ACER NEWSLETTER NO 34 NOVEMBER 1978

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New ACER Research Program Takes Shape

At the Annual Meeting of Council on Thursday 14 and Friday 15 September, the Director Dr J.P. Keeves presented his report on the work of the ACER for 1977-78 and the Program of Research for 1978-79. The past 12 months have seen marked changes in the ACER Program of Research and the Council examined these changes and authorized future developments. Where once the ACER had 13 small sections each pursuing its own limited field of research in an independent and autonomous way, the staff of the Council have been consolidated into three major Divisions and three Service Units. The three Divisions are concerned with:

Measurement and Evaluation
Learning and Teaching, and
Social Foundations of Education.

The three Service Units cut across the work of the Divisions and involve:

Sampling and Analysis Services
Library and Information Services
Advisory Services

The Program of research and development for each of the three Divisions is being developed by the staff of the Council in collaboration with Advisory Committees in each area which provide advice and guidance for the work to be undertaken. The program so developed is examined critically by the Executive Committee and Council and priorities are assigned to specific projects, so that the limited funds available from different sources may be assigned to studies of the highest priority. It is anticipated that in future the members of the State Institutes of Educational Research will also be asked to comment on the work being undertaken by the Council. Thus the ACER staff seek open debate and discussion at all stages on the work that it is doing so that its program of research and development will make a significant contribution to educational practice in Australia.

A more detailed report of the proposed program in the area of Measurement and Evaluation, is presented in another section of this *Newsletter*. However, it is in the field of the Social Foundations of Education that the work of the Council has developed most in recent months. The thrust of the program of research in this area is focused primarily on the problems of youth during the period of leaving school and the holding of a secure position in society. Early in 1978 the staff of the Council commenced a study of the problems of unemployed youth. This has been followed by the undertaking of a substantial study commissioned by the Education Research and Development Committee into school leavers in Australia. This study is being supplemented from the ACER's resources so that a major investigation can proceed. Further allied studies are being carried out which involve an evaluation of the Educational Programs for Unemployed Youth (funded by the Australian Department of Education) and an investigation of the employment and unemployment of the graduates and diplomates of Colleges of Advanced Education in Victoria which is being funded through the Victorian Institute of Colleges from the Malcolm and Anna Moore Trust.

A second and extremely important study being planned is an investigation into the allocation of staff and resources to schools and within schools. This study is particularly concerned with the impact of different policies on individual students and teachers. Opportunities are provided to examine a wide range of policies and practices because all six State Departments of Education in Australia, the ACT Schools Authority and the New Zealand Department of Education will be collaborating with the ACER in this study which is being commissioned by the Australian Education Council. It is expected that from the examination of the variety of policies and practices within the eight education systems and their schools it will be possible to identify clearly guidelines for the future. While it will be necessary to examine the relative uses of alternative arrangements, it will be important to investigate in some detail what is happening in schools and the impact of these practices on students and teachers. These studies are important new developments in the program of research of the ACER. Building on these studies and from his experiences overseas in recent months, Dr T.H. Williams the newly appointed Assistant Director in the area of the Social Foundations of Education will develop a more detailed statement of future needs and priorities.

There is in addition the area of research concerned with Learning and Teaching. At the present time general guidelines are being laid down for work in this field which includes studies of curriculum evaluation, studies of the education of special groups particularly those who are disadvantaged, and studies of school and classroom practices that are beneficial to learning in the area of core curriculum. A proposed program of research is being prepared and will be considered by an Advisory Committee at its first meeting in mid-December 1978.

The Council is seeking to develop a strong and vigorous program of research, and this has involved the appointment of new staff in recent months. The years ahead promise to be ones of highly productive research activity and the release of research findings of considerable importance to Australian educational practice.

The ACER *Newsletter* is published by the Australian Council for Educational Research, 9 Frederick Street, Hawthorn, Victoria 3122. Communications should be addressed to the Editor, Peter Jeffery at this address. The *Newsletter* is published three times a year. Each issue is serially dated according to its month of publication.

Training in Sweden for Assistant Director

Prior to taking up his appointment as Assistant Director responsible for the area of Social Fundations of Education, Dr Trevor Williams was awarded an Advanced Research Training Fellowship by the ERDC. The Fellowship provided for a three-month period of study in Sweden at the University of Stockholm and at the University of Uppsala. Two programs of study were undertaken, one at each of these universities, and the programs were designed to complement each other.

