

The Conceptualisation and Impact of a post-graduate course in Lesson and Learning Studies.

John Elliott and Lucy Austin, University of East Anglia, UK

The research context.

Elliott has played a leading role since 1967 in the development of the 'teacher as researcher' movement in the UK and internationally (see Stenhouse 1975) and as a member of the Centre for Applied Research in Education under the direction of Lawrence Stenhouse. Between 1970 and 2000 he directed a number of funded classroom focused action research projects, involving collaboration between teachers in schools and academic experts in the field of curriculum development and pedagogy. The most notable of these concerning impact in the UK, Europe and more internationally, was the Ford Teaching Project (See Elliott, J 1976/7). Funded by the Ford Foundation this action research project was widely regarded as an exemplar of rigorous action research. It practically demonstrated the key ideas that shaped Stenhouse's idea of the 'teacher as researcher'; namely:

A Process Model as opposed to an *Objectives Model* of teaching for understanding;

Experimental Teaching in which ideas and hypotheses about how to improve the quality of students' learning experiences were tested and further developed by *teachers as researchers*;

Professional Learning Communities collaboratively and systematically develop shared insights by comparing and contrasting cases of each other's practice;

The development by teachers and professional researchers of a common vocabulary of concepts and a *syntax of theory* as a basis for talking about the problems of teaching and learning.

The Ford Teaching Project resulted in the construction of a dynamic body of professional pedagogical knowledge about teaching for 'inquiry learning' across the school curriculum. The dissemination of this newly constructed research platform was facilitated by the formation of the 'Classroom Action Research Network' in the mid-70's. Sponsored initially by the Ford Foundation CARN connected the emergent 'teachers as researchers' movement across institutional and national boundaries. It impacted upon emerging action research networks in a number of professional development areas, such as nurse and social work education and as a result became renamed the 'Collaborative Action Research Network.' It is still active to-day and co-ordinated from Manchester Metropolitan University. In the early '90's the linked *Educational Action Research Journal (EARJ)* was founded with the aspiration of publishing high quality educational action research that crossed the boundaries between professional organisations and higher education institutions. Now *scopus indexed* the journal flourishes to-day.

At the turn of the century Elliott was appointed an Advisory Professor at the newly formed Hong Kong Institute of Education with the role of assisting the Institute to upgrade to university status in the aftermath of the 1997 changeover from British colonial rule. In this role he initiated and supported a programme of action research within the Institute aimed at transforming teacher education practice, stemming from the traditional system of teacher training colleges, to enable it to prepare young teachers to participate intelligently in the widespread curriculum reforms initiated by the Hong Kong government. He was also appointed to a strategic advisory role by the HK government in relation to these reforms. This included helping curriculum officers based in the HK Curriculum Development Institute

(CDI) to support action research-based curriculum development activity in schools. The CDI had developed a sophisticated curriculum framework of Key Learning Area's, Generic Skills, and Values & Attitudes that left space for school and teacher-led initiatives with respect to curriculum organisation and pedagogy.

It was in this context of curriculum reform in Hong Kong that the Centre for Learning Study and School Partnership was established at Hong Kong Institute of Education, now the Education University of Hong Kong, under the Directorship of Prof Lo Mun Ling, who had previously moved from a position at Hong Kong University. Lo had worked at HKU with one of its Visiting Professors, Ference Marton from the University of Gothenburg. Marton and his colleagues had developed, from a design experiment in Sweden, a learning theory that could be used by teachers in classrooms as a pedagogical tool. In HK, with Lo and others, he proceeded to explore the potential use of this theory as a pedagogical resource in the context of the curriculum reforms underway. Lo's contribution was to integrate the Japanese Lesson Study approach to curriculum and pedagogical development in schools with the use of the 'theory of variation' as a pedagogical tool. This theory-informed lesson study was called 'Learning Study' because it focused attention on the students' experience and awareness of the object (content) of learning, whereas Lo felt that Japanese lesson study and other forms of teacher research had a tendency to direct attention to 'teaching methods'. Two core learning study projects were launched from the Centre for Learning Study and School Partnership at the Hong Kong Institute of Education; one on Professional Development and Curriculum Improvement in Primary Schools (PIPS) was funded by the Quality Education Fund (QEF) for three years (2001-2003), and the other, 'Variation for the Improvement of Teaching and Learning' (VITAL) operated largely in secondary schools and was funded by the HK Department for Education and Manpower (2005-2008). Elliott was invited to undertake an Independent Evaluation of both projects (See Elliott 2004 and Elliott & Yu 2008, 2013).

It was in the course of these two evaluations of Learning Studies in Hong Kong that Elliott had an opportunity to explore connections between Stenhouse's conception of the 'teacher as a researcher' and the Learning Studies forged in Hong Kong as a means of supporting the curriculum and pedagogical reforms. Both had emerged in a context of increased government intervention in shaping the school curriculum, but one which left teachers and schools space in which to generate their own initiatives with respect to the organisation of the curriculum for the purpose of teaching and learning in classrooms. Both 'variation theory' and the 'process model' emphasised the quality of interactions inside the classroom, between learners and between learners and their teachers in relation to subject content. Both focussed the teacher's attention as a researcher on the study of such processes and their relationship to specifically educational aims and values, rather than on the study of inputs in relation to outputs of lessons, which is shaped by an *objectives model*. Both appeared to embrace a case study methodology using triangulation methods for gathering and analysing data from the perspectives of the teacher, professional peers, and learners. Both emphasised the importance of learning theory as the source of a common language in which to talk about the classroom process. From the perspective of variation theory the *intended, enacted and lived object* of learning, together with its *critical aspects and features*,

provided such a language. These terms took on a particular significance when interpreted in the light of Stenhouse's *process model* as opposed to an *objectives model*. The use of variation theory to inform lesson study has generated a conceptual discourse in the literature that has brought its links to the *process model* to the fore, together with the role of the teacher who not only improves practice through learning study but also contributes to the further development of theory (see Ko 2014 and Runesson 2015. Also see Elliott 2015c for a detailed account of the conceptual links cited above).

