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**Title:** A literature review of lesson study in initial teacher education: perspectives about learning and observation.

## Abstract

- **Purpose** – A structured review of literature on Lesson Study (LS) in initial teacher education (ITE) was conducted. The focus was on how learning and observation were discussed in studies of LS in ITE.
- **Design** – Each national team (in Norway and England) undertook independent searches of published peer-reviewed articles. The resulting articles were then combined, screened and collaboratively reviewed, the focus being on two areas of enquiry:
  - 1) How learning is represented and discussed;
  - 2) The extent to which observation is described and used to capture evidence of learning.
- **Findings** – The literature review indicated 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 principal focus of attention. There was also a lack of clarity in the definition of learning and the use of learning theory to support these observations.
- **Research limitations** – This study was limited to a review of a *selection* of peer-reviewed journal articles, published in English. It arrives at some tentative conclusions, but its scope could have been broadened to include more articles and other types of published material e.g. theses and book chapters.
- **Practical implications** – Research that investigates the use of LS in ITE needs to be more explicit about how learning is defined and observed. Furthermore, LS research papers need to assure greater clarity and transparency about how observations are conducted in their studies.

- ***Originality/Value*** - This literature review suggests that discussion of both learning and observation in ITE lesson study research papers should be strengthened. The review highlights three principal challenges that ITE LS researchers should consider: a) how to prepare student-teachers to observe (professional noticing being a promising option), b) the wide variation in the focus of classroom observation in ITE lesson studies c) discussion of what is understood by learning needs to stand at the heart of preparation for lesson studies in ITE.

**Keywords:** Lesson Study (LS), Initial Teacher Education (ITE), Learning, Observation.

**Paper type:** Literature review.

## Introduction

There is controversy internationally about approaches to preparing new teachers, with debates broadly divided into two principal and competing schools of thought. Some argue for ‘technicist’ craft-oriented approaches (e.g. Gove, 2010), others for more research-oriented developmental approaches. Whereas the former focus on the acquisition of important craft skills, proponents of the latter approaches argue that the purpose of initial teacher education (ITE) is to equip student-teachers for continual learning, giving them much more than a starter kit of technical skills (Hiebert, Morris and Glass, 2003; Farrell, 2006). Within such an approach, new teachers are encouraged to develop knowledge and skills so they become both learner and context-responsive and, in theory, more prepared to cope creatively and effectively with the diversity of classrooms in real time.

Lesson Study (LS) has been used in a growing number of contexts to scaffold the kinds of development envisaged by Hiebert et al. (2003), but also to support the development of important teacher skills such as quality lesson planning (Hird, Larson, Okubo and Unchino, 2014). However, using LS in ITE as a vehicle for new teacher development, results in a number of challenges. One such is the facilitation of LS during a student-teacher practicum, which includes the challenge of securing availability and quality support from their teaching practice mentors (Marble, 2006; Cajkler and Wood, 2016a).

In this review, ITE-related LS research literature was explored through a collaborative and systematic literature review conducted by the universities of Stavanger, Norway, and Leicester, England, which focused specifically on how learning and the observation of learning were discussed in the papers analysed. One of the premises that informed the teams’ thinking at the start of the review was that at the heart of LS are the two processes of learning and observation (Lewis, 2002; Murata, 2011; Dudley, 2014). Crucially, therefore, it was argued that how learning is understood and defined should determine how it is observed. The review focused on two principal areas of enquiry when looking at the LS literature:

- How learning is represented and discussed within the ITE LS literature
- How evidence of learning is effectively captured using observation as a tool

At the time of conducting the review, there were over 500 published, peer-reviewed LS-related articles in various journals. However, the majority of these reported on projects with in-service teachers, with only a minority (17%) of the articles relating to the use of LS in ITE.

An additional aspect that interested the teams' analysis of the selected papers was the exploration of how LS has been adapted and implemented in ITE contexts. In contrast to LS undertaken by in-service teachers, who may have the opportunity to spread the LS cycle over a number of weeks or even months, practicums undertaken by ITE student-teachers are much more constrained by time. Therefore, opportunities for the completion of full 'traditional' LS cycles i.e. those that include collaborative planning and observation of research lessons taught, may be restricted (da Ponte, 2017).

