

ABSTRACT

Multiple Representations in an Algebra Unit of Grade Seven Mathematics Textbook and the Extent of their Use by Teachers.

This study aimed at identifying types of multiple representations and translations between them, which are available in an algebra unit of seventh grade Palestinian mathematics textbook, and comparing them with the ideal situation where all representations and translations are used, as provided by Lesh Model. It also aimed at identifying representations and translations among them, used by teachers in teaching the same Algebra unit, and compare the frequency of this use with the ideal situation, and with the representations in the textbook.

For this purpose, the researcher designed a guidebook for analyzing the Algebra unit, which enables him to identify all representation and translations in the Algebra unit, or representations and translation demonstrated by the teacher during his Algebra lessons. In this qualitative- quantitative study, an algebra unit was analyzed using the above-mentioned instrument. The identified representations and translations were arranged in a table. In constructing validity of this analysis, it was referred to four specialists in mathematics education who gave their consent to the analysis. In establishing the reliability of the analysis, the author compared his analysis with the analysis of another

mathematics teacher trained by the researcher, and with a replication of the analysis performed by the researcher himself. The Kappa value and the percentage of compatibility showed sufficient consistency between the analyses.

The researcher attended five classes for each of the three teachers involved in the study, and recorded all the representations and translations among them, used by each of the three teachers.

The researcher gave one mark for each representation, and each translation between them, and zero mark if no representation or translation was used. The mean and standard deviation for each type of representation and for each translation between them was calculated.

The results showed that the verbal representations, and the use of written symbols, were very highly used in the Algebra unit, while the three other representations of using pictures, 3-D models, and real life situations, and translations among them, were either rarely or very rarely used. Results also showed that teachers' use of written symbols and verbal representations were very high, while their use of the three other representations, and for the translations among them was extremely low.

Based on the results, the researcher recommended that educators and textbook writers involved in development of the mathematics curriculum and textbooks, need to enrich curriculum and textbooks with multiple representations and translations between them, and train teachers to use

them effectively. He also recommended that teachers be trained in the use of multiple representations and translations among them, and be urged to use them in their teaching. The researcher recommended that future research be carried out to compare representations in the Palestinian mathematics curriculum with other developed countries' curricula, especially countries who scored high in the TIMSS test such as Singapore.