At Uppsala Dr Williams worked with faculty in the Institute of Statistics on questions relating to the estimation of structural equation models which incorporate latent variables defined by explicit measurement models linking these latent variables to their observed indicators. Most of this work centered around the application of statistical models developed by Professor Karl Joreskög and the use of a computer program (LISREL) developed within the Institute, to estimate the parameters of a wide variety of structural models that pertain to issues in educational, psychological, and sociological research. As it happened Dr Williams's visit coincided with an intensive workshop on factor analysis, covariance structure analysis, path analysis and structural equation models conducted by the Institute for European Research Workers, and he participated in this.

At the University of Stockholm Dr Williams worked with faculty at the Institute for International Education and with IEA. This provided the opportunity to become familiar with the work of the Institute and with the IEA data banks. As a result, Dr Williams was able to address research questions pertinent to IEA concerns through the application of the statistical techniques noted above to the cross-national data contained in the IEA data bank.

Although these statistical techniques have considerable potential for research into educational problems — particularly, research of a nonexperimental nature — they are not generally known within the educational research community, nor are they readily accessible to most research workers. As a result, plans are underway to write a 'LISREL Primer' in collaboration with Ingrid Mattson of the University of Stockholm. At present the intent is to produce a text focusing on structural equation models and their estimation. This text would be aimed at research workers who may be unfamiliar with this approach and will introduce the reader to the area through a series of examples of increasing complexity based on the IEA data and estimated with LISREL.

ACER Physics Tests

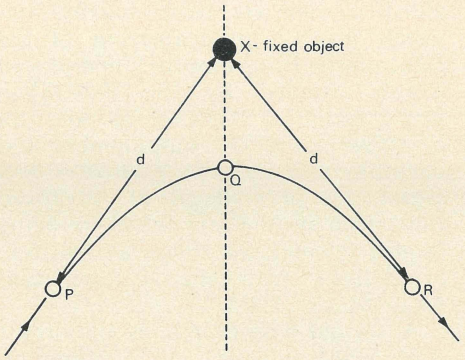
Graeme Wilmot

A new series of physics tests designed to assist in secondary school physics programs has recently been published by ACER. These replace the outdated *Physics Diagnostic Tests* prepared in the mid-sixties for the Victorian and Queensland PSSC course.

The new tests, called the *ACER Physics Unit Tests,* are also intended to be diagnostic in nature, complementing the student's course in physics in the last two years of secondary school. However, they are distinctly different from the earlier tests in that the latest series should be applicable to any secondary school physics program throughout Australia.

Although there are many different physics courses offered in the various states of Australia, and the A.C.T., the *Physics Unit Tests* give no preference to any one particular course. The topics for the tests were selected from an Australia-wide survey, in which physics teachers were asked to specify the most commonly taught areas of their courses. It was therefore possible to choose a wide range of topics which should be adaptable to all of the physics courses.

Questions 25 & 26 refer to the following information:
A sphere moves along a path near a fixed object X which *repels* it with a force equal to $\frac{c}{r^2}$ where c is a constant and r is the distance between centres of the sphere and the object.



The sphere was projected from infinity where its potential energy was zero. The interaction between the sphere and the object is an elastic one.

25 The kinetic energy of the sphere at Q is

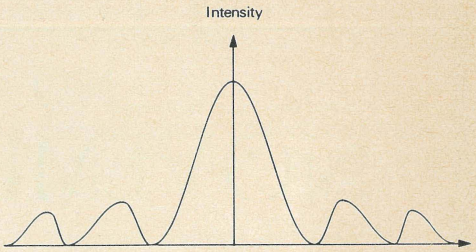
A zero.

B less than it was when at P, but not zero.

C greater than it was when at P.

D the same as it was when at P.

8 A parallel beam of monochromatic light is incident on a single slit. The intensity of the diffraction pattern is as shown.



The pattern can be explained if one assumes that

A the two edges of the slit are acting as two point sources in phase.

B the slit is acting as a single point source.

C the slit is acting as two point sources with a phase difference of π.

D the slit is acting as a row of point sources in phase.

The *Physics Unit Tests* consist of 21 tests on different topics, a Teachers Information Booklet and List of Answers Booklets. It is further intended that 21 diagnostic aids will be produced to complement each test and offer explanations as to which of the answers is the best alternative.

Original items were submitted by physics teachers in several states and these items were then screened through discussion sessions and trial-testing at a random sample of schools throughout Australia. As a result of the trial-testing, a detailed item analysis was able to be performed, and together with the critical evaluation offered by professional staff, a final selection of the items was made.

There are between 25 and 30 items to each test. They are presented in a multiple-choice format where the students are required to select the correct response from a number of given alternatives. The majority of the tests have four alternatives. The multiple-choice approach has appeared to be more effective and simpler than other methods of testing, and it provides an easy approach for self correction. Diagrams have been included in many of the questions for clarification.

