

Building a sustainable east – west dialogue on teaching and learning: The fusion of lesson and learning studies

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This paper reports on the growth of the World Association of Lesson Studies (WALS) and the international dialogue that it sustains. In particular, it outlines the features of Learning Study; the hybrid version of Lesson Study developed through a sustained East – West dialogue of more than a decade, and refers the reader to some of the key publications that have contributed to it. The Variation Theory used in Learning Study in the Asia-Pacific region was developed in Europe from the phenomenographic research approach to learning (Marton and Booth, 1997) to explain the conditions necessary for the design of effective learning situations. Many parallels have since been observed. The Learning Study approach to design is illustrated here and its strengths and challenges identified. Its potential as a teacher action research, professional development strategy is discussed. The intention of this paper is to invite the reader to join the dialogue.

Key words: Learning study; Variation Theory; design-based research; Action Research.

Introduction

The World Association of Lesson Studies (WALS) began life in Hong Kong in 2006 with its first international conference hosted by the Hong Kong Institute of Education. The concept of lesson study needed no introduction. It had been identified in *The Learning Gap* (Stigler and Hiebert, 1999, Yoshida, 1999) as a successful, peculiarly Asian approach to teachers' professional development that might account in part for the success of Japanese teaching, and it subsequently took root in the USA and other western countries. The lesson study is essentially action research in which teachers working in collaboration problematize classroom processes with a view to improving learning outcomes (Lewis, 2009). Uniquely the Hong Kong WALS conference introduced a new slant on lesson study which has become known as Learning Study. This approach to teacher action research combines lesson study with design based research and a particular theory of learning referred to as Variation Theory (see Figure 1). By 2010, the WALS conference had begun an international journey, leaving its original base in the Hong Kong Institute of Education and moving first to the Sultan Hassanal Bolkiah Institute of Education, University of Brunei, then to the University of Tokyo in 2011 and in 2012 to

the National Institute of Education, Singapore. Other international venues are lined up for 2013 and beyond. Membership of WALS is growing. Each year the number of countries represented increases and enriches the dialogue between teachers and academics from East and West. In 2011, the first issue of the official journal of WALS was published entitled the International Journal of Lesson and Learning Studies. In this article, I will outline the features of learning study, the hybrid version of lesson study developed through a sustained East – West dialogue of more than a decade, and refer the reader to some of the key publications that have contributed to it.

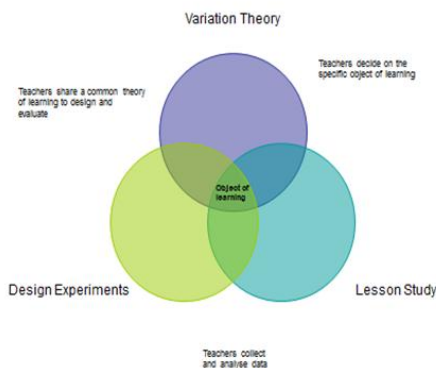


Figure 1. Components of Learning Study

The theory used in learning study was developed from the phenomenographic research approach to learning (Marton and Booth, 1997) to explain the conditions necessary for the design of effective learning situations. Hitherto the outcome of phenomenographic studies had been mappings of qualitatively different, often hierarchical related, conceptions of phenomena derived mainly from iterative analysis of deep interview data. For example, an early study of economics students’ understanding of the concept of price (Dahlgren and Marton, 1978) identified two conceptions of price: 1) price experienced as a property of a commodity comparable with its colour, size and weight (“Because the producers have set a price. They have included all the costs.”), and 2) price experienced as an entity determined by a dynamic market system (“If you consider this competitive model, so to speak, that’s where demand and supply are in equilibrium, that point, it’s a simple answer so to speak.”). For anyone teaching this object of learning, the implication is clear. If a learner, asked to explain why the price of a commodity is \$X, reveals an understanding as conception 1, there is a need to do something to change that conception since conception 2, we can agree, is a better way to understand price determination. The departure for phenomenography was to ask what did it take to change the conception of a phenomenon held by an individual for a better one, one which had more explanatory power.

According to variation theory (Runesson and Marton, 2002; Marton and Tsui, 2004), individual learning results from the discernment of critical aspects of objects and situations and from focusing on them simultaneously. A critical aspect is an aspect of the object of learning which is necessary for a particular meaning to appear in the learner’s awareness. The presence or absence of any critical aspect distinguishes between one meaning of the object of learning and another. An aspect can be discerned only if the

learner experiences variation along a dimension corresponding to that aspect against a background of invariance in other aspects. To extend the example of price to illustrate this point, consider a learning situation designed to bring about change in learners' conception of price. They might be tasked to reflect on why a standard can of cola has different prices in different locations - a hotel, a supermarket, a low-cost airline flight and so on (Davies and Brant, 2006). In this learning activity, the product is invariant but the market conditions prevailing in the different locations vary. Supermarket pricing is competitive but airline flight pricing is less so. The learners have the opportunity to learn from the difference. They see the importance of market structure in price determination and that commodities are not produced with prices - with costs but not prices. The variation theory predicts that a designed experience of an appropriate pattern of variation and invariance is a necessary condition for learning because an aspect can be discerned only if the learner experiences variation along a dimension corresponding to that aspect against a background of invariance in other aspects such as in this case where the commodity is invariant but the market structure varies. Learning something in a particular way requires that the learner experiences simultaneously patterns of variation corresponding to the critical aspects of the object of learning. The steps in a Learning Study are similar to the action research cycle of lesson study:

