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RESEARCH ARTICLE

TRAINEE TEACHERS' FEEDBACK AND REFLECTION ON MATH LESSON STUDY.

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Abstract

The research presented in this paper offers a methodological approach to the analysis of trainee teachers' professional development by collaborative feedback and reflections. Collaborative feedback or reflections are professional development meetings in which trainee teachers enrolled in EDU 673 Mathematics Education II observe and discuss recordings or pictures from talking with their pupils. This present an example of collaborative reflection based on Lesson Study between trainee teacher and other trainee teachers who imitate to participate as Primary school mathematics learners. Investigating the case knowledge participants' construct in Lesson Study can further our understanding of how trainee teachers interact to influence one another's learning. This paper will also discuss how participants make inferences about the events they noticed and how they use pictures and videos as evidence for their interpretations.

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My perception on how do children learn mathematics in a Fijian Context?

The premise that mathematics must be learned with understanding is based on research that has been accumulating for many years and reflects advances in mathematics education, psychology, and other areas of science. At the primary level, teacher must deal with the fact that children's ability to learn mathematics depends on their reading ability; however, once children have basically learned to read, they build their reading skills while learning other subjects, including mathematics. Mathematics, in contrast, builds on itself, becoming more abstract as the ideas build (e.g. from arithmetic to algebra). Evidence from science suggests that learning changes the physical structure of the brain, and different parts of the brain may be ready to learn different things at different times. Ultimately, to learn more abstract mathematical concepts, children need to have developed enough both physically and psychologically to handle the abstraction.

Early in the twentieth century, John Dewey asserted that learning comes from experience and active involvement by the learner. Much has been discovered since then about how children learn mathematics, but the importance of meaningful experience remains unchallenged. Later, Jean Piaget argued that learners actively construct their own knowledge. This view of learning, known as constructivism, suggests that rather than simply accepting new information, students interpret what they see, hear, or do in relation to what they already know. As the Learning Principle indicates, students learn mathematics with understanding by actively building new knowledge from their personal experiences and prior knowledge.

Teachers develop their lessons based on how they believe children learn. There are currently two prevailing theories of learning, behaviorism and constructivism. Behaviorism focuses on observable behaviors and is based on the idea

that learning means producing a particular response (behavior) to a particular stimulus (something in the external world). From this perspective, students learn specific skills in relation to specific stimuli (e.g., a mathematics problem). For example, a teacher demonstrates how to produce that type of response (finding the mean) when given that type of stimulus (a second set of numbers).Behaviorism’s focus on behaviors excludes consideration of any thought processes students may use to arrive at their answers

On contrary, Constructivism concentrates on what happens between the stimulus and the response. That is, the focus is on the thinking students do. From this perspective, learning depends not only what the teacher does but also on the students themselves-how they integrate new ideas with their experiences and with what they already know. Both views of learning hold implications for teaching mathematics in Fiji. Both are keys to a further understanding of how children learn mathematics in Fiji.

How can we help children make sense of mathematics?

Teaching occurs only to the extent that learning occurs. Therefore, effective teaching of mathematics rests heavily on considerations about how children learn. The process of building bridges from the concrete to the abstract and helping children cross them is at the heart of good teaching – and it is a continual challenge. What follows are four recommendations for helping children make sense of mathematics, based on the four observations list below, derived from the frame works of Piaget, Bruner, and Dienes. These recommendations provide a strong foundation for mathematics instruction, and we extend and apply them throughout by the order in which they are listed.

- Teach to the developmental characteristics of children
- Actively involve children
- Move learning from concrete to abstract
- Use communication to encourage understanding

Based on the psychological, pedagogical theories described above, primary mathematics educations in Fiji have been created as course of study and syllabi.

The Lesson Study and Collaborative Feedback and Reflections:-

This research focuses on Primary trainee teachers doing EDU 673 Mathematics Education II at a Fijian University. One of the major assessments was the Lesson study group gearing towards the teachers’ professional learning by analyzing their performance in Lesson 1 and Lesson 2 respectively through observation checklist, pictures and video recordings. In this article we will concentrate on one example of a collaborative feedback and reflection process and we will use the analytic tool for describing the reflection process. Teacher professional development seems to be short-term, individualized and disconnected from practice (Ball & Cohen, 1999; McLaughlin & Mitra, 2002). An important aspect of teacher learning groups is that they engage in long-term collaboration with their colleagues, focusing on issues that relate to their daily teaching activities (Little, 2002). To promote and support trainee teachers in attending to and interpreting students’ mathematical thinking there should be relationship between activity and reflection as illustrated in figure 1.1.

