

# Programmable Toy Pro-bot in Early Childhood (logo language): examining the sense of pacing

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## PURPOSE OF THE STUDY

It has been observed that the understanding of the concept of programming requires appropriately designed teaching interventions. (Komis & Misirli, 2016). Because of its limited examination in Greek research community, this study attempts to investigate the concepts of preschool students concerning the numerical symbols and their relationship with the directional and orientation instructions for the pacing of the programmable Probot toy, but also to study any variations in the interpretation of the symbols after the completion of the didactic intervention.

## METHOD

### Sample

- 20 preschool students (16 boys and 4 girls, mean of age = 5 years) from schools in the Region of Western Greece.
- The "convenient" or "symptomatic" or "occasional" sampling was chosen, (Bhattacharjee, 2012, p. 69, Cohen, Manion & Morrison, 2008, p. 170; Creswell, 2009, p. 148; Robson, 2007, p. 314).

### Research tool

- Structured interviews with thirteen open-ended questions were taken place to evaluate pre and post participants' concepts.
- Drawings
- Didactic intervention – Educational scenario

### Analysis

- NVivo8 data quality analysis software

## Pro-bot (TTS Group)

The Pro-Bot (the "Big Brother" of Bee-Bot) car format, supported by a full numeric keypad, can follow the sequence of commands that have been entered by the user.. It supports structures and creates procedures and by touching sensor may implement the control structure.

It can be programmed by novice users both through the use of a computer and through the device itself. It has friendly interface and playful appearance. It focuses on STEM but may combine and other cognitive areas like Language and Arts.

## THEORETICAL FRAMEWORK

Based in the literature review about the integration of educational robotics two approaches are arisen as far as the educational kits concerned : the first is that they are used for the construction and function of the robotic system using the appropriate programming language and the second is that they are used as pre-constructed robotic systems using the appropriate programming language (Komis & Misirli, 2014). In addition, a well organized and systematic teaching intervention should be the dominant point on teaching programming (Pekarova, 2008) , and as a consequence the educational robotics can offer a developmentally appropriate educational context where various knowledge and competencies may be developed and enhanced (Komis & Misirli, 2016). In this way opportunities can be given to students attending multiple mathematically oriented activities (Highfield, 2010).

## RESULTS

### Pre intervention

Students' responses before the didactic intervention were divided into two categories. Children combined the numbers with the directional commands in two different ways.

- The 8 out of 20 participants attribute the use of number keys to the move of the programmable toy Pro- Bot, multiplying the move that the direction commands indicate with the symbol of the number.

- The majority of the participants (12/20)attribute the use of number keys in the acceleration of the programmable toy Pro- bot.

□ All of the students correlated the keys with numeric symbols with the change of pacing.

### Post intervention

After the didactic intervention the concepts of the children changed, as the 16 attribute the use of the numbers in the step parameterization and in the measurement of the length in centimeters. Also, 2 of them reported the use of it for the measure of time. One of them did not want to answer.

Moreover, it should be mentioned that gender or age was not a differentiating factor of the responses of the participants , as no deviations were observed in their responses.

## DISCUSSION

- ✓ Pro- bot consists a tool with cognitive potential for preschool students and specifically for the improvement of the interpretation of programming concepts and algorithmic thinking, as "Big Brother" of Bee- Bot. Through the involvement of students in an appropriate environment they can develop initial programming concepts (Komis & Misirli, 2014).
- ✓ The findings of the survey can be used to provide feedback on future research planning. Implementing an educational scenario for the detection of students concepts and the construction of cognitive learning about further use of parameterization for the measurement of time. And this can be the follow-up to expand this research.
- ✓ In this way the appropriate teaching activities illustrate and highlight programmable toy's functions and controls (Greff, 2005).
- ✓ The co-operation between researchers in the field of educational robotics and universities from countries around the world could render possible the exchange of experiences , valuable content for the creation of more appropriate didactic interventions.

## REFERENCES

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