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A study on primary grade students' errors on column graphs

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Interpreting and drawing column graphs is essential to the students and the general public as it is a popular format for presenting information related to social issues. The Sri Lankan Primary Mathematics syllabi consist of six main topics: numbers, mathematical operations, measurement, money, space and shapes, and data handling. Of these topics handling data consists of the sub topics: (i) collect data and represent in a graph and (ii) read time tables and graphs logically. In Sri Lanka, the concept of column graphs is introduced to children in Grade 3 (8 years of age) and expanded gradually until Grade 5. The column graphs could be defined as a 'type of graphical presentation, in which numerical values are represented by vertical columns'. The Grade 5 Scholarship Examiners' reports highlighted that the students' performance in column graphs is poor. The objective of this study is to identify the errors in representing data on column graphs.

The sample for the study consisted of 117 boys and 108 girls of Grade 5 from four 1 AB type Tamil medium schools in the Colombo Educational Zone. A question paper with 5 problems on data handling was designed. Only 124 students got all answers correct for these graphs. The students were subsequently interviewed to identify the reasons for the errors. The data collected from the interviews were further analysed to categorise the errors.

The following types of errors were identified (i) scale used on vertical axis does not begin at zero (Students have labelled the vertical axis starting at one) (ii) number track used on vertical axis (Students have numbered the spaces on vertical axis of a column chart) (iii) incorrect labelling of horizontal axes (Students have labelled the items represented on the horizontal axis) (iv) inconsistent scale used on vertical axis (students have labelled the vertical axis using an inconsistent scale) (v) inconsistent scale used on horizontal axis (students have used different widths for their column). Knowledge of these errors is useful to primary mathematics curriculum developers, educators, teacher trainers and teachers to minimise the errors made by the students, in understanding column graphs.

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