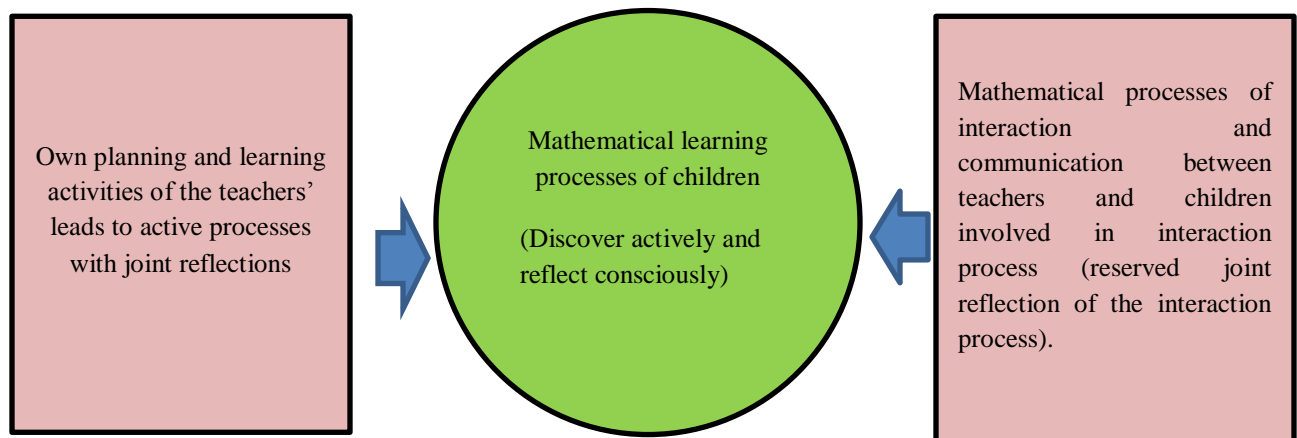
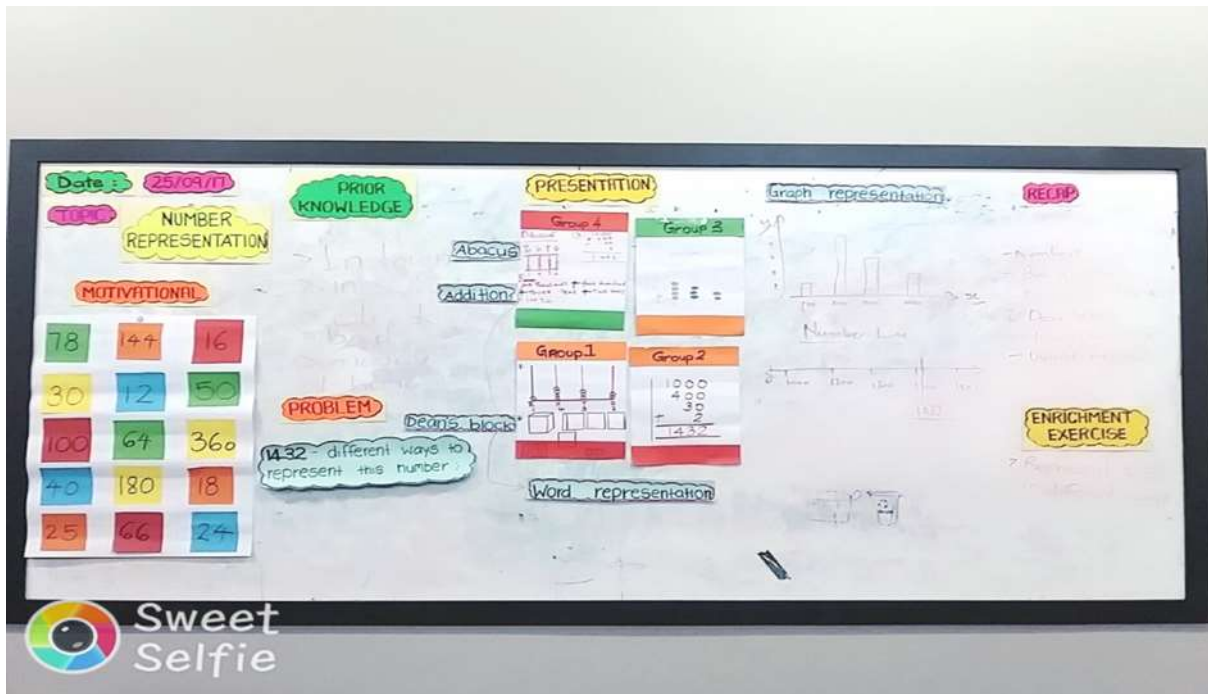


Figure 1.1:- Mathematical processes.

