



- 4 DEC 1969

australian council for educational research

newsletter

no 3, summer 1970

Many teachers of mathematics are becoming increasingly aware of the problems and difficulties associated with assessment of students in mathematics. Many are beginning

two hundred much-worked-over and tried test questions have been classified into various categories according to type, form of presentation, and difficulty. The easier questions

out test prescriptions, and for criticizing test items, are described. Experience at ACER has indicated that it is virtually impossible for an examiner (or teacher), working alone, to produce a quality objective test. (Just as it is impossible for a single teacher to mark reliably an extended answer test.)

So transcripts of two panel meetings which were called together to discuss the prescriptions of a mastery test, and to criticize test items, are included in the book, in order that teachers might gain some insight into the tremendous importance of inter-personal dialogue in test construction.

Objective Tests and Mathematical Learning

to have glimmerings of unease about their current testing efforts, and are looking for ways of improving their tests. In particular, many teachers have become interested and intrigued at the possibility of using test questions in which the unreliability due to marking is reduced almost to zero through the use of short-answer or multiple-choice responses.

KEY QUESTIONS

How does a teacher assess his students in mathematics? To what extent does he confuse a student's mastery of learned material with the student's problem-solving ability?

To what extent should the function of a test determine its content? What is the difference between a diagnostic test and a predictive test? And are there different subsets of diagnostic tests and predictive tests?

These questions, and many others, are discussed in *Objective Tests and Mathematical Learning*.

The author has for the past three years been Chief Examiner for the CSSE Quantitative paper.

In the appendix to the book, over

are suitable for good Form 2 students, and the more difficult ones could be used for Form 6 students.

However, these particular questions are of a very special kind. They are largely unrelated to the specific mathematical topics taught in schools. They are tests of 'instant learning', of the student's ability to handle mathematical situations different from any he has previously met.

Often in the classroom situation this is *not* the aspect of student behaviour which we are concerned to assess. Inevitably tests of this sort will produce a distribution of scores which conform to a more or less skewed normal distribution, with its personal implications of failure and hopelessness for the poorer students.

CLASSROOM TESTS

The early chapters of the book, therefore, deal with the various functions of classroom tests—diagnostic, mastery and predictive, as well as the tests of mathematical learning exemplified by the scholarship questions.

In addition, methods of writing

ESTIMATES OF ERROR

Finally, simple methods for determining the internal consistency of the test, and for estimating the error of the test, are given. It is argued that in the interests of professional honesty such estimates of error should always be attached to a mark or grade awarded to a student.

Whilst it is hoped that the examples of objective test questions included in this book may be of value to teachers, it is believed that if some of the procedures discussed for teacher-produced tests are implemented, this will lead not only to an improvement in mathematics assessment, but also to an improvement in mathematical teaching and learning.

The book *Objective Tests and Mathematical Learning*, by Noel Wilson (price \$3.15), will be published in December.

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Language Development

It is generally accepted that there are at least three interrelated sequences of development relevant to the learning of language. John B. Carroll in his book *The Learning of Language* defines these three areas as: (1) 'cognitive' development, that is, a child's capacity to recognize, identify, discriminate, and manipulate the features and processes of the world around him; (2) development of the capacity to discriminate and comprehend the speech he hears from others in his environment; and (3) development of ability to produce speech sounds and sequences of speech sounds that conform more and more closely to the patterns of adult speech.

CHILD'S VOCABULARY

The vocabulary development of a child is rather slow at first. Six months after he has said his first 'meaningful' word, he may still know only a few words. There comes a stage, however, when he acquires a much bigger vocabulary very rapidly. This seems to occur when, in his cognitive development, the child has reached the point of perceiving that things, events, and properties have 'names'. During this 'naming stage' he learns to ask questions like 'What's that?' 'What's that called?' 'What does that mean?'

By the time the child reaches school, say by the age of five, his vocabulary is often quite extensive, particularly if he has rich verbal experiences in his environment. Estimates of the child's vocabulary at this stage range from an incredible 23,700 words to a conservative 3,000. It is possible, however, for a Grade 1 child to have a vocabulary of 7,500 words.

Regardless of which of these estimates of a child's preschool vocabulary is correct, we accept that the child needs a fairly substantial vocabulary to meet the demands of the school environment and to apply the known language skills still further to embrace reading.

VERBAL COMMUNICATION

Many children come to school ready and willing to talk. But there are also those who need encouragement and help to verbalize. Some children may be reluctant to speak because of shyness; others may lack the skills or knowledge to verbalize. The latter are the ones which should cause us greatest concern, and we should seek to discover what has caused the retardation in language development.

The child may come from a home where English is not the first language and where it is rarely spoken. He may come from a family in which verbal communication is rare, a not uncommon occurrence in low-income families; or the child may have some mental or physical defect which has delayed normal development.

