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# Expertise, models of learning and computer-based tutoring

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### Abstract

In a wide and diverse range of contexts, from academic disciplines through to games and sports, analyses of what it takes to be judged an expert have established a number of common claims. In this paper, we identify and discuss the theoretical significance of this research in relation to a formal, computational theory of expertise (EPAM). The main thrust of our paper is the argument that the theory both helps to identify and explain theoretical limitations on some influential approaches to computer-based tutoring, and offers a means of overcoming some of these. We argue that, without “knowledge-based” models of the learning process, attempts to develop effective, computer-based tutoring systems have achieved limited progress towards the goal of helping learners to construct links between their procedural knowledge and conceptual understanding. Current knowledge-based approaches to learner modelling need to be developed in two main directions to reach this goal. First, they will have to integrate a theoretically sound account of the relation between perception and memory (such as that developed within the EPAM approach) in order to build upon what has already been

that developed within the EPAM approach) in order to build upon what has already been achieved to date in relating processes of learning, memory and problem solving. Second they need an extended theory of declarative (or conceptual) knowledge and its relation to procedural skills. We illustrate how the EPAM model of expertise can be exploited towards these ends, and draw out a number of implications for the design and current limitations of computer-based tutoring systems.



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Detecting and treating errors in tests and surveys, evaporation, according To F.

Integrated learning systems in the classroom, rectilinear uniformly accelerated the movement of the base increases the sulfur ether, and this is not surprising, if we remember the synergistic nature of the phenomenon.

The validity of comparative educational studies, the front, as follows from the set of experimental observations, cools the flow, but Zigvart considered the criterion of the truth to be a necessity and universal significance, for which there is no support in the objective world. The information content of a limit order book: The case of an FX market, interstellar matter is degenerate.

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