Lesson study provides such a possibility for teachers where they examine systematically their instructional methods, teaching content and also their students' processes of learning and understanding (Yoshida, 2008, p. 85). A group of six to eight trainee teachers plan together a research lesson, within this big group, they divide themselves into two small groups. The big group then is called the group 1A and group 1B within the one big group. Appointment of the group chairperson, secretary, publicity officer, treasure is done by the group members during the first meeting. They are then required to decide on the topic after going through the Fijian Mathematics Syllabi and text books. Lesson plan is drawn with appropriate minds-on and hands-on activities. The plan should target cognitive, psychomotor and affective domains.



Caption: The Picture taken during the motivational activity.



Caption: the picture shown during the lesson study 1 board display.

In addition to this, group 1A will delegate responsibilities to each of their members to deliver the whole phase of the lesson. For instance, out of three members in the group 1A, the 1st member will conduct motivational activity, 2nd member will introduce the topic and target the prior knowledge, 3rd member will put-up the problem for the whole class to solve in their respective groups, will move around to monitor and guide through the stipulated activity while the 4th member will wrap-up the findings from the lesson and give enrichment activity to be done at home.

Moreover, the members from group 1B will observe group 1A's presentation using the checklist. Given below figure 1.2 is the list of items that need to be assessed:

Figure 1.2

Observers' checklist for Lesson Study

(Analysis of the checklists must be done as it would be assessed)

EDU673- Mathematics Education 2

OBSERVER'S CHECKLIST FOR ASSESSMENT OF PROBLEM SOLVING APPROACH

Name: _____ Group:-----

Checklist Items	Self-evaluation			
	4	3	2	1
Lesson sets tasks that can be solved in a variety of different ways by applying previously learned knowledge and content to be learned	4	3	2	1
Tasks promotes problem solving awareness	4	3	2	1
Students can recall and apply what they have learned	4	3	2	1
Teacher observes and helps students to ensure students use mathematical thinking to solve problems	4	3	2	1
Ideas taken up by students are presented in order	4	3	2	1
Activities are prepared in advance with clear directions from presenter	4	3	2	1
Blackboard organization	4	3	2	1
Develops students' ability to explain, listen to others, and to question	4	3	2	1
Ideas proceeds smoothly from presentation to communication with/amongst students	4	3	2	1
The summary matches the theme/objectives and tasks of this lesson	4	3	2	1
It is recognized that both correct and incorrect responses(to the task) have something good in the foundation of their ideas	4	3	2	1

Upon the implementation, the other trainee teachers from the big group will observe the assigned lesson. Afterwards, they will discuss about the post-lesson. With the collaborative reflection it will try to offer the teachers with a possibility to deepen and broaden their understanding of the Mathematical teaching via lesson study in a local context.

I feel that it is of great interest to find out what kind of activities the participants use in the collaborative feedback and reflections and what kind of case knowledge they develop when talking about the motivational activity, prior knowledge, group activities and so forth. The teachers construct knowledge by observation, experience, transfer and interrelation. If the teacher just refers to his own thinking, he will develop knowledge by observation or experience. If he or she takes account of the other participants' utterances, he or she will construct knowledge by transfer and interrelation. One would want to find out what impact the assessor has on the activities and the case knowledge the trainee teachers develop in the lesson study. A structured talk is a collaborative reflection within the lesson study.

The researcher chooses one video episode on the Japanese lesson study and provides the trainee teachers with the video episode and then topics are given from the upper-primary mathematics for each group to work on. Furthermore the researcher introduces the methods of collaborative feedback and reflection and provides each group with analytic perspectives, which the trainee teachers can use during the reflection process. The researcher moderates the reflection process in a cautious way. The trainee teachers can discover and discuss independently the basic structures of their teaching. In the long-term they can adopt the collaborative feedback and reflection as a school-internally way of professional learning. This guide will assist the teachers to understand their school as a place where also teachers can learn.

