Towards a comprehensive pedagogical theory to inform lesson study: an editorial review.

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Abstract

Purpose. This editorial review takes its agenda from issues about the meaning and use of variation theory in the context of Lesson Study, which have already been raised in previous issues of the journal. Its main purpose is to suggest a way of resolving such issues by locating variation theory in a broader framework of pedagogical theory.

Runesson's editorial commentary on articles in the special issue on the uses of pedagogical and learning theories in the context of Lesson Study suggest that they challenge the presumption that variation theory can be used as a basis for pre-specifying learning objectives in advance of teaching. This raises the issue of which approach to teaching the theory can be matched with; namely, teaching viewed as a technology or teaching viewed as an interactive process with students in which ends cannot be specified independently of the process. Also Hogan's review of two recent books about Lesson and Learning Study in Issue 4.2 raises the issue about the extent to which the examples supplied abstract the experience of learning from questions about students' motivation and attitudes in classrooms. Hogan suggests that the widespread use of learning theories, such as variation theory tends to distort the concept of learning employed in Learning Study by emphasizing its cognitive rather than emotional/attitudinal aspects.

Approach. Elliott's approach to the above issue is to pick up on Posch's comments in the current issue, which suggest that variation theory has implications for student motivation that need to be made more conceptually explicit in the context of Lesson and Learning Study. He argues that this can be done by integrating it into Alexanders dialogic model of teaching and Stenhouse's process model of curriculum development, and linking it with two related pedagogical theories that underpin these models; namely, 'democratic pedagogy' (Dewey) and 'accelerated learning' (Vygotsky).

Research Implications. Such a conceptual integration of variation theory within a dialogic model of teaching throws light, Elliott argues, on Learning Study viewed as a form of *educational* action research.

Practical Implications. This review article goes on to examine how the Lesson Studies depicted in issue 4.4 can be located in the light of the pedagogical framework and perspectives proposed.

Key words: variation theory, learning motivation, planning by objectives, principles of procedure, dialogic teaching, democratic pedagogy, accelerated learning.

Article Type: Conceptual Paper.

Introduction: Issues surrounding the meaning and use of variation theory in the context of lesson study.

The last special issue of the IJLLS (4.3) contained articles about 1) how a more theory-informed approach to Lesson Study might further improve the quality of *research lessons* as a means of developing teaching and learning in classrooms; and, 2) how what has become known as its 'Learning Study' variant

informed by Marton and Booth's (1997) *variation theory*, can be integrated into a broader theoretical framework. The two questions are linked to the extent, I would argue, that the development of a comprehensive theoretical framework for learning study will increase the scope of lesson study as a form of educational research.

In her editorial review for issue 4.3 Runesson (2015) pinpoints articles that contribute to the further development of variation theory as a specific learning theory. These articles suggest that *critical features* of the object of learning cannot be found in the subject-matter/content alone. Their identification rested on an analysis of differences in students' understanding of the object of learning. Runesson argues that the articles she cites view *critical aspects and features* of the subject-matter as relational in character. They are critical for the learner alone, in order to make the object of learning their own.

I would argue that Runesson's review of certain articles in 4.3 has pedagogical implications for curriculum planning and the design of lessons. Firstly, it implies that variation theory should not be viewed as a basis for identifying pre-specifications of desirable learning outcomes in the form of objectives. *Critical aspects and features* of the object of learning cannot be identified in advance of the teaching and learning process. Identification rests on an analysis of differences in students' understanding that emerge and are manifested in the process itself. Hence the importance and significance of the *research lesson* as a basis for a 'learning study' informed by variation theory. Secondly, variation theory as it is currently being developed in the context of learning study, has implications for

students' motivation to learn which have not been translated into explicit principles of pedagogical design.

