Developing logical thinking in computer science students – modelling the curriculum and teaching environment

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Abstract

Logical thinking is a cognitive ability that underpins the understanding of many hard sciences, computer science subjects, and the performance in the fields related to these subjects. It is a lack of consensus, however, as to what constitutes logical thinking, and whether the education system nurtures or hinders its development. If we can understand these aspects, maybe we can start improving the process of developing logical thinking in our students. This research is a qualitative study, using 12 semi-structured interviews with 13 questions, in total duration of 616 minutes, to investigate the perceptions of 5 female and 7 male teachers from three Romanian technical universities about the process of developing logical thinking of their students. The benefit of answering this research question is that we can learn how we could address the systemic gaps to increase the students’ performance in technical fields. The study takes an approach of analysis based on Uri Bronfenbrenner’s bioecological theory, to investigate themes from the micro and meso systems of Bronfenbrenner’s model. Two major themes were identified to answer the research questions, which identify systemic gaps on how logical thinking is mainly hindered in the child’s early development, arriving to college with insufficiently developed skills which make the learning exercise difficult. At the same time, the study identifies paths to improve the teaching of technical subjects, and the perception of needed abilities and traits in students applying for technical majors.

Keywords

Logical thinking. Teaching technical subjects. Teaching effectiveness. Student performance.