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Chilean primary school difficulties in building bar graphs

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Introduction and method

A relevant part of the information we face every day is given in statistical graphs, whose interpretation is often needed to make different decisions; therefore there is a need for citizens to achieve enough graphical competence. These reasons led countries like Chile to introduce statistical graphs in the primary education (MINEDUC, 2012).

In a previous study (Díaz-Levicoy, Batanero, Arteaga & Gea, 2016) bar graph were the most common representations in the Chilean curricular guidelines and textbooks. Consequently in this research we intended to assess the students' difficulties in building these graphs.

This research was aimed to identify the 6th and 7th grades Chilean school children's difficulties in the construction of bar graphs, which are recommended in the curricular guidelines and is the most frequently presented graphic in the Chilean textbooks.

To achieve this aim we analyzed the responses of 745 students, from 13 different educational centers and with an average age of 12.3 years to the task reproduced in Figure 1 in which students should form the frequency distribution of data.

Task. The following data result of a survey where children were asked for the number of brothers and sisters: **0, 1, 3, 2, 2, 3, 2, 4, 1, 2, 1, 2, 0, 2, 3, 1, 1, 0, 2, 4, 0, 1, 2, 3, 1, 1, 2, 2, 2**
Buid a bar graph that summarise this information

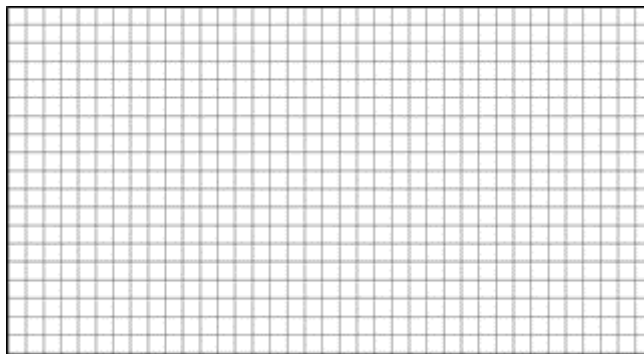


Figure 1: Task given to the students

Main results

We classified the students responses in correct, partly correct or incorrect according to the following criteria, following an inductive and cyclical process characteristic of content analysis and considering the results of previous studies:

- Correct responses correspond to bar graph that represent the data and use the criteria for these representations.
- In partly correct graphs there are minor errors, such as forgetting the general title, or using

bars with different distance between them.

- In incorrect graphs the representation of data make no sense.

Type of graph	6th (n=380)	7th (n=365)
Correct	4,7	7,9
Partly correct	40,3	44,1
Incorrect	31,3	17,8
Do not complete	23,7	30,1

Table 1: Percentage of students according their responses

Results are presented in Table 1, where there are no significant differences between both grades. Results are better than those reported by Bivar (2012) and worse than those by Fernandes, Morais & Lacaz (2011) and Evangelista, Oliveira & Ribeiro (2014) although in these last studies students did not need to form the distribution. The most frequent errors in our research were representing the list of data without forming the distribution (15.4% of students), non-proportional scales (13.7%), lack of titles or labels (34.6%) and bars with different width or separation (18.1%). Some students committed several of these errors. All these results suggest the need of reinforcing the teaching of graphs in Chilean basic education.

Results show the high difficulty, since only 50% of students produce correct or partially correct graphs. The differences between the two groups were not statistically significant. More details about the errors made by the students can be read in Díaz-Levicoy (2018).

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