E-LEARNING VIA SYNCHRONOUS COMMUNICATION – EXPERIENCES FROM A LEARNING STUDY COURSE IN HIGHER EDUCATION

Eva Edman Stålbrandt, Kajsa Falkner, Stockholm Uninversity, Sweden

Introduction

At the department of Education at Stockholm University we offer a master program in didactic science. The participants are teachers with a teacher degree who would like to develop their work in school. The programme is half time studies and almost all the participants work full time at school. Since the autumn 2013 we offer the master programme as an e-learning programme (Holsapple & Lee-Post, 2006). One reason is to offer teachers to combine education with work and another motive is to attract teachers from other parts of the country or abroad. Introducing distance education means creating major changes in how teaching and other resources are used. It challenges faculty staff to reflect on and improve the course design as well as exploiting digital technology in order to improve the students' learning process. The overall aim of this project is to develop the learning environment within an e-learning course in relation to its content.

Learning Study

Learning study was developed from the ideas about lesson study of Professor Ference Marton, at University of Gothenburg in Sweden, together with colleagues in Hong Kong at the beginning of 2000 (Marton & Tsui, 2004; Kullberg, 2010). A lesson study is a Japanese form of professional development that centres on collaborative study of live classroom lessons. Lesson study is a translation of the Japanese words jugyou (instruction, lessons or lesson) and kenkyuu (research or study) (Lewis, Perry & Murata, 2006). The term might also be translated as instructional research, lesson research or study of instruction. According to Lewis, Akita and Sato (2010) these alternate translations remind us that the Japanese term jugyou does not focus on polishing lessons, which the English language term seems to connote. The term refers to *live* instruction, not to a lesson captured on paper.

Lesson study was, according to Ko Po Yuk (2012), developed by in-service Japanese teachers to foster their pedagogical knowledge and competence through working together in iterative cycles of planning, teaching and assessing research lessons in their classes. After Stigler and Hierbert (1999) attributed the superiority of Japanese students in international test scores to the use of this approach in professional teacher development, lesson study has spread throughout USA and in other places such as Hongkong, Singapore, Sweden and Iran (Yuk,

2012). Peter Dudley (2012) asserts that there is evidence that the use of lesson study can improve teaching, learning and pupil learning outcomes in a range of school contexts. According to Dudley (2012) lesson study "*works successfully in a system that expects teachers and school leaders to improve professional knowledge and practice through systematic use of collaborative, enquiry-based teacher learning approaches such as LS.*" (p.98)

Learning study and lesson study share many common features. Booth studies have a collaborative and iterative process of planning, analysing and revising lessons. They share an aim to improve students and teachers' learning. They also share a specific learning goal. In a learning study a researcher use to participates in the study. It could also be the case in a lesson study (Kullberg, 2010). In the following we sum up the similarities between lesson study and learning study:

Similarities between learning and lesson study:

- Teachers learn about their pupils' learning;
- Teachers' collaborative study of live classroom lessons;
- Aim: to improve teaching and try new ideas;
- The lesson is available for other colleagues;
- A cyclic process: lesson planning, learning observation, analysis, revision of lesson plan.

The cyclic process of planning and evaluating can be described as follow:
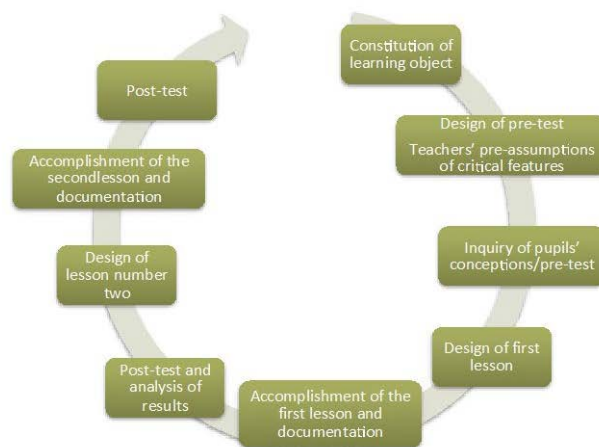
Figure 1. The cyclic process of planning and evaluating

The most important differences between lesson study and learning study are that in a learning study a learning theory is used (Lo & Marton, 2012; Lo, 2012). In learning study the observation is most often a video recording of the lesson. Specific learning is in the foreground in the learning study. In the learning study pre- and post-tests are used to explore students' learning and what may be critical for student learning. In the following we sum up the differences between lesson study and learning study:

Table 1: Differences between learning and lesson study

Learning study	Lesson study
Competence/learning object	Classroom activities
Teaching research in practice	Development through practice
Collaboration researcher-teachers	Collaboration teachers-teachers
Phenomenography and variation theory	No obvious theory
Since 2000	Since 1920's

The primary focus of the learning study is on an *object of learning*. The teachers and researcher work together. The teachers chose the object of learning. The findings of the learning study are expressions of implications on students' learning can be understood depending on how an object of learning is constituted by a teacher in terms of the intended, enacted and lived objects of learning. A learning study also gives points of departures of how to develop the teachers' competences. (Marton & Booth, 1997; Marton & Tsui, 2004; Marton & Pang, 2006) The constitution of learning objects can be described within the relationship between content of learning, learning outcome and students' knowledge:
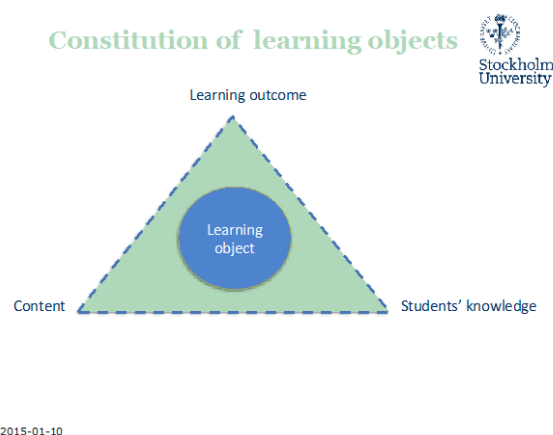

Figure 2.

An aim of the Learning study is to contribute to knowledge about relationships between teaching and learning in school. The framework used in learning study, variation theory, states that, to improve student learning, attention must be paid to what is being learned, the capability that is to be improved and the features (critical features) that it is necessary for the learner to discern.

Variation theory

Variation theory has its roots in the phenomenographic approach (rooted in phenomenology, Husserl, 1995). The Theory also shares assumptions with the socialcultural perspective of learning (cf. Chaiklin & Lave, 1993; Lave & Wenger, 1991; Rogoff, 1990; Vygotsky, 1978). Phenomenography was developed at the Department of Education at the University of Gothenburg in the early 1970's (Marton, 1981; Dahlgren, 1975; Säljö, 1982; Marton et al., 1999). The phenomenographic study explores students' learning and their ways of experiencing a specific phenomenon in the world. Usually in interviews qualitatively different ways of experiencing the phenomenon are categorized. The categories of description describe the variation in the ways of experiencing the phenomenon investigated. Phenomenography and variation theory share a non-dualistic ontological position. Angelika Kullberg (2010) writes:

> *Although there is an existing world independent of the human mind, the world as we see it prevails only through our experience of it. Since people experience things in different ways, the experienced world varies between people. (p.39)*

From the perspective of variation theory there is no difference between the experience and the content experienced. The subject and the object are inseparable and are reciprocally coherent. There is an existing world but it is constituted of the viewer's experiences of the world.

Ference Marton and Mun Ling Lo (2012) emphasises the contribution of variation theory to learning study. Variation theory provides a theoretical grounding to understand some necessary conditions of learning. According to Ference Marton & Shirley Booth (1997) learning is always directed at something – a phenomenon or an object. That leaning always results in a *qualitative change* in the way of experience the phenomenon or the *object of learning*. The learner experiences or understands the object in a different and hopefully a more qualified way. According to Marton and Lo (2012) to see an object of learning in a certain way the learner has to be aware of its certain aspects and to be able to discern these aspects at the same time. Marton and Lo (2012) explain:

> *Because such aspects are critical to the intended way of seeing the object, we call these critical aspects. Seen from this light, we believe that when students do not learn, it may not be due to a lack of ability. An object has many aspects, and not all aspects are critical; thus students who fail to learn may be focusing on aspects other than the critical aspects. Alternatively, they may not be focusing simultaneously on all critical aspects and their interrelationships, which are required to acquire the way of seeing the object intended by the teacher. (p.9)*

Kullberg (2010) emphasises that what is critical to the learners is not the same as their difficulties with the content taught. "Instead it is what they must be able to discern to experience the object of learning in a certain way." (p.34)

The object of learning has a dynamic characteristic. The intended object of learning planned by the teacher may not be the same as the enacted object of learning teachers try to implement in the class. The lived object of learning – what students actually experience – is not always the same as the enacted object of learning. Marton and Lo (2012) assert this a main reason why in every lesson there are students that learn well and student that learn what the teachers intended.

