

TABLE 21
VALUE OF METHODS COURSE TOPICS AS A BASIS FOR AN
INSERVICE COURSE REPORTED BY NON-ESSM TEACHERS

Item No.	Part C Course Topic	N	% Non-ESSM Value Response					
			1	2	3	4	5	6
1	Open ended experimentation	26	0.0	0.0	3.8	30.8	38.5	26.9
2	Low emphasis on rote memorization	26	0.0	7.7	7.7	23.1	34.6	26.9
3	Experience with activity materials	25	0.0	0.0	0.0	4.0	16.0	80.0
4	Coding student behaviors	26	3.8	15.4	7.7	34.6	23.1	15.4
5	Coding teacher behaviors	25	8.0	16.0	12.0	36.0	20.0	8.0
6	Giving Piaget-type tasks	26	3.8	11.5	23.1	30.8	11.5	19.2
7	Introduction to Piagetian stages	26	3.8	23.1	23.1	26.9	3.8	19.2
8	School practice teaching experience	26	0.0	3.8	3.8	26.9	15.4	50.0
9	Videotapes of task performances	25	0.0	12.0	12.0	20.0	44.0	16.0
10	Slides of classroom teaching	25	4.0	12.0	36.0	20.0	16.0	12.0
11	Films of science class activities	25	0.0	4.0	16.0	28.0	28.0	24.0
12	Activity guides for classroom teaching	26	0.0	0.0	7.7	19.2	34.6	38.5
13	Interaction with instructor	26	0.0	0.0	23.1	30.8	26.9	19.2
14	Miscellaneous readings	26	3.8	15.4	23.1	30.8	11.5	15.4
15	Review of elementary science projects	26	0.0	7.7	23.1	19.2	34.6	15.4
16	Practical "tests"	25	12.0	4.0	20.0	28.0	24.0	12.0

EDUCATING HANDICAPPED CHILDREN FOR TOMORROW'S
SOCIETY

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SUMMARY

As shown by the involvement of the Organization for Economic Cooperation and Development, and of both Federal and State governments through various committees of inquiry, much concern is felt regarding the impact of technological change and of variations in economic conditions upon employment opportunities for school leavers. When the adolescent is handicapped the problems faced are compounded, and we may question the appropriateness of the special educational experiences that have developed in an *ad hoc* manner. In many countries, handicapped children are being offered - often guaranteed by legislation - a free and appropriate education. But at the same time employment opportunities for the handicapped are shrinking, and the notion of sheltered employment is becoming increasingly vacuous through the elimination of many routine tasks due to technological advances.

Research evidence has been gathered in Australia in recent years which highlights some of the problems of educating handicapped children in today's society. This research, together with the reports of several recent inquiries, suggest directions for rethinking the nature of special education services and curriculum in order to anticipate likely employment conditions for the handicapped.

The relationship between schools and society has traditionally been marked by two major transitions, from home to school, and from school to work. In special education, in particular, the first has been increasingly blurred, with home-based programs often starting as soon as the handicapped child is so identified. The second transition is also less clear. Special education has taken a leading role in the development of work experience, but this may prove only a rear-guard action for some handicapped students. The development of integrated programs of meaningful work and lifelong education may prove vital in the future. Not only do we need to develop many aspects of the vocational preparation of handicapped students, but we need to set the world of work in a context of satisfying and challenging lifelong development.

Illustrative examples will be given from several recent Australian studies (a) the education of mildly intellectually handicapped children, (b) the 'natural' integration of children with hydrocephalus and spina bifida, and (c) the evaluation of services to the moderately retarded.

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CONSTRUCTING MEANING WHILE READING

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In a review of the literature in reading, MacGinitie (1975) made a number of suggestions for future study, including the proposal that the different comprehension skills identified by Davis (1972) at high school and college levels be further investigated at younger age levels. MacGinitie recommended that these investigations should include studies to determine the influence on reading comprehension of skills "in remembering ideas [and] weaving together ideas" (p. 21) which are heard and understood.