One impact that Elliott's evaluations of learning studies in Hong Kong had was to demonstrate the power of teacher and student interviews to illuminate the learning process with respect to both parties during a study. In the PIPS evaluation Elliott focussed on eliciting the individual learning narratives of students, whom he met in small groups, and discovered that 8 year old learners could recall learning processes they had experienced during a learning study conducted a year previously. Data from student interviews was reported and analysed in the PIPS Evaluation Report (2004) for the Quality Education Fund in Hong Kong. The strength of impact on learners surprised the academic experts who mentored the teachers and schools involved in the project. In the VITAL Project Evaluation extensive teacher interviews revealed the impact the experience of a single collaborative learning study had on the development of their subject and pedagogical content knowledge. The findings from such interviews were reported in a book length evaluation report (see Elliott & Yu 2008) and an executive summary report published later in the journal *Education & Didactique* (2013). Interestingly Elliott gained the impression that the use of interviews in the evaluations - to generate insights into the learning process amongst students and amongst teachers working as 'professional learning communities' to develop collectively the quality of teaching and learning in their classrooms – impacted on the methods employed to gather data in the course of learning studies.

In general Elliott, with Yu, concluded that the impact of a single full-blown learning study - that is characterised by

a) collaborative lesson planning; b) peer observation of lessons; c) post-lesson conferencing and analysis; d) cyclical teaching, and the use of variation theory to inform the analysis and hypotheses tested in the lesson cycles - is sufficient to disrupt the normal and routinized patterns of interaction in classrooms on a sustainable basis. Although the evidence gathered suggested some return to normal practice, there was nevertheless also evidence that the cultural scripts that underpinned teaching and learning in schools had been significantly destabilised. This provided a context in which less resource intensive and collective methods of lesson study (such as working with a critical friend, discussing video-clips, keeping a reflective journal) might support further development in the quality of teaching and learning in individuals' classrooms.

Elliott reported emerging findings of the VITAL Project Evaluation at international conferences established by the Centre for Learning Studies in 2005 and 2006. The aim of these conferences was to promote an exchange of information about lesson study as it globalised beyond the Japanese context. At the end of 2006 the 'World Association' of Lesson Study' (WALS) was formed and held its 1st Annual conference in 2007 in Hong Kong

and Shenzhen on mainland China. Lo Mun Ling became its 1st President and Elliott was appointed to succeed her from 2009-2011. WALs not only embraces academic researchers and experts as members but also practising teachers engaged in lesson study within their schools. In 2011 Elliott, was appointed, on the recommendation of the WALs Council, Chief Editor of the association's new *International Journal for Lesson and Learning Studies*, with Lo Mun Ling serving as Co-Editor. One of the major aspirations of the journal was to publish Lesson and Learning Studies with other classroom action research studies that were authored by teachers or co-authored by academic experts with teachers. The editors hoped in the process to draw on presentations at the annual WALs Conferences of lesson and learning studies carried out by teachers and collaborating academic experts from many countries. This is now increasingly happening along with more articles authored and co-authored by teachers being published. All WALs members have online access to the journal as part of their conference/membership fee. In 2015 the journal achieved recognition by the *Scopus* indexing system in which the role of 'teachers as researchers' in the field of lesson and learning studies was acknowledged as an innovation in the field of academic publishing. More recently in September 2016 the journal has received further recognition by being included in the Thompson Reuters' *Emerging Sources Citation Index* (ESCI).

As Lesson Study has globalised beyond the Japanese context it has been conceptually and methodologically linked with a range of ideas and research methodologies. Globalisation has provided a context for the further development of the theory and practice of Lesson Study as a form of participatory pedagogical research. This paper aspires to make a significant contribution to such development.

During the period 2011-2016 the IJLLS allowed Elliott and his co-editor Lo Mun Ling to influence the development of a new discipline of lesson study as it globalised beyond Japan and interacted a) with the use and development of Variation Theory in Sweden, Hong Kong, Brunei and the UK; and b) with the Stenhouse tradition of school and classroom-based action research. The editors have been able to do this not only by publishing a significant number of influential/seminal articles, but also through Editorials and Editorial Review Articles. These have not simply contained summaries of journal content but identified conceptual themes and issues arising from such content, which pinpoint new theoretical and methodological directions for the development of lesson study as a pedagogical science. One such editorial review article by Elliott is entitled 'Towards a Comprehensive Pedagogical Framework to Inform Lesson Study' (2015a). It attempts to conceptually synthesise journal content, particularly related to the conceptual issues posed by variation theory and its relationship to other learning theories, and with the ideas surrounding Stenhouse's *process model* and the idea of the *teacher as researcher*. In the article Elliott also attempts to link these ideas to the notion of *Dialogic Teaching* developed by Robin Alexander. The article appears amongst the top 20 downloaded articles in 2016 for the journal. It applies and further develops conceptual links between *Lesson Study*, *Variation Theory*, *Stenhouse's Process Model* and ideas of the 'Teacher as Researcher' forged by Elliott (2015c) in Wood K and Sithamparam S (Eds.) *Realising Learning*: Abingdon OXON and New York: Routledge.

An earlier peer reviewed article by Elliott, entitled 'Developing a Science of Teaching through Lesson Study' and published in the IJLLS (2012), began this process of conceptualising lesson study in a global context by grounding *learning study* alongside Stenhouse's work in Dewey's *Laboratory Model* of learning to teach, in contrast to the

Apprenticeship Model. This article has appeared in the top 20 downloaded articles over the last 4 years in the IJLLS (over 2000 downloads).

The design of the post-graduate course in Lesson and Learning Studies.

In 2012 Elliott was invited to design a free-standing 20 credit module at UEA that could be 'cashed in' towards an MA. It was entitled 'Developing Innovative Pedagogies through Lesson Study.' This module operated in a small group of secondary schools during the Spring Semesters 2014 and 2015. Following consultation with the senior leadership teams and teachers involved in the course during those years the module has now been redesigned to offer more flexible options to schools and teachers. The full module offered for 2017 is worth 30 MA level credits. The major features of the course design can be depicted as follows:

1. The recruitment of groups of 2-4 teachers from each school to undertake a collaborative lesson study in their schools as a learning community. Individual applicants may take the course if they can arrange to work with a group of colleagues in their school on a lesson/learning study.

2. An introductory lecture programme at UEA, which covers:

- methodological perspectives on lesson study as a form of participatory pedagogical research e.g. *triangulation methods* (see Elliott 2015b);
- the Stenhouse conception of the role of 'the teacher as a researcher' within a *process model* of curriculum development;
- the use of variation theory and Vygotskian concepts to inform the design and conduct of *research lessons*;
- the introduction of a general design framework that conceptually and methodologically pulls the above together.

These lectures are supported by the required reading of texts depicting the key ideas, concepts and links plus examples of lesson study that bridge the Stenhouse perspective on classroom action research, Japanese lesson study and the uses of Variation and Vygotskian theory as common languages for interpreting and discussing data.

