

# Teaching Query Writing: An Informed Instruction Approach

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## ABSTRACT

This paper is intended for those instructors asked to teach an undergraduate introductory class on SQL query writing, which is usually difficult for students to learn. After reading Bruer's *Schools for Thought* [1], we realized that we need to modify our approach so that it uses *informed* instruction (instead of *traditional* instruction) and since have noticed improvements in student performance in SQL query writing.

The following is a paraphrase of Bruer's discussion of *traditional* instruction: The learner (T1) watches the instructor demonstrate the strategy and (T2) is then permitted to practice the strategy, (T3) while not being given an explanation as to why the strategy worked. Finally, (T4) the learner is not given feedback on their performance when they practiced with the strategy.

Where *informed* instruction (again, a paraphrase of Bruer's work) includes: The learner (T1) watches the instructor demonstrate the strategy, and (T2) is then permitted to practice the strategy and (I3) is given immediate feedback on how successful they were when using it. Finally, the learner is told (I4) why the strategy works and is told (I5) when to apply the strategy. Parts T3 and T4 are replaced by I3, I4, and I5.

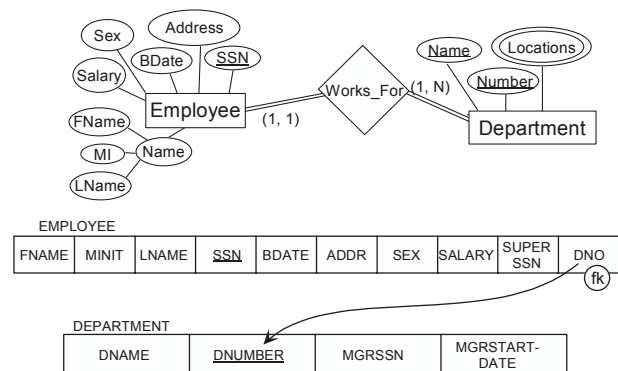
Number I3 (getting immediate feedback) has recently been addressed through the development of software tools that aid the student when writing a query, e.g., "Animated Database Courseware" (ADbC) [3].

Points I4 and I5 (i.e., telling the learner "when" and "why") have to do with developing metacognitive skills in the learner which aid the learner in spontaneously applying a strategy to new situations, and are the focus of this paper.

Supporting *informed* instruction, requires instructing the learner when and why to apply a strategy. For SQL query writing, we contend this "when and why" comes from the data model. However, in many database textbooks [2] data modeling (e.g., ER diagrams, schemas, relational algebra, etc.) and SQL query writing appear in separate chapters. There is often little (if any) connection made between the chapters covering SQL query writing and the chapters covering data modeling.

Example query: *List the last name and address of all employees who work for the Software department.* For experienced database

people who have access to, and understand the data modeling diagrams [2] (shown below), it is obvious that the relationship between these two tables is a 1:N relationship and that we need to do an EquiJoin between EMPLOYEE.DNO and DEPARTMENT.DNUMBER.



But students trained using the *traditional* (un-informed) instruction method have not been introduced to, nor do they have an understanding of this underlying data model, and therefore have a more difficult time solving the query.

Our recommendation, make use of *informed* instruction and use the data model information when teaching SQL query writing.

## Categories and Subject Descriptors

K.3.2 [Computers and Education]: Computer and Information Science Education; K.3.1 [Computers and Education]: Computer Uses in Education

## General Terms

Design

## REFERENCES

- [1] Bruer, J., *Schools for Thought, A Science for Learning in the Classroom*, MIT Press, 1993.
- [2] Elmasri, R., Navathe, S., *Fundamentals of Database Systems, 5<sup>th</sup> Edition*, Pearson-Addison Wesley, 2007.
- [3] Murray, M. and Guimaraes, M., "Expanding the database curriculum", *J. Comput. Small Coll.* 23, 3 (1/08), 69-75.