The many faces of lesson study and learning study

Keith Wood
Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei Darussalam

Abstract

Purpose – The purpose of this paper is to provide a review of the contributions to the current issue.
Design/methodology/approach – The paper is intended to stimulate a discussion about the nature of lesson study (LS), its use in initial teacher education (ITE) and the role of learning theory in the design of the research lesson.
Findings – The term LS was first used to describe a Japanese LS. It was seen as career-long teacher-initiated collaborative professional development through which teachers researched lesson designs to teach problem-solving and develop independent thinking skills in their students. As it has been adopted across the world, it has been adapted. This raises questions about the form and effect of LS in its various forms, about the role of learning theory in the design of research lessons and about the appropriateness of introducing LS in programmes of ITE.
Originality/value – This editorial review provides an overview of the insights and issues identified by the authors in this issue of the journal.

Keywords Learning study, Learning theory, Lesson study, Initial teacher education

Paper type Viewpoint

In their literature review of lesson study (LS) in initial teacher education (ITE), Cajkler *et al.* (2017) focus on how learning and observation were discussed in these studies. They found that there was "no universally held understanding of, or explanation for, the process of observation, how it should be conducted, and who or what should be the principle focus of attention" and there was a "lack of clarity in the definition of learning and the use of learning theory to support these observations". The sample included 17 studies conducted in the Americas, two in Asia and five in Europe. The review reveals that LS is subject to adaptation when it is incorporated in ITE.

Angelini *et al.*'s (2017) paper reports on the use of LS by 12 undergraduate pre-service foreign language teachers in a European university over a five-week school-based teaching placement. Had it been published earlier, this paper might have qualified for inclusion in Cajkler *et al.*'s review. The pre-service teachers (PSTs) were prepared for LS using an approach based on a LS specification by Dudley (2011). Other studies have involved the advice contained in Dudley's handbook. For example, Cajkler and Wood (2016) advised their mentors and student teachers to follow the stages of Dudley's model:

(1) review by mentor and student-teacher of learning challenges faced by students in one class;

(2) identification of a specific challenge with an aspect of learning;

(3) agreement on a timetable of research lessons in the practicum;

(4) planning of a "research lesson";

(5) first teaching of the research lesson by the mentor; with the student-teacher (and, possibly other teacher) observing the learning of three case students (as advised by Dudley, 2011);

(6) collaborative evaluation and amendment of the lesson, focusing on evidence about the three case students' learning;

International Journal for Lesson and Learning Studies
Vol. 7 No. 1, 2018
pp. 2-7
© Emerald Publishing Limited
2046-8253
DOI 10.1108/IJLLS-10-2017-0047

(7) re-teaching of the lesson to another group by the student-teacher, with observation of student learning by the mentor; and

(8) collaborative evaluation of the lesson (Cajkler and Wood, 2016, p. …).

In Angelini *et al.*'s research, the LS involved two cycles. It was integrated with a university programme of initial teacher training. The authors found that the PSTs faced three challenges resulting from their engagement with LS: having a good command of English to conduct the lesson; fostering real communication in class; and reinforcing social competences using games and simulations. They referred to the PSTs realising their errors through reflection on the first cycle. And in doing so, the PSTs referred to the theory taught in the university programme. For example, they came to see that the use of kinaesthetic games was beneficial to learning. However, in their responses to a follow-up question about their perceptions of LS, the PSTs did not refer specifically to what students learnt and how they learnt it. The authors concluded that the PSTs needed to improve their evaluations of students' learning and that this was something to be reinforced through the university teaching methods programme.

In reading Angelini *et al.*'s paper, it is interesting to consider whether their account would meet Cajkler *et al.*'s concern that:

> As LS is increasingly adopted by initial teacher educators, it is inevitable that more variations and adaptations will occur, as demonstrated by this review. In order for this evolution to maintain a principled approach to LS, as practised successfully for over a hundred years, teacher educators need to be rigorous in the ways they describe and discuss how they adapt LS for use in ITE (Cajkler *et al.*, 2017).

Cajkler *et al.* appear to be referring to the principled approach of Japanese LS in their reference to over 100 years of practice. Reporting on his experience of working with teachers in other countries who wish to participate in LS, Fujii (2014) has observed:

> Outside Japan […] it seems that many aspects of lesson study that are well understood by Japanese teachers have not transferred readily. For that transfer to happen, the Japanese model of lesson study needs to be more explicitly defined, including the beliefs and attitudes of Japanese teachers that underpin the process of lesson study (Fujii, 2014, p. 1).

He noted five misconceptions discovered from working with mathematics teachers in Africa, paraphrased here in question and answer format:

> Five Misconceptions about Lesson Study.
>
> Is Lesson Study a Workshop? No […] it is a teacher-led, or bottom-up, activity. In lesson study, the initiative is taken by teachers.
>
> Must the Lesson Plan be Followed Exactly? No […] a lesson plan is a "learning/teaching proposal". For this reason, if a lesson steers away a bit from what was written in the lesson plan, due to the actual classroom situation, this is never thought to be wrong.
>
> Is Structured Problem-solving Just Solving a Task? No […] the teacher poses a problem to the class *without* first demonstrating how to solve it […] the aim, for example, in a maths class, is that through solving the problem, the students learn mathematical ways of thinking, and more generally, wisdom for becoming independent thinkers or intellectually independent human beings.
>
> Is the Focus of Consideration the Teacher? No […] it is the teaching.
>
> Should a Research Lesson Always be Re-taught? No […] A lesson is an organic system. Re-teaching reinforces the idea that the same lesson plan can be used with different students, and that the students are not an important consideration (Fujii, 2014, pp. 6-13).

Japanese LS to which Fujii (2014) refers is an approach to career-long collaborative professional development. LS in ITE at the start of a teaching career in Japan is different to this.

Chichibu (2016) explains that as part of in-school training, the PST prepares a lesson plan and presents a research lesson under the guidance of a mentor. The focus is on the intensive study of teaching and learning materials:

> From simple problem to high-level cases in which finding the problem of a lesson is difficult, only a highly competent mentor can find the problem and suggest improvements. Mentors need the competency to observe the lesson and the knowledge and skills to improve the lesson […].
>
> *Kyouzai-kenkyuu* […] is valued in the lesson study of initial teachers. *Kyouzai-kenkyuu* is an original idea in Japan, and it provides studies on curriculum and teaching materials, including a textbook […] Because textbooks are also designed in a manner that leaves teachers with some room for interpretation, they need to think about how they can teach lessons using textbooks (Chichibu, 2016, p. …).