The aim of the tests is quite clear. They are expected to be administered concurrently with the normal physics syllabus and to be an aid to students learning. That is, they should reinforce the student's study program and indicate his weaknesses and strengths in particular topics. In this way, the student should be able to direct his attention to those parts of the syllabus that require further revision.

Space in Mathematics

Greg Cornish

The *Space Test* represents the second publication under the series title, *ACER Mathematics Profile Series,* the first publication in the series being the *Operations Test.*

The *Space Test* is seen as an innovative addition to available published tests for two major reasons. Firstly, this test, as with the others in the series was developed using the Rasch approach. The use of the Rasch approach permitted the development of a measurement scale (called the MAPS scale) on which not only all test items in the series could be located, but also the student results on any test in the series. Secondly, the *Space Test* demonstrates a unique attempt to quantify certain aspects of mathematics which are spatial in nature, or have a spatial character.

Structurally the *Space Test* consists of 128 items which are partitioned into four unit tests each of 32 items. Although primarily intended for students in Years 7 to 10, the *Space Test* may be suitable for students in late primary or upper secondary school. Details on the selection of an appropriate test are given in the Teachers Handbook.

The items in the *Space Test* have been designed to monitor a student's development in certain spatial aspects in mathematics. To this end the item content specifications represent the traditional spatial topics in mathematics and some of the perceptual aspects which underlie these topics. It is proposed that those items in which perceptual aspects are highlighted may suggest learning activities to assist perceptual development where such aspects may be affecting a student's progress. The test items also embrace other relevant characteristics, detailed in the *Space Test* Teachers Handbook.

Two sample items from the *Space Test* have been presented below. These items illustrate two of the types of items in this test, but do not pictorially summarize the *Space Test.*

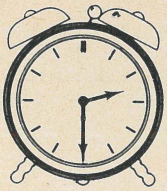
Details of *ACER Maths Profile Series*
Operations Test

Test booklet (8 pages) 25c
Answer & record sheet per 10 .... 70c
Score key (with master profile 'cursor') 50c
Teachers Handbook (41 pages) . $4.50
Specimen Set $5.35

Space Test

Test booklet (36 pages) $1.00
Answer & record sheet per 10 .... 70c
Score key (including master profile 'cursor') 50c
Teachers Handbook (36 pages) . $4.50
Specimen Set $6.10

28 This is the reflection of a clock in a mirror. It appears to be reading 'half past two'.



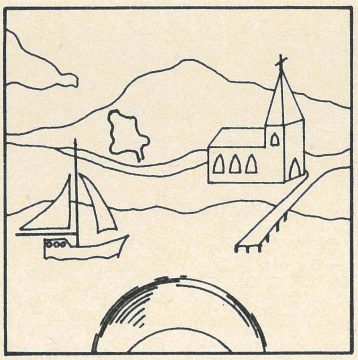
The time shown by the actual clock would be

A 2.30 **C** 9.30
B 6.12 **D** 10.30

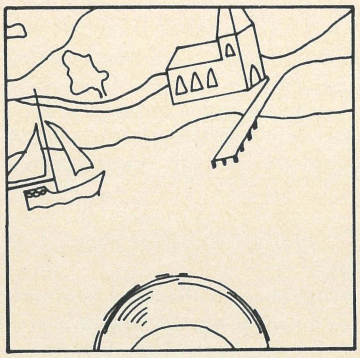
Item 28, Unit 1

This item requires the simple spatial transformation of determining the mirror image of an object.

30 These two sketches show the view from the cockpit immediately before and after an aeroplane made a manoeuvre.



Before



After

The aeroplane has

A dipped its right wing only.
B dipped its left wing only.
C dipped its left wing and dived.
D dipped its right wing and dived.

Item 30, Unit III

This item, set in a concrete situation, requires spatial orientation with the student as an 'origin'.

Since a Rasch measurement scale was used it was possible to relate this scale to the Piagetian cognitive stages of development. In this framework certain regions on the MAPS scale reflect student progress through various stages of operational thinking. These operational stages are reflected in the items calibrated onto the MAPS scale and a description of the stages is provided in the Teachers Handbook.

Program in Measurement and Evaluation

Test research and development has been a substantial component of the ACER program for many years. This research activity has been supported by specific grants as well as by the users of test materials and testing service programs.

The program of research and development in the area of Measurement and Evaluation has been developed by Council staff to meet the need for sound instruments to measure aptitude and achievement, attitudes and preferences, and to enable evaluation of a variety of educational programs.