In his review of two recent books on Lesson and Learning study (Issue 4.2) Hogan (2015) argues that the concept of learning, which featured in many articles had a one-sided cognitive orientation. The articles he claims are largely silent on questions about how students' attitudes to learning change. In this respect he appears to be particularly referring to studies that are informed by variation theory. However, commenting on Hogan's claim in this issue of the *IJLLS* (4.4) Posch points out that he expresses a note of caution in suggesting that "There would seem to be no reason in principle why essentially qualitative things such as enduring enhancements in students' *attitudes towards* learning and in their practices of learning couldn't be included in lesson study and learning study, as well as the enhancements in cognitive achievements that are already included". If they were, Hogan argues, then this would more strongly locate lesson and learning study in the context of *educational* research as distinct from the narrower context teacher and school effectiveness research. Lesson and Learning Study of the former kind would pay due regard to the formation of enduring attitudes to learning in the form of a " desire to go on learning"; what Dewey called *collateral learning*, which he argued maybe of more educational significance than the learning of specific items of subject content.

Posch makes a start on explicating the implications of variation theory for students' motivation by citing Marton and Booth's (1997) concept of *relevance structure,* as referring to the students' experience of what the learning situation calls for or demands. The presumption here, Posch claims, is that

the source of motivation is intrinsic to the subject-matter itself. However, he argues that Lo Mun Ling's use of this concept gives it a normative turn and in doing so derives a different view of motivation. For Lo (2012), Posch points out, a *relevance structure* shapes the relationship between the object of learning and the learners' experience of everyday life. Whether the learner perceives the link, she believes, will affect their understanding of and response to the object of learning, which is why pedagogical design should "pay attention to the object of learning and its relationship to students' everyday experience --- so that what is learn't is embedded in meaningful tasks---." (p.200). This points, according to Posch, to a specific kind of learning motivation that focuses on this relationship, inasmuch as "it is assumed that the meaning of an object of learning for the students and for their life experience will affect their motivation to deal with it---." However, even Lo (2012) Posch argues, "offers only little information on how teachers could provide opportunities for students to develop a favourable relevance structure." He does however point out a few indirect indications. One is the claim that students' intuitive understandings of the object of learning have to be taken seriously by teachers within the pedagogical process, not simply because of their significance for identifying the critical features of the object of learning, but because of the respect they receive if their preconceptions are valued. Another indication for Posch "is the request that teachers should provide many opportunities for students to voice their understanding of the learning object." He argues that although their primary purpose is cognitive the invitation to express their views indicates to the students that they can influence the process of learning. This is likely, he contends, to have a positive influence on students learning motivation.

In his response in this issue (4.4) to Posch's comments about his review, Hogan notes Posch's statement that the articles published to date in the *IJLLS* also tend to neglect issues regarding the influence of teaching strategies on students' motivation to learn, putting this down to the strong cognitive orientation of Lesson and Learning Studies published in the journal; "an orientation which 'appears to be rooted in the phenomenographic background of variation theory." Hogan appears to go along with this, arguing that "By using a theory in a foundational way (in this case variation theory), by using technical categories such as 'objects of learning' and their 'critical aspects', by using the problematic term 'learning outcome' in an essentially cognitive sense, Learning Study discloses its intellectual leanings toward conventional forms of empirical science." Such leanings, he concludes, "may not be conducive however to Learning Study's own best aspirations as a form of educational research". Hogan argues that "In order to realise more completely its strengths as a form of educational research, Learning Study needs to make educational experience *in its fullness* its explicit research theme." In this respect he makes a distinction between the experience of learning and *educational* experience. The latter will include the cognitive aspect of the experience of learning but one which will yield fertile insights that contribute progressively to the disclosing and cultivation of students' own potentials for flourishing as human beings, and to their capacity to contribute fruitfully to community and society. For Hogan, *educational* experience is learning shaped by the aims and values that underpin the practice of *Education.* Learning Study then becomes a form of

educational research when it focuses on how such aims and values can be realised in practice. In this respect particular learning theories, such as variation theory, constitute resources for critical reflection about the professional cultures that shape teaching and learning in practice.

In her editorial review for Issue 4.3 Runesson (2015) refers to two rather different understandings of theory. In one sense, she argues, "Theories of learning are explicit, involve definitions and logical propositions but are sometimes static and detached from the specific situations they have a bearing on." In another sense she acknowledges references to teachers' 'practical theories' "that are implicit and situational and involve values and emotions". Several papers in the special issue, she claims, explore how both are resources in lesson and learning study. Hence, "it is not a matter of applying theory and neglecting practice-based knowledge, but to adopt theory and theoretical concepts as critical lenses that allow a synthesis of practical and formal knowledge." Within such a synthesis, she claims, the practice of teaching and learning. "might be seen with 'new eyes' and the theoretical lens might result in a qualitatively different perception of the situation."