Evidence from the selected articles shows that numerous approaches have used *elements* of LS to good effect in order to support student-teacher development. An example of such an adaptation is that of peer or microteaching LS, where ITE students teach their research lesson to their fellow students at the university rather than teaching in *real* classrooms (Fernandez 2005, 2010; Carrier, 2011). Other adaptations include those described as shortened LS cycles carried out by student-teachers whilst in schools (McMahon and Hines, 2008) and those that involve planning for LS but without the opportunity to teach. In one case, student-teachers' experience of LS was restricted to the collaborative planning phase only (Cavey and Berenson, 2005). Attempting to bridge the gap between universities and schools, some studies involved planning for the LS cycle at the university before the research lesson was taught during a practicum and then evaluated (by video) on the student-teachers' return to the university (for example, Cohan and Honigsfeld, 2007). Finally, there are a number of studies which *did* include opportunities for student-teachers to teach research lessons in schools and to complete a more traditional LS cycle (Marble, 2006, 2007; Tsui and Law, 2007; Chassels and Melville, 2009; Sims and Walsh, 2009).

This literature review demonstrates that the application of LS in ITE has been subject to a range of adaptations, in which the level of participation by student-teachers in planning, observation, teaching and evaluative discussion of learning varies quite markedly. One general criticism made by those taking part in the literature review was that the theoretical or practical reason for these adaptations was not always made clear to the reader.

## Literature Review Methods

In order to review empirical research on LS in ITE, the group had to source articles which would be relevant to the review. A review of research on LS in the ITE of secondary school mathematics teachers, analysing 16 publications, has recently been conducted by da Ponte (2017) but he reviewed *all* forms of available literature (scientific journals, book chapters,

congress proceedings, and PhD dissertations), not just peer reviewed journals, as in this review. In this review two independent searches of published peer-reviewed articles were conducted at different times by each national team.

In England, before the collaboration with Stavanger began, two reviewers had searched ERIC and SCOPUS with the sole term 'lesson study' for all relevant papers written in English. Searching ERIC led to a list of over 1100 papers. However, while many of these contained the words 'lesson' and 'study' in the title or abstract, many proved not to be about LS. The SCOPUS search led to 338 papers, many of which were duplicated in the ERIC list. Combing through the two searches and discarding those not about LS, we arrived at a selection of over 500 possible titles, which were imported into an ENDNOTE database for more detailed analysis by the two researchers. Duplicates were then analysed and removed. In addition, some hand-searches were conducted (notably of early editions of this International Journal), leading to a total of 534 papers entered in ENDNOTE. Each title and abstract were then studied to determine the context and focus of the study and, as a result, each publication in the database was labelled using the following categories:

- ITE relevant
- In-service
- Higher Education
- Prison education
- Editorial/Position paper
- Call for papers
- General (review/survey)

This process led to the identification of 89 papers (17% of the original 534) that were labelled as focused solely on ITE. These papers were then subjected to further scrutiny and screened in full (whole paper), using exclusion criteria:

- Not lesson study
- Not empirical research papers
- Not peer-reviewed (theses, for example, were excluded)

- Not initial teacher education (not ITE)
- Not written in English.

This led to the identification of 68 articles, a process that was completed before this current literature review began.

Therefore, in order to cross-check these results, it was agreed by the Stavanger group that structured searches should be made in three academic databases (Eric, Academic Search Premier and PsycINFO). The search terms used to explore peer-reviewed journal articles in English were: “Lesson Study” and “teacher education”. Since different labels of ITE exist, we decided to use the broader and more general term of “teacher education” instead of terms like “prospective teacher education” or “preservice teacher education”. This search resulted in 61 articles from Eric, 29 from Academic Search Premier, and 21 from PsycINFO. After duplicates had been removed, 81 articles remained for potential inclusion and these were screened using the following exclusion criteria:

- Not empirical
- Not lesson study
- Not published
- Not peer-reviewed
- Not initial teacher education

When these were compared to the screenings conducted in Leicester (68 papers), 34 articles were found to be present in both samples. After discussion, the research teams agreed that this combined sample of 34 joint articles would provide a representative selection for detailed analysis. After an initial reading of these papers by pairs of reviewers, a further ten articles were excluded for various reasons: four were not considered empirical, four were not about ITE, one was not about LS and a final article (Cheng, 2011) could not be retrieved. This resulted in twenty-four core articles that were read, reviewed and coded by at least two group members from one or both of the universities. This practice continued throughout the project.