The Executive Committee of Council has invited a number of educational and psychological researchers to provide advice and guidance as members of an Advisory Committee on Studies in Measurement and Evaluation. The Committee is chaired by Professor D. Spearritt (NSW) and includes in its membership Mr L.D. Blazely (Tas.), Professor J.A. Keats (NSW), Professor B. McGaw (WA), Mr R. Warry (Qld) and Dr G.J. Whitehead (Vic.) as well as some ACER staff.

The Advisory Committee reviews the program and suggests priorities for research and development. This committee also advises on the technical procedures which should be employed in the preparation and validation of tests and suggests modification and additions to the range of tests and testing services supplied by ACER.

There are three main categories within the area of Measurement and Evaluation. The first concerns the development of tests and educational materials for use by teachers and guidance officers while a second category is concerned with the development of tests and other instruments for use by psychologists. The third category is concerned with the preparation of tests for testing service programs. A number of projects within each of these categories are described below.

Development of Tests and Educational Materials for use by Teachers and Guidance Officers

Curriculum Materials Evaluation

This project involves the development of criteria which can be used by teachers to evaluate curriculum materials which are available commercially.

Junior Secondary Mathematics Topic Tests

These tests have been developed in response to a need for diagnostic tests in Mathematics at the junior secondary school level. The tests of the *ACER Mathematics Profile Series* include tests of operations, spatial development, and measurement. The Rasch model has been used in the development of these

tests and each test and sub-test can be related to a common scale. The *Space Test* is described in more detail in another section of this *Newsletter.*

Physics Unit Tests
These tests have been developed to assist the diagnostic evaluation of a student's progress in the last two years of secondary school Physics. The tests and associated diagnostic aids are described in more detail elsewhere in this *Newsletter.*

Screening and Diagnostic Tests for Early Primary School
A series of simple assessment devices suitable for use in the early primary school years is being developed. Materials being prepared include a basal word knowledge test, tests of receptive language, copying skills, phonic skills, spatial relationships and number correspondence.

ACER Mathematics Test Norming Program
The last six tests in the *ACER AM Mathematics Tests* series have been normed and the manual for the complete 16 topic areas in the series has been prepared for publication early in 1979.

School Achievement Tests
It is proposed to develop a battery of school achievement tests and checklists for Years 3 to 9. These instruments may be used by teachers to survey achievement to determine which children meet specified criterion levels of performance, and as a basis for remediation and/or further learning.

TAFE Tests
This project aims to provide appropriate selection tests for apprenticeship and middle-level courses together with a pool of written and performance tests appropriate for some specific trade areas.

Career Planning and Guidance Program
The Careeer Development Inventory (Super) is being adapted and validated for use in Australian conditions.

Chemistry Unit Tests
This new project aims to develop a kit of tests to be used for diagnostic evaluation of student performance in Year 12 Chemistry. In addition to the development of tests it is anticipated that diagnostic aids will be prepared.

The Development of Tests and Instruments for Use by Psychologists

Higher and Intermediate Level Group Ability Tests
The existing AL-AQ and ML-MQ group ability tests are being revised and renormed. Parallel versions of these tests and of the existing B40 test are being prepared and normed also.

Studies of Tests of General Ability
This project aims to provide a theoretical framework and a methodology for the assessment of strategies that individuals use during problem solving. The implications of such a 'process model' are being investigated both in relation to teaching and in relation to the assessment of general and specific abilities and achievement.

Testing Services Program

Australian Scholastic Aptitude Test
At the present time, the ACT, Queensland and Western Australia use student performance on the ASAT for the moderation of school assessments at Year 12 level. These States jointly commission the preparation of a new series ASAT Test annually.
ASAT Special Testing Program
More than 2500 candidates sit each year for special testings with versions of the ASAT Test for mature age and special entry into tertiary institutions.

Australian Law Schools Entrance Test
The University of Melbourne in collaboration with the University of New South Wales, Monash University and the ANU have commissioned the development of an *Australian Law Schools Entrance Test.*

Co-operative Scholarship Testing Program
This program is conducted each year on behalf of a large number of independent schools in all Australian States.

Miscellaneous Testing Services
Regular testing programs are conducted for the Victorian Nursing Council, the Psychological Corporation (USA) and Educational Testing Service (USA). In addition, selection test scoring and reporting services are provided on a contract basis for a number of semi-government authorities.

