

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

### SESSION 5

<b>Presentation Code</b>	5A
<b>Title</b>	Critical Process for Supporting Teachers to Establish Professional Communities Using Lesson Study: Case Studies from the Project IMPULS Collaborations with UK, US, and Qatar
<b>Presenter/s</b>	Akihiko Takahashi, Toshiakira Fujii, Naoko Matsuda, Geoffrey Wake and Shelley Friedkin
<b>Affiliations</b>	DePaul University (United States of America)
<b>Type of presentation</b>	Plenary Symposium
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Alumni Auditorium)
<b>Abstract</b>	<p>Many Lesson Study projects outside of Japan have been conducted by enthusiastic volunteer teachers independent of their school professional development activities and struggle to make a vital impact on student learning. On the other hand, Lesson Study in Japan is most often conducted as part of a highly structured school-wide project aimed at addressing common teaching-learning challenges. In order to make vital impacts on student and teacher learning, simply imitating the superficial features of Lesson Study is not enough.</p> <p>Project IMPULS (International Teacher Professionalization Using Lesson Study) at Tokyo Gakugei University has several ongoing collaboration with projects conducted outside Japan. The aim of this symposium is to discuss what the key elements of Lesson Study are that contribute to students and teacher learning, and how can we use them to improve Lesson Study both in and outside Japan.</p> <p>The Lesson Study Immersion Program aims to provide opportunities for researchers and educators to experience authentic research lessons and post-lesson discussions in Japan. Since 2011, Lesson Study leaders from several countries outside Japan have had the opportunity to participate and work with leading Japanese mathematics education researcher. This session will report key findings from the program and discuss how Lesson Study is being used in different cultures and how these adaptations are supporting teacher professional development systems.</p> <p>Developing professional learning networks for mathematics teachers using lesson study in the UK.</p> <p>In the UK, the project Lessons for Mathematical Problem Solving (LeMaPS) has sought to initiate, develop and sustain networks of teachers using lesson study to inform pedagogies that support the teaching and learning of problem solving. This work has been informed by close collaboration with the project IMPULS team.</p> <p>The LeMaPS project has researched what is necessary to facilitate</p>

	<p>what is in effect a systems level change to teacher professional development. The work has focused on: (i) structures of governance and support of schools and teachers, and (ii) the support of individual and groups of teachers. In relation to the first of these, the project was funded at a time of major change in school governance in England including the introduction of a national network of 37 'math hubs'. This proved to be both a challenge and opportunity for the project eventually leading to a successful outcome. To support teachers a support toolkit has been developed. This encapsulates those features of lesson study that have emerged as being fundamental to the process in the UK. In summarizing our work we consider what might be the essential features of adoption and adaptation of Japanese lesson in any national context.</p> <p>School-wide Spread of Lesson Study and Shared Classroom Practices in Mathematics: U.S. Case Study.</p> <p>Teaching Through Problem-Solving (mondai kaiketsu gakushu) is widely practiced in Japan and sparked the interest of a group of U.S. teachers from a West Coast school, as a way to build the mathematical practices found in the Common Core State Standards for Mathematics. In 2014, one member of this group, supported by the IMPULS project, visited Japan through their immersion program to learn more about teacher development systems used to improve mathematics instruction and student learning, most specifically Teaching Through Problem-Solving (TTP).</p> <p>This case study examines the key experiences gleaned from the program and tracks how subsequent development over two years resulted in school-wide lesson study and shared classroom practices across K-5 grade levels. Using findings from teacher and student interviews, student work and data from video-taped research lessons and daily classroom instruction, this paper documents the journey of several key drivers that allowed the rapid and robust spread of practices. These drivers include 1. Visible evidence of student learning, 2. A concrete entry point for teachers into the instructional routines of Teaching Through Problem and, 3. Cycles of lesson study to deepen the learning.</p> <p>Providing first-hand experiences of CLR cycle to nurture leaders of Lesson Study: Learning from IMPULS- Qatar University Project.</p> <p>The IMPULS-Qatar University project is a pilot program aimed for establishing a school-wide Collaborative Lesson Research (CLR), a form of Lesson Study to seek vital impacts on student and teacher learning, in four primary and preparatory schools in Doha as a robust organizational improvement model of professional development. The project has focused on collaboratively supporting schools and teachers by providing extensive resources and training opportunities for four partner schools supported by</p>
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	<p>the Qatar University content specialists. The results of the first two years of this ongoing project suggest that nurturing Lesson Study leaders may be the critical process for implementing CLR. In this session we will discuss how the project activities of the first two years support Qatar University content specialists to gain their knowledge about effective teaching of mathematics and the process of CLR, and develop expertise for leading Qatar teachers to design, observe, and discuss lessons to improve teaching and learning mathematics.</p>
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<b>Presentation Code</b>	5B
<b>Title</b>	Lesson Study and Initial Teacher Education (ITE): Understanding Learning and Meaningful Observation to Guide Beginning Teachers
<b>Presenter/s</b>	Phil Wood, John Elliott, Raymond Bjuland, Nina Helgevold, Wasyl Cajkler and Deborah Larssen
<b>Affiliations</b>	University of Leicester (United Kingdom)
<b>Type of presentation</b>	Symposium
<b>Strand</b>	Lesson study in different cultural, subject and learning contexts
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Newman Red)
<b>Abstract</b>	<p>At the heart of lesson study are the two processes of learning and observation. Crucially, how learning is understood should determine how it is observed. However, what is meant by 'learning' and how is it reliably observed in research lessons? Researchers for this symposium explored initial teacher education (ITE) lesson study research literature specifically for its discussion of learning and how learning is observed. We looked at this through the lens of ITE studies because we have a shared interest, with findings which are not untypical of the wider lesson study literature.</p> <p>Symposium researchers focused on three principal questions for the three discussion papers in the symposium: 1. How is learning defined and discussed within ITE lesson study literature? 2. How effectively is observation used as a tool for capturing evidence within lesson studies? 3. How can our understanding of learning and approaches to its observation be developed for lesson study in ITE programs? Participants in the symposium conducted two structured literature reviews, screening 80 papers that feature lesson study in ITE and analyzing 35 papers against in-depth inclusion/exclusion criteria to inform the three papers below.</p> <p><b>Paper 1:</b> Exploring the nature of learning in lesson study (<i>Nina Helgevold; Raymond Bjuland; Bugge, Hans-Erik; Philip Wood</i>).</p> <p>This paper explores the nature of reporting on learning in lesson study following a structured review of the ITE-based literature, focusing on two questions: 1. How is learning defined in lesson study research papers? 2. How is it used to frame discussion of findings? The analyses were used to identify both coherent frameworks and gaps in the literature, offering platforms for thinking about ways to strengthen use of learning theory and observational methods in lesson study research. The analysis of papers within ITE shows that learning is not a central feature in published research, and relies on a small number of learning theories, especially those using a socio-cultural basis, e.g. communities of practice. The focus for discussion of learning also tends to emphasize the learning of the participants rather than student learning. Claims are often made regarding the amount teachers have learned through the lesson study process, but their</p>

own understanding of learning, on which the method is based, is rarely queried and investigated. The paper will consider how a more critical and substantial approach to learning in lesson study might be fostered.

**Paper 2:** The place of observation in lesson study  
(*Wasył Cajkler; Deborah Larssen; Arne Jakobsen and Janne Fauskanger*).

This paper explores how observation in lesson study is explained and used, discussing results from a structured review of ITE-based papers, which explored how the literature currently discusses observation and the collection of observation data, critically evaluating: 1. How is the process of observation explained in the papers? 2. How was the observation conducted? 3. Who/what was observed? Interim findings suggest that very little attention has been given to how learning is actually observed in research lessons. While Lewis (2002) emphasizes watching the pupils and the importance of watching pupils' faces and eyes, research papers rarely detail how the process of observation is carried out. The review exposes the limitations of relying solely on in-class observation in ITE settings as a tool for deep understanding of children's learning. The paper will discuss how lesson study researchers can improve on the use and reporting of in-class observations.

**Paper 3:** Learning and Observation in Lesson Study. Developing Critical Approaches to Methodology  
(*Philip Wood; Nina Helgevold; Wasył Cajkler; Deborah Larssen*).

