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Development of an intervention program in counting principles for first- grade students – Pilot study

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Development of the intervention program:

This study was designed considering the need of developing effective interventions that could help basic education teachers to favor their students' learning process. The objective of this study was to develop and intervention program focused on teaching counting principles for first-grade-children and to evaluate its applicability through a pilot study. The planning of the program was based on the guiding principles established by researchers of the field (Clarke, Doabler, Nelson & Shanley, 2015; Fuchs & Fuchs, 2001) and in intervention studies (Dyson, Jordan & Glutting, 2011; Praet & Desoete, 2013; Toll & Van Luit, 2013).

Method of the Pilot Study

The objective was to evaluate the applicability condition of the intervention program in terms of: the quality of the proposals, duration of the sessions and the functionality of the idealized dynamics through the pilot study. Participated in this study 10 first-grade students from a public school located in Porto Alegre, Brazil. The application of the intervention occurred in 4 sessions of approximately 1h30 (2 sessions of 45 minutes in each meeting). In total, there were 8 sessions, each one with focus on a specific counting principle. All sessions were structured with the same dynamics (previous motivation, contextualization, activity and systematization) and were applied by the researcher. The researcher registered the progress of the intervention using a field dairy.

Results: with regard to the quality of the proposals, the researcher's notes indicated that most of them worked properly, but needed some kind of adaptations. This could have occurred for two reasons: first, the sample of 10 children ended up being too large, which was an obstacle to maintain the group attention and to give more individualized attention to the students; second, the participating children had good previous knowledge, completing the tasks faster than expected once they understood the instructions of the researcher. Regarding the duration of the sessions, the 45 minutes idealized weren't fully used because the intervention took place in the children's regular classroom and also because they were fast to complete the activities. Finally, the idealized dynamics for the sessions worked well, with the initial moments (previous motivation and contextualization) acting positively to engage the previous knowledge of the students. The final moment of systematization was repeatedly pointed out as needing to be reorganized. All the researcher's notes helped to reformulate the intervention program, culminating in its second version (presented below) to be tested as an experimental study. A paper presenting the experimental study, with the final intervention program in counting principles, was submitted to the TWG2.

Guiding questions:	Tasks:
Session 1: stable order, one-to-one correspondence and cardinality. - where do we find numbers? - what are their purpose? - how can we count them? - is there a right way to count? Which one? - what can we do to know how many things there are in a set?	- observation of the room to search for numbers and their purposes; - analyses of journals and magazines to search for numbers and then ordering them; - game: “which one is missing?”
Session 2: stable order, one-to-one correspondence, cardinality and order irrelevance. - how can we count without getting lost? - how can we know if we already counted one item? - how can we count a set that is not organized?	- demonstration of counting marbles in figures by the researcher; - demonstration of counting marbles in figures using little papers; - individual practice.
Session 3: stable order, one-to-one correspondence, cardinality, abstraction and order irrelevance. - what can we count? - where do we begin to count?	-game board: “color game”; - game board: “two hands”.
Session 4: stable order, one-to-one correspondence, cardinality, abstraction and order irrelevance. - how can we count in our heads? - how can we organize numbers when we’ll count? - how can we find out what number is without knowing its name?	- bingo of numbers; - closing questions: (can you say one thing you learnt during the intervention? Which task was easy? Which task was difficult?).

Table 1: Intervention post adjustments

Conclusions

The pilot study was important and helpful for testing the initial version of the intervention program. It was possible to analyze the activities, structure and time planned to the intervention program and to make improvements culminating in its second version that was applied as an experimental study.

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