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Language and Conceptual Abilities of Pre-school Children

In recent years increasing emphasis has been placed on the importance of the early experiences of the child in laying the basis for the development of later skills and abilities. This has led to a growing interest in pre-school education, particularly the provision of special pre-school programs for children from disadvantaged backgrounds.

Relatively little research has been undertaken at the pre-school level in Australia. A few experimental programs have been developed for special groups of children, particularly Aboriginal children, but in general pre-school education in Australia follows the traditional pattern. That is to say, its emphasis is mainly on the socio-emotional development of the child, and it is provided mainly for children of middle-class and professional backgrounds who can afford to pay the fees that are normally charged.

However, the impact of overseas work in the field of pre-school education is now leading to a change in emphasis and a recognition of the need to provide pre-schooling for all children, particularly those from poorer and less privileged backgrounds.

One of the problems in working in this area is that relatively little is known about the extent of the need. What are the abilities of normal middle-class children on entry to school? How many children have failed to develop these abilities before they enter school? What sort of pre-school programs are required to help children develop the skills and abilities that are required as a preparation for formal schooling?

RESEARCH PROJECT

ACER is seeking answers to some of these questions in its current research project on the language and conceptual abilities of pre-school children. This project is funded by the Australian Advisory Committee on Research and Development in Education, and its general aims are as follows: (1) to study the range of abilities of children on entry to school; (2) to determine what abilities are related to school readiness and later school achievement; (3) to see if the abilities that are related to school readiness and achievement can be developed by special pre-school programs for children who lack these abilities; (4) if these abilities can be developed by special pre-school programs, to determine whether or not this has any effect on later school achievement.

For the moment, the study is concerned with the first two questions only. Ultimately, it is hoped that the study will be extended to investigate the two final questions.

A sample of children drawn from pre-schools and day nurseries in two contrasting socio-economic areas of Melbourne has now been tested on a series of language and conceptual tasks. These children will be re-tested on entry to school and at the end of their first school year on a series of school readiness and school achievement tests. In addition, they will be retested on the series of Piagetian tests administered at the pre-school level, in order that a more detailed study of the relationship between the development of Piagetian concepts and school achievement may be undertaken.

SCHOOL READINESS

In addition to this follow-up study of children tested at the pre-school level, a survey of school readiness on a larger sample of children will also be undertaken. This survey will be undertaken on samples of children drawn from the preparatory grade intake of selected state schools in the same areas as the pre-school sample was drawn from. These children will be tested on a battery of school readiness tests on entry to school and school achievement tests at the end of their first year of schooling. A study will then be made of the relationship between school readiness and later school achievement, and other factors such as age of entry to school and socio-economic background. This survey of school readiness will

provide information on a larger sample of children than can be included in the pre-school follow-up study, and will complement the information being obtained by the more intensive study of the smaller sample of children.

The findings of this study should be relevant to determining what groups of children are most in need of pre-school education, assuming that the aim of pre-school education is to develop the language and conceptual abilities that are necessary for school readiness. In indicating the types of language and conceptual skills that are most closely related to later school achievement, this study should also provide a basis for determining the goals of pre-school education and devising appropriate methods of achieving these goals.

JUNIOR SECONDARY SCIENCE PROJECT

Early in 1966 a small group of teachers came together at ACER to produce science learning materials for junior secondary students in Victoria. This undertaking, known as the Junior Secondary Science Project (JSSP), eventually produced eighteen units of materials. They covered a comprehensive range of science topics and provided an individualized science learning program for students in the first and second years of secondary school.

The main part of each unit was a series of cards on which was set out a basic learning sequence for the topic concerned. The sequence consisted of reading material, written exercises, and instructions for experimental work. It was intended that all students in the class should work through this sequence, each at his own pace, taking one card at a time, completing the work on it, and exchanging it for the next one in the sequence. Some of the cards contained short progress tests. According to his test score, the student was then directed either to a remedial card or to the next card in the learning sequence.

Pamphlets of optional activities, designed to stimulate research into ideas raised in the cards, were included to supplement the basic material. Faster-working students could be fruitfully occupied with these while others continued with their basic work. The cards and pamphlets for each unit, together with an 'unseen' test to complete the unit and in some cases reference material and apparatus, were packed into a coloured box—green for first-year materials and red for second-year.

WIDER INTEREST

By the time of publication, interest in JSSP was no longer limited to Victoria. Some Tasmanian and South Australian schools had taken part in the trials that preceded publication and went on to use the completed materials. Encouraged by the success of the project, ACER, with the support of several examining and other bodies, approached the Commonwealth for assistance with a more ambitious project which was to be Australia-wide. As a result the Australian Science Education Project, popularly known as ASEP, was begun. (See *ACER Newsletter* no. 15).

However, there was still a place for JSSP materials in schools. As stocks of the original boxed edition became depleted, it was decided by the publishers (Cheshire Publishing) and ACER that a revised edition should be prepared; not in boxes this time, but as booklets. The revision was begun at ACER in May 1972 in association with Cheshire's, using feedback material and evaluation reports as a guide. The revision aims included making changes so that the materials would be suitable for use in all states.