For the next level of the review, codes were developed for the following categories:

1. Genre of study (e.g. intervention, study of the nature of LS, study of the moderating variables)
2. Causal design (e.g. qualitative or statistical analysis to provide evidence of causality)

3. Problem or motivation behind the study
4. Sample size (e.g. small, medium or large)
5. Type of LS (e.g. traditional LS, micro-teaching LS, Learning Study)
6. Level of the student-teachers involved (e.g. primary, secondary)
7. Country in which the studies were conducted
8. Subject area in focus (e.g. mathematics, science, language)

For instance, in the second category (causal design), one of the following codes were assigned to each article:

- Not (if causality was not studied)
- Qal (if causality was studied by primarily qualitative analysis)
- Sta (if causality was studied by primarily statistical analysis)
- Mix (if mixed methods were used to study causality)
- Qsi (if a quasi-experimental design was used to study causality)
- Exp (if a randomized control trial was used to provide evidence of causality)

As an example, the article by Fernandez (2005) was included in the study and assigned the following codes:

1. Genre of study: *int* (it was an intervention study)
2. Causal design: *qal* (qualitative analysis was used to investigate causality)
3. Problem: *What teachers learn?* (the underlying problem or motivation was related to what teachers learn from the lesson study intervention)
4. Sample size: *md2(36)* (there were 36 participants in the study)
5. Type of LS: *MT-LS* (micro-teaching lesson study was applied)
6. Level of student-teachers: *sec* (the sample consisted of future secondary teachers)
7. Country: *USA* (the study was conducted in the USA)
8. Subject area: *math* (the subject area in focus was mathematics)

Reliability measures were not calculated, but as previously noted, each article was coded independently by two researchers and codes were reconciled to enhance reliability in coding any disparities being discussed when the two universities met.

The categories, and the subsequent codes, were adapted from a previously conducted literature review (Hoover, Mosvold, Ball and Lai, 2016) and adhered to common recommendations for reviewing literature in educational research (Creswell, 2012).

In addition to the coding, two over-arching research questions were addressed:

1. How is learning represented and discussed within the ITE LS literature?
2. How evidence of learning is captured, using observation as a tool?

In each case, these questions were broken down into three sub-categories to guide the coding of the papers. In relation to question 1, the sub-categories were:

- How is learning represented?
- Whose learning experience was the main focus?
- What is learned about learning from the study?

For question 2, sub-categories were:

- How is the process of observation explained?
- How were observations conducted?
- Who was observing who and what?

Analysis of articles with these questions in mind led to the identification not only of coherence, but also some possible omissions in the arguments made, which helped the reviewers to establish potential improvements that could strengthen the use of learning theory and observational methods in future LS research.

In this section, a presentation of general trends in the reviewed articles is followed by more specific results regarding how the papers discuss both learning and observation.

## Types of Study

Pairs of reviewers were required to determine the type of study, using the following criteria:

*Nature*: primarily about studying LS as a construct (nature)

*Intervention*: primarily about implementation of an intervention or treatment and effects of LS.

*Learning*: primarily about the process of teachers' learning in LS, but not a study of effects

*Moderating*: primarily about moderating variables, i.e. the role of conditions, context, or features of use in relation to LS.

*Policy*: primarily focused on an empirically based policy argument

The 24 papers reviewed were judged to fall into four categories (presented in table 1).