As Marton and Booth (1997) argue learning is a *function of discernment*, which presupposes an experienced *variation*. If we cannot discern object from its context the learning of an object is not possible. We have to experience variation of the object to discern the object from the context and distinguish it from other objects. (Lo, 2012) Further according to Ference Marton and Ming Fai Pang (2006) to giving attention to a feature of a situation amounts to the discernment of that feature, and the discernment of a feature amounts to experiencing a difference between two things or between two parts of the same thing. As Marton and Lo (2012) argue "Awareness of a single feature cannot exist without the awareness of differences (variation) between features." (p.10) Marton and Pang (2006) give an example. A shortsighted child cannot separate the shortsightedness from the world that they see. It is inseparable until she or he receives the first pair of glasses. When using the glasses the child separates sight and the world because one of the two, the world, remains *invariant* "whereas the other (sight) changes from "sight without glasses" to "sight with glasses" (p.199). As Marton and Pang (2006) argue the child moreover has the potentiality to discern sight as a dimension of variation within which two different values have been discerned. By wearing glasses in different situations and different times the child can conclude that glasses give a general improvement in sight in different conditions. "When the child occasionally take the glasses off, they experience the *simultaneity in variation* (our italics) between wearing glasses on one hand and being able to see well or not being able to see well on the other" (p.199). To summarize: as Marton and Pang (2006) argue to learn something the learner has to discern the object of learning. Discerning the object of learning amounts to discerning its critical aspects. Discerning the aspect, the learner has to experience variation in a dimension corresponding to the critical aspect against the background of invariance in other aspects of the same object of learning.

Synchronous online discussion

In the late 1990s environments for synchronous online discussions developed. Though most of them have been text-based media. Today more refined technology are offered with audio and web-cam conferencing and shared online whiteboards which bring the online experience closer to a face-to face meeting. There is so far quite little empirical research about how to support discussion in these kinds of media. However we know that the synchronous mode

offers greater spontaneity and more social interactions but is more likely to suffer from technology collapses and networking problems (Rudestam & Schoenholtz-Read, 2010). Students like this mode of learning as long as technical problems are minimal. Comparing different media resources, e.g. students' interaction with the world via Internet or communication with peers via web-based platforms, none covers the full iteration between reflective and interactive discussion with a teacher as in a practical face-to face seminar (Laurillard, 2012; de Freitas & Neumann, 2009).

Though peer discussions are valuable for learning, the teacher plays the most important role in order to scaffold the learning process by structuring the discussion according to a socio-cultural approach. As we investigate how digital environments can support interactive discussion on line there are few studies to draw on regarding face-to face class discussion, though all of them emphasise the importance of the teachers' impact. Text-based chats environments and instant messaging has been successful social media, but in educational settings teachers have to set rules for this meetings beyond the classroom. One reason is that the requirement for quick typing and reactions counteract reflection, which often is one of the course objectives in higher education (Ingram, Hathhorn & Evans, 2000).

Course design and methodology

Learning/Lesson study is a 15 ECTs credit course within the master programme in didactic science. It is half time study and the participants consist of teachers from all school-levels. The number of participants was about 40 in the spring 2013. The course is the third course in the programme. It is optional and it is chosen by 2/3 of the programme students. Two university teachers shared the teaching. The participants were divided into eight peer-groups. The groups were divided on the basis of their school-level and their teaching subjects.

The teachings materials were distributed via an open source LMS. No single technology is optimal for delivery of every kind of message (Moore & Kearslye, 2011) and e-learners need to communicate with teachers and peer students. Therefore Adobe Connect was used for synchronous audio- visible communication between participants, peer-groups as well as university teachers – participants.

