

Some critical issues posed by ‘Theory and Practices of Lesson Study in Mathematics’ from a Western Perspective

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Abstract . This paper constitutes an attempt to produce a critical commentary on this volume that is informed by a ‘classroom action research’ tradition, which originated in the work of Lawrence Stenhouse and others at the Centre for Applied Research in Education (CARE) at the University of East Anglia in England. It involved a series of projects, which engaged groups of ‘teachers as researchers’ in their classrooms, and stimulated the development of a research tradition that impacted across the UK and Europe and more widely in the latter part of the 20th century. The paper begins with a summary of the main ideas embedded in this tradition of collaborative classroom action research, and then goes on to discuss in their light a number of themes and issues posed by contributions in this volume. These include the respective roles of academic experts and teachers in the lesson study process, the role of teachers in constructing accounts of lesson studies and creating ‘knowledge platforms’, the role of teachers as researchers in relation to curriculum development, the use of learning theories to inform lesson study, and the problem of globalizing lesson study methodology across cultures and systems.

Introduction

The ‘Western Perspective’, which informs this commentary, is the pragmatist view of ‘the teacher as a researcher’ forged by Lawrence Stenhouse during the 1960’s in England through the Humanities Curriculum Project (see Stenhouse 1968, 1975) and further developed in the latter part of the 20th Century by Elliott and Adelman (1973), Ebbutt and Elliott (1985) Elliott (1976-77/2007)

, Somekh (2006), and other colleagues at the University of East Anglia and the Cambridge Institute of Education through a series of funded classroom action research projects and post-graduate teacher research programmes. This perspective stimulated and informed the classroom action research movement more widely in the UK and Europe (see O'Hanlon 1996, 2003, and Altrichter, Posch and Somekh 1993). The movement led to the creation of the *Educational Action Research Journal* in the early 1990's, aimed at supporting the development of the theory and practice of educational action research internationally (see Day, Elliott, Somekh and Winter 2002).

The key features of Stenhouse's conception of the 'teacher as a researcher', which underpinned the classroom action research movement as it evolved, can be summarized in the following terms:

1. The idea implies a *process model* (Stenhouse, 1975, Ch.7) of curriculum planning and development, in which the knowledge contents of the curriculum are selected as foci for speculative thought, rather than objective facts to be mastered. Stenhouse claimed that the structures of knowledge – procedures, concepts and criteria - that shape worthwhile curriculum content are intrinsically problematic within the subject and are therefore a focus for discussion and debate. 'Understanding' as a pedagogical aim for engaging learners with such content cannot be achieved, only deepened and widened, in the light of discussion between teacher and students and between the students themselves. Stenhouse argued that there must always be an element of doubt about what constitutes a valid understanding of subject-matter. Both the teacher and their learners have to accept an exploration of the nature of understanding as part of their respective tasks. Educational aims for handling curriculum content, such as 'the development of understanding' are best viewed, according to Stenhouse, as clusters of values to be realized in the pedagogical process of engaging pupils as learners with educationally worthwhile subject matter.

Such values, he claimed could be cast as *principles of procedure* that are logically implied by an educational aim. Hence for Stenhouse, providing students with opportunities to express their personal points of view on the subject content through classroom discussion, and in the process protecting the expression of divergent and minority opinions, are important principles of procedure that are implied by the aim of ‘developing understanding’. However, such an aim also implies principles for selecting educationally worthwhile subject content; namely, that it can be linked to the lived experiences of learners in every-day life and the structures of knowledge which enable them to think about and reflect on such experiences. The research role of the teacher is concerned with identifying constraints on the realisation of procedural values and principles in the teaching-learning situation and discovering action strategies for resolving them.

Stenhouse, echoing John Dewey, argued that “there are criteria by which one can criticise and improve the process of education without reference to an end-means model that sets limits to one’s efforts.” (p.xx) In these terms, he rejected ‘technical rationality’ as a model of reasoning for improving the teaching and learning process (see Stenhouse 1975, Ch.6). The role of the ‘teacher researcher’ was to criticise and improve educational practice in the light of the procedural principles implicit in an educational aim. In doing so s (he) generated diagnostic and practical hypotheses for fellow teachers to test in the context of improving the teaching and learning in their own classroom. However, in doing so they depended on conversations with their students disciplined by evidence about their experiences as learners in the classroom environment, and conversations with their peers disciplined by evidence gathered as observers in their classroom.

