An Integrated Model of Reflective Thinking for Learning and Solving Design Problems

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Design tasks are ubiquitous in our everyday life. Most of design problems are ill-structured and complex to solve. Based on the previous research, facilitating designers' reflective thinking is a means to develop expertise in solving design problems. Related research has attempted to capture designers' reflective thinking process. Yet, reflective thinking is hardly observed. Its dynamic nature makes it difficult to capture and interpret, which leads to the under investigation of the explicit impact of reflective thinking on design performance. To empower full capacity of reflective practice, we have developed a model to direct educators in examining and facilitating designer's reflective practice in solving real-world design problems. This model uses three dimensions to guide the understanding of designer's reflective thinking. The first dimension, the points of reflection, is used to identify the timing that reflective thinking occurs during a design process. The recognition of the points of reflection can be analyzed with the design activities in an attempt to capture the evidence of designers' iterative design behaviors, which will further enable researchers to identify the designer's approach of design process. Two design approaches are summarized from the existing literature: problem-driven and solution-driven approaches. The second dimension, the objects of reflection, shows different types of objects that designers may reflect upon during a design process. Three types of objects include reflection upon self, reflection upon artifacts, and reflection upon circumstances. The third dimension in this model represents the quality of designer's reflection. The function of this dimension is designed to examine the depth of each reflection points. The different levels of reflection are: single-loop, double-loop, and triple-loop reflective thinking. To conclude, this framework aims to provide essential aspects of reflective thinking situated in the design process, which can be an important foundation for further research on reflective thinking in design tasks. Furthermore, this framework can guide educators to design appropriate instructional strategies as well as learning environments for facilitating novice designer's reflective thinking in an effort to improve their design performance.

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