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The Effectiveness Of Lesson Study On Differentiated Instruction Among Mathematics Head Panels In District Of Port Dickson

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Abstract

This study is to examine the effectiveness of lesson study on differentiated instruction among Mathematics head panels in district of Port Dickson, Malaysia. Teachers who received substantial professional development can boost their students' achievement. The effectiveness of professional development practice is being measured by the heads of panel understanding about differentiated instruction and the application of differentiated instruction in the classroom. Teachers often struggle to deliver mathematics lesson effectively in classroom due to different learning styles and students' mixed abilities in the classroom. Some students learn at a slower pace and some in advance stage. The activities provided by teachers may work best for some students but will not work for others. During lesson, teachers often assign tasks, which many students end up with disappointment and confusion. Students become passive learners and teacher felt frustrated. Therefore, differentiated instructions make sense because it offers different paths to understand content, process and product. The aim of the present study was to obtain information from the school teachers in the implementation and planning of differentiated instruction in teaching and learning. Moreover, the research team were interested in knowing the strategy of differentiated instruction used in teaching and learning that support quality teaching. This study involved 33 mathematics head panels from national primary schools in district of Port Dickson who volunteered to participate in this study. In this programme, heads of panel will be able to share their experiences in conducting and implementing differentiated instructions in classroom among peers in the district. Structured questionnaires and interviews were used in this qualitative study to collect data. Results indicated that the lesson study carried out by the Port Dickson District Education Office is effective. Furthermore, the lesson study that were carried out by heads of panel in theirs school managed to boost self confidence among these heads of panel. In fact, they showed willingness to share best practices to all mathematics teachers in the district of Port Dickson and also from other districts. Indeed, the lesson study programme is fostering the collaborative

reflection in improving instructional practice, especially in the essential skill of teaching mathematics in the mixed-ability classroom.

Keywords: *Professional development, lesson study, differentiated instruction, head panels, collaborative.*

Abstrak

Penelitian ini untuk menguji keefektifan Lesson Study pada pembelajaran yang dibedakan antara panel kepala Matematika di distrik Port Dickson, Malaysia. Guru yang mendapatkan pengembangan profesional yang substansial dapat meningkatkan prestasi siswanya. Efektivitas praktik pengembangan profesional diukur oleh pemahaman ketua panel tentang instruksi yang dibedakan dan penerapan instruksi yang dibedakan di dalam kelas. Guru sering kesulitan untuk menyampaikan pelajaran matematika secara efektif di kelas karena gaya belajar yang berbeda dan kemampuan siswa yang beragam di dalam kelas. Beberapa siswa belajar dengan kecepatan lebih lambat dan beberapa di tahap lanjutan. Kegiatan yang diberikan oleh guru mungkin bekerja paling baik untuk beberapa siswa tetapi tidak akan berhasil untuk yang lain. Selama pelajaran, guru sering memberikan tugas, yang banyak siswa berakhir dengan kekecewaan dan kebingungan. Siswa menjadi pembelajar pasif dan guru merasa frustrasi. Oleh karena itu, instruksi yang berbeda masuk akal karena menawarkan jalur yang berbeda untuk memahami konten, proses, dan produk. Tujuan dari penelitian ini adalah untuk memperoleh informasi dari guru sekolah dalam pelaksanaan dan perencanaan pembelajaran yang dibedakan dalam pembelajaran. Selain itu, tim peneliti tertarik untuk mengetahui strategi pengajaran yang berbeda yang digunakan dalam proses belajar mengajar yang mendukung kualitas pengajaran. Penelitian ini melibatkan 33 panel kepala matematika dari sekolah dasar nasional di distrik Port Dickson yang secara sukarela berpartisipasi dalam penelitian ini. Dalam program ini, ketua panel akan dapat berbagi pengalaman mereka dalam melakukan dan menerapkan instruksi yang berbeda di kelas di antara rekan-rekan di kabupaten. Kuesioner terstruktur dan wawancara digunakan dalam studi kualitatif ini untuk mengumpulkan data. Hasil penelitian menunjukkan bahwa Lesson Study yang dilaksanakan oleh Dinas Pendidikan Kabupaten Port Dickson efektif. Selain itu, pembelajaran yang dilakukan oleh para ketua panel di sekolahnya berhasil meningkatkan rasa percaya diri para ketua panel tersebut. Bahkan, mereka menunjukkan kesediaan untuk membagikan praktik terbaik kepada semua guru matematika di distrik Port Dickson dan juga dari distrik lain. Memang, program studi pelajaran mendorong refleksi kolaboratif dalam meningkatkan praktik pembelajaran, terutama dalam keterampilan penting mengajar matematika di kelas berkemampuan campuran.