According to Stenhouse (1975, Ch.6) ‘the behavioural objectives model’ of curriculum planning and development distorted the nature of Knowledge. In this respect, again echoing Dewey, Stenhouse embraced ‘democratic rationality’ as a model of reasoning

for improving the teaching and learning process. Within this model of practical reasoning ‘the teacher as a researcher’ reflected jointly on both the means and end of teaching, while taking into account the points of view expressed by pupils and professional peers. Stenhouse was happy to depict the process of teacher action research as one of *curriculum development*, since the *process model* that shaped it synthesised ‘principles for selecting content’ with ‘principles for engaging learners with it’. Teachers as researchers reviewed and reconceptualised worthwhile curriculum content in the process of developing strategies for realising their pedagogical aims.

2. The idea implies that the teacher is socially situated in *professional learning communities*, which collaboratively and systematically develop shared insights into, and strategies for handling, problems and issues that arise in their classrooms about the realisation of their educational aims and values in action. They do so by sharing, comparing and contrasting their case studies of teaching and learning in their classrooms. Such ‘communities of practice’ provide a context for ‘collaborative lesson research’ that is orientated towards providing platforms for the improvement of teaching and learning and curricula in schools. The aim of collaborative teacher research with support from professional researchers is to progressively construct a professional knowledge base that can be accessed by increasing numbers of teachers to support the development of their professional practice in classrooms. The scale and depth of teachers’ professional development will depend on the cumulative growth of accessible ‘pedagogical knowledge platforms’ by teacher-researchers. This does not imply that teachers use such platforms to improve their practice without becoming teacher-researchers themselves. It simply implies that the scale and depth of teacher development is dependent on the progressive construction of publicly accessible pedagogical knowledge. Without the construction of accessible and cumulative ‘pedagogical knowledge platforms’ by teacher researchers the professional development of teachers will lack over time both *scale* and *depth*.

3. The idea implies that teaching is cast as an ‘experimental activity’ in which the publicly accessible findings of teacher research are treated as hypotheses - about how to improve the quality of students’ learning experiences, and the ethical agency of teachers in realising educational values and principles in action - to be tested and further developed in more classrooms conceived as ‘laboratories’. In this respect we again find echoes of Dewey, with respect to his ‘laboratory model’ as opposed to an ‘apprenticeship model’ of learning to teach (see Elliott 2012). On this view, teachers learn to improve the curriculum and the teaching and learning process in their classrooms when they become active participants in the process of creating pedagogical knowledge. The research they undertake will not only benefit them as individual practitioners but also have the potential to contribute to building ‘public platforms of professional knowledge’ that other teachers may benefit from.

4. According to Stenhouse the growth of collaborative teacher research and the progressive construction of pedagogical knowledge platforms are dependent on “a common vocabulary of concepts and a syntax of theory” as a basis for holding disciplined conversations together about the problems of teaching and learning. In other words, teacher collaborative research that is grounded in a ‘democratic model’ of reasoning needs to be informed by a pedagogical theory.

Early in the 21st Century, this author encountered *Learning Study* as a participatory form of classroom action research while working as an adviser on the curriculum reform process in Hong Kong. *Learning Study* was developed by Lo Mun Ling and her colleagues at the Hong Kong Institute of Education in the context of the post-change-over curriculum reforms (see Lo ~~et al., M.L., Marton, F., Pang, M.F., Pong, W.Y. (Eds) 2004; Lo & Lo, M.L. 2009~~). It blended the Japanese tradition of lesson study as a form of collaborative teacher research with Marton and Booth’s Variation Theory (1997), which was developed in Sweden at Gothenburg

University. A high point for this author was his appointment as Evaluator of the ‘Variation for the Improvement of Teaching and Learning’ (VITAL) Project in Hong Kong Schools (See Elliott and Yu 2008, ~~and~~ 2013). It stimulated an interest in comparing *Japanese Lesson Study*, *Learning Study* and the *Teacher as Researcher* movement that stemmed from the work of Stenhouse and others in England.

Themes and Issues posed for the author by this book.

The collection of papers assembled in this book are an important resource for scholars, school teachers, and policy makers who are interested in the theory and practice of Lesson Study, both in the context of mathematical education and more generally across the school curriculum. East Asian and North American perspectives dominate, although there are interesting accounts of lesson study in Africa, the UK, Sweden, Switzerland, Iceland and Portugal. Notably absent from this author’s point of view are accounts of mathematics lesson study in Ireland, Austria and Germany, and Spain. For this author, when viewed through the *lens* outlined above, many of the papers pose important and challenging issues about the development of the theory and practice of lesson study as it globalizes. They provide a structure for this commentary.