Via the course design we tried to offer as many modes of communication as possible. Asynchronous and synchronous written communication was afforded in the LMS. Video lectures, different presentations, external links were also offered in the LMS as learning-recourses. A critical and important mode of communication was the university teachers-participants' mode. In order to avoid solely asynchronous written feedback from university teachers to participants we organised seven web-based audio-visible seminars, which included all the participants led and structured by the university teachers. Every peer-group was represented in the web-seminar by a spokesperson – a different one at every seminar. Between the seminars managed by the university teachers, the peer-groups met in Adobe Connect, in their own "rooms" preparing the tasks for the web-based teacher-seminar. The tasks consisted of written protocols of the different proceedings and understandings of a learning study. The

protocols were written by the participants together in the peer-groups and revised after reading three other peer-groups protocols. Another task in the middle of the course was to perform of a learning/lesson study together with several analyses. To make the performance and analysis possible for the peer-group, as they were physically spread geographically, the participants video-recorded the lessons and showed the film in Adobe Connect for those participants that could not attend physically during the lessons.

Results of the empirical study

The result of the empirical study constitutes of three categories of description. In each category we present a critical feature expressed in our data related to the e-learning environment. The critical feature expresses what is crucial in the participants' experience of the learning study and how and where it appears in the learning environment.

The first critical feature identified in our data is for the participants to make difference between the theoretical concepts of learning object and what is critical or what is the crucial ability. From the participants' point of view we discovered over and over again that the learning object is similar to the critical feature. It implies what is important to the experience of the crucial ability; neither identifies nor separates from the learning object. This was partly discovered in the written protocols and was able to be processed in the synchronous audio-visible web-seminars with the teachers. Compared to a Campus-seminar the digital synchronous discussions offered a focus on each group's particular critical feature without distractions from other students, although the other students listened to the teacher-conversations with all the other groups.

A second critical feature formulated is the participants' opportunity to draw attention to the implications of their own subject knowledge. When the participants pay attention to expected critical features different and undefined understandings of the learning object appear. What they experience in terms of misunderstandings among their students and what they expected the students to experience indicates the teachers' experiences of the learning object supposed to be unclear or unpronounced as in our first critical feature. During the synchronous web-seminars when we tried to scaffold the participants by examples in order to understand the concept of learning objects, we discovered that in some cases the participants' subject knowledge was too shallow in order to discuss and understand the concept of learning object.

The third and most important critical feature is "to make difference between locating the issue to the educational activity or to the individual student". This conception appears in the participants' constitution of the learning object. Here the participants' students are expected to claim familiarity with different issues. They are expected to find information, to bring different information together and to interpret the information they get. When the participants located the issue to the individual student, their students' knowledge was expected to be revised. If the issue instead will be located to the educational practice there are questions about teachers' experiences of the learning object, what the participants' experiences implies to their ways of constitute the learning object and what will be possible to identify as a

critical feature. It implies what is important to the experience of the crucial ability neither identifies nor separates from the learning object. This critical feature appeared early in the course, during the synchronous web-seminars, when the participants were supposed to identify what is critical or what is the crucial ability they must offer their students to learn. In some cases this critical features disappeared when they analysed their lessons, but in too many cases it remained.

The three categories of description reflect how the participants experience learning in the learning study circle. In order for the intentioned learning to take place the challenge designing the next course will be to make possible for the students to discern the critical features.

Conclusions

Our experiences from the first e-format learning study course are more positive than we expected. The synchronous audio-visible discussions increased the focus of the content compared to our experiences from Campus-seminars. The e-learning format created possibilities for enhanced learning, however it required a strong engagement from the participants in the interaction with other peers and the course content. Regarding our first critical feature: to make difference between the theoretical concepts of learning object and what is critical or what is the crucial ability, we redesigned the synchronous audio-visible discussions into smaller groups. In this way each participant get larger possibilities to interact with the university teachers. Regarding, what we consider, our most important critical feature to make difference between locating the issue to the educational activity instead of to the individual student, is still a challenge to overcome through future development regarding digital course design.

References

1. Chaiklin, S. and Lave, J. (1993). *Understanding practice: Perspectives on activity and context.* Cambridge, England: Cambridge University Press.

2. de Freitas, S. and Neumann, T. (2009). Pedagogic strategies supporting the use of Synchronous Audiographic Conferencing: A review of the literature. In *British Journal of Educational Technology, 40(6),* (pp. 980-998).

3. Dahlgren, L.-O. (1975). *Qualitative differences in learning as a function of content-oriented guidance.* Göteborg studies in educational sciences 15. Göteborg: Acta Universitatis Gothoburgensis.

