Title

Investigating Cognitive Gain In A Logical Experiment

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Several researches have been performed in various domains of knowledge about learning differences between learners regarded as experts and those regarded as novices. In some previous researches, we have investigated the learning, area of interest of researchers involved with cognitive science and computer science (AbLi96, Lima96, Po&col02 and Ca&col02).

In [AbLi96], for example, we conducted an experiment to examine characteristics related to cognitive gains in problem solving and the criterion to decide if a logical reasoning used in the solution of a specific problem could be used by similarity for other classes of problems. A more theoretical contribution concerning logic theory and its learning is in [Lima96].

[Po&col02] examines mental-representation strategies applied to solve contextual problems involving mathematical calculus: the interest is centered on formal procedures, algorithms, and strategies that could be used by three groups of peoples: with specific mathematical knowledge (*the expert group*); without this knowledge (*the control group*); and without this specific knowledge but acquainted with the designed problem context (*the familiar group*).

[Ca&col02] investigates the human reasoning applied to the mathematical problem-resolution process: the approach is based on two main settings: *a.* the investigation of mental processes involved in the human reasoning applied to problem resolution; *b.* the analysis of differences in the categorization and resolution of mathematical problems by beginners and specialists

We are actually developing a new experiment involving the teaching of computational logic by a playful approach (Socratic situation involving logical reasoning). This experiment aims to verify cognitive gains in two learners groups: experts and novices.

By examining the logical sequenced steps done to solve a logical entertainment we intent to detect criteria of utilization of reasoning by absurd or probabilistic reasoning by these groups. The extended idea concerns in fact the identification of cognitive contexts able to improve rather the use of probabilistic reasoning than reasoning by absurd and vice-versa. Of course, in our experiment, it is assumed incontestably that experts solve complex problems considerably faster and more accurately than novices do. Those differences are commonplaces of everyday experience, yet only recently have we begun to understand what the expert does differently from the novice to account for this superiority. Nevertheless, some initial results of our investigation could be applied to the learning of computational logic. These results could be applied in an elaboration of ideal pedagogical guidelines in order to facilitate the utilization of a more appropriate kind of reasoning to solve a particular Socratic problem.

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