3. The design and implementation of a collaborative school-based lesson study supported by visits from the course tutor(s). In this respect the extent to which the lesson study design was informed by variation theory or some other explicit learning theory was left to the discretion of the group of teachers involved.

4. The production by each group of a lesson study text structured around a high quality research poster that is presented to other course members and staff and PGR students at UEA; feed-back from which informs the production of a full-text lesson/learning study.

5. The production by each course member of a 4000 word individual learning narrative (see O'Hanlon 2003) depicting the individual's professional learning journey through the collaborative lesson study process.

In the new 30 credit module groups may participate in a shorter CPD version that does not require an individual learning narrative to be submitted for the purpose of summative assessment.

The 2017 course consists of a departmental secondary school group (Ethics and Religion) of three teachers recruited initially to undertake the CPD version. However, two subsequently upgraded to the full 30 credit version. This course also consists of an individual teacher from an independent Junior School who is undertaking a lesson study with a group of non-participating teachers in her school. She chose to undertake the course as one of the modules she wished to study for completing a full MA.

The impact of the above module on the professional development of the teachers involved in and with the module, and on the development of CPD policy and practice in participating schools is providing the focus for an impact case study in the period leading to the next National Research Assessment Exercise. In this respect the university funded Lucy Austin, a local secondary school teacher who has successfully yet critically facilitated Lesson Studies within her school organisation (see Austin 2016), to undertake on a part-time basis for three months an evaluation of the impact of the three courses to date on the professional development of the teachers involved and more generally on the professional and organisational culture in their schools.

Eight *Professional Learning Narratives* submitted by course members in 2014 and 2015 had already been analysed by Elliott to elicit themes that are relevant to an assessment of the impact of the course conceptually and practically on the individual participants. The analysis and supporting data was originally presented at the WALs 2015 Annual Conference in Thailand. A redrafted version follows below.

Two collaborative lesson studies conducted through the course have, following a review process, been published in the IJLLS (see Driver, Elliott and Wilson 2015 & Bradshaw and Hazell 2017). There is evidence that both have been extensively down-loaded.

A case study, by Austin, of the impact of lesson studies as a CPD strategy in a local secondary school and the contribution UEA has made through the MA PGR programme and LS module, was presented at the WALs 2016 Annual Conference at the University of Exeter. Subsequently it has also been published, following review, in the IJLLS.

Later we will note "the curious abundance of cross-curricular 'objects of learning'" in the lesson studies conducted in the context of the module, as opposed to subject-specific 'objects of learning'. We speculate about the possible reasons for this when we had anticipated more subject-specific lesson studies, particularly from groups that attempted to use variation theory to inform their research. The majority of participating teachers made use of the concepts and ideas associated with the theory. We would claim that there is no contradiction involved here. Although learning studies informed by variation theory have

often focused on 'knowledge content', such as subject-specific concepts and skills in mathematics and science, the theory itself can be used to inform the development of more generic capabilities, which are involved in helping "the learner to make sense of their lives and their world" (see Lo and Marton 2012 p. 9). Although the lesson studies tended to focus on generic and cross-curricular 'objects of learning' some explicitly explored their relationship to the development of more subject-specific Knowledge. In this respect we have in mind lesson studies on:

'Variation theory based approaches to teaching subject specific vocabulary within differing practical subjects';

'Developing *Problem-Solving Skills* in Mathematics';

'Developing *Extended Writing* Capability';

'Developing *Collaborative Learning* Capability'.

In what follows we present two analyses of impact data gathered by Elliott and Austin respectively. In doing so we hope to pinpoint its relevance to the *research impact framework* formulated by the UK *Economic and Research Council*. The major dimensions of this framework are:

1. Conceptual Impact-e.g. professional capital to inform the practice of collaborative Lesson Study;
2. Instrumental Impact-e.g. the spread and scale of collaborative Lesson Study in the system;
3. Capacity Building-e.g. the development of individual and group capabilities to improve professional practice in classrooms through collaborative Lesson Study;
4. Cultural Change-e.g. transforming beliefs and values that underpin professional and organisational practices;
5. Ensuring Connectivity-e.g. through the development of school and regional Lesson Study networks.

Emerging themes that are relevant to an assessment of conceptual and practical impact.

The following themes emerged from the Learning Narratives submitted by 8 course members in 2014 and 2015. They are illustrated by extracts selected from the narratives. In brackets following each thematic statement the number of narratives in which the theme was cited is recorded.

1. Lesson Study as an alternative to performance management of teachers in schools.(5 citations)

It is sometimes frustrating to me that professional dialogue in education places an unequal emphasis on teaching methods without thoroughly examining the complexities of the learning process. Performance management cycles, Ofsted inspections, Public Exams and League tables all provide accountability frameworks, producing data used for scrutiny of school and teacher performance. In this way the British Education System stresses the important role of the teacher and their methods in the classroom. This places a lot of faith in the significance of pupil attainment data, our target setting, and individual professional judgments. There maybe a risk that we overlook the most important event in our classrooms: the actual experience of our learners. I was curious about whether lesson study could shift our attention back to the analysis of the learning process. (TS)

The idea that a teacher is in your classroom not to judge you as a teacher but rather to help develop the teaching and learning of the lesson in relation to the students was something I thought was very powerful. More often than not a culture has arisen in the teaching profession where being observed is the be all and end all and it is a reflection on you as a person, when in fact, it should be a mechanism for support and collaborative help towards improving your teaching in relation to students learning outcomes. (AH)

Where a teacher plans and prepares in isolation and a line-manager observes and delivers a verdict can often prove to be an unsatisfactory experience. An alternative of planning, observing and reflecting collaboratively has the potential to create a much more supportive and constructive process for improving practice. (DK)

2. Lesson study as formative practice and Stenhouse's idea of the 'teacher as researcher'. (5 citations)

I found it particularly interesting to be introduced to Stenhouse's concept of Teacher as Researcher. The references made to Hoyle's concept of restricted professionals and extended professionals seemed relevant to my initial aspirations (as head of CPD) for our Lesson Study as a form of professional development for our teachers. It was striking to me that 'a high level of classroom competence' was an attribute of the restricted professional according to Hoyle, whereas an extended professional also 'has a concern to link theory and practice' as well as 'a commitment to some form of curriculum theory and mode of evaluation'. I was intrigued to read that Stenhouse goes further still when describing the critical characteristics of extended professionalism as 'The commitment to systematic questioning of one's own teaching as a basis for development; 'The commitment and the skills to study one's own teaching' and 'The concern to question and to test theory in practice by the use of those skills'. It is this aspect of Lesson Study that most excited me during this session, particularly because this language was so different to the language used by OFSTED. (TS)

To start with we wanted to plan everything there and then, but then we realised it was better to start with one thing at a time as this would allow us to develop it further and make it more effective. It was at this point we decided we needed to do some background research.

