teachers at NISA IB has decided to take part in the Lesson Study process, because it is flexible: it can be considered as an integrated part of the Action research, solving narrow tasks; and at the same time can be seen as an independent area of pedagogical work. The primary aim of our Lesson Study was to find out the reasons for our students' low motivation in fulfilling learning tasks in the lessons.

	After watching some lessons we realized that we needed a supplementary new direction: to observe the teachers' class management, because we found out that students could be bored because of their teacher's weak organization and preparation of the lesson. To begin with teachers used the Case Study method and observed one group of students, who were not active during the lessons. Having watched them for a couple of lessons it was clear that we should change the object of our attention and consider the teacher's work in a more detailed fashion, therefore the Sequential and Transcription methods were used to watch our colleagues while organizing and conducting their lessons. Initially we expected that the students were not active because of their psychological mood or laziness and it meant that changing the tasks for them would solve the problem, but unexpectedly we found that the teacher's preparation for the lesson could influence the students' response even more than students' mood or reluctance to participate in a lesson. This made us come to the conclusion that sometimes the passiveness of the students can be rooted in teacher's inability to manage their students or to think of their lessons as a creative process. At the present time teachers are at the stage where they are studying academic literature, aiming to find out the best international and national practices to be used to improve this situation. The next step will be to work out a program of observation of the teachers' preparation skills, classroom management and teaching methods and to create some strategies for improvement.