Table 1. Research problem and design

	<b>Intervention</b>	<b>Learning</b>	<b>Nature</b>	<b>Moderating</b>
How teachers learn?	Jansen and Spitzer (2009); Sims and Walsh (2009)	Tsui and Law (2007)		
What teachers learn?	Cajkler et al. (2013); Cavey and Berenson (2005); Fernandez (2005); Leavy (2010)			
How and what teachers learn?	Chassels and Melville (2009); Ricks (2011)	Fernandez and Robinson (2006); Fernandez (2010); Suh and Fulginiti (2012)		Carrier (2011)
What contributes to change?	Helgevold, Næsheim-Bjørkvik, and Østrem (2015)			
What contributes to practice?	Marble (2006); Marble (2007)			
What contributes to pupils' learning?				
What opportunities?			Peterson (2005)	
What challenges?	Amador and Weiland (2015); Bjuland and Mosvold (2015)	Gurl (2011); Parks (2008)	Parks (2009)	
Effectiveness of LS?	Cohan and Honigsfeld (2007); Davies and Dunnill (2008)			

The majority of studies (n=15) were classified as intervention studies (in some form) (e.g. Leavy, 2010; Jansen and Spitzer, 2009). Among these intervention studies, different themes were developed. For instance, whereas two articles focused on *how* student-teachers learn (Jansen and Spitzer, 2009; Sims and Walsh, 2009), four investigated *what* student-teachers learn (Fernandez, 2005; Cavey and Berenson, 2005; Leavy, 2010; Cajkler et al., 2013) and two studies combined these ideas and focused on both *how* and *what* student-teachers learn from

undertaking an LS cycle (Chassels and Melville, 2009; Ricks, 2011). Most of the studies (15) focused on student-teachers learning in and from the *process* of engaging in LS. Four studies investigated what LS contributes to change in classroom practices and to how this relates to the development of student-teachers. However, studies on how and what LS contributes directly to *pupils' learning* did not appear in the sample of articles selected in the review.

## Countries in which the studies were conducted

In the aftermath of Stigler and Hiebert's (1999) comparative findings on the approaches different cultures use in their teaching of mathematics, LS has attracted considerable attention in the United States. The majority of studies on LS in ITE (16 of 24 studies) were conducted in the United States (see Table 2). Five studies were from Europe, and only two studies were conducted in Asia.

Table 2. Countries in which the studies were conducted

Continent	Country	N	Studies
Americas (North/South)	Canada	1	Chassels and Melville (2009)
	USA	16	Amador and Weiland (2015); Carrier (2011); Cavey and Berenson (2005); Cohan and Honigsfeld (2007); Fernandez (2005); Fernandez (2010); Fernandez and Robinson (2006); Gurl (2011); Jansen and Spitzer (2009); Marble (2006); Marble (2007); Parks (2008); Parks (2009); Ricks (2011); Sims and Walsh (2009); Suh and Fulginiti (2012)
Africa		0	
Asia	Hong Kong	1	Tsui and Law (2007)
	Japan	1	Peterson (2005)
Europe	Great Britain	2	Cajkler et al. (2013); Davies and Dunnill (2008)
	Ireland	1	Leavy (2010)
	Norway	2	Bjuland and Mosvold (2015); Helgevold, Næsheim-Bjørkvik, and Østrem (2015)

Interestingly, the only study conducted in the Japanese context in this sample was carried out by an American researcher visiting Japan (Peterson, 2005), this imbalance probably explained by the fact that searches were limited to peer-reviewed journal articles in English.