This paper considers the insights gained from papers 1 and 2 above. In critiquing and problematizing the roles of learning and observation in lesson study research, this paper reflects on the potential for a wider spectrum of data collection approaches in lesson study research. Given the potential of lesson study to help us investigate and understand the learning of student-teachers/pupils in greater depth than many other approaches to pedagogic research, we need to reflect upon the gaps and assumptions which are identified in the literature as a starting point for developing new methodological frameworks to clarify: 1. whose learning we are researching in lesson study and why 2. the nature of observation as a medium for 'capturing' learning 3. how our understanding of learning will impact on types of data we choose to collect. This paper will act as a starting point for discussion in these important areas which are all too often implicit within the lesson study literature. The symposium will act as a starting point for wider, continuing discussion about the methodological ramifications of

	engaging in a critical reflection on the nature of learning, its place and application in lesson study, and the methodological implications which stem from this.
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<b>Presentation Code</b>	5Ca
<b>Title</b>	School–University Partnership mediated by Lesson Study to Promote Professional Learning in the Third Country Training Program
<b>Presenter/s</b>	Dian Hendriana, Ikmanda Nugraha, Sumar Hendayana and Asep Supriatna
<b>Affiliations</b>	Universitas Pendidikan (Indonesia)
<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 14:30-16:00pm (Forum Seminar Room 1)
<b>Abstract</b>	Professional learning has a major importance for educational practitioners. Professional learning in the workplace must be focused on promoting networked learning that exceed traditional learning that exist within institutional boundaries. Based on the theoretical framework of Cultural Historical Activity Theory (CHAT), this paper point out on a study from three years Third Country Training Program (TCTP) on the professional learning that was afforded by a school–university partnership in the TCTP program mediated by lesson study. The study showed that the program provide participants to exchange ideas, information and experience among TCTP Trainees and the Indonesian counterparts in the field of Mathematics and Science education. During the program, they negotiated the mediating tool and consequently they created an activity system that transformed from learning how to teach into learning how to help the students learn.

<b>Presentation Code</b>	5Cb
<b>Title</b>	Construction of a Professional Discourse Community of Geography Education
<b>Presenter/s</b>	Alain Pache, Sandrine Breithaupt, Viviane Borruaz, Mélanie Braun and Annick Isoz
<b>Affiliations</b>	HEP 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 14:30-16:00pm (Forum Seminar Room 1)
<b>Abstract</b>	<p>The group lesson study in history and geography began in June 2015 from a concern amongst several human science educators and social psychologists in the university of teacher education, state of Vaud, Switzerland. Initially seeking a deeper understanding of the process of “secondarisation” [creation of secondary discourse] in primary school human sciences (students aged 8 to 12) and, secondly, to implement new ways of teaching, they appealed to teachers who could be interested in teaching these disciplines. In this paper, the main focus will be on geography. The lesson study implemented over 3 cycles has allowed the development of a lesson plan (put online) whose objective is the identification and location of animal facilities.</p> <p>The lesson studies mainly concentrate on the professional development of teachers in relation to student learning (Lewis, Perry &amp; Murata, 2006; Miyakawa &amp; Winslow, 2009; Clerc &amp; Martin, 2011). This paper aims to identify the elements that we consider the main motivation of professional development, not only for teachers, but also for trainers during the course of the lesson study. To do this, we will present a first analysis of the evolution of the research lesson. Secondly, we will present text content analyses prepared by each group member. By crossing the two axes, we will highlight how the group was formed in a professional discourse community in the teaching of geography (Jaubert, Rebière, Bernié, 2003; Jaubert &amp; Rebière 2012).</p>

<b>Presentation Code</b>	5Cc
<b>Title</b>	LESSON STUDY FOR THE FIRST TIME – Experiences from a Research and Development Project in Norwegian Elementary School
<b>Presenter/s</b>	Nina Vasseljen and Hanne Aas
<b>Affiliations</b>	Norwegian University of Science and Technology (Norway)
<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 14:30-16:00pm (Forum Seminar Room 1)
<b>Abstract</b>	<p>Our model is designed as a 3-year action research project (2015-2017) with Lesson Study as method for teachers' professional learning and research question "How do teachers perceive their professional learning, individually and collectively, and what leads to this learning?" Seven teams of 3-6 teachers are performing nine Lesson Study-cycles during the project period.</p> <p>We use a mixed methods research design (Johnson &amp; Onwuegbuzie, 2004) and collect data by audio records of the teachers planning and evaluating and structured logs from teachers, team leaders and school leaders during the cycle. We analyze the data through sociocultural discourse analysis (Mercer, 2004) and Constant comparative method (Strauss &amp; Corbin, 1998) and compare recordings to logs to check for convergence and divergence.</p> <p>Our findings indicates that Lesson Study as method for teachers professional learning get significantly strengthened by a model that includes organizational support, school leaders engagement, learning management and external support. Despite teachers' statements about the benefits of Lesson Study, audio records show variation of reflection level among the teacher teams. Comparing logs and recordings, teachers' professional knowledge might remain tacit and might not challenge existing practice without support from school leaders and team leaders implementing actions decided by school leaders, team leaders and researchers in cooperation. Norms for communication, structure in conversation, leadership, and support from external professionals can all affect participants' learning (Timperley, Wilson, Barrar, &amp; Fung, 2007). The quality of the conversation is the key for the participants' learning outcome (Mercer, 2004).</p>

<b>Presentation Code</b>	5Da
<b>Title</b>	A Case Study of a Descriptive Language System for the Visualization of Interpretation in Lesson Analysis
<b>Presenter/s</b>	Masami Matoba
<b>Affiliations</b>	Tokai Gkuen University (Japan)
<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 14:30-16:00pm (Forum Seminar Room 2)
<b>Abstract</b>	<p>The materials used for lesson analysis are facts arising from the actual lesson, and this includes the orderly word protocol of classroom communication based on recordings made with a recorder. From the perspective of research methods, one of the most important tasks is visualization of the interpretation process of the word protocol. The purpose of this presentation is to develop the descriptive method for word protocol and the relation of the signs called intermediate factors for visualization of the interpretation process of word records. The author utilized children's remarks to develop signs to show the relations between words and general ideas. The signs and the relations among them are called intermediate factors in our study.</p> <p>The procedure for analysis consisted of eight steps:</p> <ol style="list-style-type: none"> <li>1) division of the lesson process into several parts</li> <li>2) quantity arrangement</li> <li>3) selection of remarks</li> <li>4) arrangement of the remarks</li> <li>5) interpretation</li> <li>6) identification of meaning units</li> <li>7) description of the remarks in intermediate factors and</li> <li>8) abstraction of pedagogical factors through interpretation of the description.</li> </ol> <p>As an example, Morishita, a primary school student, during a social studies lesson remarked that when the residents of our city present their opinions on their life to their municipal hall, the staff at our city hall accept them. The remark can be described in the following form.</p> <p>“municipal hall”/(Morishita) [WN(the residents of our city present their opinions on their life to their municipal hall), (the staff at our city hall accept them)]</p> <p>Explanation of signs</p> <ol style="list-style-type: none"> <li>1) “A”/(person) [B] : A person has a concept, idea or scheme of A with the meaning or an image of B.</li> <li>2) WN(A), (B): When an action of A, an action of B takes place.</li> </ol> <p>As research findings, the following were found: (1) what the</p>

	<p>interpreter understood was recognized in the form of the relationships of meaning units utilizing the signs, and (2) the concepts which the remarks imply can be abstracted in the intermediate factors.</p>
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<b>Presentation Code</b>	5Db
<b>Title</b>	Beyond the Border of the Context. How 'Generalizable' are Results from Learning Study?
<b>Presenter/s</b>	Ulla Runesson, Anna Löfström and Björn Hellqvist
<b>Affiliations</b>	Jönköping University (Sweden)
<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 14:30-16:00pm (Forum Seminar Room 2)
<b>Abstract</b>	<p>Whether professional learning communities (PLC) can generate new and relevant knowledge recognized as a legitimate knowledge source, (i.e. formal, scientific knowledge), that is more than local knowledge thus, can be used outside the local context, has been discussed (Enthoven &amp; de Bruijn, 2010). In the study presented here, insights gained from one Learning study of what is critical for young children's (age 8-9) learning of negative numbers were communicated and used by new teachers in new contexts in order to answer the question: "Has teacher generated knowledge relevance beyond the borders of the specific context?" In the Learning study, a variation theory informed version of Lesson study, the object of learning was to become acquainted with negative numbers, and seeing them as belonging to the realm of integers. One tenet of variation theory (Marton, 2015) is that learning is seen as a change in the ways something is experienced and in order to see something in a new way, certain critical aspects must be discerned. To identify these and make them possible to discern in class by means of patterns of variation, is the aim of Learning study. Three critical aspects for the learning of integers were found. On the basis of these findings, the group designed, implemented and refined examples, activities and arte facts that was demonstrated</p>