Dialogic Teaching as a theoretical model for Lesson and Learning Study.

I would agree with Runesson and argue that variation theory can be used in Learning Study to challenge many teachers' practice-based knowledge, which is often based on a transmission model of teaching. From the perspective of variation theory, I would claim, the development of students' *understanding* of the object

of learning calls for a *dialogic* model of teaching (see Alexander 2008) - in which its critical features can only be identified by the teacher through a process of structured, cumulative questioning and discussion with the students. In this respect the students' experience of learning is mediated by the *educational* experience of dialogue with the teacher. The *dialogic* model of teaching, Alexander claims, combines what he and other classroom observers have observed about effective classroom interaction with an attempt to counter the less satisfactory features of mainstream classroom interaction. It covers more than the quality of teacher-student interaction but also the quality of interactions between the students themselves and the ways these are organised in small group or whole class settings. Alexander outlines five criteria or principles of good dialogic teaching:

1. It is *collective* process inasmuch as teachers and students address learning tasks together, whether as a group or a class;
2. It is *reciprocal* inasmuch as teachers and students listen to each other, share ideas and consider alternative viewpoints;
3. It is a mutually *supportive* learning environment in which students can express their ideas freely without fear of embarrassment about giving 'wrong' answers as they help each other in a search for understanding.
4. It is a *cumulative* process in which teachers and students build on their own and each others' ideas and shape them into coherent lines of thinking and enquiry:
5. It is *purposeful* inasmuch as teachers plan and steer classroom talk with specific educational goals in view.

Such principles, I would contend, characterise an educational process that aims to develop and deepen students' understanding of the subject matter. In the context of an *educationally worthwhile* learning process defined by these principles the development of *understanding* involves both subject-specific learning outcomes and more generic capabilities associated with *learning how to learn*, such as self-directed learning, the competent performance of learning tasks, and the ability to relate to others as resources for learning.

Inasmuch as variation theory is a theory about the 'development of understanding' when the latter is viewed as a primary aim of education, then arguably it implies a pedagogical process that can be defined in similar terms to the principles of dialogic teaching outlined by Alexander. Stenhouse's *process model* of curriculum development also strongly resonates with the idea of a dialogic pedagogy. Within this model discussion-based learning plays a central role in contrast to the role of instruction –based learning in an *objectives model* (see Stenhouse 1975). In his 1971 postscript to *Culture and Education* (1967) Stenhouse argues that the function of discussion as a pedagogical process is *educational* not merely *social* as its primary aim is 'the development of understanding'. He writes:

"There are all sorts of patterns of discussion and activity which need to be looked at afresh in the light of the aim---in practice the effect on a group of accepting that they are trying to achieve understanding rather than to convert one another to deeply held opinions is quite radical in its implications for discussion work." (p.163).

Hence, in his own work in the Humanities Project in schools, a distinction was drawn between *reflective* and *argumentative* discussion. Only the latter was deemed to be *educationally worthwhile* by virtue of its consistency with the project's aim of 'developing understanding' From this aim Stenhouse developed a number of 'principles of procedure' for helping teachers to align their role in discussion with it and to provide a basis for self-study in their classrooms. One principle which has been particularly controversial is that of 'procedural neutrality', which states that the teacher when chairing discussions should avoid using his authority position to promote his own views. Such a principle guides observations of the teachers' interactions with their students' and informs their judgements about their consistency with the aim of 'developing understanding.' Hence, for Stenhouse:

"---the chairman of a discussion who consistently asks the group questions to which he himself thinks he knows the answer implicitly asserts his position of superiority and authority, ---." (p.164)

Such a pattern of interaction denies students' an *educational* learning experience through discussion because according to Stenhouse the teacher transmits his low expectations of their performance to his students. However, another procedural principle governing the teachers' role is that s (he) has responsibility for critical standards within the discussion process by focussing the students' attention on evidence for and against different points of view, rather than his/her personal views, and asking questions about it that enable them to reflect about their

own points of view. For Stenhouse, the procedurally neutral teacher as chair of the discussion has a responsibility to positively intervene in discussions with questions that support critical reasoning about evidence and self-reflection. Such interventions, according to Stenhouse, are consistent with acceptance of responsibility for achieving understanding.