Kata Kunci: Pengembangan profesional, lesson study, differentiated instruction, head panels, collaborative.

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PENDAHULUAN

Differentiated instruction (DI) is an urgent need in education for this century (Subhan, 2006, Tomlinson et al., 2011). This is because students came from different backgrounds,

learning styles, motivations, abilities, needs and interests (Suprayogi, Godwin, Valcke, 2017). The term differentiation and its used in the classroom are familiar to many teachers as teachers should aware in their classroom, there are advanced learners and students who are below grade-level and they need teachers to understand and respond to their differences (Glass, 2011).

Background

When teachers use differentiated instruction to custom their teaching approaches according to students' learning styles and interest this means that all students have the same learning goal but the teaching approach varies depending on how students prefer to learn (Carol Ann Tomlinson, 2014). Knowing students with diverse cultural background, learning styles, abilities and multiple intelligences can help teachers to meet the needs of all students (Jane Pablico, Moustapha Diack & Albertha Lawson, 2017).

Teachers showed interest in implementing differentiated instruction since 1999 and in the 21st century learning environment, teachers across the world implement a wider variety of activities in their classes based on four areas that were being emphasized by Tomlinson, that are i) **Content:** Figuring out what a student needs to learn and which resources will help him do so (what students learn), ii) **Process:** Activities that help students make sense of what they learn (how students learn), iii) **Product:** A way for students to “show what they know” (how students demonstrate their mastery of the knowledge or skills) and iv) **Learning environment:** How the classroom “feels” and how the class works together (Carol Ann Tomlinson, 2014).

21st century is portrayed as a new era of education and implementation of differentiated instructions is considered as compulsory as teachers are facing with students that have various learning capabilities and needs (Jaweria Aftab, 2015).

In Malaysia, the implementation of differentiated instructions is seen as ‘has not been emphasized’ until the Malaysian Education Blueprint 2013-2025 being introduced (Minder Kaur, 2017). Even though differentiated instruction is not new to teachers in Malaysia, it has not been widely implemented due to some reasons such as teachers do

not really understand the concept of differentiated instruction and teachers find that they have to make a lot of preparation to cater for a heterogeneous group of students (Minder Kaur, 2017).

In the past five years, under the 4th shift to transform the system, either State Education Department, District Education Department or school leaders have focused on teacher quality because it is understood that even how good the system is, it cannot exceed the quality of its teacher (Malaysia Education Blueprint 2013-2025 2013). This scenario is clearly visible in line with the system aspirations and students aspiration in Malaysia Education Blueprint (2013-2025). Although many teachers are struggling to understand and implement differentiated instructions they are trying their very best to understand and implement differentiated instructions in classrooms.

Problem Statement

Teachers often struggle to deliver mathematics lesson effectively in classroom due to students' different learning styles as well as students' mixed abilities. Teachers find it difficult to teach students in the same class having different personality traits, learning styles, intelligences and needs because they have to prepare a diversified lesson plan to cater the students with mixed abilities. Some students learn at a slower pace and some in advance stage. Through observations, we can see that lessons were carried out by teachers without screening the students' needs. Moreover, class activities may suit certain students but not for others. Some students especially the low-proficiency learners felt bored and they are not interested to learn due to confusion and disappointment with the mathematics lesson. Some students are demotivated as they faced difficulties in understanding the content and skills clearly. Our assumption at this point was that teachers are not capable to deliver the lesson in effective way. At the same time, teachers get frustrated due to the low performance showed by students. They felt low esteem due to insufficient in-service training throughout their career. As the result, teachers had difficulties to teach in differentiated classroom. Some teachers prefer rote learning while others focus in-depth comprehension, lecture based teaching demonstration and hands on activities.

Objectives

This study was carried out to examine the effectiveness of professional development practice for the Mathematics' heads of panel in Port Dickson District through lesson study approach. This study explores the effects of lesson study on differentiated instruction among Mathematics head panels in the district of Port Dickson, Malaysia. It was guided by the following purposes: (1) to identify teachers understanding regarding the implementation of differentiated instruction, (2) to identify teacher planning and (3) to know the strategies of differentiated instruction used in teaching and learning that support quality teaching.

LITERATURE REVIEW

This study is to provide a review of the research that had been carried out on the effectiveness of lesson study on differentiated instruction among mathematics head panels in district of Port Dickson

Lesson Study

Lesson study involves groups of teachers meeting regularly over a period of time to work on the design, implementation, testing, and improvement of one or several "research lessons" (Stigler & Hiebert, 1999). The lesson study focus on a specific teacher generated problem, goal or vision of pedagogical practice. The lesson will carefully planned in collaboration with one or more colleagues which observed by other teachers. The teachers observed other teachers, recorded the outcomes for analysis and reflection. Thereafter, they discussed by lesson study group members, others colleagues and invited commentator (Lewis & Tsuchida, 1998).