The material on cards, in research activities pamphlets, and in reference booklets (where they occur), is being gathered into one well-illustrated two-colour booklet for each unit. These booklets are designed to be used in the same way as the cards. A section in the book corresponds to a card, and students will be able to work through the learning sequence in the same way as before. The only difference will be that they will have all the material in front of them at one time, which will enable easy reference to be made to work covered in previous sections and so provide a greater sense of continuity. A small book of teachers notes will accompany each students booklet, and diagnostic aids are being introduced to go with the 'unseen' tests that complete each unit.

SEVENTEEN UNITS

The titles in the new edition are, with one exception, the same as in the original. The new JSSP will consist of seventeen units; unit Green 1, Beginning Science, has been omitted. Interstate differences in age of junior secondary students have led to the old system of 'green' and 'red' being abandoned. The suitability of each unit for a particular level will be indicated in the teachers guide to that unit.

Despite the new format, the new JSSP units retain the aim of the original: to provide an individualized science learning program for first- and second-year students at secondary schools. Some of its units fit in closely with the ASEP materials, filling gaps in the latter (the units on astronomy, sound, and temperature come into this category), others provide an alternative approach to topics dealt with by ASEP, and still others deal with topics unique to JSSP. The JSSP material therefore both stands on its own as a junior secondary science learning program and complements the ASEP materials.

The following list indicates the order of publication and the first units may be expected around the middle of this year. The titles are: Materials of the Universe, When Substances Are Mixed, Things and Places, Looking for Patterns, When Substances Are Heated, The Sky Throughout the Year, Earth's Neighbours in Space, The Changing Earth, The Surface of the Earth, Forces and Interaction, How Hot Is It?, How Does it Sound?, How Mammals Function, Compounds in Solution, Energy for Life, Food for Living Things, Work and Energy.

The first unit to be published in the revised edition of JSSP will be *Materials of the Universe*, which replaces the old JSSP unit Green 3. All the material originally on cards and in research activity booklets has been included in one students booklet, the cover of which is shown above. *Materials of the Universe* provides an introduction to the particle model of matter. By working through the booklet individually, students can absorb this fairly difficult concept in their own time and according to their capabilities. The double-page spread below shows part of a section which deals with the compressibility of solids, liquids, and gases.

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In your workbook write the heading 'Can matter be compressed?', then copy the following sentence, using the correct alternative.
Air (can, cannot) be compressed.

Can liquids be compressed?

Partly fill the syringe with liquid by placing the end in the liquid and raising the handle. Place your finger over the end and try (not too hard!) to compress the liquid. Empty the syringe.

We can assume that most liquids will behave in a similar way as far as being compressed is concerned. What do you infer about the extent to which liquids can be compressed?

Write your answer to the above question in your workbook. Remember that, for you to decide that liquids can be compressed, you must be able to move the handle of the syringe so that the liquid is squeezed into a smaller space.

Can solids be compressed?

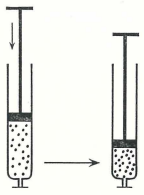
Pull the handle portion out of the syringe and place the wooden rod inside the empty cylinder. Replace the handle and push down on it and try to compress the rod (squeeze it into a smaller space).

. Did you compress the rod to any obvious extent? (If there is a rubber plunger in the syringe, allow for the fact that rubber can be compressed.)

Assuming that most solids behave in the same way as the wooden rod, what can you infer? Write this inference in your workbook using a clear sentence. (Is it reasonable to infer that *all* solids behave in this way? How could you find out?)

Before you read further, check what you have written by comparing it with the answers at the end of this section (page 22).

Solids and liquids cannot be compressed because there are no spaces between the particles.



Gases can be compressed because there are spaces between their particles.

***Are* there spaces between the particles?**

Think about what you have discovered. What information has it given you about particles in matter?
Most solids and liquids *cannot* be compressed easily. We can explain this as follows:

Assuming the particles themselves cannot be compressed, then the particles in solids and liquids are packed so closely together that they cannot be squeezed into a smaller space.

Gases *can* be compressed. Since the particles themselves cannot be compressed, then there must be spaces between them so that they can be squeezed closer together.

Put a heading in your workbook, such as 'More information about particles', then copy and complete the following sentences.
If we assume that the particles themselves cannot be ..... then, from our experiments on compressing matter, we can infer that in ..... and ..... there is little space, if any, between the particles, and in ..... there is space between the particles.

If you are not sure whether the words you filled in are correct, show your work to your teacher.

Check your progress 3

Test what you have learned by answering the following questions. Write the answers in your workbook.

1 Have a classmate check your spelling of these words:

compressed	particle
syringe	model
assume	Democritus

You may learn the spelling first but you must write the words when you are being tested.

In each of the next four questions (2-5) select the best answer and write the letter corresponding to it, e.g. 6 (a).
2 We have found that two states of matter *cannot* be easily compressed. These are
(a) solids and liquids.
(b) liquids and gases.
(c) solids and gases.

