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Mathematic Education in Practice:
An Assessment Interview of the Kinder Program in Australia

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ABSTRACT
According to the Australian Government Department of Education Employment and Workplace [3], "all young Australians become successful learners, confident and creative individuals, and active and informed citizens (p.4)." Educators' lesson planning in primary age should follow the framework and support children in the above aspects. Effective teaching pedagogies also have an ignorant role in English and Math education [5]. The task is prepared in this background and divided into two parts, using Mathematics Assessment Interview (MAI) and associated Growth Point Framework to assess children's numeracy skills. In the beginning, some important information about the interviewed child will be introduced, including the recording place and her academic details. Next, the article will analyze the teaching goals based on children's math skills and growth points. Finally, the open task will be introduced, which can be the main activity involving the natural mathematics teaching environment, and design a detailed course structure and teaching method for preparatory students.

Keywords: *mathematic education, mathematical interview, teaching practice, kinder program*

1. INTRODUCTION

1.1. Mathematic Assessment Interview (MAI)

MAI is an individual assessment to determine the numeracy and mathematical knowledge that a young student have. It originated from the famous research project Early Numeracy Research Project (ENRP) associated with the Victorian education context, held from 1999 to 2001 with 35 project schools, approximately 354 teachers and 400 students participated [1]. The project aimed to find out the young Australian students' numeracy and mathematical knowledge related to implementing the school mathematic program, the success of teaching support, and evaluate the current effectiveness of numeracy outcomes and the professional development program.

One of the necessary tools in the project was MAI. It has a detailed preparation checklist, clear interview guidelines for accurate administration of each question, and growth points for teachers to assign to each domain.

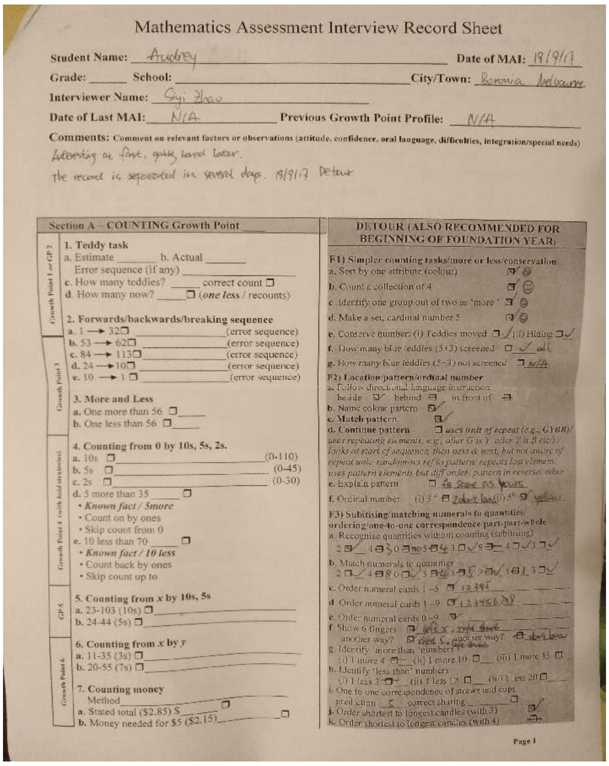
1.2. Case study

The interview was completed separately. Because the children who participated in the test were bored after 15 minutes of answering, completing the two parts of the record sheet at once is more realistic. For the first time in the morning, before the children went out to play, we crossed the detours in the researcher's childcare center and put the value parts together. For the second time, the researchers completed addition and subtraction and multiplication and division. For the first time, the researchers made records in the art corner next to the glass door, and the children would go out after putting on sunscreen. Due to the noise and interference of other children, the experiment was moved to a quieter and private corner. The next day the researchers did the next part in the same place. The child's name is Audrey G. So far, she is a well-developed, five-year-old girl in a more benevolent program and will participate in the preparation level in the next semester, the first semester in 2018.

The growth points of Audrey are six, which is no points for the foundation detour section, two points for the place value section, three points for the addition and subtraction section, and one point for the multiplication and division section. Based on this result, Audrey acquired various mathematical skills, including recognizing quantity, size, order, matching numbers to quantities, reading 1-4 digits, recognizing 2-3 digits, understanding multiplication and some basic skills.

