Teacher report on your student’s Rational Number Knowledge and any misconceptions

Using the data collected in the interview, the student's rational number knowledge is relatively developed. The student successfully applied prior knowledge, and used efficient mental strategies when accessing this information. Lauren demonstrated that she is capable of applying residual thinking, which was evident in her explanation of the part-whole fraction model. She was able to explain her knowledge of the inverse relationship between the size of the denominator and the numerator, signifying "the more the pizza is divided into equal parts (denominator), the smaller each part is (numerator)". Lauren can confidently use concrete materials to aid her understanding in relative fraction size and comparing equivalent fractions. This was evident when comparing the size of pattern blocks. She shows competence in applying the benchmarking strategy. She successfully used benchmarking when presented with information regarding the cost of cheese per kilo. This assisted her in developing a step-by-step explanation of how she achieved her answer. Lauren has some misconceptions with converting fractions to decimals. She confidently completed the ordering decimals task, however, had some difficulty in writing the correct decimal in number form when read as a fraction. Lauren could successfully identify the dots array, but found it challenging when asked, “Is there another name for that fraction?” She also had some difficulty in drawing the ‘whole’ shape after being presented with the fraction. Essentially, Lauren attempted all questions with great persistence and accompanying explanations for her answers. However, based on the results obtained, I believe Lauren could have benefited through the use of concrete materials and visual representations.
Critical evaluation of the usefulness of mathematics interviews for gaining knowledge about students’ current mathematical knowledge that can be used to plan future learning opportunities. Be sure to draw on relevant research literature to support your evaluation.

Mathematics interviews are designed to learn about students' mathematical content knowledge by observing and recording their thinking strategies. Educators use such forms of assessment in order to gain an insight on students' current knowledge, therefore providing a foundation for future planning. However, the way in which interviews are designed and conducted may limit the student's opportunity to convey their knowledge. Further, an individual student may have acquired a deep understanding about a concept, but are not provided with the opportunity to apply this knowledge if they are required to respond to a question in a specified way, (such as providing an answer to a closed question). Many educators query the validity of mathematics interviews, as it is difficult to obtain a true representation of an individual students’ acquisition of knowledge. It is expected that teachers understand “students’ thinking, their interpretations of problems, their mistakes” whilst maintaining the competency to carefully probe students in a perceptive manner (Cohen, 1989, as cited in Crespo & Nicol, 2003), yet the use of mathematics interviews do not support this.

Another major factor influencing the students' ability to comprehend or grasp a certain form of question is vocabulary. Some questions can be interpreted as confusing and misleading. However, if such a question was presented in a classroom context, the educator has the opportunity to rephrase or further explain a concept with the use of different vocabulary to assist a student's understanding. The continuous use of closed questioning does not allow for growth as students’ are expected to simply generate an answer without the opportunity to access prior knowledge or effectively apply a range of strategies. This can be compared to the style of NAPLAN testing. The Independent Education Union of Australia (2013) reported that teachers “were concerned that the tests did not measure the intended benchmarks and that other classroom assessments provided a more accurate measure of the student's literacy and numeracy level”.

The process of mathematics interviews does not provide an adequate opportunity for students to actively participate in their learning. Students are quite restricted with access to and use of concrete materials, which may potentially inhibit the representation of the student’s understanding. It is believed that instructional strategies that use manipulatives are effective approaches to improve student mathematics achievement (Gürbüz, 2010; Sherman & Bisanz, 2009, as cited in Carbonneau, Marley & Selig, 2013). It is also significant that students have the opportunity to participate in a supported but encouraging learning environment. This involves being an active participant in rich learning activities, group discussions, collaborating with peers, applying new ways of thinking and reflecting on mathematical understanding. Students will develop their confidence in mathematics if provided with this opportunity, essentially challenging individual perspectives and having an open-mind for new ideas.

“Children have more secure, positive relationships with teachers who set up appropriate classroom environments and give children high-quality feedback to stretch their emerging knowledge and skills” (Howes, Fuligni, Hong, Huang, & Lara-Cinisomo, 2013, as cited in
Clements & Sarama, p. 295, 2014). Ultimately, mathematics interviews are impractical in achieving this objective. They provide a minuscule outlook on individual students’ mathematical knowledge, failing to provide a true representation of a students’ set of skills, knowledge and understanding. Conversely, mathematics interviews indicate whether a student can successfully complete a basic closed question, using mental strategies.

Critical evaluation of the usefulness of Open Tasks with Rubrics for gaining knowledge about students’ current mathematical knowledge that can be used to plan future learning opportunities. Be sure to draw on relevant research literature to support your evaluation.

Open tasks allow students to demonstrate a deeper level of understanding. The prevailing notion that open tasks are designed to be accessible for various learning styles provide students with the opportunity to access the task in any manner. Students are able to demonstrate their current mathematical knowledge through the application of a range of strategies, making connections between concepts and identifying any evident patterns or configurations that may appear. A study conducted by McKnight and Mulligan (p. 8, 2010) found that open-ended tasks allow the teacher to “glean much information about students’ mathematical knowledge in a short time. It proved to be an effective way to cater for the varying needs of students in the classroom; extending individuals at their own pace and level. It was also possible to capitalise on the rich opportunities for engagement in visual and practical mathematical processes to develop students’ expressive language”.

Essentially, open tasks allow for self-directed learning, whereby students have the opportunity to approach a task in a manner, which caters for their learning style. This may incorporate various strategies, skills, connections and processes, which extend far beyond responding to a closed question, simply regarded ‘right’ or ‘wrong’.

Rubrics are an effective form of assessment to inform student progress. More specifically, rubrics allow for progression, as they do not explicitly state the individual student’s work sample as correct or incorrect. This is a crucial consideration for student learning. If a student is provided feedback that states everything they failed to achieve, it can have a negative impact their confidence and motivation to learn and engage with mathematics. Moreover, rubrics are considered effective in “supporting the process of formative assessment, where assessment information is used to inform students about their progress and aid them in their development” (Black & William, 2009; William, 2011, as cited in Panadero & Jonsson, p. 130, 2013). Further, an effective rubric allows educators and students to have a shared understanding of the expectations of a task. A successful rubric contains clear expectations and levels of progression, thereby indicating a students strengths and areas for improvement.
References:


