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**THE SELECTION OF
TEACHING/LEARNING MATERIALS
IN HEALTH SCIENCES EDUCATION**

Report of a WHO Study Group

WORLD HEALTH ORGANIZATION

GENEVA

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MATERIALS IN HEALTH SCIENCES EDUCATION**

Geneva, 10-16 April 1973

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THE SELECTION OF TEACHING/LEARNING MATERIALS IN HEALTH SCIENCES EDUCATION

Report of a WHO Study Group

A WHO Study Group on the Selection of Teaching/Learning Materials in Health Sciences Education met in Geneva from 10 to 16 April 1973. Opening the meeting on behalf of the Director-General, Dr T. Lambo, Assistant Director-General, welcomed the participants and representatives of other Organizations. He emphasized that a principal concern of WHO today was to help developing nations in planning and putting into effect a system of health care delivery that could bring the benefits of good health to every family, even in the most remote areas. Good health services are dependent upon the availability and proper deployment of good health staff, who in their turn demand an efficient and rapidly expanding programme of training adapted to the tasks that they must perform. A serious obstacle to progress is the shortage of teachers, especially experienced teachers, to meet the needs for basic and continuing education of all members of the health team, professional and auxiliary alike. There is now ample evidence that carefully prepared teaching/learning materials, especially in audiovisual form, can help both teacher and learner by reducing the basic instruction load of the former and by making the subject matter clearer and more vivid and interesting for the latter.

Large institutes in industrialized countries can draw on immense technological resources in the preparation of materials for their own use. It is relatively easy for their staff to obtain advertised or listed materials for preview, in order to assess their suitability for specific teaching/learning situations. Paradoxically, there is relatively less need for such information and materials in these countries where there is often no serious staff shortage and where most requirements can be met from their own resource. In most developing countries, however, the situation is quite different. There are few resources, and expertise in the preparation and correct use of audiovisual materials is limited. Although catalogues may be available, the items they list have rarely been assessed and the teacher cannot decide on their suitability from the information given. Preview is usually impossible, as few distributors will send audiovisual materials long distances on approval. Apart from the time and expense involved, there are all the hazards of customs delays and damage in transit. As a result, the teacher is unable to make a reasoned selection. As he has little or no production facilities of his own, his students and he are deprived of the potential

assistance that educational technology can afford in the learning situation.

In general recognition of the fact that catalogues and lists of teaching/learning materials need to contain more constructive information, national organizations and professional associations in several countries have independently embarked on programmes of assessment. These efforts have been largely for internal use, so that again the teacher in the developing country does not benefit. In addition, would-be assessors have come up against difficulties in evaluating non-printed materials since there is little previous experience to guide them.

In view of the present situation and in conformity with a recommendation made in a previous report,¹ this Study Group was convened with the following general aims : (1) to review the needs for and difficulties inherent in the assessment of teaching/learning materials, and (2) to recommend a programme of action for such assessment and subsequent dissemination of information on an international scale.

1. INTRODUCTION

In the programme of WHO in the broad field of educational technology,² a number of areas have been identified in which the application of new methods and approaches might be expected to contribute towards the better education and effectiveness of the health team. One such area, the local development of high quality teaching/learning materials for basic and continuing education in priority subjects for which teachers are in short supply, has already formed the subject of discussion by a previous WHO Study Group.³ A second and closely related area is concerned with the need for assessment of quality of the great range of existing teaching/learning materials, whether produced by institutes or by commercial enterprise. An information service, not only on the availability of screened materials but also on their appropriateness for different teaching and learning situations, would greatly assist the teacher in making a reasoned selection for his own particular use.

¹ *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 489, p. 28, recommendation (2).

² Since the meaning of "educational technology" may be variously interpreted, it is defined for the purposes of this report as the application of scientific knowledge about the teaching/learning process in order to organize and facilitate instruction offered by the use of methods and media of education. It therefore covers two quite separate aspects : technology *of* education and technology *in* education. The first is concerned with a systematic, analytical process of decision-making, implementation, and assessment based on the specifications of learning objectives that define what a student will be expected to do in order to demonstrate that he has learned successfully. The second is primarily concerned with the means of attaining an educational goal ; it is concerned with educational materials and associated equipment. Thus this second aspect of educational technology is dependent on and supports the first.

³ *Wld Hlth techn. Rep. Ser.*, 1972, No. 489.

It is evident that teaching/learning materials cannot be considered in isolation, as they represent only one component in the whole educational process. A simple statement of content in an information document would be of little assistance to the teacher who must be able to judge whether or not listed materials would be of direct service to him or to his students in the context of the local curriculum and educational pattern. Section 2 of this report, therefore, outlines the information that the user (who may be either teacher or student) would need to have to make a reasoned choice of material. Section 3 describes the various types of assessment that will be needed to supply this critical information. As a result of an assessment programme, an information service might be organized for the user. Section 4, therefore, considers the problems involved in the dissemination of information. Section 5 deals with methods of keeping such a service dynamic in a constantly changing situation and explores the problem of transference and acceptability of materials across national and cultural barriers. The last section suggests an action programme and makes recommendations for its implementation.

1.1 Definition and categories of "teaching/learning materials"

It was considered that a broad term should be used to describe the materials to be included in the programme of selection. The term "teaching/learning materials" embraces the whole range of materials produced for use by teachers or learners, from the simplest teaching aid to the most complex learning package. In addition to what is usually described as audiovisual material (audio and video tapes, films, microforms, projection slides, wallcharts), the term includes programmed learning materials, models for demonstration or simulation, games and similar innovative devices, computer-assisted learning programmes, test questions and problems, and any combination of these with supportive or descriptive texts that together make up the "multi-media packages" of today. Printed material in its various forms (textbooks, journals, manuals, etc.) constitutes the commonest form of learning material, and is already covered by well-established procedures of assessment and subsequent information to the potential user. Non-printed materials, however, present a greater problem. Methods and criteria for their assessment and for the dissemination of adequate data on teaching/learning materials must be greatly improved before the user can make an informed selection. The emphasis of the report is thus concentrated on non-printed materials, although new developments in the design of books and journals are likely to bring them within the scope of this document.

In order to assist in the identification of materials, it was considered useful to divide teaching/learning materials into two broad categories,

according to the degree to which they have been designed to fit into a teaching/learning context.

Type I

Materials that are elements for use in instructional systems ; they can be adapted and used for different purposes, situations, and types of student—e.g., a set of projection slides illustrating aspects of dermatology.

Type II

Materials that are systems in themselves ; they cannot easily be modified or changed in their content, order, method of presentation, or method of use—e.g., a programmed text or a multi-media package on endocrinology for medical students.

2. WHAT THE USER NEEDS TO KNOW

Books and journal articles can be obtained and examined with relative ease for their potential usefulness in teaching or learning. However, other teaching/learning materials may not be available quite so readily. Any one item may exist in only a limited number of copies. Once a copy has been obtained, inspection may require specialist equipment, and detailed examination will be conditioned by the length of the programme and its form of presentation (e.g., film, videotape, audiotape), or multi-media package). It is, therefore, highly desirable and, indeed, essential that the prospective user (teacher or student) should be able to make an informal, provisional selection from printed information on available teaching/learning materials. This will increase the chance that his selection will contain materials that are likely to fit his needs when he comes to make his final choice through actual inspection.

The following questions are those most likely to be asked by a potential user in search of teaching/learning material.

- (1) What is available in a particular subject area ?
- (2) Can it assist in specific educational aims ?
- (3) Can it be used with a specified category of students who are at a particular stage in their education ?
- (4) Can it be used within the constraints of the existing educational system, staff, time, space, equipment, and finance ?
- (5) How acceptable and effective has it been elsewhere ?
- (6) How can the materials be obtained ?

TABLE 1. INFORMATION REQUIRED BY A POTENTIAL USER *

Data	Type of material ^a	
	I	II
Subject area	x	x
Type of teaching/learning material (type I or II)	x	x
Learning objectives	-	x
Learning situations	-	x
Learning methods	-	x
Type of student and level of studentship	-	x
Study prerequisites	-	x
Pre-tests and post-tests	-	x
Guide to the use of materials	-	x
Country of origin, languages, and date of production/release	x	x
Description of content	x	x
Specific activities involving staff/students	x	x
Preparation/study time	-	x
Additional materials to be provided locally	-	x
Copyright constraints	x	x
Technical details of the materials and associated equipment, including any special storage conditions	x	x
Responsible authority for subject and educational design/production	x	x
Assessment of educational usefulness	x	x
Title of material	x	x
Conditions and cost of distribution	x	x
Name and address of distributor	x	x

* Further information on some of the items listed is given in the Annex, p. 24.

^a For definitions, see section 1.1, p. 8.

These questions call for the information that is outlined in Table 1. It will be apparent that less information may be required for materials classified as Type I (see section 1.1). The items of desirable information have been listed in relation to the above questions and not in the order in which they might appear in a catalogue.

This list is not intended to be exhaustive but it should serve to underline the need for a wide range of information. However, it would be unrealistic to insist that all these and possibly additional data should be available from a primary information source (e.g., computer bank, catalogue). It is suggested, therefore, that a primary source should provide only limited data (see Table 2). This assumes that additional details towards a final selection would be available from an information service when a limited number of possible materials have been isolated by the user. The information service would be expected to store additional information from the producers and to assemble reports of actual user experiences as well as further assessments that may have been carried out in different countries.

TABLE 2. ESSENTIAL INFORMATION ON TEACHING/LEARNING MATERIAL
TO BE PROVIDED BY A PRIMARY INFORMATION SOURCE

Data	Type of material ^a	
	I	II
Title, whether part of a series, technical details of material and associated equipment ^b	x	x
Conditions of copyright and distribution	x	x
Country and date of origin, language(s)	x	x
Scientific/educational authority and distributor	x	x
Intended audience (type and level)	-	x
Learning objectives	-	x
Intended learning situation	-	x
Summary of content (with any cultural constraints)	x	x
Assessment with responsible authority and date	x	x

^a For definitions, see section 1.1, p. 8.

^b As proposed in : American Library Association (1970) *Anglo-American cataloging rules*, Chicago.

2.1 Recommendations

There is no reliable information on the users' actual requirements for information in relation to the selection of teaching/learning materials and little is known about the processes of selection adopted by users. It is therefore recommended that pilot studies should be undertaken to determine :

- (1) which items of information are found most useful for the selection process ; and
- (2) which items of information are most likely to ensure continued use of materials once they have been selected.

3. THE ASSESSMENT OF TEACHING/LEARNING MATERIALS

The purpose of assessment of materials is to help prospective users to make an informed choice. Since there are many problems in the selection of materials, it is natural for users to look for advice and guidance. Existing sources of information are, however, uncoordinated and many of the basic items are used in ways that are confusing to producers and users alike. There is a serious need for systematization in order to prevent wasted effort. For the purposes of this report the following terminology has been adopted. *Assessment* is used to connote any or all of the processes of estimation and measurement of the effectiveness of materials.

These processes are divided into 3 categories—*appraisal*, *validation*, and *evaluation*—which are defined below.

3.1 Appraisal

Appraisal constitutes a limited prediction of the likely usefulness of teaching/learning materials based upon judgment of the quality rather than measurement of the effects on learners. It is the simplest and most readily carried out form of assessment of teaching/learning materials and is usually made by a panel of individuals that judges the materials according to criteria that have been determined in advance. While direct measurement by means of empirical trials in teaching/learning situations does not form part of assessment by appraisal, the panel will take account of trials carried out by the producers or by others, and may entertain the opinions of users of the materials.

3.1.1 *Composition of appraisal panels*

To ensure a high degree of objectivity in judgment it is important that the composition, procedures, and aims of panels be given a framework. Panels should consist of at least 3 members serving under a convener. In making up a panel, the convener must make sure that its members are well chosen for each appraisal task. He will also be chairman of all the appraisals in order to ensure stability and uniformity of standards. At the same time his preparation for this role will ensure that he can provide adequate training and guidance for panel members.

The panel should include a specialist in the subject matter of the material to be appraised, who will not only be familiar with the content of the discipline and with current research in the field but will also have had experience of teaching that discipline to the audience for whom the materials are intended. If the teacher is not a specialist in the field, however, there must be an additional panel member who is. Another member should be an educational technologist with a sound background in the design, production, and appraisal of teaching/learning materials, who will be responsible for appraising the educational and technical aspects of these materials. The panel should also include one or more students who should be from current or recent classes to whom the materials are addressed, and will therefore be capable of judging the acceptability of the materials.

3.1.2 *Criteria in appraisal*

The criteria used in appraisal concern 3 aspects of materials: content, educational and technical factors, and acceptability.

Content criteria include the accuracy of the content, the degree to which it reflects current knowledge in the field, and the degree of authenticity (all three being relative to the educational level of the intended audience).

Educational and technical criteria. The major educational factors are : the degree to which materials permit the attainment of stated learning objectives ; their appropriateness for the intended audience ; the effectiveness of their educational design (paying attention to cues, reinforcement, continuity, sequence, pace and rate of development) ; and the appropriateness of the instructional techniques employed (including such factors as learner-participation). Technical considerations include : the aptness of the medium employed, the quality of audio and visual components and the appropriateness of these components to the subject matter content.

Criteria of acceptability relate to : evidence of student and faculty involvement in the educational planning and design of the materials ; their capacity to maintain the interest of users ; the adequacy of accompanying materials ; and the degree to which materials can be modified or changed.

3.1.3 *Training for appraisal panels*

The degree of objectivity of panel judgment will depend on the establishment of criteria and the standardization of procedures. In order to ensure uniform application of procedures, both within and between panels, some training of panel members is necessary. As this will normally be a responsibility of the convener, his own training will be of primary importance.

3.1.4 *Limitations of appraisal*

The judgments of appraisal panels, since they invoke the knowledge and experience of their members, will be limited in applicability to those educational contexts that the judges combine. It will not therefore be possible for a user in a different context (e.g., a different country or region) to assume that such appraisals will take account of his particular educational requirements.

Although the appraisal process is protected against the personal bias of individual judges, it could benefit from research both on the best methods for maintaining uniformity and standards and on ways of enhancing its usefulness to panels and users in other countries.

3.1.5 *Extent of appraisal*

It is anticipated that most assessment activities will be at the level of appraisal, since this is the simplest form of assessment and the most feasible given the current training and manpower conditions in health sciences education.

3.1.6 *Recommendations*

It is recommended that experimental studies be conducted on the various factors involved in the process of appraisal, in view of the priority

likely to be given to this type of assessment and the fact that the relative reliability and transferability of judgments based on appraisals, both within and between countries, could be improved. These studies might, with advantage, form part of a broader pilot study (see section 6, p. 21).

3.2 Validation

Validation records the learning outcome achieved by specific students but does not take into account the wider circumstances in which the teaching/learning materials were used. In its simplest form it is a feasibility study and is commonly employed as an assessment procedure by the producers of materials of type II to determine whether or not learning materials accomplish the instructional goals intended.

3.2.1 Steps in validation

The basic steps in validation studies¹ are :

- (a) identification and clarification of instructional goals and objectives ;
- (b) selection of learning activities to accomplish these goals ;
- (c) determination of the type(s) and number of learning materials ;
- (d) placement of the materials in proper sequence (paying close attention to cueing, reinforcement, and density of information) ;
- (e) initial trial of the materials using a local group of students identical with or similar to the intended audience ;
- (f) determination of the degree of learning accomplished by the students using the materials ;
- (g) determination of the acceptability of the materials to local instructor(s) and students ;
- (h) modification of the learning materials in the light of information gained from analysis of data from steps (f) and (g), resulting in an improved version of the materials ;
- (i) *the writing of a brief summary report on the validation study that can be made available, on request, to prospective users of the materials.*

Step (f) needs further clarification. A post-test of the learning accomplished would be a minimal requirement, but if data from post-tests are the only information available, there is an unwritten assumption that prior to using the materials the students had attained *none* of the instructional objectives for which the materials were designed. If this assumption seems unwarranted—and it often is—a pre-test covering the same content and objectives as the post-test must also be provided. This will permit measure-

¹ A useful approach to the design and use of materials for learning is given in *Wld Hlth Org. techn. Rep. Ser.*, 1972, No. 489, Annex.

ment of the amount and degree of learning that is attributable to the materials. Unless this is done the educational impact of the materials can only be a matter for conjecture.

3.2.2 *Limitations of validation studies*

The limitations of validation studies should be clearly recognized.

Validation has primarily a local connotation. The fact that the teaching/learning materials are demonstrably useful for certain students under particular conditions in no way guarantees that the materials are of equal utility for other students or in other conditions. If, however, there is a close correspondence between the samples of students and of conditions, the probability is generally held to be high. In the strict sense, however, generalization from validation studies is not possible.

If validation studies have any meaning beyond their local context, it is only to the extent that data are obtained about student performance before and after the use of the materials—i.e., change in performance. Information must also be available concerning the minimal knowledge and skills required by teachers in order to apply the materials effectively, as well as the minimal requirements for equipment, facilities, personnel, and so on. Information on the state of development of the materials is also essential—a third or fourth version of materials would be expected to be of higher quality than the first. Finally, there must be some indication of student and teacher acceptability. If student and teacher do not value using the materials, then all the time and effort involved in their production has been in vain.

3.2.3 *Extent of validation*

There is a need for the broader application of validation studies. One procedure of considerable potential, though still somewhat new, is the “revalidation study” by one institution of materials produced in another. Impetus from a central agency or institute may be required in order to develop patterns and channels of shared validation reports, but it is to be hoped that, in the future, the findings of revalidation studies will, as a professional courtesy, be communicated to the institution producing the materials.

3.3 **Evaluation**

Evaluation is a form of multidimensional measurement involving not only learning effectiveness but also other factors, such as cost-effectiveness and acceptability. Evaluation forms a basis for decision-making, and consequently is concerned with balancing benefits of different kinds—e.g., the effectiveness of learning against costs of instruction or the effective-

ness of one set of materials against another. Evaluation costs time, money, and other resources, so that the extent and precision of studies must be weighed against the possible benefits to be obtained from them and it should be ensured that they are designed to give the information needed in a usable form.

Decision-making relies on accuracy, reliability, and adequacy of information. In general, any information is better than none at all, but the level of precision and reliability is important in estimating the degree of risk attached to making a decision.

It is important, when comparing benefits, that the minimal requirements of good experimental design be met—e.g., by setting up common instructional goals and measurement procedures; by paying attention to the principles of probability and experimental design in forming comparison groups; and by avoiding “contamination” and “confounding” in experimental tests.

Full-scale evaluation studies require a complex organization and strong commitments from the cooperating institution(s). Consequently, they are unlikely to be attempted frequently and will tend to be used to provide answers for questions having the widest concern. For example, evaluation might be used to indicate in what form and in what circumstances a particular type of teaching/learning material is most likely to be acceptable and efficient in a given country and/or region.

3.4 Comparison of types of assessment

Appraisal, validation, and evaluation should not be classified in any particular order in an absolute scale of values of modes of assessment. Each has its own merits and limitations. Further, assessment by one process may well make use of the findings of another. For example, appraisal, which is the most rapid means of obtaining an assessment, may take into account validation data and appraisals originating from another area. Again, in carrying out evaluation, part of the information provided will often consist of appraisals and validations. Indeed, the least rigorous evaluation may be based largely on such information without conducting additional, long-term, empirical and experimental tests. The extent to which evaluation studies will need to be elaborated will be determined by such criteria as the importance of their conclusions, their cost and the sequence and phasing of an educational development. The availability of expert personnel will also be critical. Validation, like evaluation, aims at continuing improvement of instruction—i.e., information about the success of materials in achieving their goals is acted on during production or development. Feedback to producers from appraisals is, however, retrospective.

3.5 Coordination

Assessment, regardless of level or complexity, is a continuous process from the identification of the need for various materials to their production, testing, and local adoption. Since the needs of an individual institution may change—for example, in response to changes in the country or region as a whole—the entire assessment process is meaningful only to the extent that it is directed toward the improvement of education and the adaptation of institutions to change.

To avoid needless repetition of assessment studies from country to country, regional coordination is suggested. However, it will first be necessary to discover how far the results of studies conducted in one country can be used by institutions in another; the question is one of cross-cultural as well as cross-national transference. Some form of coordinating service will have to be instituted to ensure the rational use of financial and expert human resources, and to ensure that procedures for assessment are organized in appropriate countries and in centres within those countries. Such a service would also act as a stimulus for innovation by encouraging the continual re-examination of basic concepts of education in the health sciences.

3.6 Recommendation

It is recommended that the feasibility of instituting a coordinating service should be tested by means of a pilot study (see section 6).

4. DISSEMINATION OF INFORMATION ON ASSESSED MATERIALS

A system designed to facilitate selection from assessed teaching/learning materials must satisfy a number of criteria.

4.1 Life span of materials and publication lag

Accession and cataloguing of information is relatively costly in money, personnel, and time. Because of the short life span of materials in health sciences education it is imperative that information be collated and disseminated as rapidly as possible. In an ideal system, a continuously updated bank of information should be immediately available to the user. He should be able to locate relevant items by means of a simple operation and should also be able to request and obtain information from places that may be distant and remotely situated from the bank.¹

¹ Such systems are currently on trial, as, for example, a satellite-based service for remote medical consultation in Alaska.

Speed in retrieving and transmitting information does not in itself guarantee that the information is up to date. This depends rather on the time involved in the process of obtaining materials, making assessments, and entering the information in an information bank. Relatively simple methods for rapid dissemination of up-to-date information have been evolved. One agency¹ distributes a bimonthly information bulletin that includes a list of materials that have become available but have not yet been assessed. The time between appraisal and publication of the reviews in this bulletin is about 3 months. All educationally acceptable items are collated into an annually updated publication with cross-classification for ready retrieval.

4.2 Accessibility

Availability and convenience to the individual user are important, irrespective of the system of collation and dissemination of the information. So, for instance, the storage capacity and speed of selective presentation of information provided by a computer system will be of small advantage if a terminal is not conveniently accessible to the user.

4.3 Standardization and compatibility

The existence of different systems of collation, presentation, and dissemination of information constitute a hindrance rather than a help. In order to develop a rational system for helping users to select materials it will be necessary to reinforce and to promote efforts to achieve standardization. It is particularly important to ensure that systems should be compatible with each other when a variety of vehicles of dissemination (computer display, microfiche, printed lists, etc.) are involved in presenting the same items of information.

4.4 Cost

Communication systems have reached different stages of development in different parts of the world. It is, therefore, inevitable that methods of dissemination should involve varying scales of financial cost and degrees of technological sophistication. Overall costing of the most sophisticated systems may show that, in their own context, they are no more expensive to run than less advanced modes of dissemination. However, technological advances do not automatically reduce the considerable cost in terms of expert personnel and time, of collecting and collating information.

¹ Department of Audio Visual Communication, British Medical Association and British Life Assurance Trust for Health Education.

The highest degree of cooperation is required to achieve optimum efficiency in the use of human and financial resources.

4.5 Coordination

There are a large number of systems of dissemination that require coordination. Evidence of movement towards international cooperation is, therefore, most welcome. However, most of the existing systems are confined to developed areas, and developing countries have only limited access to information. There is insufficient knowledge of the conduct of national and international services.

4.6 Recommendations

A broad survey of existing provisions of information for the user would be helpful. It is recommended that a global survey be undertaken to assemble data on existing national and international information services and their mode of function. As this enquiry would encompass the whole field of education and could not usefully be restricted to the health sciences, it is suggested that such a task might be undertaken jointly by WHO and UNESCO.

It is recommended that a pilot project be organized to develop and test a system of assessment and dissemination of information on teaching/learning materials. This project should involve institutions and centres in a number of different countries.

5. DISTRIBUTION AND TRANSFERABILITY OF TEACHING/LEARNING MATERIALS

5.1 Acceptability

There are many barriers to the ready transfer of educational materials from their countries of origin to other parts of the world, including cultural and linguistic differences, and the restrictions imposed by differences in educational systems and available equipment. These barriers may be less serious in the health sciences than in other fields, particularly when the materials are concerned with strictly scientific, factual subjects. However, this assumption does not rest on well established evidence or experience. It has not yet proved possible to gain reliable information on the transfer of materials to developing countries, as they are comparatively little used in these countries. The repeatedly expressed wish for self-reliance may be one factor contributing to this imbalance.

There is some evidence that the acceptance of educational materials, particularly those designed for individual learning, is strongly influenced

by the perceived compatibility with the prospective user's existing methods of teaching and learning. One result of experimentation with educational materials in developing countries has been a marked stimulus to the local production of further materials. The factors that influence these changes, including the need for greater familiarity with educational technology, are poorly understood as yet and deserve further enquiry.

5.1.1 *Recommendations*

Support for the production of locally designed materials is likely to enhance the acceptability and wider use of educational technology. The Study Group wishes, therefore, to reinforce the recommendations made by the previous Study Group,¹ in particular that support be given to existing centres and to the establishment of new centres in the developing countries, to encourage innovation and the production of teaching/learning materials.

There is a need to isolate and examine the factors that encourage and permit transfer of educational materials. Some of the investigations will be concerned with experimental studies of cross-cultural and cross-national characteristics. This work could benefit from collaboration with some of the activities organized by UNESCO.

Other aspects, more specifically concerned with education in the health sciences, will best be carried out in the context of a pilot study on the development of information dissemination and of distribution of educational materials as discussed in section 6.

5.2 **Distribution**

The organization of an up-to-date and readily available source of information on assessed teaching/learning materials is no more than an essential prerequisite. It will not solve the problems of distribution of materials from one country to another, such as the cost of preview facilities, transportation, and customs charges, the cost of the materials themselves, and copyright restrictions. Some of these aspects will be discussed in the following sections.

5.2.1 *Preview facilities*

As there is as yet little information on the transferability of assessments of study materials from one country to another, the prospective user will frequently wish to conduct his own assessment before he decides to commit his limited financial resources for the acquisition of materials produced elsewhere. It will thus be important to establish the transferability of assessments and to develop inexpensive and rapid methods of distribution for preview purposes.

¹ *Wld Hlth Org. techn. Rep. Ser.*, (1972), No. 489.

5.2.2 *Transportation and customs charges*

Large numbers of copies may be required, particularly where materials are intended for individual study. The consequent bulk and weight are likely to make transportation costly and slow. However, if just a single example can be made available for duplication to be carried out at the receiving institution (see section 5.2.3), the saving in time and cost can be very considerable indeed. Such an arrangement will not only reduce the cost of transportation but also the purchase cost of the materials themselves.

It is recognized that some countries experience serious difficulties in obtaining clearance through their customs departments. Inspection of goods and import duty charges can result in both delays and additional costs. Under the aegis of UNESCO, many countries are already signatories of the Beirut and Florence Agreements,¹ which permit the passage of educational materials free of import duty. However, a number of countries have yet to join in this arrangement. Every effort should be made to ensure a universal acceptance of these Agreements.

5.2.3 *Copyright*

The use of teaching/learning materials can be seriously restricted through constraints imposed by copyright regulations. The user may wish to modify the materials to adapt them to his particular needs, to incorporate extracts in his own materials, to make copies for his students, or to make the items available to other *bona fide* users in his country. None of these options are open to him if copyright conditions are rigorously applied.

It should be recognized that there are legitimate motives for preserving copyright and that many complexities of national laws and international agreements exist. In the interests of the health sciences and education, support should be given to attempts to overcome existing restrictions. Two recent developments are, therefore, of particular interest: (1) the creation of groups of collaborating institutions where copyright restrictions are removed for each other's productions; and (2) a national producing agency and a national funding agency that encourage alterations to and duplication of teaching/learning materials, so long as an indication is given that the information is an adaptation, which is merely *based* on the original. In other fields of education, institutions make available a guide to a suggested sequence of study and provide basic teaching/learning materials that can be adopted or adapted within this framework.

A natural sequel to such developments is a reduction of copyright or royalty fees and the offer of original or duplicate master material for

¹ UNESCO (1954) *Agreement for facilitating the international circulation of visual and auditory materials of an educational, scientific and cultural character. A guide to its operation*, Paris; UNESCO (1958) *Agreement on the importation of educational, scientific and cultural materials. A guide to its operation*, Paris.

copying by the purchasing institution. An example is the recording script for an audio tape programme accompanied by a single illustrated booklet. Both can be altered, translated, and copied locally by the purchaser. This added flexibility and reduction in cost are most likely to encourage transferability and actual use in other countries, so that the effort of design and production is matched by an increased number of users.

