

Rekenrek Article Outline

Article Review Paper: Prepare a **1000 word** review of two peer-reviewed articles. Please include a paragraph for each item provided: **Introduction, Rationale for selecting the article, Major Findings, Potential effect (s) on classroom practice and a conclusion.** Also, compose **two** open-ended questions related to the articles' content. Each member must submit the final group product and the learning team evaluation form. Although this is a group assignment, your paper should reflect the voice of **ONE**. This is why it is critical that you have a plan regarding drafts, editing, etc. If you need clarification on this, please let me know. **Please post your final paper and learning team evaluation within the link provided.**

I. Introduction

- a. The rekenrek was a study conducted in the area of Mathematic education using three groups of forty five first graders. They did this to see if there was a better way to teach students, specifically students with math learning disabilities.
 - i. “Directly translated, rekenrek means counting rack” (43).
 - ii. “The rekenrek consists of 20 beads in two rows of tens, each broken into two sets of five by color” (43).
 - iii. “Its main characteristic is that it has the five-structure built in. The five-structure represents the five fingers on each of our hands and the five toes on each of our feet. It is designed to encourage children to use strategies like double plus or minus, working with the five-structure, using compensation, making tens, and stretching children toward using these strategies in place of counting (e.g., Fosnot & Dolk, 2001; McClain & Cobb, 1999)” (43).

II. Rationale for selecting the article

- b. Since our topic was helping students with math disabilities, we chose to use this article because it is a case study of an experiment that was used to see if there was a better way of teaching students with math learning disabilities.
 - i. The rekenrek can help in addition and subtraction, so it would benefit students with learning disabilities who have a hard time with those concepts (44).
 - ii. “The participants were 45 first-grade students with learning disabilities attending self-contained classes in five schools in one district of New York City” (46).
 - iii. Basically, students were randomly selected to be in one of three groups. Group 1 had both “instruction and rekenrek”

whereas Group 2 only had “instruction” and Group 3 had neither “instruction” nor the rekenrek (46).

- iv. “Instruction was defined as fifteen 30-minute individual sessions provided daily for three weeks, in addition to classroom instruction” (46).
- c. The article recognizes what the teachers have done over the years, and it explains how the methods can be improved or changed so that more students will be able to learn and succeed.
 - i. “In order to teach the number sense concept effectively, teachers need to find ways to promote (a) automaticity with basic math facts, (b) subitization and, (c) flexibility (Kelly, 2006; McClain & Cobb, 1999; Salend & Hofstetter, 1996)” (42).
 - ii. “According to Fosnot and Dolk (2001), automaticity with basic math facts (e.g., $3+5=8$) is the ability to produce answers in a few seconds by relying on thinking of the relationships among the operations rather than recalling the answers” (42).
 - iii. “Subitization is the ability to recognize the number of objects in a set without actually counting them (Grauberg, 1998). That is, young children can compare two, three, or four objects without counting and understand the magnitude of each group. They seem to be perceiving the whole, rather than inferring the quantity” (42).
 - iv. “Finally, flexibility is an advanced stage of general number sense and involves understanding how to add and subtract with strategies (McClain & Cobb, 1999)” (42).

III. Major findings

- d. Some of the findings showed that the way that teachers thought they were teaching effectively was not actually as effective as they thought (43).
 - i. Manipulatives are what most teachers use, but they do not help what was argued to be important for productivity.
 - ii. “In the United States, the manipulatives most commonly used with young children are single object materials that can be counted, such as Unifix cubes, Cuisenaire rods, color tiles, pattern blocks, colored craft sticks, bottle caps, chips or buttons” (43).
 - iii. “However, Fosnot and Dolk (2001) argued that these manipulatives do little to support the development of the important strategies needed for automaticity even though

they have great benefits in the very early stages of counting and modeling problems. They also point out that such manipulatives begin to reinforce low-level counting strategies at a certain point” (43).

- e. As I understand it, the rekenrek facilitates more learning because it has students learning and coming up with their own ways of finding the answer to a problem (44).
 - i. “Another value of having students approach groups of five informally is that they are behaving instinctively. Thus, they can understand and apply a new mathematical concept without being frightened initially by the idea of other bases (Blaney, 1964)” (45).
 - ii. “Furthermore, Gravemeijer, Cobb, Howers, and Whitenack (2000) and McClain and Cobb (1999) noted that the structure of the rekenrek can push students toward mastery of patterning and partitioning activities, which are the essential components of subitization strategies. Patterning involves helping students begin to see numbers as quantities that can be divided into various groups. Partitioning activities take patterns a step further by providing students the opportunity to break numbers into various groups as a means of solving a problem. McClain and Cobb (1999) concluded that these activities are critical for the learning process of addition and subtraction that need to be taught in combination and not as separate mathematic functions” (45-46).
- f. The students who were a part of the group (Group 1) that used rekenrek scored higher than the other two groups. The other two groups, those not using rekenrek, had similar results (53).
- g. So, as the scores showed, the rekenrek is an effective way to teach students with learning disabilities.

IV. Potential effects on classroom practice

- a. “With the rekenrek, students in Group 1 gave clearer explanations on their arithmetic operations (e.g., they figured out that moving beads left or right can be written as +, -, or missing addends), compared to the students in Group 2. It seemed that the rekenrek served as a modality and an efficient reasoning tool for interpreting the relationship between the concrete (situation) and the abstract (symbols). Overall, observations of students in Group 1 suggested more positive attitudes toward the math activities by

the end of the intervention, compared to Group 2, as displayed by more enthusiastic behaviors towards the activities” (55).

- b. It seems to me that if teachers used this method, their students’ test scores and overall knowledge would improve.
- c. The article offers methods in which the teacher can use the rekenrek in the classroom in more ways than just one on page 56 of the article.

V. Conclusion

- a. “The results of this investigation with students with learning disabilities confirm the findings of other studies conducted with general education students (i.e., Fosnot & Dolk, 2001; McClain & Cobb, 1999); namely, rekenrek helps children grasp the big ideas of number sense and restructure their counting strategies in favor of better shortcuts, like using double plus or minus, by facilitating automaticity, flexibility, and subitization” (55).
- b. “Overall, the rekenrek provides the tool through which students create a relationship between action and thought” (56).