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EDMA310- Assignment 1 Evaluation of two assessment strategies (40%)

PART 1

Report on student's mathematical knowledge of fractions and decimals, and any misconceptions.

Overall, the Grade 5 student, Olivia, who was interviewed, had a relatively high understanding of fractions and decimals. She demonstrated a range of problem solving skills, through her use of strategies and various representations/diagrams to support her understanding and to justify her reasoning. Notably, there were also misconceptions that can be clarified and built upon in future lessons.

First of all, many skills were demonstrated in the interview process. The strategy of benchmarking and equivalence showed an understanding of the relationship between fractions. This strategy was often used to differentiate between larger and smaller fractions, using number lines, and using tenths as a benchmark to compare smaller and larger decimals. For example, 5/8 is larger than 1/2 because, 5/8 is one eighth large than four eighths, which is equivalent to one half. Further understanding of comparing fractions was shown through the use of residual thinking by explaining, for example, that 11/6 is nearly two wholes.

The Grade 5 student frequently justified her thinking and responses through reasoning. This was evident through clear explanations, drawing diagrams, or using representations like number lines or pattern blocks. It was noticeable that when Olivia struggled or wanted to explain her thinking, the use of these representations aided her thinking and furthered her own understanding.

During the interview, there were some misconceptions due to either a lack of understanding or simply because it was not yet covered in class. First of all, multiplying and dividing with decimals was not fully understood, as although Olivia reasoned that multiplying does not always make the number larger, she did not understand as to why this was the case, and therefore guessed the answers. Using specific language to scaffold her understanding could help to develop this concept, for example, 8 x 0.1 can be expressed as 8 groups of 0.1. Other misconceptions involved money to estimate costs, this may have stemmed from her lack of understanding of multiplying and dividing with decimals.

Critical evaluation of the usefulness of this assessment strategy (Interview) for gaining knowledge about a student's current mathematical knowledge that can be used to plan future learning opportunities.

According to Van de Walle (p.80, 2013) assessment should assess conceptual understanding and the knowledge of students. This should show the ability to problem solve, communicate ideas, and connect learning to prior knowledge. The assessment strategy of interviews seems to address all of these concepts. However, like other assessment strategies, it has both strengths and weaknesses in terms of its usefulness to gain knowledge about a student's current mathematical knowledge that can be used to plan subsequent lesson opportunities.

The use of interviews as an assessment provides in-depth information about a student's knowledge and mental strategies about concepts. Through this procedure, the teacher can discover the student's misconceptions as well as understood concepts (Van de Walle et al, p.90, 2013). Interviews can be designed by teachers to explore the needs of the student through questioning, listening and responding to their mathematical thinking. Since interviews often rely on the students to use mental computation, this leads to insights of deeper thinking and strategies used that would not normally be revealed through written algorithms. However, due to the structure of the interview, where there is a lack of questioning, students may feel nervous and on the spot due to the apparent lack of supportiveness and prompting when students struggle with finding a solution (Crespo & Nicol, 2003). Therefore, the information gathered from the interview is not necessarily true to the student's capability.

In terms of assessment, the interview process can be structured in two ways; evaluative or inquiry approach. The evaluative approach focuses on moving quickly through the interview with little or no follow up questions. However its purpose does not focus on assessment but rather instructing. Therefore, the interview loses its value as an assessment tool, as it is not gaining insights into the student's thinking to help plan future lessons, but rather does the student know the mathematical content or not. On the other hand, the inquiry approach emphasises using questioning to probe the student's thinking, which is arguably more effective when addressing the individual's needs (Crespo & Nicol, 2003).

One of the disadvantages for both students and teachers when conducting the interview process is not being able to provide more detail or prompts to guide the student's thinking. Although the interview is not an opportunity for teaching strategies, students who provide incomplete justifications could be guided through questioning to encourage them to build upon and improve their answer (Evens, & Houssart. 2004).

While the interview process has advantages and disadvantages, the value of this assessment tool is based on how teachers can utilise it to instruct future teaching strategies to cater for the individual student's needs.

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PART 2

Critical evaluation of the assessment strategy open task with rubric for gaining knowledge about student's current mathematical knowledge that can be used to plan future lesson opportunities.

Assessment more accurately reflects the student's learning in the classroom environment, where the teacher can make judgments based on the student's performance about what they know and can do. This is known as formative assessment which influences both instructional teaching and the way students learn (Callingham, 2008). This reflects the advantages of the open task, which allows students to demonstrate what they know through a variety of strategies and approaches.

One method to gain information about a students' own knowledge and strategies in order to form assessment, is by questioning. There are four main types of questioning, which is useful in an open-ended mathematical task. These are; starter questions, questions to stimulate mathematical thinking, assessment questions, and final discussion questions (Way, 2008). It is important to promote discussions regarding mathematical open tasks so that students can develop clear communication about mathematical concepts and for the teacher to assess the students' understanding.

Assessment for learning opportunities occur regularly in the classroom, for which teachers need to understand how students approach assessment tasks in order to plan future learning. Open-ended tasks cater for this purpose as they provide a broader yet deeper range of information about a student's learning and understanding compared to more restricted tasks such as tests or interviews (The Australian Association of Mathematics Teachers Inc, 2008).

By utilizing performance criteria for assessing and improving student mathematical understanding, the teacher should first identify what mathematical concepts should be used in the student's work in order for the student to understand the expectations of the task (Arther & McTighe, 2001).

This leads to the advantages of using rubrics to provide expectations for students in order to demonstrate what level of understanding the students are performing at. Rubrics provide structure to observations and discussions of the learner's understanding and expectations of the task. There are two types of rubrics: analytic and holistic (Brookhart, 2013). Analytic rubrics describe each criterion separately based on the expectations of the task, which is used for formative assessment. On the other hand, holistic rubrics describe the expectations of the criteria at the same time in order to make an overall judgement of the quality of the work, and are suited for summative assessment. In the case of open-ended tasks, analytic rubrics are more appropriate as it will provide information and feedback for both the teacher and the student. Analytic rubrics can also be used to show evidence of the student's progression of their mathematical understanding.

Open-ended tasks allow students to use a variety of strategies for which teachers can assess a broader understanding of mathematical concepts. Assessment should be used to gather information to instruct future lessons for which rubrics provide structure and expectations.

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