	<p>to be effective for promoting the intended learning. The refined and successful lesson design and its underpinning fundamentals, the critical aspects, were documented and communicated to four 'new' teachers. After a common discussion, the teachers individually planned one lesson with the presented results from the Learning study as a resource. The lessons were video recorded and results from the pre- and post-tests were analyzed. Tentative analysis shows that the results on the post-tests reflects the results in the Learning study. Thus, the successful design seemed to be successful in the in new lessons as well. This raises the question of whether and in what ways the results of Learning study are generalizable.</p>
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<b>Presentation Code</b>	5Dc
<b>Title</b>	The Relation between Teachers' Beliefs in Classroom Management and Teaching in an Elementary School: Comparing 3 Classes Studying an Expository Text.
<b>Presenter/s</b>	Takayoshi Sasaya
<b>Affiliations</b>	Mie University (Japan)
<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 14:30-16:00pm (Forum Seminar Room 2)
<b>Abstract</b>	<p>Effective classroom management leads to improving the quality of lessons, and it is often difficult for novice teachers (Darling-Hammond, Baratz-Snowden, 2005). Some studies have claimed that classroom management is affected by teachers' beliefs in classroom management. However, there has been little study concerning the characteristics of beliefs in classroom management because teachers' beliefs are complexly composed of many kinds of beliefs. Therefore, in lesson studies, little attention has been given to the relations between teachers' beliefs about classroom management and their teaching in class. It is important that the characteristics of beliefs in classroom management are discussed to improve the quality of lessons. The present study was undertaken in order to reveal relations between teachers' beliefs of classroom management and teachers' other kinds of beliefs, and to discuss effects of teachers' beliefs in classroom management on teaching. The participants in this study were 3 second grade classes in a school near Tokyo. 3 teachers were interviewed to analyze their beliefs, and the 3 classes for a lesson study in the school were</p>

	<p>observed to analyze their styles of teaching. Their beliefs were also analyzed from the lesson plan sheets (Jugyo-an) which they made for the lesson study. Thus, it became clear that (1) their beliefs about classroom management related to their beliefs about teaching and to their beliefs about curriculum, (2) their beliefs about classroom management strongly influenced their interactions with a specific child in simultaneous group lessons, (3) their beliefs in classroom management were shaped through long-term interactions with children in their classrooms, for example, in classes, in class activities, and in educational counseling. It is suggested that beliefs in classroom management and beliefs in teaching influence each other, and that beliefs in classroom management influence teaching, especially interactions between a teacher and a specific child in simultaneous group lessons, even though it is said in Japan that classroom management is strongly related to student guidance outside of class. It is critical to be aware that interactions between a teacher and a specific child in simultaneous group lessons are important for effective classroom management, and that the interactions shape teachers' beliefs and teacher-children relationships spending a long time. In this respect, lesson studies need to watch interactions between a teacher and a specific child in simultaneous group lessons to improve the quality of lessons.</p>
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<b>Presentation Code</b>	5E
<b>Title</b>	Prometheus Community - and European Online Community for Lesson Study
<b>Presenter/s</b>	Elaine Cristina de Andrade Barbosa
<b>Affiliations</b>	University of Minho (Portugal)
<b>Type of presentation</b>	Workshop
<b>Strand</b>	Developing professional Learning communities: models and practices
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Peter Chalk 2: 1.1-1.3)
<b>Abstract</b>	Participation in Information Society has challenged educational systems to integrate new digital communication tools in innovative teaching practices with the objective of training individuals involved in real knowledge production. Teachers assume the critical role of

	<p>research, select, evaluate and develop tools, skills and practices that constitute a model for pupils to lifelong acquire and develop knowledge and competences. Professional development of teachers, in that perspective, should include methods and strategies that allow them to experience and learn continuously, using ICT to integrate practical and professional learning communities (UNESCO, 2008). In European context, recommendations and policies (European Commission, 2013; Eurydice, 2012) emphasize the need to create collaborative models of professional development, heavily integrated in classroom routine and focusing on pupil learning and curriculum through school and teachers' networks and online communities. These studies demonstrate the need to promote training in digital skills, along with teacher training, in order to increase confidence levels in using these tools, essential condition for their integration in teaching practices for collaborative knowledge building.</p> <p>The belief that Lesson Study is an approach able to engage teachers with diverse cultural and professional background in a reflective collaborative work in this challenging context lead us to the develop the Prometheus Community: an online multiplatform community that aims to connect participants from different European countries, providing information about Lesson Study and supporting the organization of cross-countries Lesson Study groups through the 2016/2017 school year, aiming to develop planned, observed and discussed lessons in a multicultural view, focusing on pupils learning, promoting teachers' digital competences.</p> <p>This workshop will provide participants: - An interactive guided tour for the Prometheus Learning Management System: participants will be able to surf the structure of the Lesson Study courses and join the international groups for practicing LS. (about 60 minutes). - A networking session: participants will be able to meet teachers from European Countries who are seeking for Lesson Study partners to build a common protocol and develop the Lesson Study online sessions through the next school year; - Free register on Prometheus Community (since the platform is funded by EU, there are no fees for participants who want to join the Lesson Study groups)- Q&amp;A session with the Platform developers.</p> <p>- Printed guide for the Prometheus Platform. The workshop is planned for 1.5 hours, for teachers from all school levels and fields, who can find partners to develop LS through next school year.</p>
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<b>Presentation Code</b>	5Fa
<b>Title</b>	The Implementation of Local Wisdom-Based Learning in Vocational High Schools through Lesson Study Activities
<b>Presenter/s</b>	Iwa Kuntadi, Isma Widiaty and Pupung Purnawarman
<b>Affiliations</b>	Universitas Pendidikan (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Learning studies
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Newman Purple)
<b>Abstract</b>	<p>Local wisdom-based learning in Vocational High School is a way to teach the nation's cultural values. One of the objectives of this learning is to instill manners and characters that are consistent with the identity of Indonesian people, especially for the young generation. Learning to observe the process of character education is best to be conducted in a lesson study setting. Lesson study is a learning model that has the advantage of involving some observers so as to observe the learning process of local wisdom more closely. This research aims to implement local wisdom-based learning, especially in the learning of batik competence. The research questions are: (1) How to carry out the "Plan" stage in implementing the learning of batik based on local wisdom through lesson study activities in vocational high school?; (2) How to carry out the "Do" stage in implementing the learning of batik based on local wisdom through lesson study activities in vocational high school?; and (3) How to carry out "See" stage in implementing the learning of batik based on local wisdom through lesson study activities in vocational high school? The method used in this study is the implementation research. The respondents were students of SMK 14 Bandung. The model teacher and observers involved were teachers who taught batik in vocational schools. The implementation process also involved collaboration with faculty members in universities who administer batik courses. The implementation of learning batik based on local wisdom was carried out for three cycles. Findings of the study illustrate three important aspects. First; the "Plan" stage shows that the lesson design of batik lesson based on local wisdom was designed by paying attention to learning objectives, materials, lesson, and assessment. Second; the 'Do' stage was implemented by adopting the learning syntax of teaching wisdom from Sternberg which generally consists of six procedures; Third; the "See" stage illustrates the collaborative process to discuss the learning process that has been implemented using observation sheets and also character evaluation scales.</p>

<b>Presentation Code</b>	5Fb
<b>Title</b>	The Influence of A Cooperative Learning Instruction Using Socio-scientific Issues (SSI) Context for Teaching Reaction Rate on the Learning Environment and Gender.
<b>Presenter/s</b>	Sri Rahayu and Yunilia Nur Pratiwi
<b>Affiliations</b>	Universitas Negeri Malang (UM) (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Learning studies
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Newman Purple)
<b>Abstract</b>	<p>The importance of classroom learning environment has been increasingly recognized over the past 20 years. Student's individual behavior is the result of the interaction between the individual and his/her environment, namely that an individual's behavior is affected internally by characteristics of personality and externally by the environment itself. During cooperative learning instruction using socio-scientific issues, student's social interaction is high, and therefore students must work in a risk-free environment where they are encouraged to ask questions, share ideas and engage in dialogue. Cooperative Learning requires students to interact face-to-face, be positively interdependent, be effectively proceed their group, practice their social skills, and ensure their own individual accountability for the information obtained in the activity and therefore they should be individually assessed. All students must participate equally and simultaneously to ensure equal opportunities for all students. The use of socio-scientific issues as a learning context adds more tool for students to engage in debates and discussions. This study aimed to assess the effectiveness of cooperative learning instruction combined with socio-scientific issues in terms of the learning environment, gender of students, as well as effect size of each dimension of the learning environment. This study utilized a quasi-experiment, post - test only group design. Sample consisted of 91 eleventh-grade high school students who were studying chemistry reaction rate topic. They were chosen by cluster random sampling which grouped into three classes, namely control (conventional) group, experiment I (cooperative learning/CL) group, and experiment II (cooperative learning – socio-scientific issues/CL- SSI) group. The research instrument was WIHIC questionnaire that consisted of 50 items (five scales) and it assessed seven dimensions of Student Cohesiveness, Teacher Support, Involvement, Investigation, Task Orientation, Cooperation, and Equity. Reliability of instrument was 0.902. The data was</p>