5.2.4 *Recommendations*

The pilot project discussed in section 6 should incorporate a study of the validity in other countries of assessments of teaching/learning materials. The same study should investigate means of rapid and inexpensive access to educational materials required for reassessment in another country and methods of distribution involving minimum cost and maximum flexibility for adaptation to local needs and consequently enhanced transferability.

WHO should explore ways in which the efforts of UNESCO in facilitating the transportation and customs clearance of accredited materials might be supported.

6. CONCLUSIONS AND RECOMMENDATIONS FOR ACTION

6.1 Pilot study

The Study Group considered that there is an immediate need for a pilot study on the establishment of an information service for teaching/learning materials, with associated investigations into a number of problem areas identified in previous sections of this report. It was recognized that considerable efforts are already being made by many international, national, and private organizations to provide information on assessed materials. It was suggested, therefore, that advantage be taken of the existing experience, facilities, and expertise for the planning and implementing of this pilot study.

Various elements for this suggested pilot study have been outlined in this report. The extent and geographical coverage of such a study would be decided on the basis of feasibility. An integrated set of activities might take the following form :

(1) *Information service*

One or more institutions already involved in the dissemination of information on teaching/learning materials would be invited to collaborate with WHO during the trial period to provide the information service. The selected institution(s) would have the expertise and facilities needed to meet the requirements of the pilot study.

(2) *Appraisal of materials*

The associated activity of appraisal of materials would be carried out at a number of carefully selected teaching institutions, in both industrialized and developing countries. To ensure continuity and maintenance of standards, a full-time convener would have to be appointed in each teaching institution, with responsibility for selecting and convening appropriate panel members for the appraisal of each item of material. Conveners would forward the details of each appraisal to the information service for storage and dissemination, not only to users but also to producers. This feedback would materially assist the educational improvement of new teaching/learning materials.

(3) *Feedback from the user*

A system of user (teacher or student) reporting would need to be developed to ensure a constant flow of information on the efficiency of the service. This would provide the users with additional data for selection. It would also contribute to the assessment of the validity of the appraisal system. In this context, it should be stressed that the success of the information service must be measured in terms of its practical value to the user.

(4) *Concentration of resources*

In order to reach practical conclusions within the limited period of the pilot study, it may be advisable to concentrate on specific subject areas and types and levels of student, rather than to attempt to cover the whole field of health science education.

6.2 Field trials

In parallel with the main activity of appraisal, on which the majority of user information would be based, WHO might consider coordinating and directing a programme of evaluation aimed at exploring educational approaches to the use of teaching/learning materials in different countries.

6.3 Problem-oriented research

Attention has already been drawn to the need for problem-oriented research projects on the role of educational technology in health sciences education. Some examples are the transferability of teaching/learning material, the specification and use of learning objectives, and training in the design and use of teaching/learning materials, particularly in the developing countries.

6.4 Summary

The above activities and related responsibilities are summarized in Table 3.

TABLE 3. PROPOSED PRINCIPAL ACTIVITIES AND RESPONSIBILITIES

Proposed agency	Proposed activity					
	Planning and coordination	Collation and dissemination of information	Field trials	Problem-oriented research	Panel appraisal of materials	Reporting on efficiency of service and on value of materials in use
WHO	x		x	x		
Institution with existing expertise and facilities in information storage and dissemination		x			x	x
Selected collaborating institutions			x	x	x	
Users (teachers and students)						x

It is also recommended that a further meeting of experts might be convened at a later date to review the results of these activities and to make proposals for subsequent action.

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Annex

INFORMATION TO ASSIST THE SELECTION OF TEACHING/LEARNING MATERIALS

The main text of the report has indicated the type of data that may prove helpful (see section 1.1) and the limited amount of information that is thought to be desirable for the selection of teaching/learning materials through a primary information source (see section 2). Some further information is given here together with a number of illustrative examples.

1. Subject area

The description *endocrinology—thyroid function—¹³¹I scan* will occupy little more space than *endocrinology* alone and will be considerably more helpful. In general, it is suggested that key words be used for this purpose.

2. Type of teaching/learning material

An indication of the type (see section 1.1) will assist the prospective user to determine whether he should read the entire entry or not. It will also enable him to assess whether the entry contains sufficient information (see Table 2).

3. Learning objectives

The specification of what students should be able to do in order to demonstrate successful learning may be of three broad types :

(a) long-term objectives at institutional level that can only be achieved as a result of an entire course—for instance, *the student will be able to demonstrate courtesy and consideration when conducting a physical examination* ;

(b) intermediate objectives that can be achieved in a shorter term through a series of limited learning experiences—for instance, *the student will be able to recognize and identify a specified range of pathological lesions with the use of the ophthalmoscope* ;

(c) specific, instructional, “enabling” objectives that represent steps towards the attainment of intermediate objectives—for instance, *the student will be able to identify and name a specified range of muscles on the living model*.

