



Lesson Study Practice of Science Teachers in Zambia: Its Effects, Enhancing and Hindering Factors

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Abstract

In Zambia, through the initiative of the government, science teachers at secondary school level have been conducting Lesson Study activities at school as their In-service Continuing Professional Development activity. Lesson Study is a problem solving process which consists of a series of activities using real classroom situation as a venue of learning for teachers. This usually includes planning of a lesson, conduct of the planned lesson in a class and discussion on the lesson for further improvement. Science teachers in Central province as a pioneer in Zambia have been conducting Lesson Study since 2006. They usually plan a science lesson on a particular topic as a group of science teachers at school and one of the group members conduct the lesson to their students. After the lesson, teachers in the group hold discussions to improve the lesson together with knowledge and skills sharing on teaching science. After some years of the introduction of Lesson Study, an impact survey was conducted in Central province to assess effectiveness of the practice as well as factors which enhance and hinder implementation of the activities. As a result of this research, it was found that, in the province, teaching skills of science teachers were improved and students' pass rates in national examination increased in science compared with provinces which were not implementing the practice. The survey also revealed that support from school managers and allocation of well-trained lesson study facilitators were enhancing factors of Lesson Study, while heavy loads of teachers and high pupil-teachers ratio were some of the hindering factors.

1. Introduction

Continuing Professional Development (CPD) of in-service teachers at primary and secondary schools in Zambia is one of the focuses of the government to improve a quality of classroom teaching and performance of students [1]. Based on the policy which recommends implementation of demand-based, continuing small-sized teacher training [2], the Ministry of Education, Science, Vocational Training and Early Education (MESVTEE) has been conducting School-based CPD programme which enables all the teachers at primary and secondary schools in the country to have opportunity to continuously learn from each other at school level since 2005. Under SBCPD, lesson study practice was introduced in 2005 as a tool for improving science lessons as well as teachers' knowledge and skills on teaching with a technical cooperation of Japan International Cooperation Agency (JICA). After five (5) years of implementation of lesson study by science teachers at secondary schools in Central province in Zambia, an impact survey was conducted to assess the effects and problems of the practice. This paper describes the methods of lesson study implemented in Zambia and its effects as a practice of CPD for in-service teachers.

2. Lesson study in Zambia

Lesson study which originated from Japanese schools is a well-known practice by educators to improve a classroom teaching and learning. After Stigler and Hiebert [3] analyzed features and effects of lesson study in Japan, the practice has been adopted and adapted by educators in many countries; however, few countries in Africa have introduced the practice under an institutionalized programme. Among many African countries, the MESVTEE of Zambia has institutionalized a programme to request all the science teachers at secondary school level to conduct lesson study at their schools as an activity under SBCPD programme. Lesson study has been an on-going activity in Zambia basically following eight (8) steps of activities by teachers, 1) defining problems or challenges, 2) collaboratively planning a lesson, 3) implementing planned lesson, 4) discuss lesson and reflect on its effect, 5) revise the lesson, 6) teach the revised lesson, 7) discuss the lesson and reflect again, and 8)



compiling and sharing reflections [4]. In respective school or cluster of schools, science teachers are requested to prepare an annual plan of lesson study activities as a subject group and continue the cycle of activities once a month in the period that schools are opened.

In Central province of Zambia, lesson study of science teachers was introduced as a pilot in 2005 and by 2007 it had been spread into all the 29 secondary schools. The practice is now part of the school curriculum, where the activity is timetabled with teachers meeting to discuss issues related to classroom practice on a daily basis.

3. Objective of the research

Following implementation of the lesson study practice, a research was conducted in 2010 by MESVTEE in coordination with JICA in Central province of Zambia. The objectives were;

- 1) to assess the effect of lesson study as an impact survey; and,
- 2) to find enhancing and hindering factors on the implementation of lesson study.

4. Method and participants

Documentation and interview method was adopted to pursue this research. For assessing the effect of lesson study, national examination pass rates in science and biology subjects were compared between Central province as implementing group and other 6 provinces as non-implementing group. The year of data and number of examination centers to be used in this research are shown in the table 1.

