INVESTIGATING THE CONTRIBUTION OF ANALYSIS PATTERNS TO THE PROCESS AND PRODUCTS OF OBJECT MODELING

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INVESTIGATING THE CONTRIBUTION OF ANALYSIS PATTERNS TO THE PROCESS AND PRODUCTS OF OBJECT MODELING
研究分析模式對物件建模過程和結果的作用

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Abstract

Numerous controls and testing at design level have been introduced to guarantee the success of a software project; however, the major reasons behind software project failures and reworks are attributed to inaccurate or incomplete information requirements gathered during the system analysis phase. Overall quality of requirements captured in the early phases of system development contributes significantly to the project success. Object models are considered as important artifacts that represent requirements resulting from object-oriented analysis (OOA).

Although several guidelines are available for object modeling, developing quality object models has always been considered a challenging task. This research aims to investigate the role of analysis patterns in providing assistance to novice analysts for improved performance and quality of object modeling. The research approach considers both the technical and the behavioral aspects of object modeling. For the technical aspect, an analysis patterns module is built as an extension to an open source CASE tool. This extension is used to assist system analysts by offering guidance in using analysis patterns while creating object models. For the behavioral aspect, the research model presented by Batra et al. (1990) is used as the guiding framework for studying the relationship between pattern-based object modeling and the overall analysts’ performance.

Laboratory experiments with two groups were conducted to investigate the contribution of the object-oriented analysis patterns (OOAP) to the quality of ensuing object models. The performance of novice analysts in completing the modeling task was also compared. Questionnaires were used to collect the data regarding the perception of the participants.
on the modeling approach from the two experimental groups. Finally, follow-up interviews were conducted to triangulate those earlier findings and also to provide an in-depth understanding of object modeling process using analysis patterns.

The quality of object models created by the participants was analyzed using the conceptual quality framework proposed by Lindland et al. (1994). The results indicate that novice analysts with the help of OOAP performed faster and produced better overall quality object models. The differences were significant in both the semantic and pragmatic quality of object models. There was no significant difference in the perception of participants belonging to the treatment and control groups; this indicates that using OOAP does not cause any hindrance to the modeling process. The data collected from the interview provide further insights into the benefits of OOAP in identifying missing classes, associations and aggregations.

The results from this research have important research and practical contributions to both teaching and industry. The superior semantic quality confirms the role of analysis patterns in identifying missing elements and invalid relationship multiplicities. Thus, incorporating pattern-based support into CASE tools can be valuable in helping novice analysts in the development of more complete and valid object models. Further, this study provides clues about common errors committed by novice systems analysts in business object modeling. The results, therefore, can also be employed to address difficulties in teaching and learning object modeling.

*Keywords:* Analysis Patterns, CASE Tool Support, Conceptual Modeling, Object-oriented Analysis, Quality of object models
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