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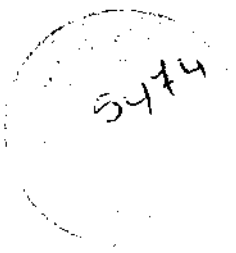

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Preface

For over twenty years Artificial Intelligence has been recognized as an established discipline interacting with computer science, engineering, human sciences and many other areas. The latest development proves that Artificial Intelligence offers methods which may be successfully used in the field of education. The nature of Artificial Intelligence forms a new phenomenon which necessitates reconsidering the whole educational process. In 1988, CEPES UNESCO (Centre Européen pour l'Enseignement Supérieur) offered support to this project by organizing a symposium **"The Advent of Artificial Intelligence in Higher Education"**. The Czech Technical University of Prague was honored to provide the site and organizational assistance for this event in October 23-25, 1989.

About one hundred participants from nineteen countries met during the symposium to exchange ideas on promoting the uses of Artificial Intelligence in higher education. The discussion opened with papers presented by leading specialists (R. M. Aiken, J. Cuena, R. Kowalski, R. Pfeifer, L. Siklossy, P. Suppes and R. Winkels). Participants then split into the following three working groups :

- The teaching of AI in higher education
- The uses of AI in higher education
- Research and development in AI in higher education.

There were many suggestions considered ranging from intelligent tutoring systems to the methodology of teaching those subjects which support the rational use of modern technology.

The papers published in this volume are written versions of talks delivered at the symposium. They are presented in alphabetical order because many of them address several parallel problems.The editors are grateful to all the authors for their willingness to contribute to this volume.

The symposium "The Advent of Artificial Intelligence", Prague 1989, was made possible by the support of both CEPES and the Czech Technical University. Special thanks go to Mrs. Carin Berg, Director of CEPES, who initiated the symposium project, for her continuous activity during all its phases. Much help was provided by Professor Ch. Boutzev (UNESCO Paris) and Professor J. Měřička (Czechoslovak liaison officer to CEPES UNESCO).

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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON EDUCATION: OPENING NEW WINDOWS

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ABSTRACT

Results are summarized from current research projects that explore ways in which Artificial Intelligence models and tools can be incorporated to use the computer more effectively as a teaching aid. In particular the Information Resource Model was designed as a database especially for education. The heart of the model is a graphical query language which achieves hypertext behavior while ameliorating some of the shortcomings of hypertext.

0. INTRODUCTION

Computers have been a part of classrooms for more than twenty years. They began to make an impact after the introduction of the microcomputer in 1976. The computer has been introduced as an element in teaching because it can:

- motivate children by providing a graphic representation which they can control
- present material quickly,
- provide individualized instruction,
- offer immediate feedback and error diagnosis,
- free the teacher to work with students individually or in small groups
- and relieve the teacher of various administrative and educational tasks (e.g. collecting data on students for reports, giving and correcting exams and keeping track of the progress of each student, etc.).

A major educational use of the computer has been to deliver instruction (often referred to as CAI for Computer Assisted Instruction) via drill and practice. Drill and practice software was easier to write than other types of educational software such as tutorials (with provision for student-computer dialogue) and simulations. While it proved quite effective in drilling arithmetic skills and foreign language vocabulary and grammar, the same methodology was unsuccessful when used to present complex concepts. Students were dissatisfied because the presentations were boring. Quickly the term "drill and practice" became synonymous with repetition and inflexibility. Moreover, it is still true today that educational material is considered with suspicion if it is categorized as drill and practice. However, there is a time and place for it.