Lewis (2000) found that Japanese teachers believe that lesson study able to improve their teaching. They were able to successfully shift their approach to teaching science from "teaching as telling" to "teaching for understanding" through intense studying and sharing during lesson study.

Rock and Wilson (2005) research indicated that teachers involved in lesson study would benefit from peer coaching and mediation training. The training should help them feel more comfortable when providing or receiving constructive feedback from their peers. In addition, findings revealed from the data clearly indicate that the lesson study model can serve as a means of teacher professional development with positive impact on teacher instructional practice. Data from the study indicates that teachers consider themselves and their practice to be more effective as a result of participation in the lesson study model as well.

According to Katina et.al, (2012) pilot study in Malaysia, students involved in Lesson Study have a good perception of Lesson Study. 85% of students agreed that teaching is more attractive compared to the previous lesson. While 86.86% agreed that teaching more easily understood through the Lesson study and teaching with excellence through Lesson Study. While 93.33% of teachers agreed on time and 95% agreed that teachers teach earnestly by Lesson Study. While 91.67% agreed that they are easy to understand lessons taught by the teacher when using Lesson Study.

Effective learning and Quality Teaching.

According to Moore (2005), the more the teachers knows about their students the easier their job. Differentiated instruction is an instructional process that has excellent potential to positively impact learning by offering teachers a means to provide instruction to a range of students in today's classroom situations (Hall, Strangman and Meyer, 2003). Tomlinson (2001) describes differentiated instruction as factoring students' individual learning styles and levels of readiness first *before* designing a lesson plan. Research on the effectiveness of differentiation shows this method benefits a wide range of students, from those with learning disabilities to those who are considered high ability. Differentiating instruction may mean teaching the same material to all students using a variety of instructional strategies, or it may require the teacher to deliver lessons at varying levels of difficulty based on the ability of each student. Tomlinson (2001) identifies three elements of the curriculum that can be differentiated, which are content, process and products. Each of

the three key elements of differentiated instruction, content, process and product support individualized instruction of pattern recognition.

The study of Rock and Wilson (2005) found that knowledge gained from lesson study enabled the teachers to regularly include differentiated instructional strategies when planning for small group mathematics instruction. Before lesson study, the participants planned for small group mathematics instruction, all groups had made up lessons that addressed a specific objective and used the same material and sequence of activities. However, after engaging in lesson study, the skill or concept was the same for each of the small groups but the difference was the depth and learning process and the materials used.

Differentiated instruction is a teaching approach that sparked from the pedagogical shift brought by scholars who placed importance on learner differences in delivering knowledge (Mohd Hasrul et.al, 2017). It is a process through which teachers enhance learning by matching students characteristics to instruction and assessment. Differentiation allows all students to access the same classroom curriculum by providing entry points, learning tasks and outcomes that are tailored to students' needs. In a differentiated classroom, variance occurs in the way which students gain access to the content being taught, the process by which they acquire information, and the manner in which they demonstrate understanding (Hall, Strangman and Meyer, 2003). The Ministry of Education Malaysia has recently launched the Differentiated Teaching and Learning of English Language program to be implemented in the public schools across the country (Mohd Hasrul et.al, 2017). The matter now is to attend to the teachers' dilemma in implementing the differentiated teaching and learning approach.

There are some studies focused on students' grouping strategy which are flexible grouping, ability grouping and also independent study. In Palmer (2010) study, he concluded that flexible grouping and independent study were able to engage and challenge students in their learning, and Bondley (2011) found that placing students according to ability groups contributes to positive learning. In a more recent study, in Scott's study (2012) concluded

that high ability students did benefit from differentiated instruction but such was not the case for average ability students.

The data showed that differentiating lesson based on learner interest assists teachers to establish learning relevance among the students. As students found out the task or topics of discussion familiar, they would find the learning fond the learning is meaningful and making sense. Experiencing lesson study in differentiated instruction may impact teachers' to meet differentiated instruction needs. Differentiated instruction has been established and well known in the western part of the world, but its implementation is relatively new in the Asia region (Mohd Hasrul et.al, 2017).

METODE PENELITIAN

A mixed method study was used to explore the teachers' understanding in DI in primary schools in Port Dickson district. The sample for this study were 281 mathematics teachers in Port Dickson district consist of 62 schools including 17 National primary schools (NPS) and 16 Chinese primary schools (CPS), 17 Tamil primary schools (TPS) and 12 secondary schools in Port Dickson District. However, a total of 167 out 281 teachers responded to the online survey.