## How studies report on learning

When exploring how *learning* is represented in the LS review, the analysis revealed Wenger's (1998) Communities of Practice theory, to be a dominant theoretical perspective used in discussions about student-teachers' learning (Tsui and Law, 2007; Parks, 2008, 2009; Chassels and Melville, 2009; Suh and Fulginiti, 2012; Cajkler et al. 2013). The review also revealed that Pedagogical Content Knowledge was used as a theoretical construct in four of the papers (Cavey and Berenson, 2005; Leavy 2010; Fernandez, 2010; Bjuland and Mosvold, 2015), particularly where their research was discussed in relation to a collaborative context. Other theoretical frameworks included: reflective practice (e.g. Carrier, 2011), activity theory (e.g. Tsui and Law, 2007, Helgevold et al. 2015), situated learning (Fernandez, 2010), experiential learning (Suh & Fulginiti, 2012), and the Pirie–Kieren Dynamical Theory (Cavey and Berenson 2005). Some studies drew on a range of concepts to situate their research, for example, Gurl (2010) discussed a range of studies that might be summarised as falling within a framework of collaborative reflective practice, drawing on a range of writers, for example Frykholm (1998) and the concept of communities of learning. Graham (2006) was framed by a consideration of the conditions for successful internships, and by the ideas of LS researchers such as Lewis (2002) and Stigler and Hiebert (1999) about collaboration and focus on learning. Sims and Walsh (2009) took a similar approach with an extensive and informative review that leads to discussion of 'pedagogies of investigation' (citing Lampert & Ball, 1998, 1999) and the notion of an 'inquiry stance' (proposed by Cochran-Smith & Lytle, 1999, p. 725). There was evidence of inquiry orientations being adapted in ITE-related LS projects in up to 14 papers (e.g. Marble, 2006, 2007; Parks, 2008, 2009; Sims and Walsh, 2009; Leavy, 2010; Carrier, 2011; Helgevold et al. 2013; Bjuland and Mosvold, 2015).

Such review findings suggest that there is a strong orientation within articles on LS in ITE towards notions of social and collaborative perspectives on learning, with inquiry and reflection being key characteristics of ITE programmes that LS can support. An example is to be found in Chassels and Melville (2009, p. 736):

We examine LS as a means to encourage and sustain new teachers as collaborative and reflective professionals committed to on-going inquiry and learning.

However, the review revealed less consideration of the cognitive aspects of learning for the individual student-teacher. An exception was Cavey and Berenson (2005, pp. 174–75) who, drawing on their use of the 'Pirie–Kieren Dynamical Theory for the Growth of Mathematical Understanding', noted that:

It is assumed that a learner comes to a particular learning situation with Primitive Knowledge (all other knowledge) as well as some knowledge of the particular topic that is identified by some outer layer of thinking. The seven outer layers of thinking are: Image Making, Image Having, Property Noticing, Formalizing, Observing, Structuring, and Inventising.

In answering the question of how learning is used to frame the discussion of findings, the review process showed that the dominant reporting of learning was focused on student-teacher rather than pupil learning. The reviewers also noted that, although authors may propose a theory of learning in the context and theoretical background to the article, this was often not returned to during the discussion of findings and implications.

Following analysis of how learning theory was integrated into the papers, three possible levels of theoretical coherence were identified (see table 3), each of which is discussed further below.

Table 3. Coherence in the consideration of learning as professional development

<b>Levels of theoretical coherence and integration defined</b>	<b>No. of papers</b>
<b>Coherent conceptual framework</b> There is sustained discussion of learning through a coherent, theoretical perspective on learning, which is integrated throughout the paper and returned to in the analysis and discussion of evidence from the study.	11
<b>Partial coherence</b> There is some discussion of learning through a learning theoretical perspective, although it is often not integrated within the paper and/or is not returned to in the analysis or in discussion of evidence from the study.	3
<b>Limited coherence</b> Little use of a theoretical framework, and/or it is not integrated or used in the discussion of the evidence– ‘theory in passing’	10

Although the analysis of learning perspectives in this selective review identified three *discrete* levels of coherence and integration, these judgements need to be treated with caution.

Nevertheless, the analysis revealed a high degree of variation in the attention given to learning and learning theory.

In the first group (n=11), learning seemed to be represented in a *coherent manner* where the theoretical approach which pervades these articles is presented clearly at the beginning of the text and the interpretation of findings is convincingly anchored in these same perspectives throughout the discussion and conclusions. An example of this is Amador and Weiland's (2015) use of the concept of *professional noticing* to frame student-teachers' observations of how pupils' mathematical thinking develops during a lesson. In this way, the article delves into the nature of the conscious noticing concerning classroom occurrences, which student-teachers developed during the teaching process and which they explored during the LS cycle. Amador and Weiland (p. 109) explain it thus: 'When teachers engage in lesson delivery, experts are distinguished from novices based on their awareness of the situation and their ability to "perceive what is important in a given situation, and to infer what it portends with respect to the goals of that situation"' (Miller, 2011, p. 51).' Professional noticing is functionally defined as a learned skill at the outset and data are categorised in terms of the participants' own accounts of what they noticed about pupils' learning. In the discussion of these findings, the initial focus on professional noticing is clearly linked to previous research, reflected in the analysis of the data, and discussed for its relevance to the learning of professional noticing skills. This type of theoretical integration was typical of 11 papers.