- A group of teachers, supported by a consultant, decide on an object of learning - a topic or principle or approach to problem solving that is included in the curriculum.
- Drawing on information about the learners' different ways of experiencing the object obtained by a pre-test and by pooling the teachers' experience of teaching the object, the Learning Study group designs the new lesson(s). (Figure 2)
- Variation is used as a tool for designing the new lesson(s).
- One of the teachers teaches the new design. Evidence is collected through observation and video-recording of the lesson, and learners are post-tested and may be interviewed.
- The Learning Study group considers the evidence and analyses the test results. If they find the learning outcomes unsatisfactory, they review the design. (Figure 3)
- If necessary, the next teacher teaches the revised design in her class and evidence is collected.
- The Learning study continues in a cyclical process of improvement until the group is satisfied with the design.

Learning study's emphasis on seeing and responding to carefully structured difference as the stimulus for learning can be found in the early work of the Gibsons (1955) on differentiation in perceptual learning which is driving the development of perceptual learning modules by Philip Kellman and his team in UCLA (Kellman, Massey and Son, 2010). It can also be seen in Kahneman's (2011) reference to the experience of 'contrasting alternatives that might change your mind' by operating in within-subjects mode in contrast with our everyday experience of between-subjects mode. There seems to be no reason why an alternative to variation theory could not be used to provide design tools for learning study, and indeed there are examples of design based research in Europe which appear promising. Ruthven, Laborde, Leach and Tiberghien (2009) describe how design tools may be derived from 'grand' theories such as constructivism and used to create effective mathematics and science lessons. It is a question of what

works. Tapping an explicit theory of learning distinguishes learning study from other types of lesson study where the contribution of theory can remain implicit (Lo and Marton, 2011). Being explicit advantages the participants by providing a common vocabulary for evaluation. This feature of learning study supports the development of clinical practice whereby the object of learning is explicitly emphasised, enmeshing content, pedagogy and the individual experiences of the learners, and where the outcomes are judged on the basis of evidence and can be reported for the information of others so that they can see what works and why. This has the potential to transform teacher education and professional development (See, for example, Andrew, 2011).

Main categories	Sub-categories
A Price is determined by the nature of the commodity	A1 Focus on the features of the commodity A2 Focus on the cost of inputs to the production of the commodity
B Price is determined by the demand of the commodity	B1 Focus on the inverse relationship between quantity demand and price B2 Focus on the factors that affect the level of demand. E.g. taste, availability of substitute goods and so on
C Price is determined by the structure of the market	C1 Focus on the factors that affect the level of demand, e.g. taste, availability of substitute goods and so on C2 Focus on consumers' perceived proximity of supplier of similar commodity C3 Focus on monopolistic suppliers' ability to discriminate between buyers when setting price

Figure 2. Extract from a Learning Study (Lu, 2011) showing the categories of description of learners' conceptions of price

Group 1

Conception	Pre-test (bun)		Post-test 1 (coke)		Post-test 2 (bun)	
	Occurrence	%	Occurrence	%	Occurrence	%
A	9	47	3	15.8	5	26.3
B	7	36	1	5.3	0	0
C	0	0	14	73.7	13	68.4
Absent	3	15	1	5.3	1	5.3

Group 2

Conception	Pre-test (bun)		Post-test 1 (coke)		Post-test 2 (bun)	
	Occurrence	%	Occurrence	%	Occurrence	%
A	12	60	0	0	6	30
B	6	30	2	10	2	10
C	0	0	14	70	11	55
UNC	-	-	4	20	1	5
Absent	2	10	-	-	-	-

Figure 3. Extract from a Learning Study (Lu, 2011) showing the pre- and post-test results from the first cycle

In her closing remarks at the Tokyo Conference, the President of WALIS urged members to go deeper in their reports of lesson and learning studies, to focus on the object and to tell us more about what it is and how it is successfully achieved by learners through lesson and learning study.