PAT Reading Tests

A new series of reading tests will soon be released by ACER—the Progressive Achievement Tests (PAT): Reading—designed for use in Grades 3-9. The reading tests form part of a battery of standardized tests first published by the New Zealand Council for Educational Research in 1969. The tests were standardized in Australia by ACER in November 1970.

The tests are intended to assist teachers in determining the level of development attained by students in the areas of reading comprehension and reading vocabulary. The reading comprehension tests measure both factual and inferential comprehension of prose material.

REUSABLE BOOKLETS

The reusable test booklets are organized in an overlapping format and contain the test questions for all pupils between Grades 3 and 9. Pupils record their responses on a standard answer sheet which covers all grades; there are separate answer sheets for reading comprehension and reading vocabulary. Each answer sheet can be used for only one test administration.

The handbook provides details on administering, scoring, and interpreting the tests, data for which are presented as stanines and percentile ranks for each state.

It is recommended that a specimen set of either form be purchased to study the material prior to the purchase of multiple copies. The specimen set consists of one reading comprehension test booklet, one reading vocabulary test booklet, score keys, one copy of each standard answer sheet, and a teachers handbook. Further details on the series may be obtained from the ACER Advisory Services.

Beyond Place or Time to Alternative Learning

Ron Fitzgerald has recently returned from a six months' overseas study tour. His Churchill Fellowship enabled him to examine alternative approaches to learning for older adolescents. This introductory article forms the first of a series dealing with the following aspects of alternative approaches to learning: within the school grounds, beyond the school base, and the community college concept.

Until the sixties, nations (outside North America) permitted only a gifted or wealthy elite of sixteen-year-olds to stay on at school. By 1970, postwar policies of extending opportunity had produced a much more mature and perceptive group of students. They had begun to question the lack of fit between the realm of learning and the world of everyday life.

The prevalent sense of restlessness and incipient revolt among youth is posing a serious threat to the schools, whose routines have long reflected a constant concern with the problem of controlling a conscript company. In the past, teachers have managed in one way or another to impose their arbitrary rituals on the young. Now they need to devise new approaches for adolescents. The latter more readily realize that either by passive resistance or open confrontation they can disrupt the work of the schools.

Attempts to meet the demands of older secondary students have begun to take on radically different forms. These include setting up new types of institution and extending the school base out into the community; there are moves to modify existing school organization and create new types of curriculum. Attempts to improvise make-shift street-corner halls stand out in contrast to steps taken to establish more elaborate school plant.

Only time will show whether some of these more radical approaches will prove viable as general alternatives to commonly existing forms of education. It is one thing to permit the odd experiment on the periphery of a school system. It is quite another to have it applied widely. Two factors—cultural context and required conditions for effective reform—seem especially important here.

First, we are coming to appreciate more and more how educational policy and practice reflect the culture of both the nation and local community. In particular the political system and linked forms of administration affect the scope for experiment and change. Local control of the school system, for example, may find it hard to win a consensus on the form of proposed innovation. On the other hand, educators within a centralized school system can avoid these restraints. But an alternative approach may suit one community, yet, for social or demographic reasons, fail elsewhere.

CAPACITY FOR CHANGE

Second, the capacity of the school to withstand radical change may be very limited. Historically, the mass character of public education has meant a relatively low technical level of operation. This stems in part from the need to train and employ large armies of teachers. Also the narrow confines of the school may not permit much effective interaction between practitioner and client. The rhetoric of education makes much of a concern for individual needs. The reality of classroom life runs counterwise.

Any solution to this dilemma appears to lie outside the realm of schooling. A first step might be to abolish daily attendance and provide ready access to formal learning right throughout life. Serious study on this kind of alternative approach has already begun. Also, we have the certain prospect, not far off, of television-computer-telephone systems of learning linked to home or street-corner learning centre. These schemes will lighten the school's task of transmitting information. As a result educators could devote more time to developing learning activities based on human interaction and geared more specifically to the needs of the disadvantaged.

RECURRENT LEARNING

If formal learning need not be limited to a specific place, neither should it be confined to a certain stage of life. Governments all over the world have begun to consider seriously the principle of recurrent or life-long learning. Already they have mounted joint research projects aimed at devising ways and means to give reality to this concept.

It is clear that educators must take a serious interest in the world of work. They need to be aware of the rapid shifts in the nature of employment and in the development of new careers due to technological and social change. One particular task to which educators could contribute is the construction of career paths and the restructuring of jobs in certain industries which have a notoriously unstable work force. The food trades and transport services are notable examples. In these cases the link between training and education needs to be carefully shown.

In a sense all learning is related to subsequent vocation or career since it involves a change in knowledge and consequent behaviour. It is therefore mythical to maintain that academic studies are not vocational in any sense or that technical studies lack educational value. A continued experience with academic study may turn people away from types of jobs for which they are suited. Because of its potential negative as well as positive effects, continued learning should be treated as a complex social and personal issue.