How the theory and practice of lesson study shapes up in different cultural settings

There are a number of articles on the history, theory and practice of Chinese lesson study that enable the reader to explore similarities and differences between the theory and practice of Japanese and Chinese lesson ~~study~~ ~~research~~. Here details about how curriculum change in a particular historical and cultural context shapes the theory and practice of lesson study are particularly illuminating. Li’s article, however, pinpoints some invariant culturally distinct features of the Chinese lesson study tradition:

By frequently referring to some Chinese classic works, we attempt to demonstrate how Lesson Study in China has resonated strongly with a few fundamental principles in traditional Chinese education and culture regarding teaching and learning. Specifically, we identify three main themes that have underlain the forms

and characteristics of Chinese Lesson Study: (1) Respecting and learning from masters and experts; (2) Teaching and learning by integrating profound theory and deliberate practice; (3) Consolidating teaching and learning into one complete process. These themes provide guidance to the roles and behaviors of all parties involved in Lesson Study activities: mentors, experts, experienced and novice teachers, and fellow teacher participants.

Within this tradition, the master teachers have expertise that they have developed over time through their active participation in a form of lesson study that has involved the joint development of theory and practice, where practice is informed by an explicit pedagogical theory, and which in turn is developed through practice. Hence, in the Chinese lesson study tradition the development of both theory and practice have joint primacy. According to Li the master teachers learn about different aspects of their teaching - “educational theories, curriculum standards and instructional materials, subject matter content, student characteristics, lesson design and teaching strategies, assessment, etc.”—in the process of deliberately developing their practice. The development of theoretical understanding is not dissociated from the development of teaching as a practice. In this way Li claims, Chinese lesson study traditionally *consolidates* the development of teachers’ teaching expertise with their development as learners. There appears to be a marked similarity of perspective in this respect with Stenhouse’s idea of the ‘teacher as a researcher’. This might be explained by the fact that the relationship between knowledge and action in Confucian thought shares much in common with a philosophically pragmatist view of that relationship rooted in the work of Dewey and Pierce. It is this philosophical outlook that also underpins the Stenhouseian perspective on the ‘teacher as researcher’ ~~perspective~~.

According to Li the Chinese lesson study tradition involves not only “sharing professional learning unidirectionally from mentors and experts to novice teachers”. It also involves “mutual learning among fellow teacher participants with similar levels of experience”. He argues, consistently with Confucius that even “expert and experienced teachers could potentially learn good ideas and strategies from novice teachers in Lesson Study”. Hence, in a

broad sense, “all teachers involved in Lesson Study could be considered members of a learning community with equal status yet varying goals and learning needs” On this account Chinese lesson study does indeed appear to embody a form of ‘democratic rationality’.

In the west, it is often assumed that lesson study methodology originated in Japan. This assumption is understandable given the influence of the PISA tables internationally and the emergence of Japan in those tables as a high performing nation in the field of mathematical learning prior to the more recent emergence of high performing Shanghai. When policy makers, the media, and academic educationists sought reasons for Japan’s success, they discovered lesson studies as a pedagogical practice in Japanese schools; particularly in the primary sector. Interestingly, the vast majority of accounts of Japanese lesson studies depicted in this book are drawn from primary school mathematics lessons. This poses an interesting question: why is lesson study as a pedagogical practice more established in primary rather than secondary schools in Japan; particularly upper secondary schools? This does not appear to be the case with Chinese lesson study as it is portrayed in this book. Could one reason be that it is within this latter age range that teachers as individuals are increasingly held to account by high stakes forms of summative assessment. Another might be that many primary school teachers lack sufficient subject-matter knowledge to teach a subject well. By working together as a group with a subject-matter specialist to study teaching materials and associated curriculum content (*kyouzai kenkyuu*), and then to develop their practice by collectively designing and observing one another teaching *research lessons*, they could compensate for individualized deficits in subject knowledge.

Lesson Study in the Japanese context presupposes a ready supply of curriculum expertise (often referred to in this volume as *knowledgeable others*) to service the planning and conduct of the lesson study process. In the ‘The Origin and Development of Lesson Study in Japan’ Makinae suggests a reason for this supply; namely, the origins of Japanese Lesson Study in teacher training

colleges, during the latter half of the 19th century, as a method for equipping teachers to handle the new teaching materials based on an ‘object lesson approach’ to teaching subject content. This approach was grounded, she claims, in a Pestalozzian theory of subject-matter learning:

According to Makinae a key feature of the teacher training system was the ‘*criticism lesson*’:

In this method, the normal school (training college) students presented a lesson to the class and other students observed and discussed it --- Later, the criticism lesson expanded its role from pre-service teacher training to in-service professional development. This describes how lesson study originated in Japan.