Alexander (2008 p.59) views Stenhouse's pedagogical principles as an important contribution to the practical realization of dialogic teaching in classrooms and schools. Stenhouse viewed them as a basis for a form of lesson study in classrooms and schools that became known as teachers' action research. It is this form of research that Hogan is concerned to integrate into learning studies, which are informed by variation theory. In my view a significant development of lesson studies informed by variation theory and indeed other theories of 'understanding', would be the conduct of research lessons designed to support the realization of procedural principles of teaching that are consistent with such theories. I look forward to a flow of submissions of lesson studies of this kind in the not too distant future.

Alexanders' model of dialogic teaching is underpinned by two not unrelated *educational* theories of teaching. One stems from Dewey's concept of 'democratic pedagogy' and the other from Vygotsky's idea of 'accelerated teaching'. Democratic pedagogy specifies a pedagogical process that "seeks to enact the ideals of the wider democratic society" (Alexander 2008). It stands in sharp opposition to a model of teaching as a form of knowledge transmission in which teaching and learning is shaped by the

traditional relationship of domination and subordination between teachers and taught. According to Alexander, "teaching as acceleration" stands in opposition to "teaching as facilitation", which is based on the Piagetian notion of 'developmental readiness'. For Vygotsky good teaching is that which outpaces development. It pushes and drives the understanding of the student forward and onward.

Stenhouse's *process* model of curriculum development clearly mirrors important aspects of 'democratic pedagogy' and 'teaching as acceleration'. The pedagogical process which puts discussion at the centre is shaped by democratic values. Its relationship to the pedagogical aim of 'developing understanding' is a matter of democratic as opposed to instrumental or technical rationality. Teaching viewed as a technology is not a significant aspect of the *process* model as it is within the *objectives* model of curriculum development.

Embedded in the teachers' role as chair of a classroom discussion is also the idea of 'teaching as acceleration'. An important aspect of the role is to prevent discussion going round in circles by introducing new evidence as a basis for posing questions that push students' thinking forward.

<u>To what extent do the lesson studies reported in this issue depict aspects of dialogic teaching that are informed by the educational theories which underpin it?</u>

The article by Tan et al on 'Improving the use of physical manipulatives in teaching science concepts through lesson

study' presents an account (uninformed by variation theory) of dialogic teaching with students as a significant *educational* process. Excerpts of dialogic teaching are presented in the text to illustrate how:

"Pupils' responses became instrumental in testing the effectiveness of the eardrum model in the pursuit of achieving conceptual understanding among the pupils. The unexpected responses of pupils led to the realization of the teachers that there was a flaw in the construction of a manipulative model. This was shown when the pupils said that air was responsible for the movement of the ping pong ball in the eardrum model. The unexpected responses became one of the major talking points during the post lesson discussion. Teachers used their realizations during the second implementation when the hole on the box used to make the sound was covered to prevent the gushing of air when pupils hit it to make a sound. In this way, only the sound waves created by the hitting of the box would be responsible for the movement of the plastic sheet and the ping pong ball. Pupils' responses during the second implementation improved after the modification done by the teachers. The second implementing teacher was able to elicit from the discussion that sound waves were responsible for the movement of the plastic sheet and that sound makes the eardrums and the earbones (ossicles) vibrate when a sound is heard."

