

# The Implementation of Lesson Study in Mathematics: The Case of Zambia

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*This research aims to investigate the implementation of lesson study in mathematics, taking the case of Zambia. The research will focus on answering questions on how participants define lesson study, mechanisms put in place to support lesson study, how the actual implementation of lesson study at school level is done, and what has been the effects of lesson study. A case study approach will be used. Three secondary schools, six officers from the senior ranks in the Ministry of Education, six school administrators and six teachers will be invited to participate. Data will be collected through interviews, video recordings, observations and documents. Research results and recommendations will be disseminated through a PhD thesis.*

## *Introduction*

Japanese Lesson Study has been adapted by various countries as a process in which teachers progressively strive to improve their teaching methods by working with other teachers to design, test, and improve lesson sequences and critique one another's teaching techniques (Baba & Nakai, 2011; Tall, 2008). Since 2005 the Zambia Ministry of Education (2009) has institutionalised lesson study across the country as one of the effective ways of improving primary and secondary mathematics education. The Ministry demands each school to conduct one lesson study circle every month.

While research on investigating the adaptation of lesson study has increased elsewhere, Zambia seems to have insignificant research. Currently, the notable article on lesson study implementation in Zambia is by Baba and Nakai (2011). Several studies have indicated that some non-Japanese adapters of the lesson study have largely ignored the investigation of instructional materials and other critical features of lesson study (Doig, Groves, & Fujii, 2011; Fernandez, Cannon, & Chokshi, 2003; Perry & Lewis, 2009). Fernandez and her colleagues, for example, argued that teachers must adopt three "critical lenses for examining practice" if lesson study is to succeed. These lenses are the "Researcher Lens", "Curriculum Lens" and "Student Lens". Fernandez et al. (2003) argued that the failure by teachers to adopt these lenses reduced the chances of lesson study's success in the U.S. This and the findings from other studies have significant implications for lesson study implementation in various countries.

We are yet to know how much attention Zambian teachers give to these lenses and other critical aspects of lesson study that other studies have uncovered. In light of this, research on the implementation of lesson study in mathematics in Zambia seems urgent. Lack of such research is a serious omission, particularly given the fact that studies on the adaptation of Japanese Lesson Study are not mere issues of empirical interest, but issues that have significant

bearing on the professional development of teachers and, indirectly, the economy of a nation. The Government of the Republic of Zambia, for example, endorses that the skills students get in mathematics play a critical role in the country's socio-economic development (Zambia Ministry of Finance and National Planning, 2011, p. 91).

This research aims to investigate how lesson study in mathematics is being implemented in Zambia.

### *Research Questions*

The overarching research question is:

RQ: How is lesson study in mathematics being implemented in Zambia?

This overarching question will be answered using the following subsidiary questions:

SQ1: How is lesson study in mathematics defined by the Zambian Ministry of Education, in-service providers, school administrators, and teachers of mathematics?

SQ2: What mechanisms have been put in place to establish lesson study as a model for professional development in Zambian schools?

SQ3: How is lesson study being implemented at the school level?

SQ4: What has been the effect of the implementation of lesson study in mathematics in Zambia?

### *Theoretical Framework*

The theoretical framework for this research is grounded in Crotty's (1998) schema of four interrelated elements that "can help to ensure the soundness of ... [this] research and make its outcomes convincing" (Crotty, 1998, p. 6). These elements are epistemology, theoretical perspective, methodology and methods.

The epistemology for this research is Constructivism. Unlike Objectivism, which views that "things exist as meaningful entities independently of consciousness and experience, that they have truth and meaning in them as objects" (Crotty, 1998, p. 5), or Subjectivism which holds that reality is not a firm absolute, but a fluid, indeterminate realm which can be altered, Constructivism holds that "truth and meaning do not exist in some external world, but are created by the subject's interactions with the world" (Gray, 2009, p. 20). In light of this, some socio-cultural-constructivists, such as Vygotsky (1978) posit that cultures and societies people live in provide them with the cognitive tools to construct their meanings, which are internalized.

This research will employ Interpretivism as its theoretical perspective. Interpretivism is founded on the belief that reality is socially constructed and fluid (Adler, 2000). It is culturally and historically contingent, laden with political values and serving certain interests and purposes (Howe, 1998). In light of this, lesson study in mathematics in Zambia can best be understood as an approach implemented within school cultures. This research will be conducted in three secondary schools whose contexts, referred to as professional communities, are the most favourable conditions for teachers' professional learning (Anderson, Greeno, Reder, & Simon, 2000; Putnam & Borko, 2000; Slegers, Bolhuis, & Geijsel, 2005).

Within the Interpretivism perspective, the Onion Ring Model (Figure 1) will be used to reflect lesson study implementation in Zambia. This model has been used in previous educational research (European Union, 2011; Lárusdóttir, 2014).