We drew a mind map of ideas of what our current thoughts were and what we wanted to find out and achieve by the end of the study. We also thought about how we were going to measure what we were investigating. Using student responses, we wanted to be able to compare their writing from before and after to see if their answers had progressed in depth, as well as in the quality of their written communication.

We decided that we needed to do some background research to identify the specific thing we were going to look into. We had already identified that teachers often use in their feed-back to students "Be more detailed" but what do they actually mean. To answer this question, (we) asked staff---to complete a short survey. Interestingly, but not surprisingly, feed-back indicated that when teachers ask students to be more detailed we mean different things across the subjects. Surprisingly, even in the same subject area, different teachers wanted students to do different things when asking to be more detailed. This got me thinking how are the students supposed to know what we want them to do if some of us are thinking different things, does their feed-back need to be more specific?

We then carried out a student survey ---asking them what they thought teachers wanted when they were asked to be "more detailed" and again students' responses varied with some not knowing what was expected of them.---This research caused us to start thinking what do we mean by 'more

detailed' and how do we want them to be more detailed, this research was the starting point of our research process. (NT)

Of course, as with any such study or process, the evaluation in general was a pivotal aspect of the process. We itemised changes that we felt could be made to the study and due to the nature of issues raised formulated a number of possible options for future studies of a similar nature. (AK)

3. The 'process' rather than the 'objectives' model of learning as a basis for designing 'research lessons.' (5 citations)

--the language of objectives and targets is not necessarily a useful way of describing learning. If the experience of every student is different a more useful way to understand it is as a process. Creating a learning environment where students are enabled to participate in their own learning process. (DK)

It seems to me that a Networked Lesson Study, when effectively employed, is more about viewing a lesson from the students' point of view rather than the teacher's. Too often when lesson planning we focus on a particular outcome we are either hoping or are required to achieve and make the assumption that if we present our material thoughtfully and engagingly our learning objectives will naturally be met, losing sight of the great range of our students and their particular, individual difficulties in understanding and/or achieving an object of learning (LD)

4. Lesson Study as a basis for designing cross-curricular innovations in classrooms. (3 citations)

Chance to reflect together, sharing ideas and experiences from a variety of subject specialisms. (NT)

As a group we were slightly unsure how this study would work between three teachers in different subjects. However, we were hopeful that the similarities between History, RE and English would be sufficient to make the process worthwhile. Thus we went into this experience knowing little of what to expect. (DK)

5. Developing conceptual understanding of the relationship between subject specific knowledge and cross-curriculum thinking and writing skills through lesson study. (3 citations)

Current reforms seem to treat the learning of knowledge and the cultivation of higher order thinking capability as mutually exclusive to each other, so that the approach is either back to basics with a focus on the mastery of subject knowledge or reform to cultivate higher-order thinking capabilities to prepare students to face the world of the future. However, novice and expert research points out that the capability to engage in an inquiry process to solve problems can only be built on a deep understanding of the subject knowledge. The learning of knowledge and the cultivation of higher-order thinking capability thus cannot be taught in isolation, and in fact they are closely related to each other. Variation Theory resolves this conflict by pointing out that an object of learning has two aspects: the specific aspect, which refers to the subject-matter, knowledge or skill that we wish students to learn (short-term goal), and the general aspect, which refers to the capabilities that can be developed through the learning of the specific aspect (long-term goal). (AH)

6. Theory-informed lesson study as a basis for questioning beliefs and assumptions embedded in current practice. (6 citations)

I believe in many ways Variation Theory is more about understanding the process of learning, not simply focusing on the method of teaching. It can inform teachers and allow them to make 'wise pedagogical decisions'. It changed my outlook on the concepts of differentiation. If a student does not understand the critical aspects of an object of learning, s(he) cannot, therefore, understand the critical features. The critical aspect becomes a barrier to achieving the object of learning. However, it

is not differentiation in terms of adjusting the presentation of material to students' different levels of ability or in the varying difficulty of a range of tasks, as we commonly apply the term. Rather, it requires a shift of focus to realise that the key variation is in the perspective of the learner. Again, I think it is an invaluable way of looking at our classrooms and our students. The more we recognise that students perceive individual lessons and/or objects of learning in a wide variety of ways, the closer we as teachers can come to helping students to discern the critical features of a lesson and make significant progress.

How do you address a previously neglected critical feature or 'learning gap' that exists for a small minority without repeating yourself, belabouring a point and potentially losing the opportunity to push and stretch students who have already grasped the concept? I think the answer lies in the teacher changing direction, shifting the students' perspectives and coming at the same material from a different angle, but achieving this on a daily, lesson by lesson, basis is challenging. It also requires a teacher to recognise patterns in learning and to be aware of the fact that 'critical features are critical because the learners participating in the study have problems with them'. To me, this is where a process of collaboration and discussion with colleagues of 'what works' through Networked Lesson Study is potentially so valuable. (LD)

While I feel many of us did not fully understand the complex ideas around Variation Theory I did take some useful insights. The first of these was that the learning experience for all students is different and the teacher can never assume how a student has interpreted the lesson and the content. There is a 'variation' in the learning experience for every student. Secondly I learnt the benefits of comparing similarities and differences, to establish critical aspects and features. Thirdly, that using the language of objectives and targets is not necessarily a useful way of describing learning. If the experience of every student is different a more useful way to understand it is as a process. Creating a learning environment where students are enabled to participate in their own learning process. So while these ideas (linked to variation theory) were certainly complex I feel I did take away from them my own lessons. Certainly the idea that learning is an ongoing process which is different for every student can be seen to have influenced our later work --- (DK)

7. The public presentation of lesson studies as a basis for school-wide professional learning (3 citations)

An additional line of discussion came from other teachers. It was interesting that the mathematics teachers in the room saw the relevance of the 'academic register' (the development of a vocabulary of terms for expressing and communicating ideas) to their subject, particularly in the speculative vocabulary that relates to problem solving. It was also thought provoking that another Assistant Head with a similar job description to myself suggested that teaching the Academic Register could constitute an effective Whole School Literacy strategy. (TS)

An evaluation of the longer-term impact potential of the module by Austin.

Co-author Austin was set the following task in 2017:

'Determine the extent of the impact of the part-time Lesson Study MA module of the professional development of the teachers who participated in it and on the school as an organisation.'