The ability to combine ideas becomes increasingly important during reading development. In some cases, pictures or transition words may serve as cues but these cues are often omitted and the connection between ideas is not explicit but has to be inferred by the reader. For example, that this skill in organization may be necessary even for a beginning reader may be illustrated by the following complete page extract from the Ladybird Key Words Reading Scheme (Murray, 1964).

Here we are, says Jane.

We are home.

It is fun in the water.

The child has to make the connection between the ideas in the last sentence and those which have appeared previously in the story - not just in the preceding sentences but in the preceding pages. Without this capability, the last sentence will seem quite irrelevant or the reader may conclude that Jane's home is in the water or even that it is bath night!

In the extreme case, and this may especially apply to some beginning readers, the child may not really expect the reading operation to produce meaning (Downing, 1973). Thus he may be quite willing to process words only at the surface level and he will fail to organize a series of sentences into a coherent and meaningful representation. This is in contrast to the reader (or listener) who does expect meaning and who, in seeking to understand a message, will be concerned with more than verbatim word order but will actively operate on the semantic context to get the gist of the message (Reid, 1974).

A number of experiments with adult subjects (Bransford, Barclay and Franks, 1972; Bransford and Franks, 1971; Franks and Bransford, 1974; Sachs, 1967) have demonstrated this active participation and have provided evidence for a constructive rather than representational model of comprehension and memory. There has not, however, been as much attention paid to the way in which children process similar information, although Paris and Carter (1973) have reported a study which tested second and fifth grade children's knowledge of implied information.

The children in the Paris and Carter study were read a list of sentences such that three sentences comprised a "story." A later recognition test consisted of four different sentences for each story - a true premise, a false premise, a true inference, and a false inference. The results indicated that the children responded in a similar manner to adults by "recognizing" a significant number of true inferences.

The present experiment was designed as a partial replication of the Paris and Carter study but it also used two other methods of probing the information which children store from a series of sentences. One method required written recall and the other required recall by drawing a picture. 241

A combined sample of third and fourth grade children was used since Paris and Carter had found that second and fifth grade children showed the same response pattern and it was anticipated that the children in this experiment would behave similarly. It was also expected that the children would incorporate the information in a series of sentences into either one picture or one story if they remembered the sentences in a constructive rather than verbatim fashion.

The effect of using the marker "a" instead of "the" was also tested since Haviland and Clark (1974) had suggested that subjects may be more likely to combine propositions if "the" is used to mark the nouns. Evidence presented by Maratsos (1974), which demonstrated that young children have mastered the difference between specific and non-specific reference, suggests that the Haviland and Clark proposition may be tested with children as subjects.

Method

Subjects

Eight groups of twelve subjects (six boys and six girls) were randomly selected from 65 grade 4 children and 102 grade 3 children at an upper middle class suburban school. Four groups were from grade 3 and four were from grade 4.

242

The reading comprehension ages for all children were measured using the GAP Reading Comprehension Test, Form B (McLeod, 1967). No subject's reading age was more than six months below his chronological age.

Materials

Subjects in all four groups at each grade level were initially read sets of sentences which were later to be recalled by drawing or writing. For two groups at each grade level, the three sentences were:

The bird is flying away.

The cat is in the tree.

The bird has the worm.

For the other two groups, "the" markers were replaced by "a."

In the second part of the experiment, which partially replicated the Paris and Carter study, there were two conditions. In one condition, the marker "the" was used in three acquisition sentences.

The dog is on top of the box.

The box is in front of the door.

The dog is big and black.

These were followed by a verbal recognition test consisting of the following four sentences which represent a true premise, a false premise, a true inference and a false inference.

The dog is on top of the box.

The box is behind the door.

The dog is in front of the door.

The dog is behind the door.

In the second condition, "the" was replaced by "a" in both acquisition and recognition sentences.

Procedure

Two groups from each grade were allocated to the condition in which the marker "the" was used and two to the "a" condition. Of these two groups, one was given instructions to draw and the other was given instructions for written recall. The instructions were to the effect that the experimenter wanted to see if the children had a good memory. They were told to listen very carefully to some sentences and to try to remember them. They were also told that there would be a short period of number fact practice before the experimenter would ask them to write down (or to draw) what they remembered.