There appears to an expectation in the international literature that LS will be adapted as it is adopted by countries outside Japan; that as the cultural script of teaching varies, what is meant by LS can be expected to vary. This did not seem to be their intention when Stigler and Hiebert (1999) introduced LS to the world. Rather it was that, given time, it would be the culture of teaching that would change with the introduction of the Japanese LS professional development model which would lead to an improvement in learning. But LS could not be a quick fix for the problem identified in The Teaching Gap (Stigler and Hiebert, 1999). As Ermeling and Graff-Ermeling (2014), both American Teachers who have experienced Japanese LS first hand during a period of employment as teachers in Japan point out, "teachers learning to conduct lesson study will likely need significant time and resources to gain understanding and appreciation for what it means to fashion a coherent storyline, articulate, and test hypotheses, rely on evidence to guide reflection, embrace collective ownership of improvement, and persist with problems over time".

Takahashi *et al.* (2013) have drawn attention to the difficulty of achieving the change needed in US mathematics teaching identified in the teaching gap – "shifting from a focus on teaching mathematical procedures to having students do mathematics" – because it requires a simultaneous change of tasks, goals and teachers' and students' ways of engaging with mathematics. They suggest the use of Japanese materials and approaches in cycles of study: trialling materials and approaches in the classroom, reflection, refinement and re-trialling. They emphasise the importance of LS allowing "educators to develop a common vision of what reform ideas actually look like in practice". They provide the example of the need for teachers to reconcile their different conceptions of mathematical problem-solving before they can share their experience of a lesson. And they identify the need to build teacher ownership of research-based knowledge. LS with high-quality materials is, they argue, the way "to join the strengths of teacher 'ownership' with the introduction of well-tested, high quality resources and models". This need to shift the focus in teaching from teaching procedures to having the students "do" the subject would apply across the curriculum. It is not limited to mathematics.

This is very different to, for example, Dudley's model of LS and it begs the questions of what are the principles on which LS should be based and whether it should be included in ITE. Without clear answers to these questions, perhaps we should not be surprised at what Cajkler *et al.* found in their literature review.

Cajkler *et al.* did not include the words "learning study" in their literature search. As a form of collaborative professional development learning study employs the LS action research procedure to research the design of an effective lesson but couples this with an explicit theory of learning – the variation theory of learning – developed by Ference Marton and his many collaborators worldwide (see, e.g. Marton and Booth, 1997; Lo, 2012; Marton, 2015).

In this issue of the journal, two papers explore the use of learning study in ITE. In Tan's (2017) paper, in a similar way to Angelini *et al.*'s, PSTs are learning from their mistakes but

Tan's PSTs do have a way of answering the what and how questions with reference to variation theory.

Tan's paper describes the experience of three biology (Grade 10-12) PSTs during a pilot learning study included in the author's design of her ITE and the school-based practicum. The first cycle of the learning study was carried out during the university-based programme through which the PSTs "learned to determine the learning object and critical aspects, apply variation theory to design and review lessons, and collaborate to design, teach and evaluate their theory-based lesson through peer micro-teaching and classroom research". The second cycle took place during the school-based three-month practicum the following year. Some discontinuity occurred as contextual constraints during the practicum resulted in the teachers being placed in different schools and led to a change in the object of learning between the two cycles of learning study. The PSTs used video recordings of their lessons to inform meetings called to reflect on the lessons.

Thematic analysis of the PSTs' perceptions of their experience revealed how they "negotiated learning opportunities and challenges within the learning study" by becoming comfortable with making mistakes, using those mistakes to review teaching approaches, and engaging with "variation-framed pedagogy". This allowed the PSTs to structure their conversation about what worked in the classroom and why, and what could be done differently, in contrast with the experience of the PSTs in Angelini *et al.*'s study.

Durden's (2017) phenomenographic study of PSTs' experience of learning study in ITE has identified five conceptions of learning study and their critical aspects from a sample of 18 business studies and economics PSTs at two English universities. The conceptions form a hierarchy. The highest (most sophisticated) conception of learning study (five) sees it as "transforming students" understanding through conceptual change'. The critical aspects present in this conception are: "working with others and reviewing and re-teaching lessons; focusing on student activity in lessons; delimiting the object of learning from its context; determining teaching objectives by reference to levels of student understanding; and varying features critical to each level of student understanding". In contrast, the lowest conception of learning study (1) (least sophisticated) simply sees learning study as "Improving lessons by following a process" of "working with others and reviewing and re-teaching lessons" (critical aspect).

There is a parallel here with the findings of the Prosser *et al.*'s (1994) phenomenographic study of conceptions of teaching where the highest conception (most sophisticated conception) of teaching was found to have a "how to teach" aspect described as "helping students change their conceptions" and a "what to teach" aspect described as "students' conceptions"; in contrast with the lowest conception of teaching with aspects: (how) transmitting (what) syllabus/text concepts.

Durden's argument is that the findings of his study provide "a framework for exploring differences in the quality of learning studies and the relationship between teacher conceptions of learning study and the degree of conceptual change in students in a learning study. it also enables facilitator/researchers to design and manage interventions to develop teacher understanding of learning study". If a critical aspect is not present in the awareness of a PST, variation theory posits that it is necessary, through the design of the learning study, to open a dimension of variation through contrasting features of that critical aspect to bring it into awareness. For example, exploring the variation in the ways students experience the object of learning will bring the aspect D to the awareness of the PSTs.

Durden's Conception 2 of learning study could appear, perhaps, to resonate with Dudley's (2011) advice offered to PSTs and may explain in part Angelini *et al.*'s finding that PSTs in their LS did not refer specifically to what students learnt and how they learnt it, that is to say, although it was a LS, it could have been seen by PSTs as "facilitating students taking responsibility for their learning" by "working with others and reviewing and

re-teaching lessons" and "focusing on student activity in lessons". Perhaps not. This conjecture simply serves as an example of the use of the outcome of Durden's phenomenographic analysis. The study would need to be repeated in the very different context of Angelini *et al.*'s study.

In contrast with the previous studies, Wirawan *et al.* (2017) report an investigation of the effects of spiritual group training on improving the spiritual well-being among adolescences using a pre- and post-test experimental design. The paper justifies publication because it signals something new about the development of spirituality and group work, introducing literature and new ideas which could lead to further practical development. But it raises more questions than it answers about LS. The training materials were based on the following "aspects: understanding the meaning of life, understanding the values, building connections, understanding becoming, and transcendence". How was the training designed? Was there a learning theory that informed this design? The paper reports that "by giving a space for each individual to share the values and meaning, the opportunity to increase the level of spirituality becomes more possible". Spirituality as an object of learning needs further clarification. The improvement in the test result does not reveal the nature of the students' experience of the training. Does not explain why the results improved. Interviews with students, parents and trainers would have revealed more. As Cajkler *et al.* point out, as variations and adaptations of LS occur by lesson studying in new contexts with new objects of learning, the demands placed on the researchers in reporting their studies will increase.

