ABSTRACT

Common Errors in the Concepts of Fractions and Operations and the Thinking Strategies Associated With These Errors

This study aimed to identify the common errors and the patterns of their occurence among students of the fifth, seventh, and ninth grades in the concepts of fractions and operations on them. It also aimed at identifying the thinking strategies associated with these errors, and the extent to which these errors persist.

Accordingly, this study sought answers to the following questions:

1. What are the most common errors and their patterns of occurrence for students of the fifth, seventh, and ninth grades on fractions, decimals, and operations on them?

2. What are the thinking strategies among students of the fifth, seventh, and ninth basic grades associated with these errors in the concepts of the fractions with their two kinds, common and decimal, and in the operations among them?

3 .What is the extent to which the students of the fifth, seventh, and ninth basic grades adhere to the strategies of their thinking which accompany the common errors in the concepts of the fractions with their two kinds, common and decimal, and in the operations on them?

The population of the study consisted of all the students of the fifth, seventh, and ninth basic grades in the governmental schools in the city of Hebron. The sample of the study consisted of 1178 male and female students distributed on 19 schools containing 36 sections. They were chosen by the simple random selection method. To answer the questions of

the study two study instruments were adopted, and were represented in the diagnostic test to know the errors formed among the students, and the clinical interviews in order to know the strategies followed by the students and the extent of thier adherence to them. Data was then analyzed based on the descriptive statistics. consequently, the results were obtained.

The results showed variation in the common errors committed by the students of the fifth, seventh, and ninth grades in the concepts of the fractions and operations on them. It introduced a very large knowledge base about these common errors among the Palestinian students. It was noticed that the highest percentage of the wrong answers amore the fifth grade students in reading the decimal fraction, and conducting the addition and subtraction operations on them, whereas the highest percentage of the wrong answers was among the seventh grade students in the topic of dividing the common fractions and the decimal fractions. In addition to this, the results of answering the test of the ninth grade showed a decline of the percentage for the wrong answers by students than that among the students of the fifth and ninth grades.

On the other hand, the errors of the seventh grade students in shading a shape in the form of a certain fraction were few. Also, the errors of the ninth grade students in reading the common fraction and comparing two decimal fractions of two different whole numbers and shading a quarter of a known shape did not reach the extent of considering them common errors.

The researcher was able to restrict the errors of the students in eight families of errors. She found that the highest percentage of making an errors resulted from dealing with fractions as whole numbers, followed by errors in comparing fractions, then other various errors, while the percentage was

low for errors resulting from replacing an operation instead of another, and conducting logarithms in a wrong way.

The results also indicated that there is a variety of the thinking strategies of the students which lead to their making errors. There were about fifteen methods which differ according to the difference of the concept, and the arithmetic operation conducted by the student. Among the most prominent of these strategies was dealing with fractions as whole numbers and expressing the fraction without taking case of the equality of the past, on bringing the decimal digits close to the right when conducting the addition and subtraction operations for the decimal fractions, and neglecting the zeros to the right of the decimal point upon comparing the decimal fractions. The results showed that half of the students who were interviewed adhere to the solution strategies which lead to the common errors in the concepts of fraction with their two kinds, the common and the decimal, and the operations on them.

The study recommended conducting more studies in order to clarify the reasons behind these common errors, and to know how to handle them.