Immediately after reading the sentences to the children, the experimenter gave the group five minutes of oral number fact practice. The subjects then wrote (or drew) what they had remembered.

The instructions were repeated before reading the sentences in the second part of the experiment. This time, however, the children were told that they would be asked some questions about the sentences instead of being asked to write (or draw) what they had remembered. Five minutes of oral number fact practice preceded the reading aloud of the recognition list by the experimenter.

Every child completed both a recognition test and either a drawing or a written task.

Results

Writing and drawing responses

The effect of the different markers and the different instructions is shown in Tables 1 and 2. A construction is indicated by a single drawing with all the information included or by a composite written story. The results for both grades were analysed together because the number of constructions appeared to be independent of grade level. There were 12 drawing constructions in each grade, and one written construction. Eight of the drawing constructions were responses to the marker "the."

Tables 1 & 2
about here

Recognition Errors

The percentage of errors made on the recognition test are shown in Figure 1. The most noticeable result is the similarity between these results and the Paris and Carter results where the marker "the" is used. Twenty out of forty-eight children believed that they had previously heard the sentence containing a true inference. Analysis of variance with sentence type as a within subjects variable and the two different markers as a between subjects variable shows a significant effect due to sentence type ($F = 7.90$; $df = 3, 18$; $p < 0.01$).

Figure 1 about here

Neuman-Keuls tests confirmed that this effect is due to the difference between the true premise and all other types of sentences (for each difference, $p < 0.05$). That is, the children made significantly fewer errors in recognizing the original sentence so that the results do not seem to be due to poor memory for the acquisition list.

There was also a significant difference between the true inference and the false premise ($p < 0.05$) and between the true inference and the false inference ($p < 0.05$), so suggesting that the children have not been confused by remembering only partial information but really have integrated the sentences.

The effect due to the different markers did not reach significance but there is a significant interaction between sentence type and marker ($F = 3.63$; $df = 3, 18$; $p < 0.05$). This seems mainly to be due to the low number of true inference errors in the "a" condition.

Discussion

Although the effect of using the indefinite marker "a" instead of "the" did not significantly influence the number of drawn or written reconstructions, there was a trend towards fewer reconstructions with "a". The effect of using "a"

214

instead of "the" in the recognition test, however, did produce statistically significant differences. When "a" was the marker, fewer true inferences were "recognized" ($t = 4.3$; $p < 0.01$) and, in "a" conditions, there was no significant difference between the frequency of true inference and other types of error.

The latter result is in contrast to the result obtained when "the" was used since this paralleled the findings of Paris and Carter. A significant number of children "recognized" implied information and believed it to be identical to an original premise sentence.

It has previously been proposed that this effect is indicative of the subjects' organizational strategies in storing information. The results of this experiment suggest that the marker "a" has been a deterrent to integrative organization and provide some support for the proposition put forward by Haviland and Clark.

It has also been shown that organization was not so readily apparent when the children were asked to write or to draw what they had remembered. Twelve of the 48 children did show constructive processing in their synthesized drawings but an insignificant number of children combined the sentences under writing instructions. Instead, almost all subjects demonstrated verbatim written recall of the single sentences.

The demand for a drawing may have produced an effect similar to imagery instructions (Levin, 1971-72) and encouraged the children to use organization strategies.

In this case, the result may have been a composite image since the order of the sentence did not form the most suitable sequence for a meaningful picture series.

In the case of written recall, however, the children seem to have been content with verbatim reproduction. Since the initial reading comprehension test results demonstrate that these children have the ability to organize written language for meaning, it seems likely that they were also capable of organizing these test sentences meaning fully. Perhaps they did not see the task as having meaning, either because of child-experimenter expectations or because of the nature of the sentences and their order. If this should be true, however, it is difficult to see why an instruction to draw should over-ride such task perceptions. The explanation, may rather be that the sentences were within total recall (as single units of organization) and so were stored separately for later task requirements.

The children may also have rote learned the acquisition sentences for the recognition test but could have found it necessary to re-organize the information in more economical form before comparing it with new sentences. That such re-organization did take place is indicated by the significant number of errors in which children claimed to recognize information not presented but implied by the original sentences.