Cajkler *et al.*'s point that there should be clarity about the use of learning theory and a need for rigour in LSs found support in the first issue of *IJLLS* when Lo and Marton (2012) argued that, "Teachers need a sound theory to help them make wise decisions about teaching". Elliott (2012) was very clear that "Lesson study when informed by an explicit learning theory, such as variation theory, provides a strong basis for the development of a practitioner-based science of teaching". Not all agree, of course, some may be uneasy about this emphasis on theory because, for example, "it might be launching educational research on a restricted path of discovery; a path which could curb rather than cultivate the artistic possibilities that learning study could furnish for educational thought and practice" (Hogan, 2015). But it is tempting to ask again (Wood, 2015) what is the theory of learning that informs LS? Or, perhaps, with the expectation that there will be adaptations, the question should be rephrased as, what is the theory of learning that informs Japanese LS and Chinese LS and English LS and […] ? Of course, learning study should be very clear in responding to this question wherever it is practised.

References

Angelini, M.L. and Álvarez, N. (2018), "Spreading lesson study in pre-service teacher instruction", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 23-36.

Cajkler, W. and Wood, P. (2016), "Mentors and student-teachers 'lesson studying' in initial teacher education", *International Journal for Lesson and Learning Studies*, Vol. 5 No. 2, pp. 84-98.

Chichibu, T. (2016), "Impact on lesson study for initial: teacher training in Japan: focus on mentor roles and kyouzai-kenkyuu", *International Journal for Lesson and Learning Studies*, Vol. 5 No. 2, pp. 155-168.

Dudley, P. (2011), *Lesson Study: A Handbook*, available at: http://lessonstudy.co.uk/wp-content/uploads/2012/03/Lesson_Study_Handbook_-_011011-1.pdf

Durden, G. (2018), "Improving teacher learning: variation in conceptions of learning study", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 50-61.

Elliott, J. (2012), "Developing a science of teaching through lesson study", *International Journal of Lesson and Learning Studies*, Vol. 1 No. 2, pp. 108-125.

Ermeling, B.A. and Graff-Ermeling, G. (2014), "Learning to learn from teaching: a first-hand account of lesson study in Japan", *International Journal for Lesson and Learning Studies*, Vol. 3 No. 2, pp. 170-191.

Fujii, T. (2014), "Implementing Japanese Lesson study in foreign countries: misconceptions revealed", *Mathematics Teacher Education and Development*, Vol. 6 No. 1, available at: https://eric.ed.gov/?id=EJ1046666

Hogan, P. (2015), "Lesson study east and west: identifying some key issues", *International Journal for Lesson and Learning Studies*, Vol. 4 No. 2, pp. 178-181.

Larssen, D.L.S., Cajkler, W., Mosvold, R., Bjuland, R., Helgevold, N., Fauskanger, J., Wood, P., Baldry, F., Jakobsen, A., Bugge, H.E., Næsheim-Bjørkvik, G. and Norton, J. (2018), "A literature review of lesson study in initial teacher education: perspectives about learning and observation", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 8-22.

Lo, M.L. (2012), *Variation Theory and the Improvement of Teaching and Learning*, Acta Universitatis Gothoburgensis, Göteborg.

Lo, M.L. and Marton, F. (2012), "Towards a science of the art of teaching: using variation theory as a guiding principle of pedagogical design", *International Journal of Lesson and Learning Studies*, Vol. 1 No. 1, pp. 7-22.

Marton, F. (2015), *Necessary Conditions of Learning*, Routledge, New York, NY and London.

Marton, F. and Booth, S. (1997), *Learning and Awareness*, Lawrence Erlbaum, Mahwah, NJ.

Prosser, M., Trigwell, K. and Taylor, P. (1994), "A phenomenographic study of academics' conceptions of science learning and teaching", *Learning and Instruction*, Vol. 4 No. 3, pp. 217-231.

Stigler, J.W. and Hiebert, J. (1999), *The Teaching Gap*, Free Press, New York, NY.

Takahashi, A., Lewis, C. and Perry, R. (2013), "A US lesson study network to spread teaching through problem solving", *International Journal for Lesson and Learning Studies*, Vol. 2 No. 3, pp. 237-255.

Tan, Y.S.M. (2018), "Learning study is 'hard': case of pre-service biology teachers in British Columbia", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 37-49.

Wirawan, H., Jufri, M. and Patak, A.A. (2018), "Spiritual group training for adolescences: investigating the effect of group training on spiritual well-being", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 62-74.

Wood, K. (2015), "Deepening learning through lesson and learning studies", in Wood, K. and Sithamparam, S. (Eds), *Realising Learning. Teachers' Professional Development through Lesson and Learning Study*, Routledge, New York, NY and London, pp. 1-24.

Corresponding author
Keith Wood can be contacted at: keith.wood@ubd.edu.bn

The many faces of lesson study and learning study

Keith Wood
Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei Darussalam

Abstract

Purpose – The purpose of this paper is to provide a review of the contributions to the current issue.

Design/methodology/approach – The paper is intended to stimulate a discussion about the nature of lesson study (LS), its use in initial teacher education (ITE) and the role of learning theory in the design of the research lesson.

Findings – The term LS was first used to describe a Japanese LS. It was seen as career-long teacher-initiated collaborative professional development through which teachers researched lesson designs to teach problem-solving and develop independent thinking skills in their students. As it has been adopted across the world, it has been adapted. This raises questions about the form and effect of LS in its various forms, about the role of learning theory in the design of research lessons and about the appropriateness of introducing LS in programmes of ITE.

Originality/value – This editorial review provides an overview of the insights and issues identified by the authors in this issue of the journal.

Keywords Learning study, Learning theory, Lesson study, Initial teacher education

Paper type Viewpoint

In their literature review of lesson study (LS) in initial teacher education (ITE), Cajkler *et al.* (2017) focus on how learning and observation were discussed in these studies. They found that there was "no universally held understanding of, or explanation for, the process of observation, how it should be conducted, and who or what should be the principle focus of attention" and there was a "lack of clarity in the definition of learning and the use of learning theory to support these observations". The sample included 17 studies conducted in the Americas, two in Asia and five in Europe. The review reveals that LS is subject to adaptation when it is incorporated in ITE.

Angelini *et al.*'s (2017) paper reports on the use of LS by 12 undergraduate pre-service foreign language teachers in a European university over a five-week school-based teaching placement. Had it been published earlier, this paper might have qualified for inclusion in Cajkler *et al.*'s review. The pre-service teachers (PSTs) were prepared for LS using an approach based on a LS specification by Dudley (2011). Other studies have involved the advice contained in Dudley's handbook. For example, Cajkler and Wood (2016) advised their mentors and student teachers to follow the stages of Dudley's model:

(1) review by mentor and student-teacher of learning challenges faced by students in one class;

(2) identification of a specific challenge with an aspect of learning;

(3) agreement on a timetable of research lessons in the practicum;

(4) planning of a "research lesson";

(5) first teaching of the research lesson by the mentor; with the student-teacher (and, possibly other teacher) observing the learning of three case students (as advised by Dudley, 2011);

(6) collaborative evaluation and amendment of the lesson, focusing on evidence about the three case students' learning;

International Journal for Lesson and Learning Studies
Vol. 7 No. 1, 2018
pp. 2-7

2046-8253
DOI 10.1108/IJLLS-10-2017-0047

(7) re-teaching of the lesson to another group by the student-teacher, with observation of student learning by the mentor; and

(8) collaborative evaluation of the lesson (Cajkler and Wood, 2016, p. …).