The problem of how to provide assistance in the field of language development has concerned us for some time. We knew of the materials being developed by Lloyd M. Dunn of the Institute on Mental Retardation and Intellectual Development, George Peabody College, Nashville, Tennessee, and by James O. Smith, formerly also of George Peabody College, and now Associate Professor of Special Education, University of Kansas, Lawrence, Kansas, so we decided to obtain sets of their materials to evaluate their usefulness to Australia.

PEABODY KITS

The first of the materials, Peabody Language Development Kit Level 1 (PLDK), was first tried experimentally in the USA in 1964 with groups of underprivileged children and educable retarded children. It was with children such as these that the materials were seen as being of most benefit. The first experimental edition has now been replaced by the revised Level 1 and joined by Level P, Level 2 and Level 3.

The authors originally saw the PDK as having a three-fold purpose. It was designed (i) to stimulate the overall oral language facility of the disadvantaged and retarded, (ii) to develop their verbal intelligence through training, and therefore (iii) to enhance their school progress.

Following our examination of the materials, we reached the conclusion that whilst the kits could be of great benefit to disadvantaged children and children with special problems, they could also form a useful base to the language development programme in preschool and infant classrooms. We decided therefore to add the range of Peabody Language Development Kits to our stock items as we considered Australian teachers would find them of value. We also decided to stock,

The ACER Newsletter is published quarterly by the Australian Council for Educational Research, Frederick Street, Hawthorn, Victoria 3122. Communications should be addressed to the Editor, ACER Newsletter, at this address.

separately, the manuals for the kits—we regarded these as useful reference books for language development lessons even without the kits.

LANGUAGE PROGRAMME

Emphasis in the lessons in the PDK is on reception, expression and conceptualization. The kits stress an overall oral language and verbal intelligence training programme rather than specific training in selected psycholinguistic processes. Reception is provided through the three key sense modalities of sight, hearing, and touch (see, hear, and feel), and expression is provided through the vocal and motor channels (say and do).

There are a total of twenty-three different types of activities used throughout the programme. These concentrate on the development of verbal intelligence involving divergent, convergent, and associative thinking, during the daily language development lessons. The activities do not require reading or writing skills, and no seat work is involved.

Each kit contains a variety of

items which differ from those in other kits, e.g., Level 2 contains a 'teletalk', a two-way inter-communication device. However, many of the types of items remain constant. All kits have soft hand puppets which are intended to motivate and draw out the whole group and in particular the withdrawn; stimulus cards to build a vocabulary and stimulate associative thinking; large

story posters to stimulate imagination and continuity in story telling; plastic colour chips to teach colours, sequencing, motor skills, memory, as well as to reinforce learning; either a tape recording or set of records; and a teacher's manual.

ACER Advisory Services can provide more detailed information on the Peabody Language Development Kits to those interested.

A New Publication Series

The appearance of the first title, *Using an Aural Stimulus for a Writing Task* by Jillian Maling, heralds the start of a new ACER publication series—ACER Occasional Papers.

The Occasional Papers will present work on varied topics of current concern. They should, above all, interest the classroom teacher and provide him with an insight into projects involving ACER staff or under ACER's direction.

Using an Aural Stimulus arose from a nationwide experiment carried out in August 1968. Some 620 CSSE examination centres returned essays and completed questionnaires. The essays were stimulated by two specially prepared scripts of speech, music and background noise, broadcast in all states by the ABC. Students wrote their papers after hearing the broadcast in school.

Jillian Maling's report gives the text of the broadcasts and the comments of teachers and examiners. It describes the quality of the reception and of the resultant writing.

She reaches two main conclusions from her experiment: first, that an aural stimulus is effective in promoting enthusiasm and creativity in a way that traditional methods often fail to do; second, that such a stimulus produces writing which differs from the products of verbal and pictorial stimuli.

If technical presentation problems can be overcome, there may well be a case for including an aurally-stimulated component in the CSSE Written Expression paper—at least

on the grounds that it adds a further dimension to the writing being assessed, and therefore makes the assessment a more valid one.

Using an Aural Stimulus was published in September. It is available from ACER at 75 cents per copy.

Two other Occasional Papers are in the press. Number 2 is *Admission to Tertiary Studies* (\$1.50) by Bernard Rechter. It is an account of work to date in the Tertiary Educa-

tion Entrance Project: a report of the development of the TEEP test battery and some proposals for its use.

Closed Circuit Television in Teachers' Colleges (\$0.75) by Bernard Hawkins will be the third title in the series. It reviews the various possibilities open to those who have CCTV facilities and who are engaged in teacher training. The report is based on a survey carried out by the author in 1969.

Occasional Paper 2 will be published in late January, and number 3 in February.

SCHOLARSHIP TESTING

During the latter part of each year, Advisory Services constantly receives requests for general ability (intelligence) tests as practice for scholarship examinations. These requests are usually made in ignorance of the nature and purposes of a general ability test.

The sale of general ability (intelligence) tests is restricted to qualified teachers for much the same reasons that personality tests are restricted to qualified psychologists. A certain specialized training is required to enable the user to interpret the scores on what are, in fact, measuring devices. With this training it is expected that the teacher and psychologist will avoid some of the pitfalls associated with the use of these tests.