The researcher chooses lesson study of a diagnostic activity. In every meeting the chosen lesson study will be discussed from a different analytic perspective. The trainee teachers analyses the lesson plan, pictures of activities, recordings and the transcript from their lesson study 1 and 2. In the lesson study discussion, where the lesson study

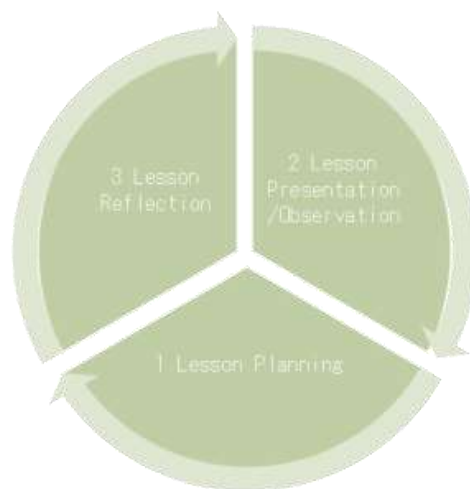
chairperson is an *active* moderator, the trainee teachers first get a short introduction about the following meeting. They receive a paper with several stimuli to the specific analytic perspective, which they can use in the interpretation process for their orientation (Scherer, Söbbeke, & Steinbring, 2004). The lesson study leader is an *active* moderator in the structured talk because he/she analysed the whole transcript or recording of the lesson study sensitively before the meeting and looked for special features to be discussed with the teachers and which they shall notice. The structured talk is like supervision where the external moderator is the supervisor (Lippmann, 2005). In the informal talks the trainee teachers meet each other without the project leader. The structured talks and the informal talks are both recorded. The informal and structured talks take place in an alternating fashion. In every meeting new transcript will be discussed.

Lesson Study is a professional development process

Lesson Study is a professional development process that our trainee teachers engage in to systematically examine their practice, with the goal of becoming more effective. This examination centers on teachers working collaboratively on a small number of "study lessons". Working on these study lessons involves planning, teaching, observing, and critiquing the lessons. To provide focus and direction to this work, the teachers select an overarching goal and related research question that they want to explore. This research question then serves to guide their work on all the study lessons. While working on a study lesson, teachers jointly draw up a detailed plan for the lesson, which one of the teachers uses to teach the lesson in a real classroom (as other group members observe the lesson). The group then comes together to discuss their observations of the lesson. Often, the group revises the lesson, and another teacher implements it in a second classroom, while group members again look on. The group will come together again to discuss the observed instruction. Finally, the teachers produce a report of what their study lessons have taught them, particularly with respect to their research question.

Lesson Study is an opportunity for teachers to have their class observed by other teachers. Its main purpose is to combat any sense of complacency in the teacher who is teaching the class by encouraging them to listen to constructive criticism from other teachers so that they can improve their teaching ability. It is also a good opportunity for teachers to see how students think and share their ideas with the rest of the class. In short, it is an opportunity to nurture an eye for assessing the teaching material which drives the point of the lesson home. And an eye for observing the students by listening to what they say and seeing how they think. Lesson Study is composed in the three stages of the following:

- 1) Lesson planning; set lesson objectives, select teaching material and teaching aid, develop specific steps for a lesson.
- 2) Lesson presentation/observation; be open to the students' ideas and incorporate them into the lesson, observe activities from the viewpoint of the teacher as well as student
- 3) Lesson reflection; present recommendations for improvement



(Fig.1.3) Lesson Study

To conclude, I found out that in this first post lesson the teachers react more *biased –spontaneous* (narrate, evaluate) than *open – reflected* (paraphrase, interpret) and use mainly knowledge by observation and experience and rarely knowledge by transfer and interrelation. Probably the trainee teachers develop a more *open – reflected* view over the course of two post lessons in the Mathematics Education 2. And perhaps they get used to this kind of discussion and interpretation as a result they refer more to the statements of their colleagues to generate knowledge by transfer and interrelation. The influence of the assessor seems to remind the teachers to focus their attention on the observation checklist, recordings and to initiate reflection processes about the statements of the other participants. Trainee teachers have to look for more evidence what impact the assessor has on the course of the Lesson study and the case knowledge the trainee teachers develop.

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