In the second group (n=3), discussion of aspects of learning theory were integrated into the text to a *certain degree*. In these articles, the difference was that although relevant perspectives on learning were introduced at the outset, they were not convincingly revisited and discussed in relation to the findings, thus weakening the overall integration of theoretical perspectives in the discussion and their relevance to the findings and conclusion.

In the last group (n=10), there was little explicit focus on learning perspectives, throughout the article, the focus being principally on praxis. Theoretical approaches may have been mentioned briefly, but there was no extensive use of these, and findings were discussed without any clear connection to a particular theory.

## **How studies report on observation**

The literature review was shaped by three core questions:

- Who was observing who and what?

- How were observations conducted?
- How was the process of observation explained?

In 22 of the 24 studies, student-teachers were involved as observers of the research lesson. In 14 studies, mentors and/or university researchers also acted as observers in collaboration with the student-teachers.

The design of the LS adaptation also impacted on what students were required to do. For example, Cavey and Berenson (2005) restricted their study to the lesson-planning phase of the LS cycle so observations were not possible. In addition, Bjuland and Mosvold (2015) described a failed LS cycle where, although intended, no observations of learning by student-teachers actually took place.

In 16 of the studies it was the performance or activities of the student-teachers which appeared to be under observation, sometimes together with pupils (8) and sometimes alone (8). In 7 studies, pupils seemed to be the sole focus of the observations carried out by participants in the study (see table 4 below). This variability demonstrates the different ways in which LS has been or can be used in ITE contexts. However if, as this analysis shows, there is a tendency in ITE applications of LS for the focus of observation to shift away from the pupils (as is the normal LS focus) and on to the student-teachers then it could be suggested that this should be made clear in the reporting of these adapted LS cycles.

Table 4. Who was being observed?

Pupils and student-teachers	8	Amador and Weiland (2015); Fernandez (2010); Marble (2006, 2007); Peterson (2005); Ricks (2011); Sims and Walsh (2009); Suh and Fulginiti (2012)
Pupils and their learning	7	Cajkler et al. (2013); Chassels and Melville (2009); Helgevold et al (2015); Jansen and Spitzer (2009); Leavy (2010); Parks (2008, 2009);
Student-teachers	8	Bjuland and Mosvold (2015); Carrier (2011); Cohan and Honigsfeld (2006); Davies and Dunnill (2008); Fernandez (2005), Fernandez and Robinson (2006); Gurl (2011); Tsui and Law (2007)
Not specified	1	Cavey and Berenson (2005)

Most papers gave some indication as to how the observation was conducted, but this was rarely an in-depth account of what was observed and how this was interpreted, and several papers provided very little information at all. It was necessary in many cases to infer how the observations had been conducted, whether using an observation schedule or format, or writing notes or annotating lesson plans. It was evident that observations were conducted in many different ways and that preparation for observation, reported in the papers, varied considerably in scope and duration. Some studies made use of video technology to support the capture of classroom data and their analysis, for example Cohan and Honigsfeld (2007), Fernandez and Robinson (2006), Fernandez (2005); Parks, (2008, 2009). In many cases, it appeared that observers made detailed notes about pupil reactions during the lessons, but there were no examples of what these data might look like, for example, Chassels and Melville (2009), Jansen and Spitzer (2009); Leavy (2010), Parks (2008, 2009), Peterson (2005), Ricks (2011), Suh and Fulginiti (2012). Some studies made specific mention of a protocol or handbook or observation format (and, in two cases, performance rubrics), for example, Amador and Weiland (2015), Bjuland and Mosvold (2015), Cohan and Honigsfeld (2007), Fernandez (2005), Helgevold et al. (2015), Marble (2006, 2007), Sims and Walsh (2009). Dudley's (2011) recommended approach of writing notes on the lesson plan was found in one study (Cajkler et al. 2013) while interviews or questionnaires/quizzes with pupils were explicitly mentioned in four papers (Jansen and Spitzer, 2009; Parks 2008, 2009; Helgevold et al. 2015).