Although lesson study in Japan evolved beyond the original initial training context, it clearly maintained strong links with a source of *knowledgeable others* in the higher education institutions, which absorbed and incorporated functions in the fields of both pre- and in-service teacher education. According to Yang and Ricks (2012) ‘Chinese mathematics teachers “do not exhibit the quantity of formal higher education as their western and Japanese counter-parts”. Yet there is evidence to suggest, Yang and Ricks claim that they have profounder understanding of fundamental mathematical ideas and better pedagogical content knowledge that they are able to use more coherently for the purposes of instruction than their counter-parts in the west and japan. Yang and Ricks suggest that this may be explained by teachers’ participation in the hierarchically layered–school, district and provincial-system of school-based teaching research networks. In this system *knowledgeable others* tend to be master teachers who have developed their expertise through becoming teacher researchers rather than abstract academic study dissociated from deliberative action in classrooms. It is a system in which novice and inservice teachers have continuing access to feedback from *knowledgeable others* at all stages of the lesson study process. I would claim that such a system sustains the distinctive characteristics of Chinese lesson study that Li refers to in his chapter.

Makinae’s paper suggests another reason for the relative containment of Japanese lesson study in the primary school sector; that it

originated in the context of curriculum and pedagogical reforms confined to this sector, which had their roots in Pestalozzian learning theory-*the object lesson* approach. It is often remarked that Japanese lesson research is not informed by any explicit learning theory that can serve as a pedagogical resource for improving teaching and learning in classrooms. This is perhaps why it is sometimes seen to have a purely practical focus on the development of an effective scheme of work (a lesson) as opposed to the realization of educational ideas in a form of action undertaken within the classroom. Whereas the latter might be said to place a dual emphasis on the development of theory and practice, the former appears to prioritize the 'primacy of practice', conceived in terms of technical efficacy. In Hong Kong the rationale for synthesizing Swedish variation theory as a pedagogical tool with Japanese lesson study methodology was that the latter often appeared to focus teachers' attention on their teaching methods as opposed to the quality of their pupils learning experiences in the classroom. Variation theory aspired to focus Hong Kong teachers' attention on the quality of students' experiences in classrooms as learners. In this respect it gave lesson study groups a shared language for thinking about and discussing problems of teaching and learning along the lines advocated by Stenhouse (1975, 157). In this authors view it also embodied a process model of curriculum and pedagogical design (see Elliott 2015, 152-158).

Some would argue that Japanese lesson study is not an atheoretical process. It is now tacitly rather than explicitly informed by the traditional Pestalozzian conceptions of learning and curriculum. One wonders how salient these are now as the cultural script shaping practice in primary schools? To what extent is that script now being compromised in a global context where national educational systems are being shaped by high stakes testing regimes that render teachers and schools accountable for their technical/instrumental effectiveness in maximizing pre-specified pupil learning outcomes? Perhaps lesson study in Japan needs to incorporate a

methodology that enables teachers to reflect on and analyze the cultural scripts that currently underpin the process of teaching and learning in their classrooms. I am thinking here of the seminal work on comparative cross-national lesson study coordinated by Sarkar Arani (see 2017,10-26), which is designed to render the ‘cultural script’, which shapes teaching and learning in particular national settings, explicit as an object of reflection for teachers.

Han and Huang in this volume write:

Although structurally similar to Japanese Lesson Study, some unique features of Chinese LS such as emphasizing the repeatedly rehearsals of the same lesson to different groups of students, perfecting an exemplary lesson, emphasizing knowledgeable others’ involvement throughout the entire of lesson study have been identified. ---Yet, more empirical studies on how teachers learn from and promote students’ learning through Chinese lesson study from various perspectives are needed.--- Interpreting and understanding how Chinese lesson study contributes to mathematics teacher learning will help practitioners and researchers better the mechanism of Chinese lesson study and deepen understanding of the mathematical work of teaching.

This author asks: who will undertake such research and how? This leads him to the next issue this book poses.

Who authors’ accounts of teachers’ lesson studies?