For determining enhancing and hindering factors on the conduct of lesson study, researchers conducted interviews and administered questionnaires to implementers in Central province. The sampling numbers are in table 2 below, though there was a limitation of sampling because there were only 29 secondary schools in the provinces at that time. After data collection, correlations between examination pass rates in science and factors reviewed in questionnaire were analyzed for the discussion.

	2005	2006	2007	2008	2009
Central Province (implementing province)	57	59	60	76	81
Non-implementing provinces (Lusaka, Eastern, Western, Northern, Southern and Luapula)	432	434	448	480	481

Table 1: Number of examination centers provided data for this survey

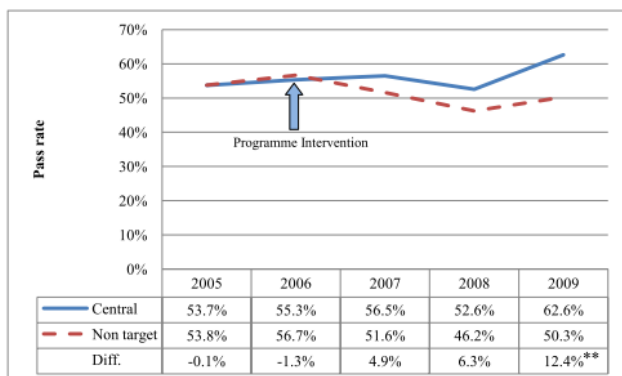
Participants	Questionnaire	Interview
School heads	29	10
Facilitators (trained teachers)	23	10
Science teachers	136	15
Pupils (Grade 12)	280	---

Table 2: Participants for questionnaire and interview

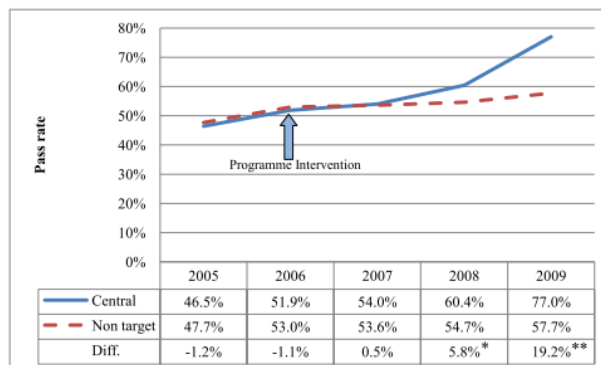
5. Findings and discussion

5.1 Effect of lesson study

As shown in figure 1 and 2, it was found that both in science (physics and Chemistry) and biology subjects, examination pass rates in Central province, where lesson study had been implemented for more than five years, were slightly higher than those of non-implementing provinces. This indicates that practice of lesson study has affected positively for the improvement of students' examination pass rates.



**statistically significant (p < .01)



**statistically significant (p < .01)

*statistically significant (p < .05)

Figure 1: Examination Pass rate for Science

Figure 2: Examination Pass rate for Biology

To seek the relationship between examination pass rates in science subjects and quality level of implementation of lesson study, criteria to differentiate implementation level were set as Table 3 and determined through interview to stakeholders at schools.

Rating	Lesson Instruments	Observation	Lesson Plans	SBCPD Action Plan
0	No observation instrument at all		No lesson plan at all	No SBCPD action plan at all
1	There are some observation instruments but they are not updated.		There are some lesson plans but they are not updated.	There is SBCPD action plan but it is not updated.
2	Observation instruments for SBCPD are updated.		Some teachers prepare lesson plan.	There is SBCPD action plan for the current term.
3	Observation instruments are used not only for SBCPD but also for regular internal monitoring.		All teachers prepare lesson plans.	SBCPD is recorded according to the action plan.
4	Observation instruments are also used by head of deputy head		Lesson plan is checked by head of department or deputy head.	Action plan is revised according to the progress of SBCPD.

Table 3: Criteria to differentiate lesson study implementation levels [5]

Based on the data collected on the criteria on implementation levels, it was found that relationship between examination pass rate in science and quality level of implementation had positive correlation shown as below.