Identifying an object of learning, its critical aspects and appropriate dimensions of variation, is not a simple process. The research may not be available - as it is for the price example cited above - to cover all the topics of the syllabuses to be taught. Normally, the object and its critical aspects and appropriate dimensions of variation have to be determined by teachers through the learning study process of design, trialling and reflection on the effect of the lesson design (Lo, Pong and Pakey, 2005; Holmqvist, Gustavsson and Wernberg, 2008). Variation theory provides the design tools. The objects of learning are molded through enactment of the designs in the classroom. For the teachers involved, this enactment is the outcome of the design process (The Design-Based Research Collective, 2003; Kelly, Lesh and Baek, 2008). The variation in students' responses to the design brings the object of learning into focus for the teachers as in the example in Figure 2 above. Through this process, the teachers are afforded the opportunity to learn about their students' learning as they teach. Detailed reporting allows others to share the insights gained. John Elliott who authored an evaluation of the Hong Kong Government sponsored three-year project entitled Variation for the Improvement of Teaching and Learning (VITAL) 2003-7 (Elliott and Yu, 2008), suggests that Learning Study in Hong Kong had created necessary conditions for the 'production of pedagogical knowledge in propositional and actionable form' (Elliott, 2009).

Some of the milestones in the development of Learning Study appear in the following publications. This is a brief and necessarily idiosyncratic tour d'horizon. The reader is advised to seek out the references listed at the end of this review. In Learning and Awareness, Marton and Booth (1997) pulled together the findings of previous decades of phenomenographic studies of learning to develop the variation theory. The authors contrasted that corpus of work with other paradigms' attempts to answer the question: what does it take to gain knowledge about the world? They emphasise the non-dualistic stance achieved by focusing on the ways in which the world is experienced by the learner. Marton and Tsui (2004) reported a set of studies in which they focused on the experience of the learner in the classroom by comparing the enacted object of learning with the intended object of learning for classes taught by different teachers who had the intention of teaching the same object. Different teachers afforded their students experience of different dimensions of variation and thus different critical aspects and objects so that the lived object of learning varied between the classes.

In 2005, the Centre for Learning-study and School Partnership (CLASP) at HKIEd published an important series of 29 learning studies in primary and secondary education (Lo, Pong and Pakey, 2005) which they sub-titled Catering for Individual Differences through Learning Studies to highlight the finding that if teachers can get the design right all students can benefit from an improvement of performance. In this book we find the helpful summary of the ways in which variation supports learning:

- V1. Variation in terms of students' ways of experiencing the object of learning
- V2. Variation in teachers' ways of preparing to teach the object of learning
- V3. Variation as a pedagogical tool

With the knowledge gained from the first and second forms of variation, the teachers in the learning study attempt to identify the critical features of the object of learning. They then decide on what aspects to focus, what aspects to vary simultaneously, and what aspects are to remain invariant or constant, and to consciously design patterns

of variation to bring about the desired learning outcomes. This process results in the teaching strategy. In a fascinating paper, Runesson (2005) analysed an exchange between a teacher and her students cited in Jaworski's (1994) book, *Investigating mathematics teaching: A constructivist enquiry*. Runesson is able to show convincingly that the teacher in the process of scaffolding the concept of 'same shape' uses a framework of variation to achieve understanding. It is interesting because it opens up the possibility that if we look carefully we may find that using a variation framework systematically is simply what good teachers do, and that different paradigms are more complementary than alternative. Marton and Pang (2006) argued that being systematic about the affordance of variation against a background of invariance is a necessary condition for learning and that mastery of a specific object of learning will require a particular pattern of variation and invariance. The source for identifying this pattern is the learners' experience of the object of learning. In an empirical study of what it takes to change student teachers' conception of the object of learning to teach (Wood, 2000), I reported some success from focusing on V1-3 above and also the contextual factors that could mediate against success for individual teachers. However, Davies and Dunnill (2008) identified some difficulties in using learning study in initial teacher education. They found that the need to access the learners' experience to determine the pattern of variation could be too challenging for some student teachers. The methodology used by Marton and Tsui (2004) appears to offer potential for developing novice teachers' understanding of teaching. I have found that the approach of comparing the space of learning created by different teachers who are ostensibly teaching the same object can lead to improved lesson design by affording student teachers the opportunity to see what is critical from the variation in enacted designs. Andrew (2011) has reported that learning study as a professional development activity makes heavy demands on teachers' subject knowledge and that some teachers can feel constrained by what they see as a trade-off between meaningful learning and preparation for examinations but that participation can have a transformative effect on those who engage fully with learning study.

More than a decade on, two publications are eagerly awaited. A new book from Ference Marton is anticipated and a publication from the Phenomenography and Variation Theory Special Interest Group of the European Association for Research on Learning and Instruction (EARLI) is expected to follow. The new WALS journal promises to be a source of examples of effective lesson and learning studies and the dialogue looks set to continue through the forthcoming international conferences. The Editors of IJLLS look forward to meeting you at the next WALS conferences and welcome your contributions to the WALS journal.

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