The Encyclopaedia of Educational Media Communications and Technology

SECOND EDITION

EDITED BY

DERICK UNWIN AND
RAY McALEESE

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Foreword by Geoffrey Hubbard

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Foreword

The Foreword to a wide-ranging conspectus, such as is contained in this volume, is an opportunity to cast an eye both backwards and forwards; to see how far we have come, and to look more keenly at where we might be going. But who are "we"? It is perhaps desirable to start off by saying for whom I write, and who I expect to be the readers of this volume.

The list of contributors is of course deceptive in this regard. They are all highly experienced specialists in their respective fields and, unless the publishers are showing an unusual degree of unworldliness, that is not the class to which they hope to sell: there are not enough of them and they are nearly all on the Contributors list. No, the target audience is much wider and more general; it is all those in teaching and training who are interested in how people learn and how we help them to learn—and that should be all teachers and trainers—and all those whose decisions affect education and training.

The backward look first. Where have we come from and where have we got to? We have come out of the application of audiovisual aids and in many respects we have not, for all the research and all the hard work, got very far. Look, for example, at the place of educational broadcasting today. The quality of the programs generated by the major educational broadcasters is first-class: first-class radio and television and first-class support material for any teacher prepared to take advantage of it. But the extent to which it is used is a continual disappointment. Or, look at the overhead projector—it fits in with the existing teaching style, simply replacing the blackboard with a cleaner and clearer presentational device which enables the expositor to continue to face his audience while pointing to the screen. Yet at two recent international conferences I have seen one presenter put up screens full of typescript which were totally unreadable in the forward rows of the audience, and another turn his back to the audience in order to point with a very long stick at the words on the screen.

There is, however, another aspect of educational technology which I sense has had an impact. It has little to do with equipment; it is the development of ideas about the context in which people learn, the exploration of resource-based and independent learning and of open and distant learning. It seems to me that minds are very much more open to new approaches than they were ten or fifteen years ago, and this of course is infinitely more encouraging than any mere adoption of an aid or technique. It supports the line always taken by the professional educational technologist, that it is only by changing the system that we get significant results; aids prop up existing practices.

This is a matter of some significance when we look to the future. It is now a commonplace to observe that we are in a period of rapid and far-reaching change, resulting from the impact of information technology. It is not just a case of being over-impressed by clever machines; there are characteristics of information technology that make it a most powerful agent of change. First, it is a technology which is miserly in its use of energy, material, and human effort. Second, it is still in its infancy, with the power of devices doubling every two years or so, and costs falling at the same rate. Third, it promises to change our developed economies by making information the most significant traded commodity, and as Anthony Smith has pointed out, information is the only commodity which you still possess after you have sold it to somebody else.

We are, then, embarking on a period of extensive social and economic change, whether planned or adventitious. In looking forward we must ask what needs these times will throw up, what demands will be imposed on the education and training system, and only then how the system can meet those needs and demands. I believe that an effective member of society in the coming decade will be the sort of person we would describe today as the product of a balanced education. He should possess a range of skills in communication and coordination which will enable him to function effectively in a complex environment, have the ability to make moral and aesthetic judgments against internal standards, be self-motivating, a problem solver, yet sensitive, caring, and altruistic. Today, however, we set this paragon up as an ideal, and turn out something rather different. My suspicion is that the future may actually require that we do something about it, and that the social and economic consequences of not so doing may be very serious.

Another factor of some significance is that this very same technology, which is changing society and which offers interesting and powerful methods to education—the ability to make the material really responsive to the student—also extends the capacity of the student to sidestep the institutional system. The electronic systems which will be extended to us so that we may buy goods and services will also enable us to explore extensive sources of information and to take up opportunities to learn; there will be plenty willing to offer the opportunities commercially.

Therefore, if we believe that the professional has something of value to offer, it behooves us to reshape the institutions of education to take advantage of the new technologies and to meet the challenges they pose. That is why it is encouraging that it is ideas that have had an impact rather than equipment. If it seems today that the developments in education are in danger of being equipment-led, we should recognize that this particular demon has already been let loose; it is our world that is being driven by it. Education and training cannot stand aside unless they are prepared to find themselves in a siding. What we have to do is to understand and apply the developments in a sound educational context.