Background and overview of participant involvement in this research

The LS MA module has run for three years 2013-14, 2014-15 and 2016-17, in total seventeen teachers had directly participated across six different schools. In three schools at least one senior school leader

had been involved in facilitating LS in connection with the module. Of the teacher participants and associated senior leaders from the first two years, eight took part in a semi-structured interview (see Appendix A). Some had moved schools and did not respond to the request to take part in an interview. One teacher responded early but declined to participate due to workload. Three teachers responded late but later tried to arrange meeting times, which were unviable, two of these were due to additional requirements placed on their timetable and the other was due to additional time pressures from external exam marking. It is intended that the teacher participants and associated senior leaders of the 2016-17 cohort be approached in the next academic year to take part in a semi-structured interview to determine the extent to which their attitudes toward LS have endured post-module completion.

The interviews focused on ascertaining the following: from the teachers 1) any changes in their ideas and views on teaching and/or learning; 2) whether these changes have had an effect on their daily practice in the classroom or other areas of work; 3) whether there has been any adjustment in their overall values or whether the module has helped them to realize some of their previously held values in a more tangible way; and from the senior leaders 4) whether there have been any noticeable changes in attitudes of the teachers involved in the module; 5) have the individual participants' involvement reached a wider group of teachers; and 6) more profoundly, has the Lesson Study module been able to provide a counterbalance to an organisational culture that measures the performance management of individual teachers as part of the whole school accountability system.

In each case, indications as to whether any discernable changes had the potential for sustainable development were looked for.

Summary of findings

All but one of the teachers interviewed were very positive about the module and demonstrated during interview that it had a demonstrable and lasting effect on their ideas surrounding teaching and learning. Several teachers commented on the module having provided an enlightening alternative to the regular model of CPD they had each experienced. They particularly emphasised the value of the collaborative element of LS. In all but one of the LS undertaken, the 'object of learning' was a cross-curricular one, often the result of the LS group composition. Even the LS that had a more subject specific 'object of learning' had a skills-based focus as opposed to the more traditional content-based stance. In every case, teachers were given the opportunity to share their findings with the rest of the staff and in all but two instances of those interviewed, the participants went further and worked with school leaders to develop an iteration of LS to enable the active involvement of a wider body of staff in action research. Further to this all six teachers referred to some element of their respective LS that has lingered in their daily practice.

For senior leaders the module fulfilled an essential ingredient of CPD provision for some teachers within the school. However, increasing budget cuts to the UK education system mean that each senior leader spoken to would find it difficult to continue providing the funding for individual, let alone groups of teachers, to enroll on the module. Primarily as a result of the relatively small number of teachers this form of CPD has engaged with to date, each school has been keen to engage with the teachers who completed the module in order to ensure it has the potential for greater impact. As yet there is no evidence of an emerging approach that demonstrates impact on a wider group of teachers or the curriculum as a whole (although there are two schools where this is more advanced than others).

We therefore conclude that the module has a powerful yet varying effect on the participant teachers themselves and the module certainly assisted in achieving the goals the senior leaders had in mind from

the beginning. But, there are some wider contextual problems poignantly illuminated by the participants' subsequent experiences. Work load or 'time' was cited as a major hindrance to further engagement with LS, this coupled with the low morale of many of their colleagues restricts the impact the former participants can have across a school without a greater drive from school leadership. This in turn raises a deeper cultural issue in the UK. 'Challenge in classrooms' (stemming from external accountability pressures for greater performativity on the part of teachers) has almost become the key phrase of 2017 but as we will explore this could well be a reflection of the teachers' own experiences. Perhaps 'challenge in the classroom' is an issue because school leaders are struggling to model this practice in the CPD provision for their staff. Those teachers and senior leaders interviewed all demonstrated some level of frustration with the situation whereby they have discovered LS as a powerful form of CPD with the potential to support whole school improvement. The ensuing problem therefore becomes how to take the small body of expertise and enable it to multiply throughout their respective schools to enable higher quality CPD to permeate the system and demonstrate a sustainable counterbalance to the accountability measures, which have become so restrictive to teacher practice in the UK.

LS as an antidote to 'CPD for everyone'?

There is a difficult paradox being faced by senior leaders where nationally school budgets are shrinking and the interviews suggest this pervades the teachers at the upper end of the quality spectrum and senior leaders the most. The highest quality teachers are needed to mentor, coach and demonstrate to an increasingly less experienced teaching body the aspects of their practice that make them suitable to deliver this training in the first instance. On the other hand, we also need the highest quality teachers to push the envelope on what is considered 'good practice' and to do this they need to be given time and space to develop their own practice. This ultimately costs money and because time is at a premium (perpetuated by a teacher shortage), not enough time can be provided for these teachers to do both the training of other teachers and engage appropriately in their own professional development.

The teachers were unanimous in their review of previous somewhat unsatisfactory experiences, and in some cases ongoing, of continuing professional development (CPD) as provided by their respective schools.

"... a lot of our CPD sometimes has been what I'd describe as 'snake-oil salesman', sat in the hall and 'death by PowerPoint'." (Teacher Q)

This was not a perception unique to the teachers, the senior leaders are profoundly conscious of the need these teachers have of a more challenging form of CPD, not least of all as a form of recruitment and retention but also as an opportunity to have a more profound but subtle impact on the teachers themselves and staff of the whole school.

"[using LS as a device] To try to get the focus of teachers' thinking and talking being about their practice in the classroom. Not being about the outcomes they're trying to get, but being about 'who am I in this classroom and what am I doing'. So, not even 'what is the best most effective way of teaching this thing' or 'getting kids to learn this thing or imparting this' but 'what is the best practice in the round for teaching and for children in the classroom'?" (Teacher R)

Whilst teachers have in all but one case found that LS resonates with their values and beliefs about teaching and learning this has not been perceived as the case with those who have been involved with the follow up work conducted by the former participants. This, would in part relate to the

manner in which the LS approach was adjusted when it was introduced to a wider body of staff (more on this later) but it is also likely due to the observations made by each senior leader interviewed:

“... you never fail to be surprised by how reluctant some people are to be reflective. Not just their teaching but their own behaviour, their relationships with other people, so I think you’ve got to be a mindful human all by yourself before you are prepared to sensitively feedback on other peoples teaching and work collaboratively with others, ...” (Teacher A)

Teachers in the UK are often (but more recently, not always) required to have a PGCE (post graduate certificate in education) or equivalent before they gain ‘qualified teacher status’. Working at a post-graduate level and as a professional implies certain ability and indeed desire to reflect on ones practice. What these interviews have highlighted is that whilst practicing teachers are expected to be operating at this level the reality is, there are many who are not. Therefore, we must consider the wider issues, which may cause a teacher to be guarded about assessing the values and beliefs surrounding their daily practice. These issues were summarized rather eloquently by one of the teachers interviewed.

