

Report on testing learning environment: Walking the number line

Module:	Walking the number line
Responsible Partner:	Hogeschool IPABO / Netherlands
Grade Level/Age Range:	Grade 5/6 (11-13 years)
Sample size:	54
Brief Description of Testing / Intervention:	<p>Testing: Pre-test only, because this intervention consisted of one lesson of one hour. Therefore, it made no sense to try to make a pre-post comparison of their reasoning.</p> <p>Intervention: Two classes of Grade 5/6 students participated in the testing of this learning environment. They all filled in the relevant questions of the pre-test and participated in the activity of walking the number line, guided by their teachers. In each classroom the students were divided into two groups so that while one group was executing the activity the other group was working on other problems in the classroom. After having switched roles, the entire class participated in a whole-classroom discussion on their findings and ideas about functional thinking.</p>

Method:

In two Grade 5 classrooms (N = 54) students filled in the pre-test questions. Their answers to these questions were coded following the relevant coding scheme developed within the FunThink project. We provide frequencies of the codes on the different items to illustrate the level of functional thinking the students showed before participating in the activity.

Results and Discussion:

Using the coding scheme provides insight in the type of reasoning these primary school children showed in their answers to the items. In this, it has to be taken into account that we can only judge their reasoning if they wrote it down, i.e., they might exhibit higher levels of reasoning when questioned verbally or in yet another modality. Nevertheless, we can judge the level of reasoning (and correctness) of the written traces of their reasoning. Below we describe the findings in frequencies and percentages for these different levels.

Clearly on items 1a and 1b, which were both concerned with graphical reasoning as an illustration of functional thinking, most students did not explain their reasoning or did not answer the question (61% in both). For those who did reply, remarkably, more students used multiple variables in their reasoning, such as time, distance, speed, or direction of the line in the graph, than students who only used one of those variables (about 13-14 students [25%] against 1-5 students [2-9%]).

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Furthermore, when looking at their reasoning on items 2c and 3c, in which students had to explain or continue figural and/or numerical patterns, a similar finding emerges. In these items, we could also observe a large number of blank responses (20%-59%). However, a higher number of low level responses of the recursive level (44%) could be observed – which can be seen as equivalent to the single variable reasoning on item 1a and 1b.

All in all, it becomes evident that various types of reasoning were exhibited on these different items, even if most students did not answer them correctly. While participating in the learning environment these different levels of reasoning also came clearly to the fore and imply that (more) learning opportunities with regard to functional thinking are necessary.