The results of this study have provided some evidence of constructive processing in memory by third and fourth grade children. There are, however, indications that many children will use verbatim representation when the task does not encourage re-organization of information.

It is to be hoped that children's failure to re-organize linguistic information (as observed under the writing instructions in the present experiment) occurs only as a result of experimental conditions and that children's classroom experiences will normally require an active construction of relationships, both in listening and reading.

Kail, Chi, Ingram and Danner (1977) reported a study of inferential comprehension among second and sixth graders which used direct questioning of contained and inferred information. Age differences were slight, but performance was markedly related to reading comprehension test scores. In the present study the sample was reasonably homogeneous in reading test scores, and it was not possible to explore this aspect.

Smiley, Oakley, Worthen, Campione and Brown (1977) have noted a comprehension deficit in poor readers which is not related to decoding skills and which seems to depend upon a lack of sensitivity to the importance of text elements. The relation between awareness of structural importance and the ability to construct meaning needs further exploration.

Some possible extensions of the present study may assist in clarifying how children comprehend while reading. Recall and/or recognition tasks need to be given at various intervals, perhaps up to several weeks, though rather more memorable passages may be needed (Anderson, 1977). It may be worthwhile to use prepared paragraphs and pictures to provide recognition tasks parallel to the recall tasks in the present study. While early studies on constructive aspects of prose comprehension have assumed that it is universally available among adults, further investigation of the parameters affecting construction of meaning among children is needed (e.g. age, reading ability, cognitive style). Other studies have examined only recall or recognition separately - these need to be related, and detailed examination made of what is remembered and what is the effect of syntactic/semantic components such as definiteness "a v. the" upon construction of meaning.

A further educational development which needs to be better understood is the use of "modelling" in developing reading comprehension. This technique has been developed by the Open University Reading Development Course team (1977) led by John Merritt. A recent Brisbane study by Sue Moore found that children had unexpected difficulty in making diagrammatic representations of their understanding of prose passages. Traditional accounts of reading comprehension have sidestepped the explaining

of how comprehension occurs as a cognitive process. Much work remains to redress this lack in our theoretical understanding and in our practical techniques for teaching.

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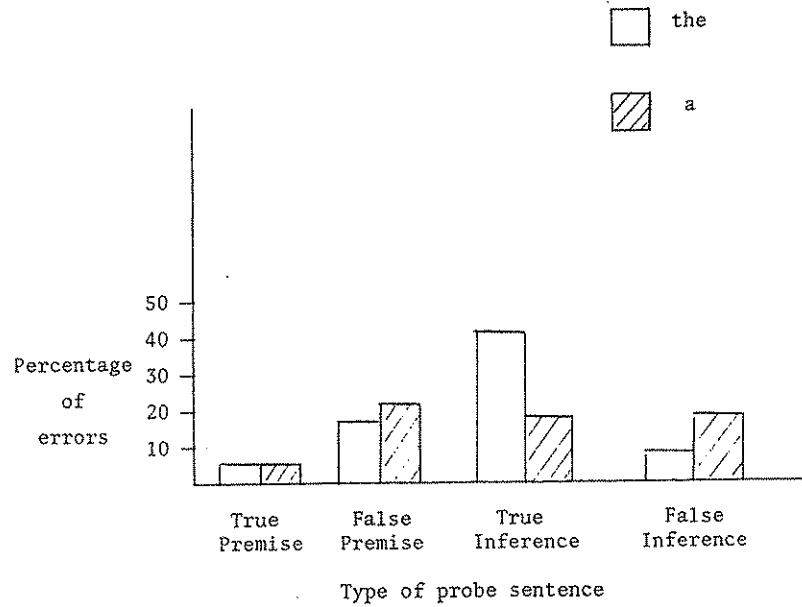


Figure 1. Percentage of recognition errors for each probe sentence.

Table 1

Contingency table showing number of constructions for different marker stimuli

Marker	Construction	Not a Construction
the	9	39
a	4	44

$\chi^2 = 1.43$ n.s.

Table 2

Contingency table showing number of constructions for different instructions

Instruction	Construction	Not a Construction
Draw	12	36
Write	1	47

$\chi^2 = 8.89$ $p < 0.01$