	<p>analyzed using parametric statistics (two way ANOVA). The results of this study showed that (1) there was a significant difference in students' perceptions of learning environment between conventional group and CL group or between conventional group and CL-SSI group, but there was no difference between CL group and CL-SSI group; (2) Effect size of seventh dimensions of learning environment showed weak effect (Students' Cohesiveness), moderate effect (Cooperation), and strong effect (Teacher's Support, Involvement, Investigation, Task Orientation, and Equity); (3) there was a significance difference between male and female students' perceptions on the learning environment, female had higher scores than male in both Experiment I and II group.</p>
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<b>Presentation Code</b>	5Fc
<b>Title</b>	Multiple Representations and Concept Acquisition with Authentic Problem Based Learning in Physics Education
<b>Presenter/s</b>	Lia Yuliati
<b>Affiliations</b>	State University of Malang (Indonesia)
<b>Type of presentation</b>	Paper presentation
<b>Strand</b>	Learning studies
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Newman Purple)
<b>Abstract</b>	<p>Concepts acquisition of physics is one capability that should be achieved by students. It can be presented in multiple representations. The multiple representation capability, especially on elasticity and vibration material in senior high school, is not easily trained in students. Many students have difficulties to understand and to reveal their representation. This study was focused on examining the relationship between the representation capability with concept acquisition of physics, especially elasticity and vibration material. The study aimed to describe the multiple representation development and its impact on concept acquisition of elasticity and vibration material. The learning model used in the study was an authentic problem-based learning (aPBL). The authentic problem based learning have characteristics that provide an authentic problem and encourage students to demonstrate active learning by solving problems, self-directed learning, and working in groups. The authentic problem based learning is associated with learning problems in their real life, so when given the learning, multiple representation capability and concepts acquisition of students can be developed. The study was conducted by mixed methods; embedded experimental design. The subject</p>

	<p>used a single class at a senior high school in East Java, Indonesia. Selection of subject was based on observation and preliminary study. The instruments used include observation sheets, multiple representations and concepts acquisition of physics tests, and questionnaire for aPBL. The data obtained were analyzed qualitatively by average normalized gain score and Cohen's d effect size. The results showed that most of the students have mathematical representation on elasticity and vibration material. The aPBL usage, in elasticity and vibration learning, greatly assist students in developing their representation, especially visual and graphical representation. Students still have difficulties in verbal representations. This has an impact on the concept acquisition of elasticity and vibration. At least 38% of students have not mastered of elasticity and vibration concepts. However, overall there is an increasing concept acquisition as the impact of implementation of learning. In aPBL, students are invited to analyze authentic phenomena and most students choose phenomena by pictorial representations. It causes the students easier to identify, resolve problems and illustrate their answer at pictorial representation. The study recommends that the student should be given the exploration and analysis exercises with authentic phenomena in physics learning. This needs to be done so that students understand and express physics concept acquisition with multiple representations.</p>
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<b>Presentation Code</b>	5Ga
<b>Title</b>	The Effects of Freewriting on Students' Attitudes towards Writing and the Use of Ideas in their Compositions
<b>Presenter/s</b>	Shakila Vasu and Jaisree Appoo
<b>Affiliations</b>	Ministry of Education (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 14:30-16:00pm ( Peter Chalk 3: 2.1-2.3)
<b>Abstract</b>	<p>A common complaint amongst primary school students in Singapore is that they lacked ideas for their composition writing, which in turn contributed to their lack of enthusiasm for writing and a negative attitude towards it. This paper describes a study that had explored the teaching of freewriting to generate ideas to a class of Primary 5 students in a Singapore school. Through the lesson study processes of collective planning, joint</p>

	<p>observation and group reflection, a team comprising English language teachers worked on the training of students in using freewriting as a key strategy to generate and develop ideas for writing and explored its effects on students' attitudes towards writing and performance in writing compositions. The students were taught to do focused freewriting based on a pair of prompts – a visual stimulus and a theme; an adaptation of Elbow's (1998) use of freewriting. Initially there was reluctance to free write as students were inhibited by worries of making grammatical errors or being judged for the quality of their thoughts and ideas. However, with a lot of encouragement and frequent opportunities to free write, most of them overcame their inhibitions and started to produce better quality of ideas. Strategic scaffolding was provided in the form of teacher modelling and explicit instruction. The teacher also encouraged peer sharing of ideas which served to foster a sense of collaborative learning. Several cycles of this took place to allow the students to overcome initial resistance to freewriting and to develop the habit of freewriting with minimal inhibition. Students in this study had initially expressed an inadequacy in having interesting and sufficient ideas to use in their writing which also contributed to their lack of enthusiasm for writing. Using a pre-intervention composition writing as a baseline standard and a post-intervention writing coupled with student surveys, the results and observations in this study showed encouraging results not only in the students' ability to generate more and better ideas but also in a more positive attitude towards writing.</p> <p>The project has important implications for addressing the issues of student motivation in writing, which in this case, is tied to the students' inability to generate interesting ideas. We intend to explore further how freewriting could tap prior involvements with texts and experiences to generate more ideas</p>
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<b>Presentation Code</b>	5Gb
<b>Title</b>	Using Lesson Study to Enhance Teachers' Professional Development and Students' Composition Writing Skills in Chinese Language
<b>Presenter/s</b>	Foong Li Wong and Shiwei Liu
<b>Affiliations</b>	CHIJ(Kellock) (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 14:30-16:00pm ( Peter Chalk 3: 2.1-2.3)
<b>Abstract</b>	<p>Lesson study is proven to be effective in enhancing teachers' professional development in CHIJ (Kellock). The Chinese Language department saw the benefits of using lesson study as a platform to enhance teachers' professional development. Therefore in 2014, in collaboration with Singapore Ministry of Education, we embarked on a lesson study project which we presented in WALS 2014. Starting from 2015, with the support from two Principal Master Teachers from Singapore Centre for Chinese Language, we continued to use Lesson Study as a protocol to work on another project titled "Enhancing Students' Chinese Language Composition Writing Skills and Content through the use Psychological Description".</p> <p>Coming from English-Speaking homes, majority of the P5 students in CHIJ (Kellock) Chinese Language proficiency is comparatively lower than that of the English language, especially in composition writing. They are not able to express their clarity towards composition writing and the lack of content description is of paramount concern. To address the inadequate content development in Compositions writing, a lesson study project team was formed to study the effectiveness of using psychological description in composition writing to enrich the content of their composition and concurrently enhancing the students' writing skills.</p> <p>Two Primary 5 classes of average proficiency level in Chinese Language were selected for the lesson study project. The project comprises of two lesson cycles, spanning a total period of six months from March 2015 to August 2015. Before the start of the first cycle, the team did an analysis of the student's compositions and concurred that the lack of content development was evident due to their weak command of the Chinese Language. Therefore the team designed lessons that focusses on enabling students to develop the skill of describing action and expressions of the characters in a composition to elicit their state of mind. By using psychological description in the composition, the composition content was inevitably enriched. After two rounds of lesson study, we analyzed the students' compositions and were pleased to see noteworthy improvement in students' composition writing.</p>

	The Chinese Language teachers similarly had benefited from the lesson study project. After embarking on lesson study for more than two years, greater cooperation is observed in the Chinese Language department, and there is also a significant enhancement in the professional development of the teachers.
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<b>Presentation Code</b>	5Gc
<b>Title</b>	Transforming On-Line Course and Program Development through Lesson Study
<b>Presenter/s</b>	Nora Hutto and Xiao Han
<b>Affiliations</b>	
<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 14:30-16:00pm (Peter Chalk 3: 2.1-2.3)
<b>Abstract</b>	<p>The process of Lesson Study was used to develop five (5) on-line Masters Degree Programs which included Special Education, Dual Language, Reading, Curriculum and Instruction, and Educational Leadership. The model of Lesson Study provided the framework for both on-line course development and individual program development. The alignment of learning and for learning included state of Texas Ex-Cet requirements and nationally recognized standards, which include Quality Matters, ILI Quality Scorecard, and Blackboard Exemplary Course Criteria which resulted in our own standards for on-line course design. The model for course development and program development was developed through research, teaching, review, reflection, re-teaching and modification. This work which was funded through Federal Grants was an interactive and collaborative work with faculty. The process of both on-line course and program development will be shared during the presentation. The model evolved into systematic on-line instructional design for the community (s) of practice. The importance of quality control, the necessity of social presence for students, and the embedding of technology and innovative methods of improving faculty teaching effectiveness are all important components of the on-line lesson study for improved student learning and teaching effectiveness. Effective teaching for learning on-line has its own cognitive set that requires coaching, dialogue, and the writing of position and research papers for faculty assimilation. On-going professional development improves teaching and learning in the on-line learning environment are also facilitated through the development of learning a course. Change is never</p>