Audrey's next math learning goal is to go forward, backward, break the sequence of section A, explain three digits from section B, count down/count from section C, and learn multiple multiplications and divisions from section D. More specifically, Audrey needs to develop the counting skills to abundant her number sense. There are four parts: counting sequence, explicit counting backward, skip counting and commutativity skills.

1.3. Data collection


Mathematics Assessment Interview Record Sheet

Student Name: Audrey Date of MAI: 18/9/17

Grade: School: City/Town:

Interviewer Name:

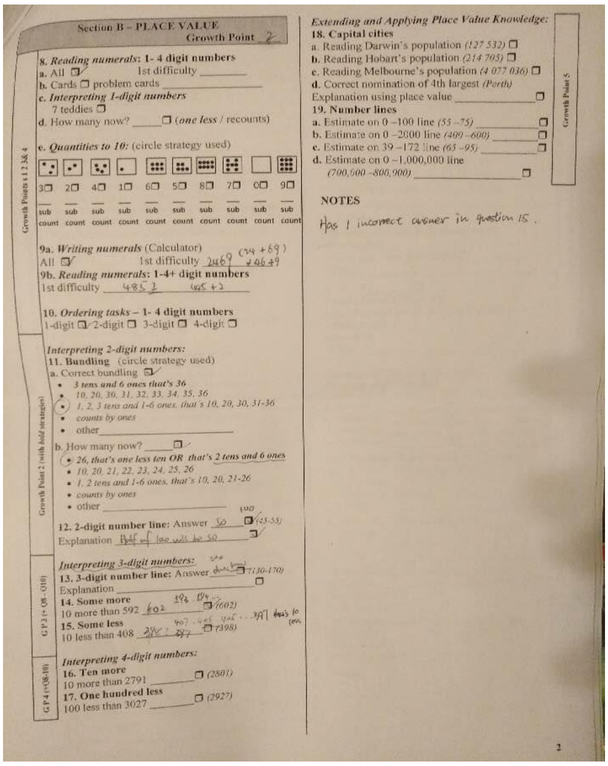
Date of Last MAI: N/A Previous Growth Point Profile: N/A

Comments:

Section A – COUNTING Growth Point

DETOUR (ALSO RECOMMENDED FOR BEGINNING OF FOUNDATION YEAR)

Figure 1 MAI interview record sheet 1


Section B – PLACE VALUE Growth Point

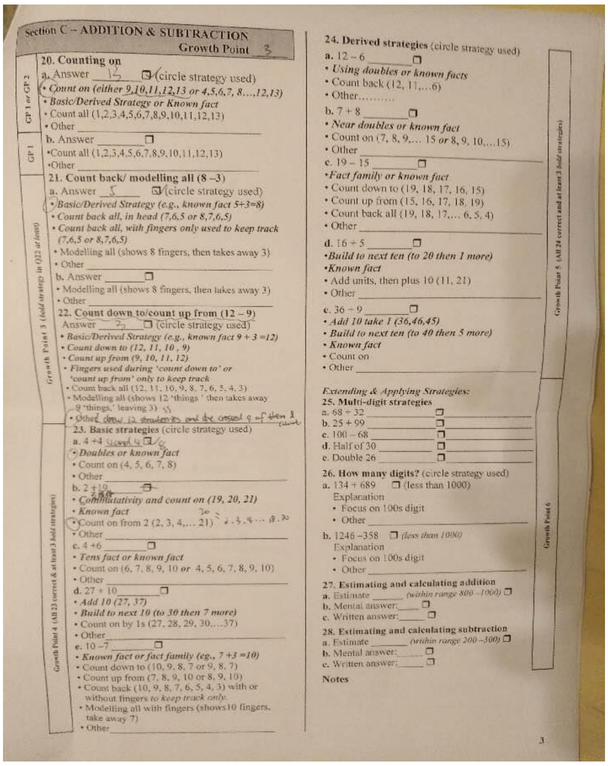
Extending and Applying Place Value Knowledge:

18. Capital cities

19. Number lines

NOTES

Figure 2 MAI interview record sheet 2


Section C – ADDITION & SUBTRACTION Growth Point

20. Counting on

21. Count back/ modelling all (8 – 3)

22. Count down to/count up from (12 – 9)

23. Basic strategies (circle strategy used)

24. Derived strategies (circle strategy used)

25. Multi-digit strategies

26. How many digits? (circle strategy used)

27. Estimating and calculating addition

28. Estimating and calculating subtraction

Notes

Figure 3 MAI interview record sheet 3

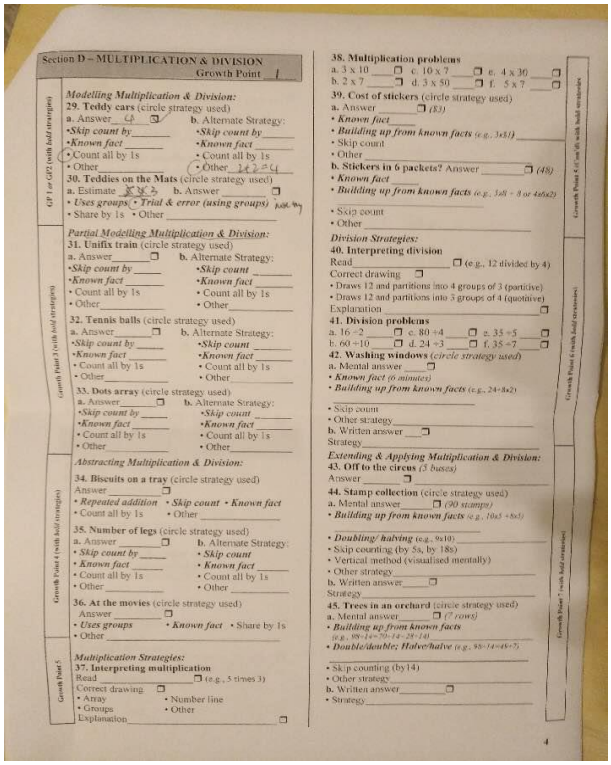


Figure 4 MAI interview record sheet 4

2. OPEN TASK FOR AUDREY

According to Reys [4], children have the sense of numbers before counting, but numbers are symbols and abstraction requires children to understand the quantity before counting better, and educators need to scaffold them through developing their prenumber concept. The concept of pre-numeration is the way children present numbers according to their understanding. For example, five can be more than three or more than six [4]. Because Audrey needs to learn more about different counting skills, here is an open task for her and all the prep children to investigate. This question comes from a set of popular YouTube videos. Its origin is to test the basic math skills of adults: "That was when child A was eight years old, and A's sister was only half of A. When A was 30 years old, how old was A's sister? "This is a tricky but interesting question that requires math and literacy skills.

The fundamental mathematic knowledge for children to explore in the open task is division and subtraction. In the mathematics section of Australia Curriculum Assessment and Reporting Authority [2] for the foundation year, this task can develop children's numbers, place values, and patterns, contributing to counting [4]. Apart from learning, literacy learning is overt as well. Children should understand that the phrase "a half" does not mean a specific number, such as a percentage. It constantly changes according to the number of numbers.

The open task can be divided into three parts to keep the proficiencies, using three main questions, which are "what is a half of eight?", "what is a half of 16?", and "when I was eight, my sister was half age of me, when I am 20 (because the foundation year children only need to understand and count to 20, so I changed 30 to 20), how old is my sister?" If children can quickly answer the third question, educators can transfer the question in another way "when my sister was 3, I was double age than her, when she is 16, how old is me?" In the beginning, educators can provide popsicles or counters to the children and to explore by themselves. The boost question for them can be "what is the meaning of a half?" then "how can you create an eight?" To develop the group and skip counting skills, educators need to encourage children to use more than one popsicle or counter to create the number eight.

Next, educators need to use the question "Do these two questions have the same answer?" "Connect the two issues. Why? The expected answer would be "half is not a number." If a child does not know what "half" is, the teacher can ask them to divide 16 popsicles into two parts, eight popsicles and eight other popsicles. For the higher achievement children, educators can use the question "how many parts for 16 if we skip counting and using a half of eight?" If they have trouble with this, educators may explain the question to them, what is "a half of eight" and "how many a half of eight will be 16?"