This volume shows that there is plenty of work going on to that end: plenty, but by no means too much. Traditionally, education and training have been conservative, willing to tolerate much in the way of experiment but slow to adopt new methods. In our accelerated modern timescale, we may have to be more adventurous.

Geoffrey Hubbard

Preface to the Second Edition

It is now eight years since the first edition of *EEMCAT* went to press. The march of technology has been more than impressive during this period: nowhere in the first edition was there any suggestion that cheap ubiquitous microcomputers were soon to provide all-purpose adaptive teaching machines, thus belatedly fulfilling one of the cherished dreams of the 1960s teaching machine enthusiasts. Of course it is not the function of *EEMCAT* contributors to devote much space to crystal-balling; the work is intended as a description of what *is,* and only to a modest extent what *might be*. Clearly the educational world as a whole was taken by surprise with regard to the implications of developments in electronics, particularly advances in microprocessor technology and in video storage and retrieval.

Not only are many modern devices inexpensive in real terms, they also offer a magnificent degree of flexibility to educational designers and practitioners. Thus far this has not been an unmixed blessing: the virility of the theory and practice of learning materials design is revealed to be less than adequate for the new situation; educators have long complained of being restrained by the inadequacies of available hardware; we are now finding that a lack of imagination can also be a serious impediment to the evolution of exciting and effective teaching materials.

EEMCAT has been subject to massive changes to accommodate these new thrusts and concerns of education. In addition to major rewriting of all substantial entries found in the first edition, some 34 major entries did not appear the first time around. In nearly every case the omission was because of either nonexistence or minimal importance as perceived in 1977–1978. All these new areas have in turn generated a pervasive jargon of their own, and this is reflected in a radical increase in the number of shorter definition-type "micro-entries" in *EEMCAT2*. No attempt, however, has been made to compete with the various authoritative dictionaries covering such fields as satellite technology, computers, photography, communications, and so on. Rather it has been our policy to identify and include only those terms which are likely to be specifically encountered in an educational context; this of course has not been easy and it is left to the readership to assess how well we have exercised our judgment.

A number of the earlier entries have been omitted on this occasion; for example, virtually all statistical definitions (product-moment correlation, variance, etc.) have been discarded: there is a plethora of readily available texts explaining such items. In spite of this trimming, the micro-entry category now contains around 1,800 entries, as against less than 900 previously.

Probably the most crucial question confronting educators today relates to the fundamental organization of educational systems. The sorts of developments in media and technology that are chronicled in *EEMCAT* suggest with irresistible force that there is no longer a clear and obvious necessity for centralized learning, at least to anything like the extent that we are accustomed to. That is, for much of the formal curriculum it is becoming at best pointless, not to mention economically foolish, to bring students together for institutionalized learning. In fact, changes in education in the coming years will inevitably be dictated by economic and political factors arising out of advancing technology, and these changes are unlikely to be restricted to minor elements of adjustment to existing structures.

Thus this second edition of *EEMCAT* will mark a watershed, dividing the past when media and technology were grafted onto an essentially unchanging pattern of education, from the future wherein learning will chiefly be implemented by new delivery systems owing little to past practice. Educators seem destined, in the words of the old curse, "to live in interesting times."

Derick Unwin
Brisbane, Queensland, Australia
August 1987

From the Preface to the First Edition

The fields embraced by the title of this work are of interest to a very wide range of professional and technical personnel. In the nature of things, few if any workers will have more than a passing acquaintance with the complete range of subjects. That is to say, most of us operate within quite specific operational areas, but nonetheless we frequently need access to information and detail relating to some other topic. The present writer, in the capacity of teacher and researcher, was often reminded of this need, and not infrequently felt irritation at the large number of sources which might have to be consulted to supply the wanted information.