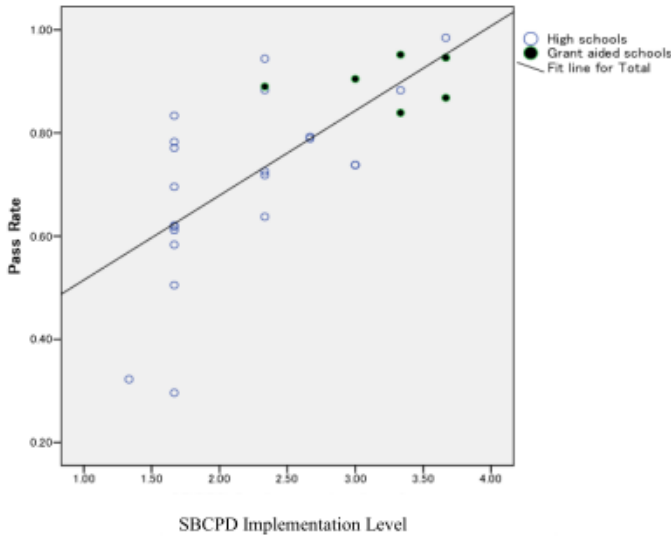


Figure 3: Examination Pass rate and SBCPD Implementation level

5.2 Enhancing and hindering factors

Figure 4 shows the correlation coefficients of each factors reviewed in questionnaire and relationships between lesson study implementation levels and each factors.

The factors of a school conducting Academic Production Unit (APU) as additional classes, a school with high pupil-teacher ratio, and a school with heavy teachers' workload appeared to be negatively related to CPD implementation, while allocation of properly trained facilitators at school and sufficient environment provided by grant-aided schools were positively affecting it.

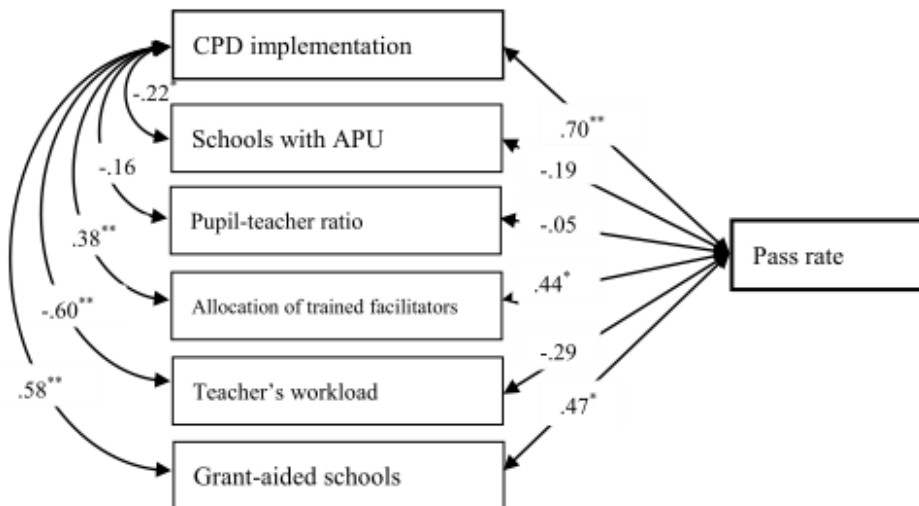


Figure 4: Correlations between SBCPD implementation and pass rate

6. Conclusion

This research as impact survey revealed that the lesson study practice of science teachers in Central province, Zambia provided positive effect to students' performance on science subject of national examination. The examination pass rate also has positive correlations to the quality level of lesson study implementation. This provides us with a positive hope that the more higher quality is maintained by the teachers to implement lesson study at schools, the higher performance of students in science are expected. Enhancing factors to the quality implementation of lesson study such as allocation of



trained facilitators and upgrading study environment could be also considered to have a better implementation of the practice, while hindering factors found in the research such as heavy workloads of teachers and high pupil-teacher could be discussion theme on the management boards to improve lesson study of teachers and learning of students in science.

References

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