In Angelini *et al.*'s research, the LS involved two cycles. It was integrated with a university programme of initial teacher training. The authors found that the PSTs faced three challenges resulting from their engagement with LS: having a good command of English to conduct the lesson; fostering real communication in class; and reinforcing social competences using games and simulations. They referred to the PSTs realising their errors through reflection on the first cycle. And in doing so, the PSTs referred to the theory taught in the university programme. For example, they came to see that the use of kinaesthetic games was beneficial to learning. However, in their responses to a follow-up question about their perceptions of LS, the PSTs did not refer specifically to what students learnt and how they learnt it. The authors concluded that the PSTs needed to improve their evaluations of students' learning and that this was something to be reinforced through the university teaching methods programme.

In reading Angelini *et al.*'s paper, it is interesting to consider whether their account would meet Cajkler *et al.*'s concern that:

> As LS is increasingly adopted by initial teacher educators, it is inevitable that more variations and adaptations will occur, as demonstrated by this review. In order for this evolution to maintain a principled approach to LS, as practised successfully for over a hundred years, teacher educators need to be rigorous in the ways they describe and discuss how they adapt LS for use in ITE (Cajkler *et al.*, 2017).

Cajkler *et al.* appear to be referring to the principled approach of Japanese LS in their reference to over 100 years of practice. Reporting on his experience of working with teachers in other countries who wish to participate in LS, Fujii (2014) has observed:

> Outside Japan […] it seems that many aspects of lesson study that are well understood by Japanese teachers have not transferred readily. For that transfer to happen, the Japanese model of lesson study needs to be more explicitly defined, including the beliefs and attitudes of Japanese teachers that underpin the process of lesson study (Fujii, 2014, p. 1).

He noted five misconceptions discovered from working with mathematics teachers in Africa, paraphrased here in question and answer format:

> Five Misconceptions about Lesson Study.
>
> Is Lesson Study a Workshop? No […] it is a teacher-led, or bottom-up, activity. In lesson study, the initiative is taken by teachers.
>
> Must the Lesson Plan be Followed Exactly? No […] a lesson plan is a "learning/teaching proposal". For this reason, if a lesson steers away a bit from what was written in the lesson plan, due to the actual classroom situation, this is never thought to be wrong.
>
> Is Structured Problem-solving Just Solving a Task? No […] the teacher poses a problem to the class *without* first demonstrating how to solve it […] the aim, for example, in a maths class, is that through solving the problem, the students learn mathematical ways of thinking, and more generally, wisdom for becoming independent thinkers or intellectually independent human beings.
>
> Is the Focus of Consideration the Teacher? No […] it is the teaching.
>
> Should a Research Lesson Always be Re-taught? No […] A lesson is an organic system. Re-teaching reinforces the idea that the same lesson plan can be used with different students, and that the students are not an important consideration (Fujii, 2014, pp. 6-13).

Japanese LS to which Fujii (2014) refers is an approach to career-long collaborative professional development. LS in ITE at the start of a teaching career in Japan is different to this.

Chichibu (2016) explains that as part of in-school training, the PST prepares a lesson plan and presents a research lesson under the guidance of a mentor. The focus is on the intensive study of teaching and learning materials:

> From simple problem to high-level cases in which finding the problem of a lesson is difficult, only a highly competent mentor can find the problem and suggest improvements. Mentors need the competency to observe the lesson and the knowledge and skills to improve the lesson […].
>
> *Kyouzai-kenkyuu* […] is valued in the lesson study of initial teachers. *Kyouzai-kenkyuu* is an original idea in Japan, and it provides studies on curriculum and teaching materials, including a textbook […] Because textbooks are also designed in a manner that leaves teachers with some room for interpretation, they need to think about how they can teach lessons using textbooks (Chichibu, 2016, p. …).

There appears to an expectation in the international literature that LS will be adapted as it is adopted by countries outside Japan; that as the cultural script of teaching varies, what is meant by LS can be expected to vary. This did not seem to be their intention when Stigler and Hiebert (1999) introduced LS to the world. Rather it was that, given time, it would be the culture of teaching that would change with the introduction of the Japanese LS professional development model which would lead to an improvement in learning. But LS could not be a quick fix for the problem identified in The Teaching Gap (Stigler and Hiebert, 1999). As Ermeling and Graff-Ermeling (2014), both American Teachers who have experienced Japanese LS first hand during a period of employment as teachers in Japan point out, "teachers learning to conduct lesson study will likely need significant time and resources to gain understanding and appreciation for what it means to fashion a coherent storyline, articulate, and test hypotheses, rely on evidence to guide reflection, embrace collective ownership of improvement, and persist with problems over time".

Takahashi *et al.* (2013) have drawn attention to the difficulty of achieving the change needed in US mathematics teaching identified in the teaching gap – "shifting from a focus on teaching mathematical procedures to having students do mathematics" – because it requires a simultaneous change of tasks, goals and teachers' and students' ways of engaging with mathematics. They suggest the use of Japanese materials and approaches in cycles of study: trialling materials and approaches in the classroom, reflection, refinement and re-trialling. They emphasise the importance of LS allowing "educators to develop a common vision of what reform ideas actually look like in practice". They provide the example of the need for teachers to reconcile their different conceptions of mathematical problem-solving before they can share their experience of a lesson. And they identify the need to build teacher ownership of research-based knowledge. LS with high-quality materials is, they argue, the way "to join the strengths of teacher 'ownership' with the introduction of well-tested, high quality resources and models". This need to shift the focus in teaching from teaching procedures to having the students "do" the subject would apply across the curriculum. It is not limited to mathematics.

This is very different to, for example, Dudley's model of LS and it begs the questions of what are the principles on which LS should be based and whether it should be included in ITE. Without clear answers to these questions, perhaps we should not be surprised at what Cajkler *et al.* found in their literature review.

Cajkler *et al.* did not include the words "learning study" in their literature search. As a form of collaborative professional development learning study employs the LS action research procedure to research the design of an effective lesson but couples this with an explicit theory of learning – the variation theory of learning – developed by Ference Marton and his many collaborators worldwide (see, e.g. Marton and Booth, 1997; Lo, 2012; Marton, 2015).

In this issue of the journal, two papers explore the use of learning study in ITE. In Tan's (2017) paper, in a similar way to Angelini *et al.*'s, PSTs are learning from their mistakes but

Tan's PSTs do have a way of answering the what and how questions with reference to variation theory.