In the reviewed papers, attention given to explaining observation varied significantly and there was limited direct reference to observation of the pupils. There was often a taken-for-granted understanding of the process of observation, for example Cohan and Honigsfeld (2007, pp. 83–84) wrote that 'they observed the lesson' or 'teaching/learning/lesson was observed' (e.g. Marble 2007). Few papers offered detailed advice about the conduct of observations, but an important exception is the paper by Sims and Walsh (2009) who carefully described how observations were undertaken (2009, p. 730):

During each research lesson, observers were positioned around the room, watching silently, constantly taking notes. Clear about their assigned duties, some observers attended to one table, others, the entire classroom. All the group members had copies of the research-lesson plan. Some observers wrote notes on the plan; most used additional paper to take notes.

Nine papers offered adjectives such as *focused/systematic/intense/close/structured/careful/specific* to describe their observations, but these terms were not explained in any detail. The

complexities involved in observing or learning how to observe were discussed in five papers. For example, Bjuland & Mosvold (2015, p. 88) highlighted:

Observation of pupil learning is decisive in lesson study, and the importance of planning how to observe pupil learning – and what behaviour to anticipate in particular (Bekken & Mosvold, 2004) – was emphasised in the preparation of the mentor teachers.

Even for those papers that offered more detail about their observation processes, few discussed the complexities relating to observation with reference to theoretical frameworks. Amador and Weiland (2015, drawing on van Es and Sherin, 2002) offered professional noticing as a framework, with which to articulate what observers may be attending to and how they might interpret the phenomena to which they give attention. Discussion of the complexities of observation was the exception, however, the norm appearing to be that most papers treated observation as relatively unproblematic.

Taken together, these findings suggest that in just over half of the papers the principal focus and purpose of observation was to look in detail at pupil learning. In other papers, this may not have been the principal pre-occupation, which perhaps contrasts with received guidance (e.g. Dudley, 2014; Lewis 2002). This leads us to question the extent to which these articles show a moving of student-teacher focus from self to an understanding of the impact of their own teaching on pupil learning.

## **Discussion**

When used traditionally as a vehicle for teachers' professional development, the focus of LS has been on how deepening knowledge and understanding of pupil learning can positively affect the efficacy and quality of teaching (Dudley, 2013, 2014; Lewis and Hurd, 2011). However, using LS in ITE contexts may mean that the focus of observations and discussion would naturally fall much more on the student-teachers rather than on the learning of the pupils or on the development of student-teachers' awareness of how their teaching impacts upon pupil learning.

In this review, two main questions were addressed: firstly, how was the concept of learning presented and discussed, and secondly, how was observation used to capture evidence?

## **Learning**



In relation to the first question about learning, claims were often made about what student-teachers had learned as a result of taking part in LS (e.g. Fernandez, 2005; Leavy, 2010). In contrast, researchers rarely defined learning nor did they all discuss in detail a learning theory framework. Learning processes were often self-reported, usually by the student-teachers themselves, and rarely from multiple-perspectives like those of the pupils or their mentors, the result being that the validity of many reported results may be questioned due to their lack of triangulation.

As noted in Table 3 above, the level to which the use of a coherent theoretical framework for learning was integrated into the discussions of findings varied greatly in the reviewed articles. Various theoretical relevant frameworks related to learning, for example Communities of Practice or PCK, were recommended by authors in the reviewed papers and these offered different ways of thinking about and assessing student-teachers' learning and development. Many of the reviewed studies lacked coherence in relating discussion of results to theory.

