# Chapter 19
# Enhancing Autonomy, Active Inquiry and Meaning Negotiation in Preschool Concept Mapping

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## ABSTRACT

*This chapter reports on a case study where a teacher, unfamiliar with Novak's concept mapping method, employed a personally custom designed Authoring Concept Mapping Kit for evaluating preschoolers' knowledge on big cats. The Kit provides drawing and voice-recording features which were designed under constructivist learning and user-centered design principles. In a single session these features enabled eleven five-year-olds to build a map with verbally-labeled symbols because they made their conceptual and propositional meanings explicit. With teacher guidance and despite the absence of arrows, mapping was possible: meanings were categorized, edited, revisited, retained, shared, and preserved. Such activities promoted active participation, knowledge organization and manipulation, and facilitated teacher instruction in a way that has seldom been reported for any approach currently employed in preschool concept mapping. Together these and other results from related studies showing use of arrows and hierarchy, support the assertion that with a tool of this type, preschoolers can use concept-mapping-related skills to structure knowledge individually and collaboratively.*

## INTRODUCTION

Underpinned by the work of researchers such as Vygotsky, Ausubel and McNamara, Novak theorized on the concept acquisition abilities of young children (two-and-a-half- to six-years-olds) and used anecdotes to explain how they acquired concepts such as "annoying", "underbrellas" [*sic*], and "grocery shopping". Through a discovery–reception learning process, involving the use of verbal language and/or concrete materials (toys, symbols), children show us how they integrate new knowledge into their cognitive structure (see chapter 4, Novak, 1998).

*Our research and more recent studies by many others in countries all over the world, has shown that*

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*young children learn quickly how to make good concept maps...' (Novak and Wandersee, 1990, as cited in Novak, 1998, p. 31)*

Novak offered theories, but has neither researched children's use of symbols when labeling concepts, nor their ability to make concept maps. I argue that the above claim is supported by his explanations of how people learn, informed comments on child development, informal observations of young children, and research results from using concept maps with early elementary age children (Gomez, c. 2008).

For more than two decades, a small but growing group of early childhood (EC) experts have reported on preschool concept mapping. Their interest has been driven by the underlying theories of concept maps, reported benefits with older children and adults, and Novak's claim that concepts can also be labeled with symbols such as + or %. Some of these experts have claimed that concept maps can help the development of learning-how-to-learn skills of preschool-age children and could be more powerful than guided conversations and drawings in the process of disclosing acquired knowledge. My doctoral study involved the investigation of an age-appropriate tool that allowed for the testing of such claims (see Gomez, 2006).

Of these EC experts, only Stice and Alvarez (1986) have reported on instructing concept mapping with Novak's template, as their preschool students were already literate. Others have reported on instructing concept mapping with an adapted template, as their preschool students were still illiterate (Badilla, 2004; Figueiredo, Lopes, Firmino, & Sousa, 2004; FOD, 2004a, 2004b; Mancinelli, Gentili, Priori, & Valitutti, 2004; Mancinelli & Guaglione, 2004; Mérida, 2001-2002, 2002; Pérez-Cabani, Falgas, Nadal, & Valenti, 1992). These teacher adaptations or symbol-based maps inspired in Novak's template present common attributes. Concepts are labeled with symbols (drawings, preset pictures or toys). When drawing on paper, concepts are still enclosed in boxes or circles. Two or more concepts are then connected with arrowhead or straight lines or woolen threads. Hierarchy is represented with visual aids: templates, color-coded threads, ordinal numbers, and/or boxes of different sizes. These options are all used to differentiate the most inclusive concepts from the more specific ones (Figueiredo, Lopes, Firmino, & Sousa, 2004; Mérida, 2002). Linking phrase meanings (e.g. have, can) are assigned to connecting lines (Pérez-Cabani, Falgas, Nadal, & Valenti, 1992) or to sections of the map (Figueiredo, Lopes, Firmino, & Sousa, 2004), but they are not explicitly instructed, as they cannot be represented with visual symbols. Only Mérida's adaptation (2001-2002;, 2002) allows for including linking phrases. Children are interviewed to elicit the meaning of a drawing, which is then teacher-annotated with handwriting next to its corresponding drawing. The annotated meaning usually stands for a proposition and the linking phrase is represented as part of it. The annotations of Mancinelli et al. (2004), usually placed in one corner of the child's drawing, represent propositions. Cross-links are not visible in any of these map adaptations. More details in the literature reviews of Birbili (2006) and Gomez (2005b).

When concept mapping with the adaptations described here, teachers' objective "appears to be the stimulation of children's critical thinking skills as well as the social interactions among peers" (Gomez, 2006, p. 33). Through verbal language and guided conversations with teachers, children establish relations between symbols (Figueiredo, Lopes, Firmino, & Sousa, 2004; Mancinelli, Gentili, Priori, & Valitutti, 2004; Mérida, 2002). The educational value of these approaches cannot be denied. One way or another, they have allowed students to develop cognitive skills relevant to concept mapping-related activities: representing and manipulating abstract concepts with symbols, organizing concepts hierarchically, and line-connecting concepts to establish relationships among them. These outcomes are relevant when