4. Dudley, P. (2012). Lesson Study development in England: from school networks to national policy. In *International Journal for Lesson and Learning Studies, 1(1),* (pp. 85-100).

5. Husserl, E. (1995). *Fenomenologins idé* (The idea of Phenomenology; in Swedish). (J. Bengtsson, Trans.). Göteborg: Daidalos.

6. Holsapple, C.W. and Lee-Post, A. (2006). Defining, assessing, and promoting e-learning success: An information systems perspective. In *Decisions Sciences Journal of Innovative Education, 4(1),* (pp. 67-85).

7. Ingram, A.L.; Hathhorn, L.G. and Evans, A. (2000). Beyond chat on the Internet. In *Computers & Education, 35,* (pp. 21-35).

8. Kullberg, A. (2010). What is taught and what is learned. Professional insights gained and shared by teachers of mathematics. Gothenburg studies in educational sciences 293. Acta Universitatis Gothoburgensis.

9. Laurillard, D. (2002/2006). Rethinking University Teaching- a framework for the effective use of learning technologies. New York: RoutledgeFalmer.

10. Laurillard, D. (2012). *Teaching as a Design Science.* New York: Routledge.

11. Lave, J. and Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, England: Cambridge University Press.

12. Lewis, C. (2006). How should research contribute to instructional improvement? In *Educational Researcher, 35(3),* (pp. 3-14).

13. Lewis, C.C.; Akita, K. and Sato, M. (2010). Lesson study as a human science. In *National Society for the Study of Education, 109(1),* (pp. 222-237).

14. Lewis. C.; Perry. R. and Murata, A. (2006). How Should Research Contribute to Instructional Improvement? The Case of Lesson Study. In *Educational Researcher, 35(3),* (pp. 3-14).

15. Lo, M.L. (2012). *Variation Theory and the Improvement of Teaching and Learning.* Göteborg studies in educational sciences, 323. Göteborg: Acta Universitatis Gothoburgensis.

16. 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. In *International Journal for Lesson and Learning Studies, 1(1),* (pp. 7-22).

17. Marton, F (1981). Phenomenography – describing conceptions of the world around us. In *Instructional Science, 10,* (pp. 177-200).

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

19. Marton, F.; Dahlgren, L.-O.; Svensson, L. and Säljö, R. (1999). *Inlärning och omvärldsuppfattning.* (Learning and experience of the world, in Swedish). Stockholm: Prisma.

20. Marton, F. and Pang, M.F. (2006). On some necessary conditions of learning. In *The Journal of the Learning Sciences, 15(2),* (pp. 193–220).

21. Marton, F. and Tsui, A.B.M. (2004). *Classroom Discoursive and the Space of Learning.* Mahwah, New Jersey: Lawrence Erlbaum Associates.

22. Meyer, J.H.F.; Land, R. and Baille, C. (eds.) (2010). *Threshold concepts and Transformational Learning.* Rotterdam: Sense Publishers.

23. Moore, G. and Kearslye, G. (2011). *Distance Education: A System View of Online learning.* 3rd ed. Belmont: Wadsworh.

24. Rogoff, B. (1990). Apprenticeship in thinking: Cognitive development in social context. New York: Oxford University Press.

25. Rudestam, K.-E. and Schoenholtz-Read, J. (2010). The flourishing of Adult Online Education. In K.-E. Rudestam & J. Schoenholtz-Read (eds.), *Handbook of Online Learning.* 2nd Edition. Los Angeles: SAGE

26. Stiegler, J.W. and Hierbert, J. (1999). The teaching gap. Best ideas from the world's teachers for improving education in the classroom. New York: Free Press.

27. Säljö, R. (1982). *Learning and understanding: A study of differences in constructing meaning in a text.* Göteborg studies in educational sciences 41. Göteborg: Acta Universitatis Gothoburgensis.

28. Vygotsky, L.S. (1978). *Mind in Society: The Development of Higher Psychological Processes.* M. Cole, V. John-Steiner, S. Scribner & E. Souberman (eds.). Cambridge, MA: Harvard University Press.

29. Yuk, K.P. (2012). Critical conditions for pre-service teachers' learning through inquiry. In *The learning study approach in Hong Kong, 1(1),* (pp. 49-64).