Tan's paper describes the experience of three biology (Grade 10-12) PSTs during a pilot learning study included in the author's design of her ITE and the school-based practicum. The first cycle of the learning study was carried out during the university-based programme through which the PSTs "learned to determine the learning object and critical aspects, apply variation theory to design and review lessons, and collaborate to design, teach and evaluate their theory-based lesson through peer micro-teaching and classroom research". The second cycle took place during the school-based three-month practicum the following year. Some discontinuity occurred as contextual constraints during the practicum resulted in the teachers being placed in different schools and led to a change in the object of learning between the two cycles of learning study. The PSTs used video recordings of their lessons to inform meetings called to reflect on the lessons.

Thematic analysis of the PSTs' perceptions of their experience revealed how they "negotiated learning opportunities and challenges within the learning study" by becoming comfortable with making mistakes, using those mistakes to review teaching approaches, and engaging with "variation-framed pedagogy". This allowed the PSTs to structure their conversation about what worked in the classroom and why, and what could be done differently, in contrast with the experience of the PSTs in Angelini *et al.*'s study.

Durden's (2017) phenomenographic study of PSTs' experience of learning study in ITE has identified five conceptions of learning study and their critical aspects from a sample of 18 business studies and economics PSTs at two English universities. The conceptions form a hierarchy. The highest (most sophisticated) conception of learning study (five) sees it as "transforming students" understanding through conceptual change'. The critical aspects present in this conception are: "working with others and reviewing and re-teaching lessons; focusing on student activity in lessons; delimiting the object of learning from its context; determining teaching objectives by reference to levels of student understanding; and varying features critical to each level of student understanding". In contrast, the lowest conception of learning study (1) (least sophisticated) simply sees learning study as "Improving lessons by following a process" of "working with others and reviewing and re-teaching lessons" (critical aspect).

There is a parallel here with the findings of the Prosser *et al.*'s (1994) phenomenographic study of conceptions of teaching where the highest conception (most sophisticated conception) of teaching was found to have a "how to teach" aspect described as "helping students change their conceptions" and a "what to teach" aspect described as "students' conceptions"; in contrast with the lowest conception of teaching with aspects: (how) transmitting (what) syllabus/text concepts.

Durden's argument is that the findings of his study provide "a framework for exploring differences in the quality of learning studies and the relationship between teacher conceptions of learning study and the degree of conceptual change in students in a learning study. it also enables facilitator/researchers to design and manage interventions to develop teacher understanding of learning study". If a critical aspect is not present in the awareness of a PST, variation theory posits that it is necessary, through the design of the learning study, to open a dimension of variation through contrasting features of that critical aspect to bring it into awareness. For example, exploring the variation in the ways students experience the object of learning will bring the aspect D to the awareness of the PSTs.

Durden's Conception 2 of learning study could appear, perhaps, to resonate with Dudley's (2011) advice offered to PSTs and may explain in part Angelini *et al.*'s finding that PSTs in their LS did not refer specifically to what students learnt and how they learnt it, that is to say, although it was a LS, it could have been seen by PSTs as "facilitating students taking responsibility for their learning" by "working with others and reviewing and

re-teaching lessons" and "focusing on student activity in lessons". Perhaps not. This conjecture simply serves as an example of the use of the outcome of Durden's phenomenographic analysis. The study would need to be repeated in the very different context of Angelini *et al.*'s study.

In contrast with the previous studies, Wirawan *et al.* (2017) report an investigation of the effects of spiritual group training on improving the spiritual well-being among adolescences using a pre- and post-test experimental design. The paper justifies publication because it signals something new about the development of spirituality and group work, introducing literature and new ideas which could lead to further practical development. But it raises more questions than it answers about LS. The training materials were based on the following "aspects: understanding the meaning of life, understanding the values, building connections, understanding becoming, and transcendence". How was the training designed? Was there a learning theory that informed this design? The paper reports that "by giving a space for each individual to share the values and meaning, the opportunity to increase the level of spirituality becomes more possible". Spirituality as an object of learning needs further clarification. The improvement in the test result does not reveal the nature of the students' experience of the training. Does not explain why the results improved. Interviews with students, parents and trainers would have revealed more. As Cajkler *et al.* point out, as variations and adaptations of LS occur by lesson studying in new contexts with new objects of learning, the demands placed on the researchers in reporting their studies will increase.

Cajkler *et al.*'s point that there should be clarity about the use of learning theory and a need for rigour in LSs found support in the first issue of *IJLLS* when Lo and Marton (2012) argued that, "Teachers need a sound theory to help them make wise decisions about teaching". Elliott (2012) was very clear that "Lesson study when informed by an explicit learning theory, such as variation theory, provides a strong basis for the development of a practitioner-based science of teaching". Not all agree, of course, some may be uneasy about this emphasis on theory because, for example, "it might be launching educational research on a restricted path of discovery; a path which could curb rather than cultivate the artistic possibilities that learning study could furnish for educational thought and practice" (Hogan, 2015). But it is tempting to ask again (Wood, 2015) what is the theory of learning that informs LS? Or, perhaps, with the expectation that there will be adaptations, the question should be rephrased as, what is the theory of learning that informs Japanese LS and Chinese LS and English LS and […] ? Of course, learning study should be very clear in responding to this question wherever it is practised.

References

Angelini, M.L. and Álvarez, N. (2018), "Spreading lesson study in pre-service teacher instruction", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 23-36.

Cajkler, W. and Wood, P. (2016), "Mentors and student-teachers 'lesson studying' in initial teacher education", *International Journal for Lesson and Learning Studies*, Vol. 5 No. 2, pp. 84-98.

Chichibu, T. (2016), "Impact on lesson study for initial: teacher training in Japan: focus on mentor roles and kyouzai-kenkyuu", *International Journal for Lesson and Learning Studies*, Vol. 5 No. 2, pp. 155-168.

Dudley, P. (2011), *Lesson Study: A Handbook*, available at: http://lessonstudy.co.uk/wp-content/uploads/2012/03/Lesson_Study_Handbook_-_011011-1.pdf

Durden, G. (2018), "Improving teacher learning: variation in conceptions of learning study", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 50-61.

Elliott, J. (2012), "Developing a science of teaching through lesson study", *International Journal of Lesson and Learning Studies*, Vol. 1 No. 2, pp. 108-125.

Ermeling, B.A. and Graff-Ermeling, G. (2014), "Learning to learn from teaching: a first-hand account of lesson study in Japan", *International Journal for Lesson and Learning Studies*, Vol. 3 No. 2, pp. 170-191.

Fujii, T. (2014), "Implementing Japanese Lesson study in foreign countries: misconceptions revealed", *Mathematics Teacher Education and Development*, Vol. 6 No. 1, available at: https://eric.ed.gov/?id=EJ1046666

Hogan, P. (2015), "Lesson study east and west: identifying some key issues", *International Journal for Lesson and Learning Studies*, Vol. 4 No. 2, pp. 178-181.