Thus was born the concept of a comprehensive ref-erence book, an encyclopaedia, which could hopefully provide within one volume material which otherwise was widely scattered and consequently difficult to alight upon. This grand design has been gestating for several years, and, as is the way with such worthy intentions, no doubt in its present edition suffers from omissions and shortcomings. It is hoped that the readership will actively communicate with the editorial staff regarding any suggestions for future improvement.

Derick Unwin
April 1977

Macro-Entries

Extended entries are provided on the following topics:

Artificial Intelligence

Assessment

Audio Instruction

Audiovisual Media

Authoring Languages for Computer-Assisted Instruction

Communication Engineering

Communication Satellites

Component Resources

Computer-Assisted Instruction

Copyright (U.K.)

Copyright (U.S.)

Cost-Effectiveness

Course Design

Curriculum Design

Curriculum Theory

Delphi Technique

Developing Countries

Distance Education

Educational Broadcasting

Educational Cybernetics

Educational Innovation

Educational Research Methodology

Evaluation

Evaluation, Naturalistic

Expert Systems

Graphic Design

History of Educational Technology

Holography

Individualization of Instruction

Information Classification and Retrieval

Information Systems for Education

Information Technology

Interactive Video

Language Laboratory

Learning Environment

Media Classification

Medical Education

Microcomputers in Education

Microforms

Military Training

Motivational Design

New Technology and Education

Open University

Orthography

Photocopying and Duplicating

Photography

Programmed Learning

Resource-Based Learning

Simulation and Gaming

Standards in Audiovisual Technology

Symbionics

Teaching Machines

Team Teaching

Telesoftware

Teletext

Television, Educational and Instructional

Textbook Design

Training Technology

UNESCO

Video Recording and Reproduction

Viewdata

Visual Literacy

THE ENCYCLOPAEDIA
OF EDUCATIONAL
MEDIA COMMUNICATIONS
AND TECHNOLOGY

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A

AASL. *See* **American Association of School Librarians.**

ABBREVIATIONS. *See* **Acronyms.**

ABC. (1) American Broadcasting Companies: one of the major U.S. broadcasting organizations. (2) *See* **Australian Broadcasting Corporation.**

ABERRATION. A deficiency of lenses which inevitably are imperfect to some degree. The use of multiple elements in a lens can greatly reduce but never eliminate aberrations. The effect of aberration is to degrade the quality of the image.

ABILITY GROUPING. An experimental design technique where subjects are grouped by ability. A program of heterogeneous grouping such that students are selected for educational provision by tests which measure their general or specialized scholastic ability. As only the intellectual aspect of the subjects can be ascertained, there can be wide variation due to external circumstances.

ACADEMIC GAME. Any game that has a specific educational application can be called an academic game. In the terminology of simulation and games a game is distinguished from a simulation by whether it is possible to have winners and losers; that is to say, an academic game has an element of competition not inherent in the real-life situation. Many such games are primarily intended for formal classroom use, but others such as Scrabble can be termed academic games with equal validity.

ACCELERATED MOTION. Means whereby movement in a film takes place at greater speed than it did in reality; opposite of slow motion.

ACCELERATED SPEECH. *See* **Time-Compressed Speech.**

ACCENTUATED CONTRAST. In facsimile, a method of operation whereby all picture elements having a luminance exceeding an intermediate reference level are transmitted as white; those having a luminance level less than the reference are transmitted as black.

ACCESS TIME. In microcomputer hard-disk specifications, the average time it takes for the disk drive to find and read from or write to any selected spot on the disk. Access times vary in the approximate range of 20–100 milliseconds.

More generally, the time that elapses between the instant the control unit calls for a transfer of data to or from a store and the instant this operation is completed. Also the delay encountered when a computer terminal is used for on-line operations as in computer-assisted learning.

ACCUMULATOR. A computer term used to describe a register or a specific storage location in which arithmetic or logical results can be accumulated.