“Some teachers find it really hard to openly question their instincts because basically, sometimes I think to be a reasonably effective teacher, some of that unfortunately means you have to be really good at managing your work load, therefore if you stop trusting your instincts or stop using some of the methods you’ve been using previously you’re going to fold. So, there’s a little bit of resistance, I find at times when you say ‘how do you know that works?’ when the person on the receiving end of that question is thinking ‘well it better, because if it doesn’t I haven’t got the time to explore an alternative.’ That doesn’t just come from their own timetable and that’s part of it; but it also comes from the accountability structures in place, the exams around the corner. We’re all worried about the exam and ‘I need to be sure of myself.’ I think for some teachers, self-doubt is really dangerous to their morale and there is an interesting tension with LS I think because it encourages, rightly, self-doubt. It values it because it is a reflective process, it is necessary and really good but in the current school climate where workload, morale and teacher confidence is low, a CPD approach that encourages self-doubt has the potential for some to cause some real tensions.” (Teacher Q)

These issues of workload, morale and teacher confidence have been major political topics for debate and review in recent months and each has been a major feature of the interviews with the module participants.

For each of the participants the module has had varying degrees of effect on their daily practice. Each teacher interviewed cited examples of how their LS had influenced the way they work in the classroom since but what emerged was a ‘pattern of variation’, a spectrum, to the degree of power these effects had. If we state the ‘object of learning’ of the module itself to have been: ‘to enable groups of teachers within schools in the area to develop innovative approaches to teaching and learning on the basis of their own Lesson Studies’ then we can see a difference in the intended and the enacted ‘object of learning’ for the teachers and we could even extend this out to the participating schools. But, let’s start with the teachers. At one end of the spectrum where the participant completed the module but has done minimal amounts with it since the enacted ‘object of learning’ was closely tied to the outcomes of the LS itself, the ‘take-aways’ as they were referred to by one teacher. Towards the other end of the spectrum there are teachers who have utilized outcomes

of their LS for a period of time and in many of these cases the outcomes still have relevance and are of benefit to their daily practice. At this end of the spectrum there is evidence of teachers having assimilated the conceptual framework into their practice:

"I think I do more testing understanding from the start, having said that it's difficult, ... If you do the 'testing the understanding' then find you get some who don't understand it and some who've gotten it easily, it's solving that problem where I haven't quite reached yet." (Teacher Z)

But further still there are participants who have taken on the conceptual framework to such an extent they are actively working with other teachers (albeit outside of the mainstream working practices of the school) to use the framework to develop further solutions:

"... it has made me go and look at things, it's made me do more LS on different things and try and find strategies. I think the nice thing about LS is you identify a problem and then do something about it, so it's specific, it's something you think 'this isn't working, what am I doing about it?'" (Teacher P)

Before we leave this section entirely, it would be misleading to avoid the subject of cost. Over the past ten years school funding in the UK has changed dramatically, there may conceivably be some exceptional circumstance by which a school would find itself paying for one teacher to complete the MA module but this would be a rare instance. A situation where a group of teachers from the same school being financially supported by their school to undertake an MA module is highly improbable as it would remove such a large volume of funds from other areas that would arguably need it more. This leads to a situation where, if teachers were to benefit from a MA module they would be paying for it themselves. Some might argue that this is not unreasonable but when this situation is seen with the backdrop whereby teachers pay has seen no substantial increase for several years (by this I mean annual increases have either been nil or below the rate of inflation) then expecting teachers to fully subsidise their own CPD raises more profound questions as to the extent teacher quality and professionalism is valued in the UK. Further to this, the teachers who would find themselves paying for their own MA module could well be teaching alongside those who were able to benefit from a fully subsidised MA introduced by the Labour government before the global financial crisis of 2007-2008. This stark contrast can be difficult for senior leaders to reconcile and the choice of where to direct funds ultimately resides in the extent to which a leader can prove the relative impact of the chosen CPD:

"... it's hard to definitely prove the impact of what is actually really expensive, in relative terms. If you are doing a masters, by UEA terms that's not expensive but in terms of my school budget it had less staff involved than might have been if I'd paid for something different and it required a lot of their time." (Teacher Q)

The resonant feature of Lesson Study for English teachers – collaboration.

The biggest commonality across all participant teachers was the enjoyment, fulfillment and enduring desire to continue collaborating. It has been the main feature that teachers return to and the one element of LS that has the greatest appeal. The fact that this was such a memorable facet of the module is indicative of the cultural issue raised in the previous section of teacher morale and low confidence. LS provided a genuinely collaborative framework whereby teachers could be in each other's classrooms without fear of judgment.

“to be able to share ideas and realise [other teachers] are having similar issues in other subjects, we just don’t get a lot of time to do that” (Teacher Z)

Module participants in three of the four original schools have in some form or another gone on to support the school in developing a CPD model involving a wider group of teachers. These have had varying degrees of structure, success and endurance but each has involved collaboration.

“..we are actually running a group of teachers at the moment who are interviewing students, collaboratively planning, observing each other and it has some of the structure of LS, some of those principles, ... it’s actually the case that in terms of a cpd model we are doing something that’s informed by LS. I wouldn’t say we could claim it’s a LS in the purest sense but that depends on your definition of LS perhaps.” (Teacher Q)

Whilst it could be taken as a significantly positive impact of LS, that one of its key features is being built into alternative CPD programmes, it could also be seen as an indication of a potential deeper issue referred to earlier. The degree of challenge inherent in LS is not particularly comfortable for many UK teachers but perhaps the difficulty we have experienced with implementing full LS as CPD is more closely linked to a lack of expertise or a reflection of an organisational culture whereby this level of challenge in teacher CPD presents more of a threat than an opportunity. We saw earlier how teacher morale and confidence is reputedly low and these are seen as a direct product of the accountability measures seen in UK schools.

On the other hand it could be an indication of the extent to which teachers feel starved of this particular interaction that there is a greater impetus to implement collaboration than the more sophisticated LS. Although this should be seen as a step in the right direction it is still a long way from a CPD model that offers the challenge and rigor provided by LS.