The inclusion of learning objectives in the information can indicate to the prospective user whether the material is likely to fit his educational

purpose and whether it is likely to assist him in the achievement of his objectives.

4. Learning situations

These may include conventional classroom activities (e.g., lectures), laboratory exercises/projects, group discussions/seminars, tutorials (including demonstrations and bedside instruction), and individual study.

5. Learning methods

These may include learning through discovery, problem solving, or practice of skills. The inclusion of this information may indicate whether the material can be fitted into the prospective user's existing educational system (see also items 4 and 10).

6. Type of student and level of studentship

This is perhaps the most difficult item of information to specify without danger of misinterpretation. The designation *Assistant Nurse* may have a totally different meaning in different countries. Equally, *Pre-clinical Medical Student* would have to be more closely defined. An even more difficult problem is posed by the need to define the stage of education or training for which the materials are thought suitable.

The first of these problems may be resolved by providing the potential user of "foreign" teaching/learning materials with a glossary that explains the student designations used in different countries. The second may be resolved by the provision of study prerequisites (see item 7) from the information service (see section 2) or distributor.

7. Study prerequisites

These are statements on the understanding, knowledge, skills, and attitudes a student is expected to possess if he is to benefit from learning with the appropriate educational materials. Such lists cannot be included in the primary information source (see section 2), nor would it be possible to give sufficient indication through the use of abbreviations, key words, or symbols. This information would thus have to be requested from the information service or distributor.

8. Pre-tests and post-tests

The precise form of these tests will depend on the types of learning objectives to be attained. Thus the mastery of a skill would clearly not be

tested with a multiple-choice question paper. An indication that such tests are provided with the educational materials would inform the prospective user that he could assess the materials more readily for their learning effectiveness and efficiency and that the tests could be of direct help to the student.

9. Guide to the use of materials

It is important to know whether adequate guidance is provided, particularly in a situation where a specific type of teaching or learning material has not been used before. This may be of interest to the teacher where he is expected to make administrative arrangements, provide additional materials, or play an active tutorial role. A guide may be equally necessary for the student when the materials are intended to be used by him.

10. Preparation/study time and specific activities involving staff/students

Both represent important information which may decide whether the materials can be used within an existing educational system, curriculum and timetable (see also items 4 and 5). Any special activities and the extent of preparation/study time may have to be balanced against the expected learning benefits, as effectiveness may be outweighed by lack of efficiency.

11. Responsible authority for subject and educational design ; year of production

Both items of information will assist the prospective user to anticipate the accuracy of the information content and whether it is likely to be sufficiently up to date for his students. The more advanced his students, the more important both these aspects will become.

12. Assessment of educational acceptability and effectiveness

The various types of assessment are fully discussed in section 3 of the report. Where an appraisal has been undertaken its inclusion in the primary information source will provide a useful indication of its educational value, even if it was prepared in a different country. The name of the responsible authority and the date when the appraisal was prepared will contribute to greater authenticity and usefulness. Where a validation or an evaluation has been conducted this should be indicated in the primary information source together with an address from which the appropriate data may be requested.

13. Description of content, country of origin, and language(s)

These data will give some provisional indication whether the materials are likely to be acceptable in the user's country, or whether any cultural or other national differences are likely to represent serious obstacles. With some materials it may be possible to make alternative provision for the spoken or written content in the local language. However, it will not be easy to alter any captions that form an integral part of transparencies, film, videotapes, printed texts, or computer programmes.

14. Technical details of the materials and associated equipment ; any special conditions for storage ; whether a single programme or part of a series

These data will include all the essential details of title, medium, and physical description that are fully described in the Anglo-American Cataloguing Rules.¹ This information will indicate whether the materials could be used with existing equipment. It should be noted that videotape has specific standards, depending on colour system, mains voltage, and scanning frequency, that vary according to the country of origin. Special storage precautions may apply to very cold or very hot and humid climatic conditions, respectively.

15. Conditions of distribution and copyright ; cost

It is important to know whether a set of materials may be borrowed free of charge for preview purposes, whether the material may be rented (hired) or whether it can only be made available on the basis of outright purchase, particularly where the distributor is in a different country. Cost may well be a decisive factor when it is remembered that an import or customs duty may be payable in addition to possible transport charges.

Copyright restrictions can also be a decisive factor. The user may wish to be free to adapt the materials to local needs, to incorporate parts in his own materials, or to make the items available to other *bona fide* users in his country. A scheme has been mentioned in section 5.3 that offers a high degree of flexibility at minimal cost.

¹ Library Association, Media Cataloguing Rules Committee (1973) *Non-book materials cataloguing rules : integrated code of practice and draft revision of the 'Anglo-American cataloguing rules'*, *British text, part 3*, London, National Council for Educational Technology.

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