ACE. *See* **American Council on Education.**

ACETATE. Cellulose acetate is a transparent material used for film stock and for overhead transparencies and animation cells. Cellulose nitrate was originally used as a base for movie film, but its highly inflammable nature represented a major fire hazard. With the introduction of the 16mm gauge in 1923 Kodak produced a ''safety'' film using cellulose acetate. Since 1951 all movie film has been made of cellulose triacetate, which combines noninflammability with the dimensional stability of the nitrate base.

ACHIEVEMENT, ASSESSMENT OF. The technique associated with measuring an individual's achievement against a specific achievement standard (norm), e.g., achievement tests (tests covering areas of academic performance). In experimental programs, it is very difficult to attribute a subject's achievement solely to the experimental variable.

ACHROMATIC. This specialized term is applied to lenses which have been designed with a combination of optical glass types which enable the focal points of dif-

ferent colors of light being transmitted to be brought together in one place, usually the plane of the film being used. Simple lenses do not provide this combining power and are said to suffer from "chromatic aberration." *See* **Apochromat.**

ACOUSTIC COUPLER. A modem-like device which converts data sent from a computer into audible tones which can then be transmitted over normal telephone lines. At the other end of the transmission line another coupler will convert these tones into signals which can be received by a computer or terminal. The coupler is typically the size of a shoe box onto which a conventional telephone handset is mounted. Normally the coupler is used to connect a computer to a computer or a terminal to a computer. In all cases both ends of the transmission line must be equipped with an acoustic coupler.

ACOUSTIC FEEDBACK. *See* **Feedback.**

ACOUSTICS. All those conditions of a given environment which affect the character of sound produced, recorded, or reproduced in it. *See* **Learning Environment.**

ACQUIRED RESPONSES. Behavior primarily learned through experience as distinct from innate responses, which are those primarily associated with inheritance characteristics. Those responses that can be attributed to a certain course of action or sequence of instruction as opposed to responses acquired without the instructional sequence.

ACRONYMS. The list below gives the full form of many acronyms and other abbreviations in the fields of educational media and technology. Many of the items cited will be the subject of entries elsewhere in this volume.

AASL	American Association of School Librarians
ABC	American Broadcasting Companies
ABC	Australian Broadcasting Corporation
ACE	American Council on Education
ACRL	Association of College and Research Libraries
ADCIS	Association for the Development of Computer-Based Instructional Systems
ADP	Automatic Data Processing
AECT	Association for Educational Communications and Technology
AEDS	Association for Educational Data Systems
AERA	American Educational Research Association
AETT	Association for Educational and Training Technology (U.K.)

AFI	American Film Institute
AFIPS	American Federation of Information Processing Sciences
AID	Agency for International Development
AIT	Agency for Instructional Television
ALA	American Library Association
ALISE	Association for Library and Information Science Education
AM	Amplitude Modulation
AMCEE	Association for Media-Based Continuing Education for Engineers
AMEE	Association for Medical Education in Europe
AMTEC	Association for Media and Technology in Education in Canada
ANSI	American National Standards Institute
APA	American Psychological Association
APL	Association for Programmed Learning (now AETT) (U.K.)
APLET	Association for Programmed Learning and Educational Technology (now AETT) (U.K.)
ARL	Association of Research Libraries
ASA	American Standards Association
ASCAP	American Society of Composers, Authors and Publishers
ASCII	American Standard Code for Information Interchange
ASET	Australian Society of Educational Technology
ASFA	American Science Film Association
ASIDIC	Association of Information and Dissemination Centers
ASIS	American Society for Information Science
ASLA	Association of State Library Agencies
ASME	Association for the Study of Medical Education (U.K.)
BACIE	British Association for Commercial and Industrial Education
BASIC	Beginner's All-purpose Symbolic Instructional Code
BBC	British Broadcasting Corporation
BCS	British Computer Society
BCU	Big Close-Up
BERA	British Educational Research Association
BFI	British Film Institute
BISFA	British Industrial and Scientific Film Association
BJET	British Journal of Educational Technology
BLAT	British Life Assurance Trust for Health Education
BPS	British Psychological Society
BUFC	British Universities Film Council (now BUFVC)