Larssen, D.L.S., Cajkler, W., Mosvold, R., Bjuland, R., Helgevold, N., Fauskanger, J., Wood, P., Baldry, F., Jakobsen, A., Bugge, H.E., Næsheim-Bjørkvik, G. and Norton, J. (2018), "A literature review of lesson study in initial teacher education: perspectives about learning and observation", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 8-22.

Lo, M.L. (2012), *Variation Theory and the Improvement of Teaching and Learning*, Acta Universitatis Gothoburgensis, Göteborg.

Lo, M.L. and Marton, F. (2012), "Towards a science of the art of teaching: using variation theory as a guiding principle of pedagogical design", *International Journal of Lesson and Learning Studies*, Vol. 1 No. 1, pp. 7-22.

Marton, F. (2015), *Necessary Conditions of Learning*, Routledge, New York, NY and London.

Marton, F. and Booth, S. (1997), *Learning and Awareness*, Lawrence Erlbaum, Mahwah, NJ.

Prosser, M., Trigwell, K. and Taylor, P. (1994), "A phenomenographic study of academics' conceptions of science learning and teaching", *Learning and Instruction*, Vol. 4 No. 3, pp. 217-231.

Stigler, J.W. and Hiebert, J. (1999), *The Teaching Gap*, Free Press, New York, NY.

Takahashi, A., Lewis, C. and Perry, R. (2013), "A US lesson study network to spread teaching through problem solving", *International Journal for Lesson and Learning Studies*, Vol. 2 No. 3, pp. 237-255.

Tan, Y.S.M. (2018), "Learning study is 'hard': case of pre-service biology teachers in British Columbia", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 37-49.

Wirawan, H., Jufri, M. and Patak, A.A. (2018), "Spiritual group training for adolescences: investigating the effect of group training on spiritual well-being", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 62-74.

Wood, K. (2015), "Deepening learning through lesson and learning studies", in Wood, K. and Sithamparam, S. (Eds), *Realising Learning. Teachers' Professional Development through Lesson and Learning Study*, Routledge, New York, NY and London, pp. 1-24.

Corresponding author
Keith Wood can be contacted at: keith.wood@ubd.edu.bn

The many faces of lesson study and learning study

Keith Wood
Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, Bandar Seri Begawan, Brunei Darussalam

Abstract

Purpose – The purpose of this paper is to provide a review of the contributions to the current issue.
Design/methodology/approach – The paper is intended to stimulate a discussion about the nature of lesson study (LS), its use in initial teacher education (ITE) and the role of learning theory in the design of the research lesson.
Findings – The term LS was first used to describe a Japanese LS. It was seen as career-long teacher-initiated collaborative professional development through which teachers researched lesson designs to teach problem-solving and develop independent thinking skills in their students. As it has been adopted across the world, it has been adapted. This raises questions about the form and effect of LS in its various forms, about the role of learning theory in the design of research lessons and about the appropriateness of introducing LS in programmes of ITE.
Originality/value – This editorial review provides an overview of the insights and issues identified by the authors in this issue of the journal.

Keywords Learning study, Learning theory, Lesson study, Initial teacher education

Paper type Viewpoint

In their literature review of lesson study (LS) in initial teacher education (ITE), Cajkler *et al.* (2017) focus on how learning and observation were discussed in these studies. They found that there was "no universally held understanding of, or explanation for, the process of observation, how it should be conducted, and who or what should be the principle focus of attention" and there was a "lack of clarity in the definition of learning and the use of learning theory to support these observations". The sample included 17 studies conducted in the Americas, two in Asia and five in Europe. The review reveals that LS is subject to adaptation when it is incorporated in ITE.

Angelini *et al.*'s (2017) paper reports on the use of LS by 12 undergraduate pre-service foreign language teachers in a European university over a five-week school-based teaching placement. Had it been published earlier, this paper might have qualified for inclusion in Cajkler *et al.*'s review. The pre-service teachers (PSTs) were prepared for LS using an approach based on a LS specification by Dudley (2011). Other studies have involved the advice contained in Dudley's handbook. For example, Cajkler and Wood (2016) advised their mentors and student teachers to follow the stages of Dudley's model:

(1) review by mentor and student-teacher of learning challenges faced by students in one class;

(2) identification of a specific challenge with an aspect of learning;

(3) agreement on a timetable of research lessons in the practicum;

(4) planning of a "research lesson";

(5) first teaching of the research lesson by the mentor; with the student-teacher (and, possibly other teacher) observing the learning of three case students (as advised by Dudley, 2011);

(6) collaborative evaluation and amendment of the lesson, focusing on evidence about the three case students' learning;

International Journal for Lesson and Learning Studies
Vol. 7 No. 1, 2018
pp. 2-7
© Emerald Publishing Limited
2046-8253
DOI 10.1108/IJLLS-10-2017-0047

(7) re-teaching of the lesson to another group by the student-teacher, with observation of student learning by the mentor; and

(8) collaborative evaluation of the lesson (Cajkler and Wood, 2016, p. …).

In Angelini *et al.*'s research, the LS involved two cycles. It was integrated with a university programme of initial teacher training. The authors found that the PSTs faced three challenges resulting from their engagement with LS: having a good command of English to conduct the lesson; fostering real communication in class; and reinforcing social competences using games and simulations. They referred to the PSTs realising their errors through reflection on the first cycle. And in doing so, the PSTs referred to the theory taught in the university programme. For example, they came to see that the use of kinaesthetic games was beneficial to learning. However, in their responses to a follow-up question about their perceptions of LS, the PSTs did not refer specifically to what students learnt and how they learnt it. The authors concluded that the PSTs needed to improve their evaluations of students' learning and that this was something to be reinforced through the university teaching methods programme.

In reading Angelini *et al.*'s paper, it is interesting to consider whether their account would meet Cajkler *et al.*'s concern that:

> As LS is increasingly adopted by initial teacher educators, it is inevitable that more variations and adaptations will occur, as demonstrated by this review. In order for this evolution to maintain a principled approach to LS, as practised successfully for over a hundred years, teacher educators need to be rigorous in the ways they describe and discuss how they adapt LS for use in ITE (Cajkler *et al.*, 2017).

Cajkler *et al.* appear to be referring to the principled approach of Japanese LS in their reference to over 100 years of practice. Reporting on his experience of working with teachers in other countries who wish to participate in LS, Fujii (2014) has observed:

> Outside Japan […] it seems that many aspects of lesson study that are well understood by Japanese teachers have not transferred readily. For that transfer to happen, the Japanese model of lesson study needs to be more explicitly defined, including the beliefs and attitudes of Japanese teachers that underpin the process of lesson study (Fujii, 2014, p. 1).