	<p>easy and for a small, Metropolitan, Catholic University moving effectively into the on-line world of teaching and learning has been a transition into the emerging world of technology. The five year grant effort has permitted the graduate programs in the School of Education to be offered on-line across the state of Texas the world beyond.</p>
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<b>Presentation Code</b>	5Ha
<b>Title</b>	Alternating Training and Teaching: How Teacher Trainers Use a Lesson Study Research and Development of Framework to Develop Guiding Strategies for Student Teachers?
<b>Presenter/s</b>	Soraya De Simone
<b>Affiliations</b>	HEP Vaud (Switzerland)
<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 14:30-16:00pm (Newman Green)
<b>Abstract</b>	<p>This paper caters to everyone involved in professional development of teachers including teacher trainers and educational researchers. In our exploratory study, we applied a lesson study procedure during a feedback session given by a teacher trainer to a student teacher. Three teacher trainers, teaching at primary level in French-speaking Switzerland were involved in our study. We analyzed 6 post-lesson interview protocols conducted at different time intervals. This procedure enabled us to highlight the tutorial posture adopted by teacher trainers as well as the knowledge they used to guide the student teachers. The results reveal that lesson study as a collective and iterative procedure is significant in the analysis of professional development of teacher trainers. This is because the application of this procedure implies a certain level of anticipation of elements they would like to integrate in their feedback. Overall, the collective thinking generated resources for professional development of teacher trainers.</p>

<b>Presentation Code</b>	5Hb
<b>Title</b>	A Lesson Study-based Action in Developing Students' Interaction in Speaking Class Using Verbal Association Games.
<b>Presenter/s</b>	Lutfi Istikharoh and Rina Agustina
<b>Affiliations</b>	University of Muhammadiyah Purwokerto (Indonesia)
<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 14:30-16:00pm ( Newman Green)
<b>Abstract</b>	<p>English Education Department students at the University of Muhammadiyah Purwokerto are expected to achieve high proficiency of English speaking skills. One of ways to achieve this final outcome is making them actively communicating in the speaking class. The students activeness relates to their comprehension towards the material. Moreover their active participation will be able to build through good verbal interaction amongst them. However, the interaction problems happened during the first and the second meeting, in which they were inactive during discussion and unwilling to talk voluntarily. These facts are supported by three problems that can be identified during the first and two meeting, namely: (1) limited <i>interaction</i>, (2) limited <i>involvement</i>, and (3) low <i>self-esteem</i>. The causes of the problems were: (1) limited <i>ideas what to talk about</i>, (2) unwilling to <i>share opinions</i>, (3) <i>English grammar misconceptions</i>, and (4) poor <i>English vocabulary</i>. Thus, <i>Verbal Association Game</i> was applied in the <i>Speaking 1</i> to increase students' active interaction and vocabulary enrichment.</p> <p><i>Verbal Association Game</i> is a language learning game which underpin the process of connecting an object of word, situation, and picture. Richard, Plat &amp; Plat (1992); Cook (1991); Celce-Murcia and Olshtain (2000); and Krashen (1988) have illustrated this game as a learning process in which students are able to develop their ideas, to find connection and to associate topics of word, situation, and picture with their own prior knowledge in the form of sentences. Furthermore, <i>Verbal Association Game</i> is also able to assist students to develop and express their ideas by using varied English sentences correctly. The implementation of the game was presented by ten cycles of lesson study with three observers which was conducted for students of semester I batch 2014. The focus of the LS was on evolving students' interaction which consequently affected their involvement during the speaking learning process. During observing student' speaking activities, the students' interaction increased gradually. In fact, 22 out of 24 students are willing to get involved actively during learning process. Their activeness was also represented by their eagerness in posing questions and giving ideas during the speaking activities. Moreover,</p>

	the students were able to construct good sentences using their new and existing vocabulary. In summary, students were able to use current and reinforce words by creating simple sentences and those sentences were constructed using appropriate diction and grammar. Consequently, these improvements support the students' interaction during the learning process in speaking class.
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<b>Presentation Code</b>	5Hc
<b>Title</b>	Improving Students' Ability to Identify English Diphthongs through Lesson Study-based Learning
<b>Presenter/s</b>	Deddy Sofyan Suri
<b>Affiliations</b>	Pakuan University (Indonesia)
<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 14:30-16:00pm ( Newman Green)
<b>Abstract</b>	English Phonology is one of the courses considered to be difficult by the students of English Education Study Program (EESP) of Pakuan University because they have to learn some related theories of producing and pronouncing sounds and words. To solve the problems, a team of lecturers agreed to conduct a learning process using a self-created technique called DRIM (Dictating, Reading, Identifying, and Modelling). The study aims at enhancing students' ability to pronounce various diphthongs. The study is conducted in four steps with lesson study based learning: Dictating, Reading, Identifying and Modelling. (1) in dictating, the students are required to listen to the words pronounced by the lecturer and to write them; (2) in reading, the students are given a text containing diphthongs. The first two steps are carried out to measure the students' basic competence of diphthongs before the lecturer explains the material; (3) in identifying, the students are supposed to identify a given text and to find out the words containing diphthongs; (4) in modelling, the students are supposed to pronounce the words containing diphthongs repeated by his/her classmates. Those four steps of DRIM technique are conducted in each meeting (cycle). Lesson study which consists of planning, doing, and seeing is chosen as the approach. In the planning session, the team sit together to decide how the technique should be carried out. Next, some observers who are lecturers are asked to

	<p>observe the teaching learning process in each meeting (doing). Finally, in the seeing session, the observers are asked to give their reflections such as comments or suggestions based on their observation. The study was conducted to the third semester students of English Education Study Program, the Faculty of Teacher Trainings and Educational Sciences of Pakuan University, Indonesia. The data was collected through tests (pre-test and post-test) for finding out the improvement of students' ability to identify English diphthongs, and for finding out the students' perception on the use of DRIM technique through Lesson Study, the data was collected through questionnaires, interview, and observational checklist. After carrying out four meetings using DRIM technique with four times of planning, doing, and seeing sessions (lesson study), the researchers can infer that DRIM technique enables the students (a) to practice a lot, (b) to focus themselves on listening, and (c) to develop confidence in giving examples of pronouncing the words containing diphthongs, and eventually, (d) to improve their ability to identify English diphthongs.</p>
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<b>Presentation Code</b>	5I
<b>Title</b>	Lesson Study in for Technology Enhanced Science Lessons
<b>Presenter/s</b>	Wouter van Joolingen
<b>Affiliations</b>	Utrecht University (The Netherlands)
<b>Type of presentation</b>	Round-table
<b>Strand</b>	Further and Higher Education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Queen's Lecture Theatre 2)
<b>Abstract</b>	<p>The capability to design and evaluate lessons should be in the toolbox of every science teacher. Especially in science teaching the role of technology in education is important. Technology is not only important in providing tools for teaching, such as smart boards, polling tools and course management, but also as tools that are inherent in the content. Examples of the latter category are simulations, e.g. of physical phenomena (Rutten, van Joolingen, &amp; van der Veen, 2012), data collection tools, e.g. for measuring temperature or pitch and volume of sound, and tools for modelling, ranging from spreadsheets to computer algebra tools, (Louca &amp; Zacharia, 2011). Such tools are used in science classrooms for performing experiments, processing their outcomes and building scientific models, often in the context of learning by inquiry. Inquiry learning tasks, inherent to science education, require higher order reasoning by students (Sins, Savelsbergh, van Joolingen, &amp; van Hout-Wolters, 2009) and are experienced as difficult (Sins,</p>