“what can happen really easily and probably what happened [when a LS based cpd was implemented] was the dilution of what LS is. It seems to me here at least, it very quickly becomes diluted into something less precise: something that is about peer support; and something perhaps a bit more comfortable; and something less clearly focussed and I think that is a real danger.” (Teacher R)

The collaborative nature is not without deeper merit. Two of the teachers interviewed spoke of the wider organizational concerns and how LS has influenced their perspective on this:

“LS has definitely changed the way I think about school improvement and teacher improvement and that’s what led me to talk to SLT about dropping ‘gradings’ from lesson observations, it’s one of the things that has influenced my understanding of planning in the department and how we plan and prepare for things, it’s also influenced my understanding of teacher improvement ...” (Teacher C)

The reference to teacher improvement was reiterated by another teacher and perhaps shows how expecting a wider group of teachers to be involved in LS, not just those already demonstrating highest quality, could support long-term sustainable improvement in schools:

“The hardest thing about my job is having a dialogue with someone about something that hasn’t worked [in a lesson/during an observed lesson] for all sorts of reasons. The good thing about LS is it gives you a framework for those

conversations and that's true of the group [this year's cpd group] too."
(Teacher Q)

Finally, two participants provided a surprising dimension to the interviews as they spoke of the guilt they felt in what they saw as the limited impact of their LS. They had a sense that the work they had completed had value to teachers and students and as such would be beneficial, but I believe once again it points to the cultural issues of embedding this practice within our schools. The difficulty here arose from the individual teachers having to be the driving force for their research to be accepted and integrated by others.

"We did have an outcome, we did arrive at a [resource] which was actually really good and it did work and is still good; and we did actually have a tangible teaching strategy that came out of it so that was a good outcome from it in the end. But, although we shared it with staff, it's not something I've revisited with teachers to the point that I feel it's an embedded strategy which is actually really disappointing and actually a source of guilt for me." (Teacher Q)

Time

Teachers in the UK have a higher than average contact time with their students than other OECD countries leaving them less time to work collaboratively. This fact has not escaped UK teachers who are poignantly aware of the time constraints they work under and was reflected in every teacher interview. Although teachers had been prepared to inject the extra time into the module, it has not been as easy to prioritise post-module completion. Two of the schools represented in this research explored the strategy of being less prescriptive about the use of teachers CPD time but perversely, this has not solved the problem.

"the reality of what we need to do [in the classroom means we prioritise that] so then I don't think we do prioritise our professional development, we prioritise the students and what they need." (Teacher Z)

Add to this the additional time teachers have required to remain informed with the multiple and recent curriculum changes, there is little additional CPD time to consider more specific issues that could be addressed through a LS.

The curious abundance of cross-curricular 'objects of learning'

Five of the six participants interviewed developed an 'object of learning' with a cross-curricular or broader educational outcome as their focus. The other was focused on a subject specific curriculum outcome but even this was a skills-based focus as opposed to the more traditional content focus.

Most of the teachers interviewed enjoyed the cross-curricular nature of their respective LS. However, they also acknowledged that a subject specific focus would be logistically easier and involve fewer inherent difficulties as summarized by Teacher P:

"when you are trying to plan the lesson you couldn't do it on the same lesson and it was trying to get something all of us could incorporate, hence the [object of learning] came up because it was something we identified as being an issue in all subjects. But it made it more difficult because each lesson really had to be planned differently to the previous one. So, although we

tended to use the same strategies there had to be tweaks because you've got a whole different learning environment..." (Teacher P)

In terms of a counterbalance to the organisational culture in UK schools some interesting features have emerged from having cross-curricular foci. Of the four schools represented in these interviews and of the six that have been involved in the module, it is apparent that whilst the respective senior leaders (in all but one) are not directly involved in the LS themselves, the chosen 'object of learning' correlated with the overarching issues the schools were facing. Whilst this demonstrates a teaching body aware of the wider school goals and demonstrating a capacity and interest to address the problem; in all cases the 'outcomes' of the modules, despite being shared with the rest of the teaching staff or senior leaders, have not demonstrated any noticeable impact on the teaching practice within the schools.

Another feature of the cross-curricular 'objects of learning' is that they are not directly measurable through exam results. Besides the nature of cross-curricular collaboration needing to focus on broader outcomes, perhaps this was the chosen route because teachers were subconsciously evading the accountability measures they are accustomed to. This use of LS certainly demonstrates that it could feasibly be put to use by schools to demonstrate action being taken to address long-term outcomes for students.

The nature of these cross-curricular LS also highlights two further issues. Within the UK there is a growing trend towards a knowledge-based curriculum and the origins of LS would certainly indicate its application in this area would be a natural fit. However, perhaps the abundance of cross-curricular LS that have emerged from this module is a reflection of the major curriculum focus of the last thirty years in the UK of a skills-based curriculum. In this sense it may be quite possible that UK teachers are not sure how to develop a knowledge-based 'object of learning' for a LS.

Long-term sustainability.

The module itself demonstrates a major cultural shift for teachers in the UK as the major foci of education policymakers are often curriculum and assessment. Pedagogy is often neglected and this permeates the entire organisational culture; but we have seen through the enacted 'objects of learning' of the participants so far that LS has the potential to address this gap.

The outcomes evidenced in these interviews show changes to the participants' values and a desire to have a wider impact. But, as yet no one has managed to demonstrate this extending beyond the individual participants to a wider group of teachers whilst maintaining the same long-term impact on teacher values. There are the early phases of this emerging in two of the four schools which are a direct result of those teachers involved with the module; but the wider contexts of their respective schools has perhaps meant this progress has been slow. Therefore in order to see if these initiatives demonstrate sustainability we need to return to this research regularly for the next two to three years.

In developing LS beyond the module, there is the contentious issue of whether individual schools have the capacity to run the highly challenging form of CPD that is LS. Throughout this research it has become clear that even when teachers have the drive and knowledge to conduct LS themselves, it does not translate into whole school development because it needs a supporting organisational structure. Rather like high ability students in a school, the proportion of 'high quality' teachers in a school are the few not the many and devising a structure that facilitates them whilst enabling the other aspects of LS discussed here are complex. Those teachers who facilitate LS across a school need first-hand experience of it to understand its potential for impact and organisational complexities. LS

also needs senior leaders to support its implementation with a clear strategy for embedding it into school policy because the demands on the teachers involved are subtle, complex and need to have status. LS cannot be a bolt on provision to teacher CPD, it has to be a whole strand of its own where teachers are expected to take their time with it, outcomes cannot be expected in one year and the structure has to give them the time to reflect.

