Chapter 1
High Order of Conceptual Thinking: Find the Equivalence of Meaning

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ABSTRACT

This chapter describe a novel pedagogy for conceptual thinking and peer cooperation with meaning equivalence reusable learning objects (MERLO) that enhances higher-order thinking; it deepens comprehension of conceptual content and improves learning outcomes. The evolution of this instructional methodology follows insights from recent developments: analysis of patterns of evolving concepts in human experience that led to the emergence of concept science, development of digital information, research in neuroscience and brain imaging showing that exposure of learners to multi-semiotic problems enhance cognitive control of inter-hemispheric attentional processing in the lateral brain, and increase higher-order thinking. The research on peer cooperation and indirect reciprocity document the motivational effect of being observed, a psychological imperative that motivates individuals to cooperate and to contribute to better common knowledge. Teaching courses in History and Theory of Architecture to young architecture students with pedagogy for conceptual thinking enhance higher-order thinking, deepen comprehension of conceptual content, and improve learning outcomes; it allows one to connect analysis of historic artifact, identify pattern of design ideas extracted from the precedent, and transfer concepts of good design into the individual’s creative design process.

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INTRODUCTION

Higher Order Of Thinking With Meaning Equivalence Reusable Learning Objects (Merlo)

‘...In all matters, but particularly in architecture, there are these two points: the thing signified, and that which gives it its significance. That which is signified is the subject of which we may be speaking; and that which gives significance is a demonstration on scientific principles. It appears, then, that one who professes himself an architect should be well versed in both directions. He ought, therefore, to be both naturally gifted and amenable to instruction.’


The main goal of this chapter is to describe innovative way of teaching and learning architecture with pedagogy for conceptual thinking that focus learners’ attention on conceptual meaning of form, and enhance learning outcomes from understanding concepts extracted from architecture precedent into design. This chapter discuss the specifics of teaching architecture with Meaning Equivalence Reusable Learning Objects (MERLO), and describes pedagogy for conceptual thinking as applied in study of architecture and peer cooperation that enhance higher-order thinking, deepen comprehension of conceptual content, and enrich interactive learning processes that lead to better understanding of principles and can be then applied in the field of architecture (Shafrir & Etkind, 2018; Etkind, Kenett, & Shafrir, 2016; Shafrir & Kenett, 2016; Shafrir, Etkind, & Treviranus, 2006; Ripley, Etkind, & Shafrir, 2004).

MERLO is a multi-dimensional database that allows the sorting and mapping of important concepts through multi-semiotic representations in multiple sign systems, including: exemplary target statements of particular conceptual situations, and relevant other statements. Each node of MERLO database is an item family that includes five statements: one Target Statement (TS) that describes a conceptual situation and encodes different features of an important concept; and 4 other statements that are sorted by two sorting criteria:

- Shared equivalence-of-meaning with TS.
- Shared surface similarity with TS.

Figure 1 is a template for constructing an item family anchored in a single target statement (TS). Statements populating the four quadrants of the template in Figure 1, namely, Q1; Q2; Q3; Q4; are thematically sorted by their relation to TS. For
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