Lambs' article entitled 'Peer-learning between pre-service teachers: embracing Lesson Study' evaluates the impact of a peer-driven Lesson Study process involving pre-service teachers (PST's) in the context of an Initial Teacher Education programme. The process was designed by the university-based tutors to create a relatively informal space for learning -

in which PSTs could collaboratively experiment with aspects of practice, share experience, and learn from each other's - free from the hierarchical school-based mentoring system and formal assessment requirements. To aid the process, collaboratively designed lessons in dyads were captured on video, and peer-reviewed beyond the 'live' moment. To assist with scaffolding the learning taking place through these reviews of video evidence, the tutors designed a set of questions to provide an element of structure to the discussions. However, according to Lamb, it was evident that the mutual trust and collegiality embodied in the peer process itself, made a significant contribution to scaffolding/accelerating the professional learning of the PSTs. Their discussions, she writes, "looked beyond the study lesson, to a much broader pedagogical understanding". Lamb describes the creation of a democratic pedagogical space for lesson study, which fosters accelerated learning, and makes a significant contribution to the realization of the educational goals of teacher preparation. Such a space beyond the formal mentoring process allows for creative risk-taking through experimentation with revised lesson approaches, and opportunities for PSTs to create "their own understanding of the links between planning, teaching, and learning."

This journal welcomes accounts of Lesson and Learning Studies that represent learning as both a *cognitive* and *social* process. In this respect it is worth noting that the articles of both Tan et al and Lamb illustrate that the social aspect of pedagogy is cognitively significant when its primary educational aim is the achievement of understanding.

The curriculum may not be exclusively aimed at the development of conceptual understanding. Some curriculum goals may exclusively specify the development of capabilities couched in the form of functional competencies and skills that can be measured by standardised tests. Teaching in this context largely gets shaped as a technology. Here, Alexander points out, that teaching is "relatively neutral in its stance on knowledge, society and the child" (p.102) The important issue is "the efficiency of teaching regardless of the context of values" and to this end "imperatives such as structure, economic use of time and space, carefully graduated tasks, regular assessment and clear feedback are more pressing" than educational theories and ideas.

In the context of a technical approach to teaching one would not wish to deny the value of lesson studies by groups of teachers aimed at progressively improving and evaluating the technical effectiveness of teaching. Landers' article is an account of a lesson study process with such an aim in mind. In this respect lesson study is appropriately cast as a form of participatory *process-product* research. It focuses on the introduction of a blended learning component involving the use of computer technology in the formal face-to-face instructional setting of Foreign Language Learning at university level. The effectiveness of such blended instruction is evaluated through the use of experimental controls to identify what difference it makes, if any, to student performance measured by standardised tests. The role of the teacher group involved in the instruction appears to be one of supporting each other, through sharing experience and

discussion, to blend the technology with the formal instruction in the ways intended. Their focus is on the implementation of an instructional method rather than the relationship between pedagogical means and ends.

The three articles cited above suggest that Lesson Study is not a fixed approach to the study of teaching. It may take various forms that are shaped by different pedagogical ideas. None of these lesson studies are informed by variation theory and yet two of them focus on students' experience of the process of learning. The other two articles in this issue make reference to the use of variation theory in lesson study.

In 'Teachers developing teaching: a comparative study on critical features for pupils' perception of the number line' Björk and Pettersson-Berggren report on a Learning Study by a group of mathematics teachers, which included themselves and involved examining "how second graders perceive and use the number line as a learning tool" . The starting point for the study is variation theory, and the implication that in order to use a number line as a tool of mathematical thinking students will need to discern its critical aspects as a representation of a numerical system. Working in the classroom with a number line, these authors contend "can help teachers probe pupils' understanding of number size and how numbers relate to each other". The overall purpose of the study was "to investigate what might be relevant to younger children's understanding of a number line." Research questions were formulated as follows:

- What is critical for pupil's understanding of how the number line can be composed?
- How can teaching be designed according to variation theory to give pupils the opportunity to develop an understanding of the number line as a tool for mathematical thinking?

The object of learning for this Learning Study was formulated *as the ability to express integer values in the range of 0-100 using the graphical representation of the number line.*

One of the interesting aspects of this particular Lesson Study is the way it builds cumulatively on other lesson studies, covering different age ranges, which are informed by variation theory to explore critical aspects for the development of pupils' understanding of similar objects of learning. This kind of knowledge-building professional scholarship is something this journal would like to encourage by publishing studies like this one.