Consequently, a more rigorous approach to explaining the experimental design and theoretical underpinnings is needed in ITE-related studies reported by the LS community, with greater consideration given to the complexity of learning. Explanations and discussions of the processes of learning should form the basis of the conceptual framework, approaches to data collection, data analysis and the discussion of participants' learning, whether they be pupils, mentors, student-teachers or university teachers.

The review revealed that there tends to be a focus less on pupil learning, as in traditional LS practiced by in-service teachers but rather more on student-teacher learning, or even in some cases on the learning of researchers/teacher educators. The review group acknowledges that a focus on student-teacher learning is a natural adaptation within ITE since the rationale for using LS in the first place would be to offer opportunities for student-teacher development of their understanding of teaching and learning. However, we call for clearer definitions of learning and how learning is approached in such studies. In addition, more research studies are needed to explore how LS in ITE also contributes to pupils' learning, especially since this has been the default focus of traditional LS.

## **Observation**

Since the primary data collection method in LS is observation, the second question aimed to investigate how effectively observation was used as a tool for capturing evidence of learning. Lewis (2002) highlights the need for careful observation of pupils and suggests that it is

important to watch their faces and eyes whilst they are involved in learning activities. However, findings from the review suggest that the focus of observation varied (on pupils, on student-teachers or it was often expressed broadly as ‘the lesson was observed’). This variation in focus might be natural, since observation in LS is related to the specific questions of interest and standard observational protocols might not be expected. It is still striking, however, that the review articles rarely provide details of the conduct of observation or of their exact focus. What this review demonstrates is a huge variation in approach and, arguably, a need for the LS community to discuss more fully the focus of observation in ITE contexts, which varies from being on the student-teacher, the class as a whole or on specific pupils. In addition, the conduct of observations (using structured and unstructured approaches) and preparation of student-teachers for focused observations should be the subject of further investigation to identify and share possible approaches. There is also a need for greater precision in explaining all aspects of observation and making explicit its complexity.

To complement observations, Dudley (2014) recommends the use of pupil interviews. However, use of interviews in the selected papers was limited, and with little discussion of challenges and complexities involved in conducting interviews with pupils. If the aim of using LS is to move students-teachers’ focus away from their own classroom performance towards the impact that their teaching has on the learning opportunities of their pupils, observations of peers, however useful, will not help to facilitate the development of this knowledge and understanding.

If LS is to provide participants with “a true glimpse of what it means to learn from teaching” (Sims and Walsh, 2009, p. 732), research projects should be explicit about observation, focusing in particular on its explanation, conduct and participation, with a stronger recognition of the challenges of observing pupil learning. In the collection of papers reviewed, stringent focus on learning and its follow-through in all stages of the study were rare. The review group found that the development of specific frameworks for observation, like that of professional noticing (Amador and Weiland, 2015), holds promise for future application of LS in ITE. Indeed, teacher noticing and reflection have been used to very good effect to frame a recent ITE-related study not covered by this review (Leavy and Hourigan, 2016).

The key messages gleaned from this collaborative study were: a) the importance of preparing student-teachers to observe, b) the need for all participants including teacher educators, student-teachers and their school-based mentors to be clear about the purpose of the LS cycle, which is the enhancement of pupils’ learning, and c) discussion of what is understood by

learning needs to stand at the heart of preparation for the conduct of lesson studies in ITE. Without these conditions, LS in ITE risks being seen as a poor relation to what might be considered prototypical LS that involves a group of teachers working on a learning-focused question, seeking to improve the quality of teaching rather than just the individual practitioner (Stigler and Hiebert, 1999), in a collaborative and supportive way. Finally, in order for the community of LS researchers in ITE to grow and support each other's work, research articles should in future provide the reader with opportunities to access tools used with student-teachers, such as observation protocols and assessment criteria, even links to handbooks or advice about how to access them.

## Conclusion

LS was used for teacher development and learning in Japan for more than a century before it was introduced to the Western world primarily following publication of Stigler and Hiebert (1999), who noted that introducing LS into a worldwide context would inevitably result in changes and adaptations. This literature review of LS in ITE has revealed that such changes and adaptations are present not only in the conduct of LS cycles but also in the discourse of academics working within the field.

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.

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### **Further reading**

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