

**Issues in Preschool Concept Mapping: An Interaction Design  
Perspective**

(Under examination)

**Gloria Gomez**

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## **Abstract**

Joseph D. Novak claimed that young children could quickly learn to make concept maps which are a knowledge representation tool for promoting meaningful learning. He supports this untested claim with theoretical accounts showing human skills for concept mapping are developed by age 3. This doctoral research investigated Novak's claim. It contributes to the areas of early childhood education, concept mapping, and interaction design.

An analysis of literature across disciplines showed that making knowledge explicit with a concept map requires representational and cognitive skills that young children have not yet mastered: concept labelling and organisation with written language and hierarchy. The poor performance of these skills with mapping tools currently used in preschool has led experts to state that young children cannot build Novak's concept maps.

To investigate these issues in the classroom a Bridging Design Prototype (BDP) was developed with structuring features that: 1) promoted children to label knowledge with verbal and/or symbolic language, and 2) scaffolded children's control over the cognitive skills needed for organising such knowledge. The BDP method is original to this research and grounded in constructivist learning and user-centred design principles.

Case studies were performed in two preschools where 4.6- to 6-year olds alone, with peers, and/or teachers, used the BDP to represent concepts and propositions with verbally-labelled symbols. In turn, these symbols were mapped in the following ways: 1) organised in a sequential pattern with arrows, clusters and/or hierarchically, 2) edited, revisited and shared. Teacher instruction was found to be effective when it promoted student autonomy, and ineffective when student participation was heavily mediated.

Child autonomy during these activities promoted active inquiry, meaning negotiation, and transformed teachers into partners, which are concept mapping-related interactions rarely reported in preschool. Finally, the active participation of children at different developmental stages (preliterate, emergent writers and special needs children) is further evidence of the inclusive and scaffolding features of this tool.

The research outcomes show that preschool children can represent and manipulate the constitutive elements of a concept map with suitably designed authoring tools, despite that Novak's strategy was not instructed due to teacher preferences. While modest, these outcomes are promising, considering interactions with the BDP were limited to one session of less than 50 minutes. They show that investigation of educational issues from a design perspective can lead to development of instructional tools that promote innovation in the classroom