

Chapter 1

INTRODUCTION

If we do not invest all our resources of energy and will in education, the race with catastrophe will be lost and the balance between man and nature will be re-established by disasters that are not only unthinkable, but also avoidable. The choice is ours, and the time for action is now.

Frederico Mayor, Director General of UNESCO
Education for All - Summit of Nine High-Population Countries
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We are at a critical moment in the history of human learning, and in the history of humans. Learning is vitally important in our future. With six billion people on earth, our current educational systems everywhere at all levels have major problems, probably not curable with present approaches.

In many areas very little education is available, and where it is plentiful it is all too often inadequate. Our current learning systems are weak. We need new learning modes and structures, and we need them quickly and globally.

This book presents a new system for learning, a system not reflecting current practice. We believe that it has great potential for the future of education at all levels worldwide. The learning units in this system will be available everywhere worldwide, at any time, at a cost-effective rate for each student.

This approach is based on a new paradigm for learning, computer-based tutorial learning. The most common delivery system will be

through a new form of distance learning, giving a new meaning to this important concept. Current technology is adequate for this system.

Interaction between the students, singly or in small groups, and the computer, will be very frequent and through the student's native language, such as English or Chinese, similar to that between a student and a human tutor. All these details and others are explained further in the chapters that follow.

We emphasize the word 'potential' in describing the new system. Additional experimental work should explore these ideas, to demonstrate the full effectiveness of the approach suggested. The current problems of learning are great, and, we believe as indicated, not solvable by the approaches currently being pursued. So we strongly urge that this empirical data be carefully gathered and evaluated with this new approach.

Creating new learning materials and systems will require great imagination and determination on our part. We need new ideas that go beyond the learning situations of today, and the ability to develop the necessary materials and institutes. Learning should be greatly improved, less expensive, and available to all in all subjects from birth to death.

Given these serious problems, not enough discussion occurs on desirable futures for learning. The following factors for learning might be considered.

1. Provide a more personalized individualized learning environment for all students. Many lectures offer little individualized help for students, so need to be replaced by individualized approaches. These units must all be developed, as very few exist today.

Highly interactive material, almost conversational in nature, will respond to individual student problems. Learning will be an active process for all students, so that knowledge can be constructed directly by the students.

2. Verify that more students learn and learn better than today, in a shorter time and with better retention. This requires careful experiments with large numbers of students. A major increase in student learning will be attained and verified by large-scale summative and formative evaluations, so that the learning gains are empirically documented.

3. Significantly reduce the costs of education, now too expensive for many students. Interactive technology allows us to reduce costs.

The traditional model of one professor teaching 25 students per class, three times a week . . . will not scale to meet this increased demand because it is too expensive

Carol Twigg, 'The Value of Independent Study'
EDUCOM Review, July-August (1995).

4. Promote research in learning. We must improve our major product, student learning. This should become a primary aim of research.

5. Develop full new modules for many areas. This new learning material will use computers and media. The content will be fully revised to meet modern standards. New modes of student assessment will be part of this development.

6. Market these materials. The units will be marketed widely to institutions and to the general public. Eventually these units should not only recoup the financial costs that have gone into them, but could become major profit sources. We will develop in languages other than English to allow worldwide use.

7. Use these segments as the basis for new distance learning institutions. We would thus greatly increase worldwide student access to learning. Eventually through these efforts we will extend lifelong learning components and work towards an educational system covering everyone from birth to death.

We need a society that focuses on learning, where everyone loves to learn. Solving many of the world's major problems, including population, water, violence, health, and environmental destruction will depend to a major extent on improving learning.

A school or university may undertake this development perhaps in partnership with other schools and universities or commercial partners or these efforts might be entirely commercial.

1.1 Summary of each chapter

We realize that not all readers will be interested in all the details in this book. The following brief summaries of each Chapter may help you to determine what you want to read carefully, at least initially, and what you want to scan. We use some repetition, so those chapters are partially independence.

1.1.1 Problems and vision of learning

We start with the problems of education today, Chapter 2. This will suggest a collection of visions for the future of learning, the basis for the remainder of the book.

1.1.2 Factors of distance learning

The approach proposed in this book assumes distance learning or e-learning which is the fashionable term these days. Many forms of distance learning are possible. Chapter 3 reviews the variables in distance learning, and shows many of the types of distance learning that are possible.

1.1.3 Distance learning – present and future

In Chapter 4 we consider examples of distance learning, using the factors discussed in Chapter 3. Some of these are important historical examples, such as the United Kingdom Open University. Others are imaginative possibilities found in fiction, making interesting and informative suggestions for the future of distance learning.

1.1.4 Individualization and Interaction

We consider, in Chapter 5, first the importance of individualization in learning. Then we look at student computer interactions, with individualization in mind. We develop a methodology for highly interactive learning, considering both frequency and quality of interaction.

1.1.5 Multimedia in Learning

Many media are possible in computer-based tutorial learning units. They will help and motivate many students. In chapter 6 we review here the use of pictures, video, sound (in both directions), and computers.

1.1.6 Tutorial learning

We have mentioned several times earlier the suggested new paradigm for learning. In Chapter 7 we explore the concept of computer-based tutorial learning, using the ideas of interaction just developed.

1.1.7 Delivery of learning

Learning units must reach students in many locations in distance learning. In Chapter 8 we look at various delivery methods that are available, some in common use. Satellites seem particularly important for the future.

1.1.8 Learning and assessment

Learning and assessment are often separated, considered different activities. In computer-based learning they can be combined. This implies that assessment is not used for assigning grades, not needed in a mastery environment, but is used to determine what learning material is to be presented next. We discuss the way to include assessment into learning in Chapter 9.

1.1.9 Structures for technology based learning

New technology in learning suggests new organizational structures for learning material. Particularly important are ways to organize learning that stress mastery and experiential learning, we discuss these issues in chapter 10.

1.1.10 Developing tutorial learning units

Chapter 11 presents the system developed at the University of California, Irvine, and the University of Geneva for developing highly interactive tutorial computer-based learning. Management, design, implementation, and evaluation are considered.

1.1.11 Cost of highly interactive tutorial learning

In Chapter 12 we investigate the important considerations concerning the cost of learning, focusing on the approach considered in this book and comparing it to some extent with other educational strategies. We argue that computer-based tutorial learning is a cost-effective method for the future of learning.

1.1.12 Initial tutorial learning units

We review, in Chapter 13, the possibilities for development, in all areas. The emphasis is on what should be developed first, in terms of both market and need.

1.1.13 Starting new distance learning institution

In this final Chapter (14) we consider the problems in starting new learning programs of the type discussed in this book. Both conventional institutions and new ones, possibly for profit, are considered.

1.1.14 Bibliography

We list the references used in preparing this book.

Tutorial Distance Learning
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