	<p>Savelsbergh, &amp; van Joolingen, 2005). That creating effective lessons around such technology is not trivial was shown in a previous study in which learning outcomes varied significantly between teachers, using the same technology and the same lesson designs (Rutten, van Joolingen, &amp; van der Veen, 2016). This means that there is a strong need for teachers to critically examine and redesign lessons in which technology is used to stimulate and support learning by inquiry. Obviously, lesson study (Dudley, 2014) is a candidate approach for empowering teachers in the critical design and evaluation of such lessons.</p> <p>In the coming year, we plan to introduce lesson study as the main approach in a design course for pre-service and in-service science teachers. The main purpose of the course is to equip students with skills to design and evaluate technology-enhanced science lessons for inquiry-based learning. To this end they will go through a full lesson study cycle in which they will perform two research lessons. The course will be evaluated with respect to its effects on student self-efficacy in the design of the technology-rich lessons.</p> <p>In this round-table I would like to discuss the following questions:</p> <ol style="list-style-type: none"><li>1. How to observe the effects of the lesson design on the inquiry behavior of students in the research lessons?</li><li>2. How can observational technology, such as video, audio and software registration be used in an optimal way?</li><li>3. How to assess students skills and self-efficacy with respect to technology enhanced, inquiry-based lessons?</li></ol>
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<b>Presentation Code</b>	5J
<b>Title</b>	Developing Lesson Study for Additional Educational Uses for Pupils with Learning Difficulties: Lesson Study for Assessment and Inter-Professional Lesson Study
<b>Presenter/s</b>	Brahm Norwich, Sui Lin Goei, George Koutsouris, Hannah Hamlin and Marie Barrett
<b>Affiliations</b>	University of Exeter (United Kingdom)
<b>Type of presentation</b>	Symposium
<b>Strand</b>	Special needs and inclusive education
<b>Time/Location</b>	Sunday 4 <sup>th</sup> September 14:30-16:00pm (Newman Blue)
<b>Abstract</b>	<p>This symposium aims to explain and demonstrate how lesson study approaches usually used to promote professional learning and teaching developments have been developed and evaluated through three rounds of successive trials. This work is based on original development and research work undertaken between 2010-2013 at Exeter University that applied and research lesson study to enhance the teaching of pupils with moderate learning difficulties in secondary schools (Norwich and Jones, 2014).</p> <p><b>Paper 1:</b> Lesson Study for assessment (<i>Professor Brahm Norwich</i>)</p> <p><b>Aims:</b> The aim of this paper is to illustrate the principles and practices of adapting lesson study as a dynamic or response to teaching approach to assessing pupils with learning difficulties (Norwich and Ylonen, 2015). This variation of lesson study is justified and used to evaluate a small scale trial in 5 primary and secondary schools.</p> <p><b>Methods:</b> Fifteen lesson study team members recorded their lesson study practice using provided templates. They also completed questionnaires about the context, process and outcomes of the lesson study at the end of two cycles. Each participant was interviewed individually about their lesson study experiences.</p> <p><b>Findings:</b> Evidence is presented of how lesson study for assessment refocused teachers' assessment of pupils' learning needs away from child to learning environment factors. Teachers' perceptions about the lesson study process and its outcomes are also summarized as are ways to further develop this novel formative assessment approach.</p> <p>This trial shows original evaluation evidence of the feasibility and value of using lesson study for assessment.</p> <p>Norwich, B. &amp; Ylonen, A. (2015): A design-based trial of Lesson Study for assessment purposes: evaluating a new classroom based dynamic assessment approach European Journal of Special Needs Education, DOI: 10.1080/08856257.2015.1009702 .</p>

**Paper 2:** Inter-professional Lesson Studies: (*Dr. George Koutsouris*)

**Aims:** This paper reports on empirical findings to propose that issues of translating basic science, including knowledge from neuroscience, into relevant teaching practice can be addressed through Lesson Study (LS), as an increasingly used technique to stimulate teacher enquiry. The findings presented are from a modified LS approach that involved psychologists and mathematics lecturers working together with school-based teachers to prepare a series of lessons on mathematics (Norwich et al., 2016).

**Methods:** The LS team review and planning meetings and subsequent interviews were recorded and analyzed, with reference to translational issues and the kind of knowledge used.

**Findings:** It was found that there was some successful bridging between theory and practice, and evidence of translation of theoretical knowledge into relevant teaching practice. Yet, the analysis showed that relatively little involved a useful applied neuroscience/neuropsychology element, whereas other psychological knowledge from cognitive, developmental, educational and clinical psychology was considered more relevant to planning the LS. These findings will be discussed with reference to the debate about the relevance of knowledge about brain functioning to school teaching, and in relation to a particular reading of Nonaka and Takeuchi's knowledge creation SECI model that presents knowledge creation as an interaction between tacit and explicit knowledge.

Norwich, B., Koutsouris, G., Fujita, T., Ralph, T. Adlam, A. and Milton, F. (2016) Exploring knowledge bridging and translation in Lesson Study using an inter-professional team. *International Journal of lesson and learning Studies* (in press)

**Paper 3:** Being a Member of Inter-professional Lesson Study (LS) Team (*Marie Barrett and Hannah Hamlin*)

**Aims:** This paper describes a novel use of LS involving a school's usual educational psychologist, the school's SEN Coordinator and two mathematics teachers to develop the teaching of two pupils in a maths class. The general aim of the paper is to give an account of the experiences and observations of the SENCo and educational psychologist of the two LS cycles. The LS process involved some face to face team meetings and some distance/skype linked meetings. iPads were used to capture some of pupil learning for transmission to the educational psychologist when she could not be in the research lesson. The paper aims specifically to examine how the LS team members related to each other and how professionals

	<p>with distinct professional roles and backgrounds used their knowledge in the LS process.</p> <p><b>Methods:</b> During each LS cycle the team members kept records of their planning and reviewing processes and their observations of the two pupils' learning during the research lessons. These will be analyzed to address the specific aims of the paper.</p> <p><b>Findings:</b> The analysis of the two cycles shows how the LS team formed a productive and cohesive approach to the LS process and how this related to their previous working experiences with each other. The findings also analyze the processes and outcomes of the LS cycles in terms of teacher professional learning and pupil learning. The paper concludes with a discussion of the sustainability of this form of inter-professional LS.</p>
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<b>Presentation Code</b>	5Ka
<b>Title</b>	Best Practices of Lesson Study Implementation in Batu Tourism City (Kota Wisata Batu-KWB)
<b>Presenter/s</b>	Nurwidodo
<b>Affiliations</b>	University of Muhammadiyah Malang (Indonesia)
<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 14:30-16:00pm (Peter Chalk 1: 1.1-1.3)
<b>Abstract</b>	<p>Mathematics and Natural Science Education Department, Faculty of Teacher Training and Education, University of Muhammadiyah Malang (FTTE UMM) is grantee of lesson study extended grant batch 3 year 2011-2013. One of the responsibilities as a grantee is extending the implementation of lesson study in partner schools. The Department has been collaborating with Batu Tourism City to expand the implementation of Lesson Study in schools. Education Department KWB has agreed upon the implementation of Lesson Study in Elementary Schools (SD) and Junior High School (SMP). The programs have covered dissemination, workshop, open class, and reflection.</p> <p>Lesson study dissemination was conducted on December 2015, recruiting 400 teachers of Elementary Schools and Junior High Schools across Batu. The next stage was selecting piloting schools to follow up by conducting workshops and open lesson. There were 4 selected piloting schools, namely: SDN Junrejo 1, SDN Ngaglik 1, SMPN 1, and SMP PGRI 1 Batu. The workshops were aimed at doing lesson design necessary before conducting open lesson on January 2016. The research team also invited the expert of Lesson study, Ryo Suzuki, from Benese Japan.</p> <p>Open lesson of cycle I was conducted in SDN Junrejo 1 on March 31, SDN Ngaglik 1 on April 7, SMP PGRI 1 on April 12, and SMPN 1 Batu on April 15, 2016. Each open lesson was followed up by reflection to discuss and take the best practices out of each session.</p> <p>From monitoring and evaluation, a number of best practices were drawn both for FTTE UMM and Education Department of Batu. For the Education Department of Batu, the important points include: 1. Education Department has witnessed and generated a lot of ideas as insights for the proper implementation of lesson study; 2. Education Department has declared that lesson study is aimed at improving learning process; 3. Education Department has affirmed that lesson study is proven to improve the quality of learning process; 4. Education Department has stated that lesson study is to be a robust program to complete the icon of Batu (KWB) as a tourism city, in which “education” is supposed to also be the attraction of</p>

	KWB; and 5. Education Department finds it urgent to synergize lesson study and research paper writing of teachers and Teacher Union Program.
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<b>Presentation Code</b>	5Kb
<b>Title</b>	From Beginning to Mature: Investigating the Development of Teacher Community through Lesson Study
<b>Presenter/s</b>	Aoibhinn Ni Shuilleabhain
<b>Affiliations</b>	University College Dublin (Ireland)
<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 14:30-16:00pm (Peter Chalk 1: 1.1-1.3)
<b>Abstract</b>	<p>Teacher community has been established as a powerful vehicle for educational reform (Stoll et al., 2006). However, research has referenced the vulnerabilities of teacher communities (e.g. Rousseau, 2004) where 'fragile and transient' (Senger, 1999, p. 201) groups fail to develop into sustainable communities and therefore fail to positively impact student learning.</p> <p>In this paper, the potential of lesson study in forming and developing teacher community is investigated. Situated in two case study schools, Doone and Crannog (all names pseudonyms), the progression of two teacher communities is analysed over the course of one academic year over multiple, successive cycles of lesson study.</p> <p>Grossman, Wineburg and Woolworth (2001) suggest a model of the formation of teacher professional community. They categorize and identify the various dimensions of community as relevant to three stages of development: beginning, evolving, and mature. These dimensions correlate with Wenger's (1998) features of community of practice: mutual engagement, joint enterprise, and a repertoire of negotiable resources accumulated over time. Lesson study provides structure for the development of these features since: teachers mutually engage in phases of planning, conducting, and reflecting on research lessons; all members of the group (aside from a knowledgeable other (Takahashi, 2014)) contribute equally; teachers engage in the cycle as a joint enterprise; and teachers create a repertoire of pedagogical resources (Lewis et al., 2009).</p> <p>In this research, five teachers in Doone and seven in Crannog</p>