All of the chapters in this book are authored by academic researchers and scholars located in Higher Education settings? Moreover, it is often very unclear how these contributors to the book are socially located in roles and relationships to the work of lesson study and the teachers who participate in it. Are they espousing the stance of a scholarly and impartial observer/spectator of the process and activities they depict? Are they evaluating lesson study as an approach to developing and improving teaching and learning? Have they facilitated and coordinated the lesson study programme for teachers, which they are now authoring an account of? Have they served a programme of lesson study as ‘knowledgeable other(s)? It is important for the reader to understand the social location of academics who write about the work of teachers. One can argue that different roles carry different ‘fore-understandings’ (pre-judgements) about the phenomenon being described and that

these ought to be rendered explicit as objects of reflection by authors who are so positioned. The authors in this volume tend to present their accounts and reports as the product of much scholarly effort, as evidenced by the long list of references at the end of chapters. The point of view presented tended towards that of the detached and impartial academic in the role of the ‘knowledgeable other’.

I will now return to Han and Huang~~’ and Hans~~’s plea for more empirical research into the processes involved in Chinese lesson study. My response would be to ask why the lesson studies that are to figure as objects of inquiry cannot themselves yield the empirical data Han and Huang~~’s and Hans~~ are calling for? Cannot the teachers who participate in lesson studies produce narrative accounts of their collective and individual learning as intrinsic aspects of a lesson study text they co-author. This is not to deny the value of work co-authored by teachers with ‘knowledgeable others.’ However, it is a sad state of affairs when the latter marginalize the research role of teachers as active partners in constructing publicly accessible platforms of ‘pedagogical knowledge’.

‘Cherry-picking’ lesson study as it globalizes to western countries. Some articles in this book provide a timely warning of the dangers of methodological distortion as lesson study globalizes to the western hemisphere. For example, the paper by Takahashi and McDougal in this volume states:

Takahashi, the main author of this article, practiced Lesson Study as a teacher in Japan. He has nearly 20 years of experience observing activities referred to as ‘Lesson Study’ that looked very different from what he knows as Japanese Lesson Study. Many Lesson Study projects outside of Japan omit some of the crucial elements, which hinders their success. For example, Fujii (National Council of Teachers of Mathematics 1989) examined Lesson Study in some African countries and noted that many aspects of Japanese Lesson Study are left out. The same occurs in America; many projects omit the first crucial phase of Lesson Study, *kyouzai kenkyuu* (“study of teaching materials” that helps teachers gain knowledge and insight into mathematics and student thinking).

The significance of *Kyouzai Kenkyuu* in Japanese lesson study positioned teachers as curriculum *developers* and not simply *implementers*. Lesson study in Japan is often credited as making a significant impact on the reconstruction of textbooks and curriculum materials. In this respect, it is consistent with Stenhouse's vision of the 'teacher as researcher.' In this volume lesson study as it internationalizes is often portrayed as having a major role in helping teachers to implement curriculum reforms shaped by new national standards. This author found little reference to lesson study having a significant role in the creation of new curricula. An interesting paper by Watanabe in this volume entitled 'Lesson Study and Textbook Revisions: What Can We Learn from the Japanese Case?' explores the evidence for crediting Japanese lesson study with making a significant impact on curricula revisions in Japan from the 1980's. He concludes:

Although we cannot definitively conclude that Lesson Study led to specific changes in textbooks, there are some evidences that suggest its influence. We speculate that certain features of the Japanese education system may contribute to making such influences possible.

The process of lesson study that Takahashi experienced as a teacher in Japan appears to have addressed a curriculum problem that Bruner identified in the USA as far back as 1963. Bruner writes:

The first and most obvious problem is how to construct curricula that can be taught by ordinary teachers to ordinary students and at the same time reflect clearly the basic or underlying principles of various fields of inquiry.

In western neo-liberal societies, the strong links between higher education institutions and pre-service and in-service teacher education have weakened. The former are decreasingly a major source of 'knowledgeable others'. In this respect, the thinking of Bruner (1963) on curriculum design for schools appears to have been ignored by western governments:

Designing curricula in a way that reflects the basic structure of a field of knowledge requires the most fundamental understanding of that field. It is a task that cannot be carried out without the active participation of the ablest scholars and scientists. The experience of the past several years has shown that such scholars and scientists, working in conjunction with experienced teachers and students of child development, can prepare curricula of the sort we have been considering. Much more effort in the actual preparation of curriculum materials, in teacher training, and in supporting research will be necessary if improvements in our educational practices are to be of an order that meets the challenges of the scientific and social revolution through which we are now living.