New from ACER

Books

Parish Primary School Survey 1976
J.M. Darmody pp 174 ..... $7.50

Bearings in Moral Education
Brian Crittenden pp 96
(Australian Education Review No. 12) $4.00

The Renewal of Australian Schools: Perspectives in Educational Planning
J.V. D'Cruz and P. Sheehan (eds)
pp312 ..... $9.95

Personal Identity in a Multi-cultural Society
Barbara Falk pp16 ..... $1.00

Tests

Physics Unit Tests
The recent publication of the Group 2 tests has allowed the release of the full range of 21 tests.

Individual Tests
Test 1 Physical Measurement ..... 15¢ per copy
Test 2 Vectors ..... 25¢ per copy
Test 3 Motion in one dimension ..... 25¢ per copy
Test 4 Motion on a plane 25¢ per copy
*Test 5 Dynamics ..... 25¢ per copy
Test 6 Work and energy 15¢ per copy
Test 7 Linear momentum 25¢ per copy
*Test 8 Oscillations .... 25¢ per copy
*Test 9 Gravity and Kepler's law ..... 15¢ per copy
*Test 10 Waves ..... 25¢ per copy
Test 11 Light — reflection and refraction ..... 25¢ per copy
*Test 12 Light — interference, diffraction and spectra ..... 25¢ per copy
Test 13 Models of light . 25¢ per copy
*Test 14 Kinetic theory of gases ..... 25¢ per copy
Test 15 Static charges .. 15¢ per copy
Test 16 Electric field and potential difference ..... 25¢ per copy
*Test 17 Current electricity ..... 25¢ per copy
Test 18 The magnetic field 25¢ per copy
*Test 19 Induced EMF . 25¢ per copy
*Test 20 Atomic physics 25¢ per copy
*Test 21 Quantum physics ..... 25¢ per copy

(Group 2) Set of 10 Tests
(Nos 5, 8, 9, 10, 12, 14, 17, 19, 20, 21)
See * above for subject titles $2.40 per set
Group 2 List of Answers Booklet ..... 50¢ per coy

(Group 1) Set of 11 Tests
(Nos 1, 2, 3, 4, 6, 7, 11, 13, 15, 16, 18 ..... $2.45 per set

Group 1 *List of Answers Booklet* ..... 50¢ per copy

Teachers Information Booklet ..... 75¢ per copy

NEW FROM ACER

The Australian Council for
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THE RENEWAL OF AUSTRALIAN SCHOOLS: A CHANGING PERSPECTIVE IN EDUCATIONAL PLANNING

Edited by J.V.D'Cruz
La Trobe University

and

P.J.Sheehan
University of Melbourne

A massive program for the renewal of Australian schools was initiated in 1973. The intention was that for the first time the Australian Government would take the initiative in a major and continuing program to improve all types of schools, government and non-government, primary and secondary. To that end, an Interim Committee was initially formed and shortly after the permanent body of the Australian Schools Commission was founded to undertake the task of the renewal of Australian schools. One consequence of this national program of renewal has been that whereas the Australian Government spending on schools was $99 million in 1971-72, it now has committed itself to spend $700 million in 1979.

However, as this expenditure argues, any attempt to review and evaluate the performance of the educational renewal effort in Australia has to contend in 1978 with two sets of hard facts. Firstly, after five years of intense educational activity, there remains an unease in the Australian community about the health and direction of Australian education. In spite of big increases in expenditure on education, the concern about the quality and direction of Australian schooling is, today, even more widespread in the community that it was in 1972. Secondly, the rapid increase in the volume of resources devoted to schools is over. After the dramatic increases in Commonwealth funding for schools in 1974 and 1975 and large increases in State Government funding for schools in the three years to 1976-77, the indications are that the volume of funds available for schools from both levels of Government had stabilized by 1978 and 1979. In summary, as Australian schools find it increasingly harder to secure money for their programs, a multitude of issues remain unsettled. Hard facts have, therefore, challenged Australian education and the renewal programs of the Australian Schools Commission.

The Renewal of Australian Schools offers the first review and evaluation of a national Australian renewal program in education which the Australian community had once hoped would lead to the most far reaching and worthwhile reform of Australian schools. The contributors are among the foremost writers on the Australian education scene. They deal with important issues in depth and with even judgement. Education remains central to the wider cultural and political arena without being distorted and trivialized by petty politicking. The Renewal of Australian Schools looks set to play an important part in the debate about educational thought and practice in Australia and in the debate about the future role of the Australian Schools Commission.

CONTENTS & CONTRIBUTORS

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Signed .....

Please supply ..... copy/copies of Renewal of Australian Schools: A Changing Perspective in Educational Planning, @ $A9.95 each (post and packing included).

Cheque/Money Order enclosed ☐

Send book/s with invoice for payment ☐

Please send *ACER Annotated Book List* (gratis) ☐

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