"SHOW ME WHAT YOU KNOW"

EXPLORING STUDENT REPRESENTATIONS ACROSS STEM DISCIPLINES

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CHAPTER 4

Students' Handling of Graphs at the University Level

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The general aim of our work is to analyze the way in which social science students read, interpret, produce, and use graphs with the implicit aim of being able to contribute to better teaching of these aspects. Within this field, the specific goal of the study we describe below was to investigate which factors have an influence on students' interpretation of graphs by means of a task whose objective is to relate data to different graphs.

Data graphs are one of the most frequently used external representation systems within social sciences. According to the evolutionary view of the development of the human mind presented by Donald (1991), representation systems that evolved after language became cultural artifacts necessary for the development of the theoretical mind. In our opinion, current external representation systems fulfill a function similar to that set out by Donald. In other words, these cultural systems are true thought amplifiers (Lévi-Strauss, 1963; Martí, 2003; Martí & Pozo, 2001; Olson, 1994) that contribute to the development of an expert or specialized mind, capable of interpreting or creating new meanings in the sense that they enable both communicative and epistemic functions. In this context, they "format" the minds of those designing, interpreting, or using them, restricting and giving meaning to different kinds of information (Olson, 1994; Pérez-Echeverría & Scheuer, 2009). Therefore, it is not surprising that different fields of knowledge can be characterized, at least in part, by the development of external representation systems that enable both the development of specific meanings and an efficient communication. Nonetheless, these functions are not evident. The specialization and specific development of these systems make most of the relationships among

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