What is clear from this study is that the evidence gathered about pupils' perceptions and use of the timeline as a learning tool greatly influenced the teacher groups' understanding of the aspects and features of the object of learning that they needed to accommodate pedagogically in the lesson cycle. What is not so clear is the process by which much of the evidence was gathered. We know that pupils were set tasks in the pre-tests and interviews that required them to discuss and explain their thinking about the use of the timeline. For example:

"*In the pre-test, pupils were asked to spread out numbers on number lines with different starting points and number ranges using the total number range 0-100. The tasks were to explain what was wrong and why, and to determine what was needed to be able to place a number in which only one item was selected. This was to examine the assumed critical features of the relationship between value and distance and variations of number range and length."*

"In Lesson 1 the length on the number line and number range (0-20, 15-75) varied. Pupils discussed right and wrong answers in a few different examples. The teacher presented a long number line with numbers 3, 6 and 9 together with a shorter with 30, 60 and 90 in order for the pupils to discern the scale concept."

A dialogic process of teaching and learning appears to be going on throughout the lesson cycle as the context in which evidence about pupils' perceptions and use of the timeline are gathered. However, we are given no systematic account of the 4process. The focus is on the analysis of the data rather than the dialogue and discussion through which it was elicited. Yet the latter is important for understanding the pedagogical impact of teaching strategies on students' *educational* experience and their motivation and desire to go on learning.

The article by Selin et al entitled 'Transforming new curriculum objectives into classroom instruction with the aid of learning studies' consists of a case study of the work of a group of EFL teachers as they attempt to effect the transformation of new national curriculum goals into forms of classroom instruction. The case study describes and analyses

teachers' discussions over a series of five meetings when planning and evaluating their lessons under supervision. What is described is the focus of their reasoning, the classroom activities they decided on, the curriculum content and how they decided to assess the students' learning outcomes. Initially the order of priority with respect to focus was 1) activities 2) content analysis 3) assessment of learning outcomes, while in the later stages of the process this order was reversed. Attempts were made in the course of the work to get the group to use variation theory as a basis for analysing curriculum content in ways that informed the translation of national goals into teaching strategies that improved learning outcomes. Written evaluation feedback at the end of the process revealed that teachers did not have very deep understanding of variation theory. However, methodologically the group developed a tighter shared focus on specific objects of learning as a basis for their discussions about the impact of different ways of handling content on pupils' learning. What is not clear in this case study is whether variation theory is assumed to provide the group with a basis for designing instructional methods that are instrumentally effective in producing pre-specified learning outcomes or whether it is seen as a basis for designing a dialogically social process of teaching and learning in which learning outcomes are the result of learners active collaboration with their teacher and peers to deepen their understanding in ways which render learning outcomes unpredictable in advance of the process.

Concluding Remarks

There is a need for further discussion about the extent to which variation theory can make an important contribution to the development of a theory of dialogic teaching as a basis for lesson study, alongside and linked to pedagogical ideas like

‘democratic pedagogy’ and ‘accelerated learning’. Such discussion may conclude, contrary to my own position, that variation theory is best conceived simply as a pedagogical tool for improving the technical effectiveness of instruction through lesson study.

This editorial review has tried to clarify the issues at stake about the role of theory in the future development of lesson study and to develop a position on them. They are issues which the Lesson Study Research Laboratory in Lausanne may choose to address as part of the research agenda set out in the poster presentation of its work in this issue. They are also very important for the authors of the book *Lesson Study for Learning Community: A guide to sustainable school reform* (Routledge 2015), to address (see Edmund Lim’s review in this issue). Should Lesson Study take a form that, not only promotes the development of dialogic professional learning communities in schools and educational systems, but one which also promotes the development of dialogic learning communities within the pedagogical space it opens up inside classrooms? I think that the authors - Saito, Murase, Tsukui and Yeo – will agree that the purpose of dialogic professional learning communities is to support educational reforms that through Lesson Study open up more pedagogical space in the educational system for a dialogical form of ‘teaching for understanding’. Would they therefore share my belief that variation theory can be at home in that space alongside notions like ‘democratic pedagogy’ and ‘accelerated learning’?

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