	<p>volunteered to participate in the year-long study where lesson study was introduced as a new and unfamiliar form of professional development. Qualitative data was generated through audio recordings of lesson study meetings (36 hours), researcher field notes, and teacher interviews. Qualitative analysis was undertaken as an iterative process, utilizing a coding framework as suggested by Grossman et al. (2001) and incorporating features of Wenger's (1998) communities of practice.</p> <p>Both communities began their participation at differing stages of formation: Doone as a 'beginning' and Crannog an 'evolving' community. Analysis shows that due to teachers' participation in lesson study, both communities matured to the successive dimension of formation within Grossman et al.'s (2001) framework. This finding suggests that lesson study can provide a powerful professional development structure within which teacher community can be developed.</p> <p>This research contributes to the literature on lesson study as a valuable model of professional development through which to develop sustainable teacher communities, a key feature of implementing educational reform.</p>
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<b>Presentation Code</b>	5Kc
<b>Title</b>	Implementation Strategies of Learning Organization in Enhancing The Competence of Teachers through School-Based Lesson Study
<b>Presenter/s</b>	Dian Rahmawati
<b>Affiliations</b>	SMA Negeri 1 Jalancagak
<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 14:30-16:00pm (Peter Chalk 1: 1.1-1.3)
<b>Abstract</b>	<p>Learning Organization always facilitates learning processes to its members continuously as an effort to perform self-transformation. Schools as learning organizations always provide chances to and encourage individuals within to keep learning and broadening self-capabilities and competencies. School-Based Lesson Study is a development model for teacher profession through continuously collaborative learning assessment based on mutual learning and collegiality principles in order to build a learning community. School-Based Lesson Study can build a learning organization and improve teacher's competencies when implemented effectively. This is an analytical descriptive study using qualitative approach to</p>

	<p>analyze implementation of School-Based Lesson Study in SMA Negeri 1 Jalancagak Subang. Moreover, obstacles in its implementation are analyzed using Fishbone Analysis tool to find solutions. The final aim of this study is to design a strategy for a more effective implementation of School-Based Lesson Study in order to build a learning organization and eventually to improve teacher's competencies.</p> <p>This study shows that comprehensive implementation of school-based lesson study based on strong understanding and commitment, backed up by binding policies and regulations and integrates empowerment of subject teacher associations, learning culture and dynamics building and carried out by an effective team, realistic SOP, allocation of relevant resources, application of reward and punishment system, as well as good management of resistance and performance assessment in accordance with the goals of school-based lesson study implementation can effectively develop learning organization and improve teacher competence.</p>
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<b>Presentation Code</b>	5L
<b>Title</b>	Leading Teaching for Active Learning: Lessons from Japanese Manabiai
<b>Presenter/s</b>	Masao Mizuno, Takashi Soejima, Atsushi Sakamoto, Toshiko Suzuki, Toshiya Chichibu
<b>Affiliations</b>	Aichi Bunkyo University, Fukushima University, Seirei Junior and Senior High School, National Institute for Educational Policy Research
<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 14:30-16:00pm (Queen's Lecture Theatre 1)
<b>Abstract</b>	<p>The purpose of this symposium is to examine the effect of 10 years' utilizing a Manabiai approach to students' learning at public schools in Komaki City in central Japan, and the possibility of reconstructing teaching by facilitating active learning in a classroom through this approach. Manabiai is defined as an effective learning design which facilitates students participating actively in pair or group work. The students are required to pay close attention to peers during the teaching and learning process. It is designed to combine pair or group discussions with a whole-class discussion.</p> <p>The main aspects of Manabiai in Komaki City schools are as follows:</p> <ul style="list-style-type: none"> <li>• Manabiai is a new approach to designing learning for Komaki</li> </ul>

	<p>teachers</p> <ul style="list-style-type: none"><li>• Manabiai requires teachers to understand facets of students' deep understanding</li><li>• Manabiai requires teachers to focus on students' thinking and activities</li><li>• Manabiai promotes learning community in the classroom as well as the whole school</li></ul> <p>Qualitative and quantitative research methods were employed for data collection. For qualitative research, a case study method was employed. For quantitative research, a questionnaire was completed by the teachers in Komaki City. All of the teachers from 25 elementary schools and junior high schools in Komaki City were asked to participate in the data collection process. The number of participants totaled 692, among which 603 teachers replied to the questionnaire. This means that 87 percent of the teachers in Komaki City kindly supported the research.</p> <p>From this collaborative research it can be illustrated that,</p> <ol style="list-style-type: none"><li>1) Manabiai promotes a learning community among students and teachers in the classroom as well as the whole school. These results are supported by both qualitative and quantitative analyses. Regardless of experience, gender and school level, more than 89 percent of teachers in the survey reported that they had been applying Manabiai approach in the classroom. In addition, more than 70 percent reported that they voluntarily conducted the class based on Manabiai.</li><li>2) There are two main reasons for applying Manabiai in Komaki: a) in the area of knowledge-based society, lecture-based teaching method seems no longer effective, b) Manabiai encourages students to learn how to learn and to be more self-directed in their studies. It also encourages students to relate to each other and help one another.</li><li>3) The teachers reported that Manabiai was challenging for them because it was different from a traditional method employed in the classroom. The difficulties they faced can be attributed to the characteristics of Manabiai. That is, Manabiai is continuously evolving and constantly new situations arise during interaction among students. Therefore teachers need to reflect on their action throughout a class. In addition, as a teacher becomes skilled in Manabiai, he or she realizes additional challenges with Manabiai. It is difficult for experienced teachers as well as novices.</li><li>4) Finally, it can be said that continuous discourse between students and teachers as learning partners, aiming for sustainable lesson improvement, leads to the enhancement of learning, improvement of teaching and enrichment of assessment for learning.</li></ol>
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	<p><b>Paper 1 (Soejima, Sakamoto)</b> The main purpose of this paper is to present the results of a research on Manabiai conducted in Komaki City, Japan. Based on the qualitative and quantitative analyses of the research, it could be claimed that, Manabiai has become established in Komaki. Besides, the study also revealed the need for assessment of lesson improvement from the viewpoints of a) functions and merits of cooperative / collaborative learning b) proper use of teaching methods c) a long- and short -term perspectives.</p> <p><b>Paper 2 (Mizuno, Suzuki)</b> This paper focuses on assessment by both students and teachers of a lesson aiming at knowledge construction. The students assessed the lesson from three viewpoints, namely whole-class activity, individual work and teacher-led instruction. Reflections on Manabiai process based on the students' assessment allowed the teachers to gain a deeper understanding of students' learning, which subsequently led teachers and students to improve their lessons. The results showed that the student assessment was in accord with what the teachers felt about their class. Assessment through Manabiai process based on collaboration between students and teachers may help resolve some negative issues of traditional teaching methods.</p> <p><b>Paper 3 (Chichibu)</b> The purpose of this paper is to clarify the effects of Manabiai process (as discussed in Paper 1 and Paper 2) under the educational reform in Japan, summarizing the tide of active learning and revision of the Course of Studies.</p>
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<b>Presentation Code</b>	5Ma
<b>Title</b>	Translating the Incommensurable: A Philosophical Reflection on Transferring Lesson Study
<b>Presenter/s</b>	Yasushi Maruyama
<b>Affiliations</b>	Hiroshima University
<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 14:30-16:00pm (Peter Chalk 4: 2.4-2.6)
<b>Abstract</b>	<p>Hiroshima University had a commitment to transfer Lesson Study to Dominican Republic from 2010 to 2016. The government asked the University to assist in bettering students' academic performances and the University chose Lesson Study as a tool for the betterment. The Japan International Cooperation Agency (JICA) had sent specialists of Lesson Study in Math Education to the country and they had worked with elementary schoolteachers. Hiroshima University worked with teacher educators, instead. They were professors of Math Education, Science Education, Social Studies, Physical Education and Philosophy of Education in the Faculty of Educational Science, Santo Domingo Autonomous University that is only one national and the biggest university in the country. Most of the professors used to be schoolteachers and did not have any experience in working with their colleagues for the purpose of improving their teaching. Hiroshima University's long-term plan was that in-service schoolteachers who were taught Lesson Study by teacher educators in their teacher education programs should and could improve their teaching in schools by using Lesson Study with their colleagues, and that, through improving their teaching, Lesson Study should and could better students' academic performances accordingly. The attempt of the University partly succeeded, but not in all the aspects.</p> <p>This paper will discuss cultural and conceptual issues regarding Lesson Study in order to understand its nature beyond our belief about it. The paper will analyze the case of transferring Lesson Study to Dominican Republic by means of Th. Kuhn's concept, "incommensurability," which puts great emphasis on the impossibility of translation between theories that have different conceptual frameworks. Transferring Lesson Study from Japan to other countries may seem to be a trial of translating something incommensurable because cultural and conceptual backgrounds on which Lesson Study depends may be different. When transferring Lesson Study can never mean an exact translation, what would happen in translating the incommensurable?</p>