He noted five misconceptions discovered from working with mathematics teachers in Africa, paraphrased here in question and answer format:

> Five Misconceptions about Lesson Study.
>
> Is Lesson Study a Workshop? No […] it is a teacher-led, or bottom-up, activity. In lesson study, the initiative is taken by teachers.
>
> Must the Lesson Plan be Followed Exactly? No […] a lesson plan is a "learning/teaching proposal". For this reason, if a lesson steers away a bit from what was written in the lesson plan, due to the actual classroom situation, this is never thought to be wrong.
>
> Is Structured Problem-solving Just Solving a Task? No […] the teacher poses a problem to the class *without* first demonstrating how to solve it […] the aim, for example, in a maths class, is that through solving the problem, the students learn mathematical ways of thinking, and more generally, wisdom for becoming independent thinkers or intellectually independent human beings.
>
> Is the Focus of Consideration the Teacher? No […] it is the teaching.
>
> Should a Research Lesson Always be Re-taught? No […] A lesson is an organic system. Re-teaching reinforces the idea that the same lesson plan can be used with different students, and that the students are not an important consideration (Fujii, 2014, pp. 6-13).

Japanese LS to which Fujii (2014) refers is an approach to career-long collaborative professional development. LS in ITE at the start of a teaching career in Japan is different to this.

Chichibu (2016) explains that as part of in-school training, the PST prepares a lesson plan and presents a research lesson under the guidance of a mentor. The focus is on the intensive study of teaching and learning materials:

> From simple problem to high-level cases in which finding the problem of a lesson is difficult, only a highly competent mentor can find the problem and suggest improvements. Mentors need the competency to observe the lesson and the knowledge and skills to improve the lesson […].
>
> *Kyouzai-kenkyuu* […] is valued in the lesson study of initial teachers. *Kyouzai-kenkyuu* is an original idea in Japan, and it provides studies on curriculum and teaching materials, including a textbook […] Because textbooks are also designed in a manner that leaves teachers with some room for interpretation, they need to think about how they can teach lessons using textbooks (Chichibu, 2016, p. …).

There appears to an expectation in the international literature that LS will be adapted as it is adopted by countries outside Japan; that as the cultural script of teaching varies, what is meant by LS can be expected to vary. This did not seem to be their intention when Stigler and Hiebert (1999) introduced LS to the world. Rather it was that, given time, it would be the culture of teaching that would change with the introduction of the Japanese LS professional development model which would lead to an improvement in learning. But LS could not be a quick fix for the problem identified in The Teaching Gap (Stigler and Hiebert, 1999). As Ermeling and Graff-Ermeling (2014), both American Teachers who have experienced Japanese LS first hand during a period of employment as teachers in Japan point out, "teachers learning to conduct lesson study will likely need significant time and resources to gain understanding and appreciation for what it means to fashion a coherent storyline, articulate, and test hypotheses, rely on evidence to guide reflection, embrace collective ownership of improvement, and persist with problems over time".

Takahashi *et al.* (2013) have drawn attention to the difficulty of achieving the change needed in US mathematics teaching identified in the teaching gap – "shifting from a focus on teaching mathematical procedures to having students do mathematics" – because it requires a simultaneous change of tasks, goals and teachers' and students' ways of engaging with mathematics. They suggest the use of Japanese materials and approaches in cycles of study: trialling materials and approaches in the classroom, reflection, refinement and re-trialling. They emphasise the importance of LS allowing "educators to develop a common vision of what reform ideas actually look like in practice". They provide the example of the need for teachers to reconcile their different conceptions of mathematical problem-solving before they can share their experience of a lesson. And they identify the need to build teacher ownership of research-based knowledge. LS with high-quality materials is, they argue, the way "to join the strengths of teacher 'ownership' with the introduction of well-tested, high quality resources and models". This need to shift the focus in teaching from teaching procedures to having the students "do" the subject would apply across the curriculum. It is not limited to mathematics.

This is very different to, for example, Dudley's model of LS and it begs the questions of what are the principles on which LS should be based and whether it should be included in ITE. Without clear answers to these questions, perhaps we should not be surprised at what Cajkler *et al.* found in their literature review.

Cajkler *et al.* did not include the words "learning study" in their literature search. As a form of collaborative professional development learning study employs the LS action research procedure to research the design of an effective lesson but couples this with an explicit theory of learning – the variation theory of learning – developed by Ference Marton and his many collaborators worldwide (see, e.g. Marton and Booth, 1997; Lo, 2012; Marton, 2015).

In this issue of the journal, two papers explore the use of learning study in ITE. In Tan's (2017) paper, in a similar way to Angelini *et al.*'s, PSTs are learning from their mistakes but

Tan's PSTs do have a way of answering the what and how questions with reference to variation theory.

Tan's paper describes the experience of three biology (Grade 10-12) PSTs during a pilot learning study included in the author's design of her ITE and the school-based practicum. The first cycle of the learning study was carried out during the university-based programme through which the PSTs "learned to determine the learning object and critical aspects, apply variation theory to design and review lessons, and collaborate to design, teach and evaluate their theory-based lesson through peer micro-teaching and classroom research". The second cycle took place during the school-based three-month practicum the following year. Some discontinuity occurred as contextual constraints during the practicum resulted in the teachers being placed in different schools and led to a change in the object of learning between the two cycles of learning study. The PSTs used video recordings of their lessons to inform meetings called to reflect on the lessons.

Thematic analysis of the PSTs' perceptions of their experience revealed how they "negotiated learning opportunities and challenges within the learning study" by becoming comfortable with making mistakes, using those mistakes to review teaching approaches, and engaging with "variation-framed pedagogy". This allowed the PSTs to structure their conversation about what worked in the classroom and why, and what could be done differently, in contrast with the experience of the PSTs in Angelini *et al.*'s study.

Durden's (2017) phenomenographic study of PSTs' experience of learning study in ITE has identified five conceptions of learning study and their critical aspects from a sample of 18 business studies and economics PSTs at two English universities. The conceptions form a hierarchy. The highest (most sophisticated) conception of learning study (five) sees it as "transforming students" understanding through conceptual change'. The critical aspects present in this conception are: "working with others and reviewing and re-teaching lessons; focusing on student activity in lessons; delimiting the object of learning from its context; determining teaching objectives by reference to levels of student understanding; and varying features critical to each level of student understanding". In contrast, the lowest conception of learning study (1) (least sophisticated) simply sees learning study as "Improving lessons by following a process" of "working with others and reviewing and re-teaching lessons" (critical aspect).

There is a parallel here with the findings of the Prosser *et al.*'s (1994) phenomenographic study of conceptions of teaching where the highest conception (most sophisticated conception) of teaching was found to have a "how to teach" aspect described as "helping students change their conceptions" and a "what to teach" aspect described as "students' conceptions"; in contrast with the lowest conception of teaching with aspects: (how) transmitting (what) syllabus/text concepts.