Bruner's view is very consistent with Stenhouse's vision of the role of teachers as researchers in the curriculum development process. Curriculum experts, often located in higher education institutions designed curricula for teachers to test and improve through research in their classrooms. Such was the vision both Bruner and Stenhouse aspired to realize as curriculum theorists and developers in partnership with teacher-researchers.

Dudley, Warwick, Vrikki, Vermunt, Mercer, Mette, van Halem and Karlsen appear to welcome the movement in the UK towards school-based CPD as a 'home' for lesson study. They portray an INSET revolution in schools that followed on from legislation accompanying the introduction of a statutory national curriculum and assessment system in the early 1990's. This legislation they argue, "*transformed state schools into quasi-independent, competitive businesses regulated by a national inspectorate, Ofsted, ranked annually by examination results and inspection ratings.*" In this context teachers were subjected to statutory performance management based on lesson observation. Dudley et al contend that this set the scene for an explosion of school initiated INSET

activity “as schools realized that if they were to gain the positive inspection grades and examination ranking needed to attract pupils and funding, they were going to need good results.” In this context they argue that schools were encouraged to develop their own inquiry-based processes for improving teaching and learning in classrooms. It was here they claim that “Lesson Study thrived” as a form of teacher research in the UK. Dudley et al claim that by 2012 “up to 10% of English schools had used Lesson Study.”

The major justification for introducing lesson study in England as a form of teacher professional development appears to have depended on demonstrating that it improves intended learning outcomes as measured by standardized tests (SATS). Although inspired by Japanese lesson study the role of *kyouzai kenkyuu* in the latter context, this author would argue, is far from clear, and in this respect echoes the concerns expressed by Takahashi in the North American context, where the neo-liberal outcomes-based educational agenda is also very evident. In a systems context shaped by this agenda, there is little space for curriculum development (*kyouzai kenkyuu*) as such. In this context, the design of the curriculum is shaped by nationally prescribed standards in the form of intended learning outcomes. The point of introducing a form of lesson study in such a context might simply be to find the pedagogical means of implementing curricula that match the required standards. In the Camden Project depicted by Dudley et al. school-based, lesson study groups met with a group of ‘knowledgeable others’ in the field of Math’s on a twice termly basis, but their experience appears to stem from assessment roles in the educational system. Could it be that their major role in the project appears to be that of helping teachers to interpret the new curriculum standards correctly as a basis for lesson planning? Securing good test results appears to have been a significant motive for doing lesson study in the Project. According to Dudley et al, an experimental trial demonstrated that it ‘paid off’:

The scores of project schools rose against the national average between 2013 and 2016 by two percentage points while the attainment of district schools not involved in the project fell against the national average by two percentage-points – a four percent difference in total. Both quantitative and qualitative data suggest that teachers had been developing their own practices in response to their LS learning experiences in ways that subsequently improved the learning of their pupils.

Dudley et al.’s account of the Camden Project’s design clearly demonstrates an intention to give participating teachers space and time to realize many of the critical features of the Japanese lesson study methodology, and thereby resist pressure to simply ‘teach to the tests’. It would be good to gain access to full text lesson studies

authored by Camden Project teachers, which reflectively explore the tension between the action research process they engaged in and the desire to get good results as measured by tests.

In addition to a lack of *kyouzai kenkyuu*, Takahashi noted other aspects of Japanese lesson study methodology that became diluted in the process of transference to western educational systems. These are

- Compressed time-frames for completing a lesson study cycle (eg. From 5 weeks to a day);
- Misunderstanding the purpose of lesson study as ‘creating a perfect lesson plan’ rather than ‘gaining new knowledge’ to inform the teaching learning process.
- Confusing demonstration lessons with research lessons. Demonstrating innovative teaching strategies to an audience of peers “does not necessarily help teachers to implement innovative ideas.”

Such dilutions are perhaps symptomatic of a rush to implement lesson study in short timescales, without attending to the problems of securing significant changes in the professional culture of teachers and the organizational culture of schooling. In this respect this author would recommend reading Brosnan’s (2014) implementation study of her ‘failed attempt’ to introduce Japanese lesson study methodology in the context of a new mathematics curriculum for Irish post-primary schools. It is a rare published example of what this author depicts below as *second-order action research*. Although the paper appears to render a *pathology of innovation* it also has a positive aspect, which Posch (2015) refers to in his response to Brosnan. “Luckily”, he writes, “after three years, it showed that the experience with lesson study had not been in vain but had shaken some traditional beliefs and had opened a window for change in the professional culture.”