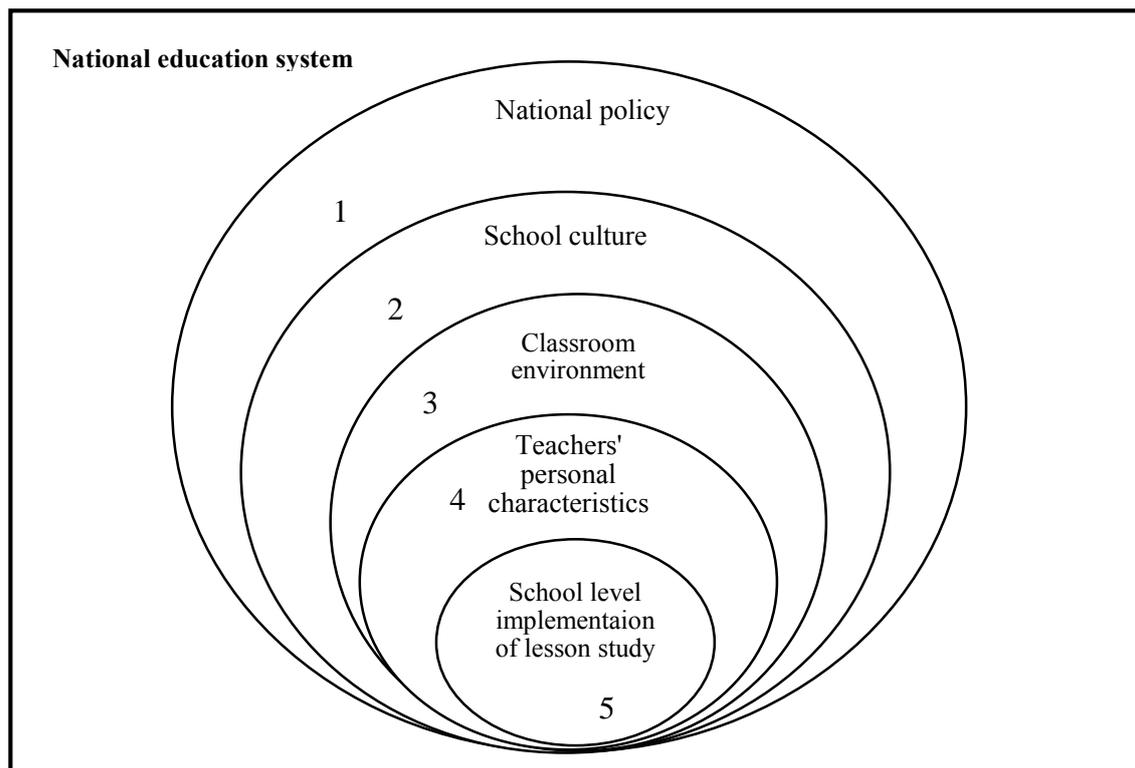


Figure 1. The Onion Ring Model for this research

Ring 1 denotes national policy on education. Data will be collected on issues about the perceived role of lesson study in addressing nationwide mathematics challenges, as set out in policy documents, and related policies and directives on implementation, as well as evaluation mechanisms.

Ring 2 denotes the school culture. Data will be collected to describe how lesson study is actually conducted within the school, and what school organisational procedures assist the implementation. For example, pertinent data (e.g., the data on how collaborative planning is supported by timetabling practices) will be collected from school headmasters and Heads of Mathematics Departments.

Ring 3 denotes both pedagogical and physical aspects of classroom. Data will be collected to ascertain the effects of the physical and pedagogical aspects of classrooms on the implementation of lesson study, and vice versa.

Ring 4 denotes teachers' personal characteristics. Data will be collected to ascertain the effects of teachers' personal characteristics on the implementation of lesson study, and vice versa.

Ring 5 denotes the implementation of lesson study at school level. Data will be collected to ascertain the attention teachers give to critical aspects of lesson study during the lesson study cycle (i.e., during planning, teaching and observing the lesson, post-lesson discussions and other follow up activities such as the re-teaching of the revised lesson).

This research will use a case study methodology. As stated by Yin (2014), Stake (2013), and (Merriam, 1998), the case study methodology is suitable when (i) the research focuses on answering "how" and "why" questions, (ii) the context of the research is contemporary, and (iii) the researcher has little to no control over the participant's behaviour. These and many

other arguments make the case study methodology appropriate to this research that seeks to answer the question on “how” lesson study in mathematics is implemented, taking the context of Zambia. Many scholars propose case study as the best option when an in-depth understanding of contextualised programmes is required (Merriam, 1998; Stake, 2013; Yin, 2014).

### *Research Design*

This research will be carried out in the Southern Province of Zambia. Participants will be selected using purposive sampling. Three secondary schools will be invited to participate. The schools will comprise one “national” school, a local urban school, and one rural school. At each school, two lesson study cycles will be observed. The Ministry of Education requires each school to conduct one lesson study cycle every month. In addition to observing lesson study cycles at each participating school, the head teacher, Continuing Professional Development Coordinator, and two mathematics teachers will be interviewed. Six officers from high ranks in the Ministry of Education will also be invited to participate.

Data will be collected using various sources: documents, semi-structured interviews, video recordings, field notes, observations of lesson study sessions, and video-stimulated recall interviews (with teachers who will teach research lessons). In addition, Grade 9 national examination results in mathematics before and after the participating school introduced lesson study will be collected to determine the effects of lesson study on students’ performance.

The textual data will be analysed using document analysis; video data using computer assisted qualitative data analysis software such as NVivo (QRS International, 2014) and Transana (Woods, 2001); and the quantitative data using software such as the Statistical Package for Social Sciences (IBM Corp., 2013) or XLStatistics (Carr, 2012).

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