Durden's argument is that the findings of his study provide "a framework for exploring differences in the quality of learning studies and the relationship between teacher conceptions of learning study and the degree of conceptual change in students in a learning study. it also enables facilitator/researchers to design and manage interventions to develop teacher understanding of learning study". If a critical aspect is not present in the awareness of a PST, variation theory posits that it is necessary, through the design of the learning study, to open a dimension of variation through contrasting features of that critical aspect to bring it into awareness. For example, exploring the variation in the ways students experience the object of learning will bring the aspect D to the awareness of the PSTs.

Durden's Conception 2 of learning study could appear, perhaps, to resonate with Dudley's (2011) advice offered to PSTs and may explain in part Angelini *et al.*'s finding that PSTs in their LS did not refer specifically to what students learnt and how they learnt it, that is to say, although it was a LS, it could have been seen by PSTs as "facilitating students taking responsibility for their learning" by "working with others and reviewing and

re-teaching lessons" and "focusing on student activity in lessons". Perhaps not. This conjecture simply serves as an example of the use of the outcome of Durden's phenomenographic analysis. The study would need to be repeated in the very different context of Angelini *et al.*'s study.

In contrast with the previous studies, Wirawan *et al.* (2017) report an investigation of the effects of spiritual group training on improving the spiritual well-being among adolescences using a pre- and post-test experimental design. The paper justifies publication because it signals something new about the development of spirituality and group work, introducing literature and new ideas which could lead to further practical development. But it raises more questions than it answers about LS. The training materials were based on the following "aspects: understanding the meaning of life, understanding the values, building connections, understanding becoming, and transcendence". How was the training designed? Was there a learning theory that informed this design? The paper reports that "by giving a space for each individual to share the values and meaning, the opportunity to increase the level of spirituality becomes more possible". Spirituality as an object of learning needs further clarification. The improvement in the test result does not reveal the nature of the students' experience of the training. Does not explain why the results improved. Interviews with students, parents and trainers would have revealed more. As Cajkler *et al.* point out, as variations and adaptations of LS occur by lesson studying in new contexts with new objects of learning, the demands placed on the researchers in reporting their studies will increase.

Cajkler *et al.*'s point that there should be clarity about the use of learning theory and a need for rigour in LSs found support in the first issue of *IJLLS* when Lo and Marton (2012) argued that, "Teachers need a sound theory to help them make wise decisions about teaching". Elliott (2012) was very clear that "Lesson study when informed by an explicit learning theory, such as variation theory, provides a strong basis for the development of a practitioner-based science of teaching". Not all agree, of course, some may be uneasy about this emphasis on theory because, for example, "it might be launching educational research on a restricted path of discovery; a path which could curb rather than cultivate the artistic possibilities that learning study could furnish for educational thought and practice" (Hogan, 2015). But it is tempting to ask again (Wood, 2015) what is the theory of learning that informs LS? Or, perhaps, with the expectation that there will be adaptations, the question should be rephrased as, what is the theory of learning that informs Japanese LS and Chinese LS and English LS and […] ? Of course, learning study should be very clear in responding to this question wherever it is practised.

References

Angelini, M.L. and Álvarez, N. (2018), "Spreading lesson study in pre-service teacher instruction", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 23-36.

Cajkler, W. and Wood, P. (2016), "Mentors and student-teachers 'lesson studying' in initial teacher education", *International Journal for Lesson and Learning Studies*, Vol. 5 No. 2, pp. 84-98.

Chichibu, T. (2016), "Impact on lesson study for initial: teacher training in Japan: focus on mentor roles and kyouzai-kenkyuu", *International Journal for Lesson and Learning Studies*, Vol. 5 No. 2, pp. 155-168.

Dudley, P. (2011), *Lesson Study: A Handbook*, available at: http://lessonstudy.co.uk/wp-content/uploads/2012/03/Lesson_Study_Handbook_-_011011-1.pdf

Durden, G. (2018), "Improving teacher learning: variation in conceptions of learning study", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 50-61.

Elliott, J. (2012), "Developing a science of teaching through lesson study", *International Journal of Lesson and Learning Studies*, Vol. 1 No. 2, pp. 108-125.

Ermeling, B.A. and Graff-Ermeling, G. (2014), "Learning to learn from teaching: a first-hand account of lesson study in Japan", *International Journal for Lesson and Learning Studies*, Vol. 3 No. 2, pp. 170-191.

Fujii, T. (2014), "Implementing Japanese Lesson study in foreign countries: misconceptions revealed", *Mathematics Teacher Education and Development*, Vol. 6 No. 1, available at: https://eric.ed.gov/?id=EJ1046666

Hogan, P. (2015), "Lesson study east and west: identifying some key issues", *International Journal for Lesson and Learning Studies*, Vol. 4 No. 2, pp. 178-181.

Larssen, D.L.S., Cajkler, W., Mosvold, R., Bjuland, R., Helgevold, N., Fauskanger, J., Wood, P., Baldry, F., Jakobsen, A., Bugge, H.E., Næsheim-Bjørkvik, G. and Norton, J. (2018), "A literature review of lesson study in initial teacher education: perspectives about learning and observation", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 8-22.

Lo, M.L. (2012), *Variation Theory and the Improvement of Teaching and Learning*, Acta Universitatis Gothoburgensis, Göteborg.

Lo, M.L. and Marton, F. (2012), "Towards a science of the art of teaching: using variation theory as a guiding principle of pedagogical design", *International Journal of Lesson and Learning Studies*, Vol. 1 No. 1, pp. 7-22.

Marton, F. (2015), *Necessary Conditions of Learning*, Routledge, New York, NY and London.

Marton, F. and Booth, S. (1997), *Learning and Awareness*, Lawrence Erlbaum, Mahwah, NJ.

Prosser, M., Trigwell, K. and Taylor, P. (1994), "A phenomenographic study of academics' conceptions of science learning and teaching", *Learning and Instruction*, Vol. 4 No. 3, pp. 217-231.

Stigler, J.W. and Hiebert, J. (1999), *The Teaching Gap*, Free Press, New York, NY.

Takahashi, A., Lewis, C. and Perry, R. (2013), "A US lesson study network to spread teaching through problem solving", *International Journal for Lesson and Learning Studies*, Vol. 2 No. 3, pp. 237-255.

Tan, Y.S.M. (2018), "Learning study is 'hard': case of pre-service biology teachers in British Columbia", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 37-49.

Wirawan, H., Jufri, M. and Patak, A.A. (2018), "Spiritual group training for adolescences: investigating the effect of group training on spiritual well-being", *International Journal for Lesson and Learning Studies*, Vol. 7 No. 1, pp. 62-74.

Wood, K. (2015), "Deepening learning through lesson and learning studies", in Wood, K. and Sithamparam, S. (Eds), *Realising Learning. Teachers' Professional Development through Lesson and Learning Study*, Routledge, New York, NY and London, pp. 1-24.

Corresponding author
Keith Wood can be contacted at: keith.wood@ubd.edu.bn