There is clearly a need for a framework of quality criteria that will enable one to distinguish ‘watered down’ versions of lesson study from those which embody universal critical aspects of lesson study methodology, while acknowledging the fact that these aspects may nevertheless culturally shape up rather differently in particular educational contexts. Such quality criteria need to be couched as procedural values and principles that give form to the process of lesson study without depicting the detailed action strategies that need to be developed for overcoming system and cultural constraints in particular contexts and realizing them in practice. Such a framework will provide a basis for ‘second-order action research’ by those involved in coordinating and facilitating lesson study in educational systems, such as school leaders and advisors, curriculum specialists and educational researchers from the academy. In my view, the paper by Lewis, Friedkin, Emerson, Henn, and Goldsmith in this volume makes an excellent start in developing such a framework. It provides a basis for planning and evaluating the lesson study process as the approach internationalizes and globalizes. The authors specify ‘goals’ for each phase of a lesson study cycle, which I would argue function as ‘procedural principles’ governing the process, by highlighting its critical aspects. They then list possible ‘Challenges’ in the form of constraints and difficulties in realizing the appropriate goals (principles) at each phase of the process, and even suggest strategies for overcoming them. This author would suggest that these are depicted as ‘hypotheses’ to be tested and revised through what I have termed ‘second-order action research’. Lewis et al finally pose questions to stimulate reflection on the extent to which the goals (principles) have been realized. Such questions can be used to structure summary accounts of second-order action research findings.

Using explicit learning theories to inform the global development of lesson study as a participatory pedagogical science.

Several papers in this volume provide accounts of how *explicit theories of learning* are used pedagogically to design and inform the lesson study process. Gunnarsson, Runesson, and Håkansson describe a Swedish *learning* study on “Identifying what is critical for

learning ‘rate of change’ “. Learning study, as noted earlier, is a form of lesson study that originated in Hong Kong and Sweden by synthesizing critical aspects of the Japanese methodology, which was considered to lack an explicit learning theory, with the theory of variation developed by Marton and Booth (1997) and colleagues at the University of Gothenburg. Although developed from phenomenographic design experiments the theory was used as a pedagogical tool to focus the classroom research of teachers on the qualitative aspects of students’ experiences as learners in their lessons. Both This author and Lo (see Elliott 2015, esp.155) have argued that such a synthesis is entirely consistent with Stenhouse’s conception of the teacher as a researcher and his process model of curriculum and pedagogical design.

The reader will find other papers in this volume that depict a synthesis of variation theory and lesson study. Huang, Gong and Han’s chapter on ‘Implementing Mathematics Teaching That Promotes Students’ Understanding Through Theory-driven Lesson Study’ shows how a synthesis of Chinese lesson study, aimed at developing students understanding of mathematical content, used variation theory as a pedagogical tool for effectively sustaining the focus of teachers on the learning process in their classrooms. Preciado-Babb, Metz and Davis report interesting Canadian research into how variation theory can inform and become sustainably embedded in the concrete teaching strategies employed to enact mathematics lessons.

Variation theory is not the only theoretical perspective used to inform lesson studies reported in this volume. As lesson study internationalizes beyond Japan and China it is inevitable that conceptually and methodologically it will interact with didactic theories, both general and subject specific, which explicitly inform or are embedded in the practice of teaching within the adoptive country and perhaps also circulating globally in a rapidly universalizing educational discourse. This volume provides examples of lesson studies that have been synthesized with a variety of theoretical perspectives. They poses the question of whether such syntheses help

to sustain lesson study as a democratic process characterized by a universal set of core values and principles of procedure.

Schoenfeld, Dosalmas, Fink, Sayavedra, Tran, Weltman, Zarkh, and Zuniga-Ruiz report on a synthesis between Japanese Lesson Study and the theoretical framework of ‘Teaching for Robust Understanding’ (TRU). The latter offers a specification of the critical aspects governing an educationally worthwhile process of engaging students with curriculum content in a manner that develops their understanding. Another way of viewing the framework is that it provides teachers with a set of procedural principles implied by the aim of teaching for ‘robust understanding’. Schoenfeld et al offer the following rationale for such a synthesis in the US context:

Teachers in the US typically have little collective time to reflect on teaching practice. TRU-Lesson Study (TRU-LS) supports the growth of Teacher Learning Communities and their engagement with key ideas and practices of TRU and Lesson Study. Like Lesson Study, it profits from teachers’ concerted attention to lesson design and reflection on the hypotheses reflected in the design. Like TRU-based professional development, it supports teachers to work together explicitly on key dimensions of classroom practice.