Finally, is the real circumstance problem-solving question. To solve the third problem, children need to clearly understand "half" and use subtraction to calculate 20 minus 4 equals 16.

During this open task, students have the most time exploring and discussing. Teachers like facilitators, after introducing the fundamental problem nature, which is "a half", they need to go around the class and give different questions based on students' current discussions.

These open-ended tasks are designed in ideal classroom situations, including a good performance by children, a positive learning environment, and a well-organized classroom. Educators can change the numbers to smaller numbers if the children in the preparatory class have difficulty solving the problem of large numbers.

3. KEY ELEMENTS OF THE LESSON STRUCTURE

When children learn math, they are experiencing fluency and comprehension, or more academic, procedural, and conceptual knowledge. According to Reys [4], fluency means that a student has received some training or experience in mathematics and can perform accurately. Students may not understand the concept of this knowledge, but they have learned how to solve similar problems. For example, it is easy for Chinese children to say multiplication tables and solve math

problems. However, most people do not know why multiplication tables are correct and where patterns come from. The process is more like mechanical brain function or memory recall. In addition, understanding is the source of positive thinking for students. For example, the relationship between the multiple nine of nine and 81 is because nine has been increased nine times. Educators need to incorporate fluencies and comprehension into their math classes when planning math classes for elementary school students. If only fluent, students do not have positive thinking, only problem-solving reflection. If only understanding is applied, students may find it challenging to solve practical problems. In addition, mathematical discussions are essential in planning courses. The teacher's current role in the classroom is to develop and build the collective meaning of all students [6].

With these sections, educators can create a reform-oriented course that is divided into three processes [6]:

a) The launch parts. The teacher introduces the students' problems, the available tools, and the expected products. This step allows students to have a clear sense of the task.

b) The exploring part. Students have discussions with peers in either pairs or small groups, work together on the problem. This step provides flexibility for students to reflect and share their own opinions about the problem.

c) The discuss and summarize part.

Students who solve the problems in different approaches will be displayed and discussed in front of the whole class.

4. PEDAGOGICAL ACTIONS AND ORGANIZE THE STUDENTS AND CLASSROOM ENVIRONMENT

In implementing the arrangement of lessons, educators play a neglected role in classroom teaching, and many teaching behaviors may affect teaching. Siraj and Taggart [4] demonstrate that many aspects contribute to good teaching and learning quality. In assessing the quality of primary schools, they found many details of assessments that helped improve the quality of school teaching. Such as organization, common goals, homework, classroom atmosphere, behavior management, collaborative learning, personalized teaching and learning, clear contact, dialogue teaching and learning, learning assessment, and plenary meetings. These require educators to control and guide the whole class students for learning effectively.

In this open task, educators have numerous chances to scaffold guide students by asking them questions and using tools when they are experiencing the question. Because of the variety of students' learning types, educators should set up several groups for students at different levels. When they have similar abilities, they will not feel excluded and can fully engage in the exploration and the discussion. Educators will be more confidence to ask them relative questions to support all the students, especially the advanced students. They will not feel the task is too simple for them and bored with it.

Generally, good classroom management can boost students' learning and positively affect them about the outcome 3. Children become strong in their social and emotional wellbeing [3]. More specifically, regarding the teaching method of mathematics, Stein, Engle, Smith, and Hughes [6] believe that the promotion of mathematics discussion is neglecting the teaching method, and they interpret it as five practices, namely prediction, monitoring, selection, ranking and assistance. The purpose of the course is to allow students to explore and discuss problems, improve mathematical understanding and fluency. Although the final results are the same, the problem-solving process and creative thinking are more valuable, allowing students to experience understanding and improve mathematical fluency.

5. CONCLUSION

MAI is an excellent tool to assess students' mathematics knowledge, using growth points is helpful to figure out the student current fluencies and proficiencies in mathematics and their achieving targets. To do this, educators need to set up an open-ended task for students to explore and discuss independently. Educators should also understand the curriculum structure and teaching methods in the classroom, affecting classroom management and student learning.

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