Participating in conducting and implementing DI in teaching and learning via Lesson Study in this study were 33 Mathematics head panels from NPS and CPS from the total of 33 schools. Lesson Study in Tamil primary school and secondary school will be conducted in October 2018. However, only 2 schools, 1 NPS and 1 CPS were chosen using purposive sampling, that consisted of 4 teachers were involved in the interview.

Training in DI was conducted twice, in February and early April 2018. Data were collected through documented of lesson study planning and debriefing meetings in April 2018, mathematics lesson plans for the month of August 2018, video recordings of instruction, several classroom lesson observations in August 2018, field notes of classroom observation and pre- and post- lesson interviews after classroom observation.

All field notes and observations were transcribed and analysed together with the data obtained from the online survey which employed a 5-step Likert scale (5 absolutely agree-1 absolutely disagree) to reflect the teachers' understanding in differentiated instructional, either teacher differentiate content, process and/or products in mathematics lesson, this is to ensure cross verification of data for this study.

HASIL PENELITIAN

In this case study, the data derived from the questionnaire, observation and conversation between the research team and the four teachers were examined to illustrate the implementing of DI in teaching and learning.

The teachers reflect the following point:

- (1) teachers understanding regarding the implementation of differentiated instruction aspects,
- (2) teachers explanation of DI planning and
- (3) the strategies of differentiated instruction used in teaching and learning.

4.1 Teacher understanding regarding the implementation of differentiated instruction.

Based on finding, 70.7% agreed and 16.8% strongly agreed that they should apply differentiated instruction in the classroom. 11.4% disagree to the above statement and only 1.2% absolutely disagreed with the above statement. However, there are 48.2% teachers acknowledged that they still lacking in knowledge and skills in practicing the DI in their teaching and learning process.

This finding indicated the head of mathematics panel in Port Dickson shows that their understanding about DI during the Lesson Study of DI conducted by Port Dickson District Education Office. However, this type of Lesson Study should continuously apply because the finding shows that more than 48% teachers still lacking in knowledge of DI. Moreover, this is supported by the finding of the interviews as below.

Teacher A

“...If there are different activities that means there is differentiated instruction.”

Teacher B

“It is very necessary to conduct differentiated instruction because some of the students are very weak.”

Teacher C

“...based on the success criteria that I had planned from easy to difficult.”

Teacher D.

“...the questions for every activity suitable to their level.”

4.2 Teacher explanation in planning Differentiated Instruction

Based on the finding, 2.4% of the teachers strongly disagreed and 9.6% disagreed that they lack of experience in planning DI. While 37.7% of the teachers undecided, 50.3% of teachers agreed that they have lack experience in planning DI.

52.1% of the teachers agreed that the process of differentiated learning is a burden to them. While 35.2 % of the teachers undecided, 12.7% of the teacher disagree that DI planning is a burden to them. Most of the teachers were lacking of knowledge in planning and therefore, they find it as a burden for them. This findings supported from the interviews as below:

Teacher A

“...I will plan different questions with image and texts... it can help students write... the good groups can write without any picture given

Teacher B

“...I'm planning a different worksheet of different category of students”

Teacher C

“...I'm planning to teach addition skill with regrouping and without regrouping.”

Teacher D

“...the questions I had prepared from simple questions and gradually follow their mastery to the harder questions ... for the weak groups, I will give a simple question so that, they will understand.”

4.3 The Strategies of differentiated instruction used in teaching and learning

Based on the observation, the findings of the strategies used of DI are as below:

Teacher A (Topic: Time- Year 1)

Students have to answer a few simple task such as matching the word with picture, underlined word, and others writing down some key points.

Teacher B (Topic: Decimal- Year 4)

The teacher conducted a quiz and students explain how they got the answer.

Teacher C (Topic: Money –Year 3)

Students have to answer a varieties of task according to their levels.

Table 1 showed that all the teachers conducted and implemented the strategies of differentiated instruction in their mathematics lesson.

Table 1 Strategies of DI implemented in Mathematics Lesson

Interviewees	Strategies of DI
Teacher A	Content and Process
Teacher B	Content and Process
Teacher C	Content and Process
Teacher D	Content and Process

KESIMPULAN, SARAN DAN REKOMENDASI

This study has shown that the training teachers received and the lesson study conducted among mathematics head panels in differentiated instruction have a positive impact on their understanding and implementation of strategies of differentiated instruction in the classroom. To enhance differentiate instruction carried out in schools, teachers need continuous professional development training.

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