What is being asserted here are conceptual links between the methodology of Japanese lesson study and an explicit theoretical framework (TRU).

An interesting example of an attempt to synthesize a globally circulating explicit learning theory with lesson study methodology is provided by Ge Wei in this volume, and entitled ‘How Could Cultural-Historical Activity Theory (CHAT) Inspire Lesson Study?’ Wei provides a detailed case study of a Chinese lesson study conducted by a group of teachers, which has been methodologically contextualized with neo-vygotskian *cultural-historical activity theory*. He points out that in China lesson study is initiated and driven by teachers. Hence, Wei’s case study focuses on the teachers accounts of their learning in the process. He claims that this data indicates that the process of methodologically contextualizing lesson study with CHAT has the impact of highlighting lesson study as a

process that widens teachers' understanding of mathematical subject matter. In doing so, he argues, it captures the complexity of learning. Wei writes:

As a dialectical theory, CHAT views human relationships as interwoven with multiple contradictions and conceptualizes learning as a dynamic and non-linear process. Expansive learning is an ideal type of this kind of learning. Expansive learning is not only a learning theory, but also a methodological instrument with which to design and promote teacher professional learning in an extensive manner.

One can see how contextualizing traditional Chinese lesson study with a globally circulating sophisticated learning process like CHAT might serve to safeguard it against the distorting impact of the global use of standardized tests to shape outcomes-based and internationally competitive educational systems. Runesson (2015) has pointed out that different explicit learning theories are underpinned by different epistemological and ontological assumptions which when used to inform lesson studies will provide teachers with rather different foci. They will inevitably shape teachers' research to lead to rather different kinds of findings. The examples of learning theories used to inform lesson study accounts in this volume appear to be highly compatible with the Stenhouse idea of the teacher as a researcher and the process model of curriculum and pedagogical design. Yet we need second-order comparative studies of the use of such theories to inform teachers' lesson studies, especially uses of Variation Theory and CHAT, to identify pedagogically significant similarities and differences.

Where are the knowledge platforms?

Runesson and Gustafsson (2012) demonstrated that research findings from learning studies, informed by variation theory, and conducted in Hong Kong could be communicated to and appropriated by teachers in Sweden. They saw their findings as a contribution to developing Stenhouse's conception of teachers as *knowledge producers* capable of building 'knowledge platforms' that could be accessed and used by teachers generally. In fact, Runesson and Gustafsson's research offers the promise of teachers participating

in the construction of cross-national platforms to support curriculum and pedagogical development on a global scale. .

Dudley et al ‘struck a chord’ with this author when they claimed in their paper that the district level meetings of the Camden Project “connected elements of the design cycle across groups of schools, helping to form lines of enquiry and knowledge-building in these challenging- to - teach areas of mathematics.”

The teacher lesson research groups supported by subject experts identified ‘difficult to teach’ mathematical content to form a cross-school agenda of themes to build lesson studies around. Dudley et al report that:

Teaching areas in which at least a quarter of the teachers identified they had little or no confidence included:

- Place value for decimal notation of fractions
- Written methods of division involving decimals
- Finding 100% given a percentage part
- Algebraic distinctions and terminology, providing explanations and solving simultaneous equations algebraically
- Identifying formulae, and models for algebraic equations, direct proportion and graphical representations
- Explaining the distinctions between types of numbers and illustrating particular forms of number
- Calculations involving fractions
- Dividing a quantity in a given ratio.

Following the completion of a first round of lesson studies that focused on these ‘difficult to teach’ areas a second district meeting enabled the LS groups to share and collectively reflect about their findings to build knowledge across cases and identify common themes to be investigated in the next round of lesson studies. Dudley et al did not outline or provide examples of the cross-school pedagogical knowledge-base that was built in the course of the Camden project and which might have been used by teachers of mathematics generally as a platform for further curriculum and pedagogical development. However, the Camden Project illustrates the value of organizational structures that will enable LS groups to draw on and contribute to the building of ‘knowledge platforms’ in relation to pedagogically challenging curriculum content. This volume presents many interesting cases of lesson studies in the field of mathematics. It points to the need to develop

lesson study in a range of curriculum fields as a process of pedagogical knowledge building across schools, systems and more globally. This is a long-term project for journal editors and educational publishers to address in partnership with teachers, school leaders, educational advisers, policy makers, and curriculum experts and researchers in academic organizations.

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