An Empirical Investigation of the Effectiveness of Object-Oriented Database Design

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This study investigated, in an experimental setting, the understanding and use of object-oriented database design concepts in designing databases. There are many varieties of object-oriented database design techniques and we chose the methodology suggested by Kroenke (1988) for use in the class. This method is expected to simplify the development of database and database applications tremendously (Kroenke, 1988). Through the market for object-oriented database systems is growing, a survey of the literature (in 1992) revealed no empirical investigation of the usefulness of object-oriented database design concepts in organizations or in classrooms.

The students were taught Kroenke’s object oriented database design method using classroom instruction and a project. After completion of the project, the students completed a questionnaire to evaluate the effectiveness of the object-oriented database design concepts. Fifteen statements obtained responses for the following research questions.

- **Need for database design**: Is the database design a practical idea?
- **Need for object-oriented design**: Do the objects provide clear conceptual ideas for database design?
- **Need to normalize**: Is the concept of normalization useful and powerful?
- **Need for DK/NF relations**: Is the transformation of object to DK/NF relations easy and helpful?

Of the 38 respondents, nearly 47 percent were male with 67 percent being in their twenties. Fifty-one percent were female with 84 percent being in their twenties. Educationally, almost 70 percent of the students were undergraduates and nearly 30 percent were graduate students. About 78 percent were in the MIS program. A software package called, “STATGRAPHICS” was used to analyze the responses of students. The means and variances for each statement were calculated. Pearson’s correlation analysis was also performed to find out the degree of correlation within the statements in each research question. This helped establish whether the students responded consistently.

The results of the survey suggested that the students were convinced of the need for database design. They valued object-oriented database design method as expressing the ideas of potential users’ needs and did not find it clumsy to use. They perceived the concept of normalized relations to be powerful. This reflected a change in their behavior, since in earlier projects the student had not normalized their files.

Though they perceived the advantage of objects and normalization, they had difficulty in transformation of objects to relations in DK/NF form. This showed that the transformation process of objects to normalized relations is difficult and needs to be improved. The transformation methodology explained in Kroenke’s book also got a low rating. Based on this study, further surveys were planned with the respondents being database designers in companies.

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