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Andrew Gemino
University of British Columbia

Yair Wand
University of British Columbia

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EMPIRICAL COMPARISON OF OBJECT-ORIENTED
AND DATAFLOW MODELS

Andrew Gemino
Yair Wand
University of British Columbia

The relative performance of alternative system analysis modeling techniques is an important consideration in the adoption of system analysis methods in organizations. Proponents of object-oriented analysis techniques have argued that object-oriented methods are capable of improved performance in systems analysis due to the method's more natural fit with human cognition in comparison with traditional system analysis modeling techniques such as dataflow diagraming (Booch 1991; Coad and Yourdon 1991; Jacobson et al. 1995). Little empirical evidence to date has been provided to support claims of superior performance from object-oriented techniques. Instead, empirical research has revealed that novice analysts seem to prefer dataflow techniques over object-oriented techniques (Vessey and Conger 1994; Wand et al. 1997).

Based on Mayer's (1989) experiments on the learning process and model of human information processing and Bunge's (1977) theory of ontology, an argument is provided that leads to the prediction that analysis techniques based on the object model will provide novice analysts with a better understanding of a business domain than will techniques based on dataflows. A multi-case experiment is currently being conducted to test this prediction.

The experiment provides each participant with one of three possible representations of a business domain: either a text description, an object-oriented diagram, or a dataflow diagram. Two types of participants who have attained some knowledge of system analysis techniques have been recruited. One type has taken a course on dataflow and object-oriented diagraming or have previously used these techniques. The other participant type has no formal experience with system analysis methods. After a pretest which captures domain and system analysis modeling experience, participants complete a series of three tests. A comprehension test asks questions directly provided in the description, a problem solving test asks questions that require participants to infer answers from information they have received, and a Cloze test (Taylor 1953) asks participants to fill in the blanks created in a text description of the domain. As a final measure, participants are asked to complete a questionnaire based on the ease of use scale developed by Moore and Benbasat (1991). Over 90 subjects have participated in the study to date.

Preliminary evidence has shown support for the predictions made above. In the comparisons of text, dataflow diagrams (DFD), and object-oriented diagrams (OOD), participants provided with either OOD or DFD outperform participants provided with full text descriptions in comprehension tests. OOD subjects significantly outperform DFD subjects in problem solving tasks, and participants viewing text descriptions outperform both OOD and DFD subjects in Cloze tests. Interestingly, subjects given OODs score lowest in ease-of-use while scoring highest in problem solving and comprehension.

If the predictions made in this study are confirmed, it will have provided some empirical evidence to support the ontological theory of information systems as proposed by Wand and Weber (1993). Further, evidence of the superior relative performance of the object model over dataflow diagram in developing understanding of a business domain, at least in simple cases, may also be provided.

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