“we can say we’ve done this [LS participants] but until people go through this process of actually seeing how it impacts; and actually it’s that time of focusing and having time to look at what kids are learning and how the kids are learning and whether it’s improving, which I don’t think you naturally do. Well, you do but you’re not continually changing things and looking at it because ultimately we’re just trying to get through the specification.”
(Teacher P)

The final aspect of long term development of high quality, challenging, professional development for teachers is the role of universities as gatekeepers to background academic research that can be used by practicing teachers to inform the starting point of any good LS. Teachers in the UK do not have access to university libraries as standard and are consequently very much limited to books they are more likely to buy and the few academic papers they may find freely available on the internet. This should ring alarm bells to any academic hoping to see research of high quality emerging from teachers’ action research. It is arguable that not only is there an organisational culture surrounding the accountability in the school system but also in the university system which is holding back action research in the UK and potentially stunting the academic development of the nation.

“There should be so much more of academics and teachers talking together. There needs to be open access to academic research for everybody.” (Teacher C)

Concluding Remarks

Austin’s evaluation generally supported Elliott’s analysis of the *conceptual impact* of the module on participating teachers’ views about teaching and learning and its development. It also cites evidence of *professional capacity building* amongst the participating teachers with respect to their capabilities to improve the quality of teaching and learning in their classrooms through Lesson Study. However, in spite of good intentions by participating teachers and some school leaders the extent to which significant transformations were accomplished in the *scale and spread* of Lesson Study within and across the schools of participants emerged as problematic for the reasons stated above. Lack of *connectivity* with the *professional and organisational cultures* currently dominant in schools lies at the heart of this problematic. In the future a possible context has been found to address these issues in the form of a *Professional Development Network* of schools that has been independently established on an area wide basis to focus on the improvement of teaching and learning. The network has developed an interest in the potential of the module and we have started to work closely with it to disseminate an interest in its potential within the school system and to address the problematics evidenced in Austin’s evaluation.

Within the next 2-3 year period we aim, in partnership with the Area PD network, to accelerate the impact of the module on the professional and organisational cultures in participating schools as a counter-balance to the dominant cultures being driven by Ofsted Inspections and linked to *individualised and outcomes-based performance management* procedures.

References.

- Austin, L. (2017) 'Leading the introduction and development of learning study in an English Secondary Academy', *International Journal for Lesson and Learning Study*, Vol 6, No 1; and Bradshaw, Z & Hazell, A (2017) 'Developing problem-solving skills in mathematics: a lesson study', *International Journal of Lesson and Learning Study*, Vol.6, No.1.
- Austin (2017) Impact Case Study Evaluation Report, Mimeo, University of East Anglia, UK.
- Bradshaw, Z & Hazell, A (2017) "Developing Problem-Solving Skills in Mathematics: A Lesson Study," *International Journal of Lesson and Learning Studies*, Vol.6, No.1.
- Driver, A. Elliott, K. Wilson, A. (2015) "Variation theory based approaches to teaching subject specific vocabulary within differing practical subjects", *International Journal of Lesson and Learning Studies*, Vol 4, No.1 72-90.
- Elliott, J (1976/77) Developing Hypotheses about Classrooms from Teachers' Practical Constructs, *Interchange*, Vol 7 No 2.
- Elliott, J (2004) The Independent Evaluation of the PIPS Project, Hong Kong Institute of Education.
- Elliott, J & Yu, C (2008) An Independent Evaluation of the 'Variation for the Improvement of Teaching and Learning' (VITAL) Project. Hong Kong Institute of Education.
- Elliott, J (2012) Developing a science of teaching through lesson study, *International Journal for Lesson and Learning Studies*. 1, 2, p. 108-125.
- Elliott, J & Yu, C (2013) Learning Studies In Hong Kong: A Summary Evaluation Report On The 'Variation For The Improvement Of Teaching And Learning' (VITAL) Project, *Éducation & Didactique*. 7, 2, p. 147-163.
- Elliott, J (2015a) Towards a comprehensive pedagogical theory to inform lesson study: an editorial review, *International Journal for Lesson and Learning Studies*. 4, 4, p. 318 – 327.
- Elliott, J (2015b) "Principles and Methods for the conduct of Case Studies in School-based Educational Action Research", in Skolnara forskningsmetoder- (Arbetslitol), SWE: Studentlitteratur.
- Elliott, J (2015c) "Lesson and Learning Study and the Idea of Teacher as a Researcher" in Wood K and Sithamparam S (Eds.) *Realising Learning*: Abingdon OXON and New York: Routledge.
- Hall, D, (2013),"Using lesson study as an approach to developing teachers as researchers", *International Journal for Lesson and Learning Studies*, Vol. 3, No. 1, 11-23
<http://dx.doi.org/10.1108/IJLLS-01-2013-0002>
- Ko, Po Yuk (2014) "Learning Study – the dual process of developing theory and practice", *International Journal for Lesson and Learning Studies*, Vol. 3, No.3, 272 – 289: Permanent link to this document:
<http://dx.doi.org/10.1108/IJLLS-07-2014-0019>

Kullberg, A. (2012) "Can findings from learning studies be shared by others?", *International Journal for Lesson and Learning Studies*, Vol. 1, No.3, 232 – 244: Permanent link to this document: <http://dx.doi.org/10.1108/20468251211256438>

Lewis, C. Perry, R. Friedkin, S. (2009) Lesson Study as Action Research, in Noffke, S & Somekh, B (Eds.) *Educational Action Research*, London: Sage pp. 142-154

James, M. (2012) An alternative to the objectives model: the process model for the design and development of the curriculum, in Elliott, J and Norris, N (Eds.) *Curriculum, Pedagogy and Educational Research: The work of Lawrence Stenhouse*, Abingdon, Oxon: Routledge.

Lo Mun Ling and Ference Marton (2011) Towards a science of the art of teaching: using variation theory as a guiding principle of pedagogical design, In *International Journal of Lesson and Learning Studies*, Vol. 1 No.1.

Lo Mun Ling (2012) Variation Theory and the Improvement of Teaching and Learning, University of Gothenburg Studies in Educational Sciences.

O'Hanlon, C (2003) "The reflexive inclusion of the self", Ch.8 in *Educational Inclusion as Action Research*, Maidenhead: Open University Press/McGraw-Hill.

Runesson, U. (2015) "Pedagogical and learning theories and the improvement and development of lesson and learning studies", *International Journal for Lesson and Learning Studies*, Vol. 4, No.3, 186 – 193. Permanent link to this document: <http://dx.doi.org/10.1108/IJLLS-04-2015-0016>

Stenhouse, L (1975) *An Introduction to Curriculum Research and Development*, London: Heinemann Educational, Ch's 5-7 on Objectives and Process Models and Ch.10 on The Teacher as Researcher.