<b>Presentation Code</b>	5Mb
<b>Title</b>	Promote Teacher Learning through Lesson Study in Kenyan Primary Schools
<b>Presenter/s</b>	Yumiko Ono, Mitsuko Maeda, Hatsue Kimura and Gerrit Stols
<b>Affiliations</b>	Naruto University of Education (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 14:30-16:00pm (Peter Chalk 4: 2.4-2.6)
<b>Abstract</b>	<p>Lesson study has been introduced in many developing countries by the Japan International Cooperation Agency (JICA) as a strategy to improve mathematics and science lessons (JICA, 2014, 2015). In Kenya, field officers and head teachers, who participated in JICA supported training in Japan (2010-2013), have been promoting lesson study in primary schools as school-based continuing teacher professional development. Subsequently the university research team visited Kenya to observe lessons and participate in post lesson discussions. Analysis of the post lesson discussions showed that comments centered largely around logistics and pedagogy, and were classified as mostly at Level 1* using the Ono, Chikamori and Rogan rubric (2013). It appeared that the discussions, while lively and well supported, did not come to grips with substantial issues which could impact on the quality of teaching and learning. Hence two new interventions in lesson study practices were implemented: ∅ Re-teaching a Standard 8 science lesson based on a revised lesson plan developed in a post lesson discussion. ∅ Teaching the same topic of the same grade (Grade 7 mathematics: division of a fraction by a fraction) in different classrooms by a Kenyan and a Japanese teacher. The proposed presentation explores how Kenyan primary school teachers experienced the two new interventions, and what they learned from them. Data for this study include lesson plans, videotaped lessons and post lesson discussions, and students' comments. Lessons will be analysed from the perspective of lesson organization, cognitive level of teacher questions, and students' level of involvement in minds on activities. Post lesson reflective comments will be used to determine which aspect of a lesson teachers focused on when observing both Kenyan and Japanese taught lessons. Preliminary analysis suggests the effect of local "cultural scripts" (Stigler and Hiebert, 1999) on teachers' reflective comments. Kenyan primary teachers were especially skeptical of problem solving approach by a Japanese math teacher, which is quite different from their local practices (Hardman et al, 2008; Kimura et al, 2015). Based on the results, we will discuss what measures are necessary to improve quality of lesson study in Kenyan primary schools.</p>

<b>Presentation Code</b>	5Mc
<b>Title</b>	Intercultural Teacher Learning through Classroom Observation and Communication in Different Contexts
<b>Presenter/s</b>	Shigeru Sasajima
<b>Affiliations</b>	Toyo Eiwa 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 14:30-16:00pm (Peter Chalk 4: 2.4-2.6)
<b>Abstract</b>	<p>Cultural or intercultural awareness is growing a more and more important and necessary concept for language teachers as well as learners who will study and work in the current global society. It is virtually impossible for language teachers to understand and teach the knowledge, attitudes, and skills that are essential to cultivate intercultural communicative competence (ICC) (Byram, 1997), which may be defined as the ability to understand their own culture and successfully communicate with people of other cultures. Not only language teachers but also other subject teachers should develop intercultural awareness through teacher education. This paper thus focuses on teacher cognition about ICC, especially teacher learning of intercultural awareness through the process of preservice teacher education program, and aims to explore the ways to help teacher trainees develop their knowledge, attitudes, and skills shaping appropriate ICC, especially even in the learning community with less opportunity to experience intercultural communication with people with different cultural backgrounds. In the present research, 12 Japanese teacher trainees participated in the school visit program in Finland in order to help cultivate their ICC by observing different types of classrooms from the ones which they have experienced in teaching and learning. The programme was coordinated by the researcher and the teacher trainees were observed in terms of knowledge, attitudes and skills by way of the ICC checklist. In addition, the teacher trainees themselves had reflective discussions on classroom observation, while they communicated with the teachers and students who they had met when visiting each school and university. The data were gathered in the forms of the field notes that the researcher had recorded and the journals that the teacher trainees had written. They were analyzed qualitatively on the basis of qualitative data analysis (QDA) (Seidel, 1998) combined with the concept of complex adaptive systems (CAS), which are considered open, non-linear and self-organizing systems and can be useful to understand complex classrooms and teacher cognition (Sasajima, 2013). The results show that the program of intercultural teacher learning through classroom observation and communication can be effective for</p>

	teachers and teacher trainees to cultivate ICC as part of their teacher cognition. In the presentation, the specific program contents, procedures and reflections will be provided as well as the implication of a model of teacher learning on ICC. They will help develop professional learning communities for teachers and teacher trainees.
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<b>Presentation Code</b>	5Na
<b>Title</b>	Target Oriented Lesson Study (TOLS) Combining Lesson study with an Integrated Impact Evaluation Model
<b>Presenter/s</b>	David Godfrey and Sarah Seleznyov
<b>Affiliations</b>	UCL Institute of Education (United Kingdom)
<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 14:30-16:00pm (Newman Collaborative)
<b>Abstract</b>	<p>This paper presents the learning gained from two projects in London, funded through the London Schools Excellence Fund (LSEF) from 2013 to 2015. Both projects aimed to improve teacher pedagogy and pupil learning outcomes through the promotion of lesson study (LS). Students from under-achieving or vulnerable groups were targeted during LS interventions. The projects involved both primary and secondary school teachers and sought to improve outcomes in either mathematics or literacy.</p> <p><b>Research questions/focus of the enquiry</b> An impact evaluation approach was adopted that had been previously used at the authors' university department to evaluate other professional development programs (Earley and Porritt 2014); this was adapted specifically to use in lesson study cycles. A promising conceptual model for 'Target Oriented Lesson Study (TOLS) is described that integrates planning for impact; the conduct of LS cycles; and evaluation.</p> <p><b>Research methods and/or mapping of the literature</b> The paper looks at empirical research on LS conducted internationally over the last 10 years. Gaps are identified in terms of levels of impact (Guskey 2002) that have been evaluated through</p>

	<p>the use of LS programs. We examine the challenge of finding the logical chain of action that leads to identifiable impact on learner outcomes when teachers are engaged in LS. We also examine some of the literature that justifies the use of our data collection tools and rationale.</p> <p><b>Analytical and/or theoretical framework</b> The approach combined the ideas of: i) 'starting with the end in mind', i.e. targeting the desired impact on pupil learning and changes to practice, ii) using Guskey's multiple-levels of impact to guide the use of data collection tools iii) an 'improving rather than proving' approach to evaluation that sought to maximize the impact of lesson study on practice and iv) triangulation of qualitative and quantitative outcome measures.</p> <p><b>Research findings and/or contribution to knowledge</b> The projects showed LS to have had an impact on teacher learning; use of knowledge and skills; and qualitative and quantitative learner outcomes. We suggest a conceptual model for TOLS and suggest this as an approach to be tested in future LS research and development projects.</p>
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<b>Presentation Code</b>	5Nb
<b>Title</b>	The Impact of Learning Community at SMP Cokroaminoto Palopo toward the Students' Participation in English Class
<b>Presenter/s</b>	Sri Damayanti Saruman, Nurjannah Zainuddin and Nurmala Saruman
<b>Affiliations</b>	SMP Cokroaminoto Palopo (Indonesia)
<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 14:30-16:00pm ( Newman Collaborative )
<b>Abstract</b>	Learning Community was held by University of Cokroaminoto Palopo in 2015. There were five English lecturers collaborated with 2 English teachers at SMP Negeri 3 Palopo and 1 teacher at SMP Cokroaminoto Palopo. This paper aimed is describing the impact of English learning community toward the students' participation in learning English at SMP Cokroaminoto Palopo. The research question of this paper is what are the impact of learning community held by the University of Cokroaminoto Palopo toward the students' participation in English class? In answering the research question, the researcher conducted a research in two years by participating in learning community. After conducting lesson study in English class, the researcher found that the students become

	enthusiastic and cheerful in learning English. The English teacher received some suggestions in teaching her class. After conducting plan, do, see with the learning community she found one model in teaching English. She called it sit down and stand up strategy. This strategy can motivate the students to be more active participants, enthusiastic, and cheerful.
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<b>Presentation Code</b>	5Nc
<b>Title</b>	Exploring Students' Knowing by Pre and Post-tests in Learning Studies
<b>Presenter/s</b>	Viveca Lindberg and Åsa Hirsh
<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>	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 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</p>

	<p>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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