A test of general ability is a measuring device, not a teaching one. While it is true that scores can be slightly improved by using similar tests, much of this 'practice effect' is nullified in scholarship test-

ing by providing a practice section on the actual test.

In the long run—and admittedly this cannot be achieved in a few weeks—a child's 'general ability' is fostered by teaching which places him often enough in situations which force him to think in a problem-solving manner.

Probably the best way to help children overcome any apprehension about 'objective' tests is for teachers to construct their own objective tests for use as part of their regular testing programme throughout the year.

Books which can be of assistance to teachers in constructing objective tests include: *An Introduction to the Principles of Classroom Testing*, J. H. Theobald; *Making the Classroom Test*; *Testing in the Primary School*, S. S. Dunn; Schools Council Examination Bulletins; *Selected Items for the Testing of Study Skills and Critical Thinking*, H. T. Morse, G. H. McCune.

Secondary Schooling in the Sixties

The secondary school has probably raised more controversy than any other social institution in Australia during the postwar period. Much of the debate has centred on the problems created by the rapid growth in enrolments. More recently, however, discussion has shifted from matters related to physical shortage to more fundamental problems concerning the learning process and its outcomes. Indeed the whole role and function of the secondary school has come up for examination.

One of ACER's major projects, just completed, has been a detailed study of these changes. Titled *Secondary Schooling in the Sixties*, this study has taken account of a whole range of factors coming to bear on the secondary school in Australia. These include such aspects as the size and nature of the student body, financial policy, the teaching force, timetabling and curricula. Developments in each particular area have been closely analysed and their implications for the learning process discussed.

A CRITICAL REVIEW

Our approach therefore has been more critical and evaluative than that of previous ACER reviews. In 1964 the Council adopted a policy which favoured the preparation of more interpretative statements on changes in particular fields of Australian education. The establishment since then of a division for comparative-historical studies and the setting up of a data storage and retrieval system reflect this shift in approach.

Work on the project proceeded, then, on an entirely new basis. The regular processing of published data in reports, journals, Hansards and newspapers provided a continual stream of up-to-date information on a nationwide scale. In addition, the research officer involved visited each of the states to have discussions with key personnel in depart-

ments of education, universities, teachers' unions, Catholic education offices and the schools. Their ideas and special knowledge contributed much to the study.

Another major task was the analysis of statistical data. Despite a recent improvement in some respects, the presentation of statistics on Australian education remains unsatisfactory. Typically, statistics are either prepared on a different basis from state to state or are simply not available on a nationwide scale at all. The entry of the Commonwealth Bureau of Census and Statistics into the field of school enrolments has proved therefore significant. In areas such as finance and staffing, however, the task of arriving at figures which have meaning and are comparable from one state to another as well as being consistent from year to year becomes a most formidable one.

The analysis of the general framework in which the Australian secondary school functions has constituted a major element in the study. It is important to know, for instance, what kinds of physical pressures the secondary school has experienced and how well it has coped with them. The rapid increase in the proportion of sixteen-year-olds at school, for example, has profound implications for the kinds of courses offered and how they are taught.

NEED FOR PLANNING

One of the conclusions of the study is that the present administrative framework in which secondary schools operate in Australia is not favourable to comprehensive and continuing planning for desirable reform and change. Too many recent policy decisions have been taken on a piecemeal and *ad hoc* basis. Committees set up during the sixties to inquire into secondary education in the various states have not been in a position to assess the full implications of their recommendations.

Nor is any overall authority responsible for accepting these proposals and providing the means for their effective implementation. Similarly, the intervention of the Commonwealth government in funding education and the growth of state aid to independent schools have created a situation with which departments are not geared to cope.

Individual secondary schools, too, face radically new problems. Staffs find themselves encouraged to take greater account of current knowledge of the learning process as well as of scientific and social phenomena. Though given relatively little preparation for radical innovation, teachers are being asked to undertake on their own initiative tasks which appear far more difficult and demanding than those traditionally tackled in the classroom.

At the annual meeting of the Council in October, Professor P. H. Partridge was appointed President in succession to the late Dr T. L. Robertson. Dr J. A. L. Matheson retired from the Council and Mr S. W. Woods (Director of Special Services, Department of Education, WA) and Professor R. Selby Smith (Dean of the Faculty of Education, Monash University) accepted invitations to join the Council as coopted members.

The members of the executive now are: Professor P. H. Partridge (ACT, President), Mr W. Wood (Qld, Vice-president), Mr A. H. Webster (NSW), Dr S. A. Rayner (Qld), and Professor R. Selby Smith (Vic.).

The secondary school finds itself in an invidious position at the beginning of the 1970s. Increasingly a focus of attention from a society troubled by great social, technological and philosophical change, the secondary school has yet to establish its identity as a stage of education in its own right. Hopefully, *Secondary Schooling in the Sixties*, by R. T. Fitzgerald, which will be published in 1970, will contribute to a clearer understanding of the outstanding problems that need to be faced and resolved in this area of Australian education.