

Intermediate Children's Ideas About The Things They Have Inside Their Bodies

INTRODUCTION

This study was initiated by the findings of the Learning in Science Project at Waikato University, (1979-1982; 1983-1985). The general findings of this study are not new, but they have not always been applied by teachers (Osborne & Freyberg, 1985).

The Project identified three key findings:

- "1. From a young age, and prior to any teaching and learning of formal science, children develop meanings for many words used in science teaching and views of the world which relate to ideas taught in science.
2. Children's ideas are usually strongly held, even if not well known to teachers, and are often significantly different to the views of scientists.
3. These ideas are sensible and coherent views from the children's point of view, and they often remain uninfluenced or can be influenced in unanticipated ways by science teaching."

The N.Z. Sixth Form Physical Education core module has a very strong emphasis on the study of movement science. There has been very little research examining the ways this module is taught and the learning that occurs.

Tasker (1984) conducted a study which explored children's ideas about what they have in their bodies. We replicated this study as a pilot for a larger project examining the learning and teaching of movement science concepts in Sixth Form Physical Education classes.

APPROACH

A sample of two intermediate schools was chosen. Five classrooms were visited. These were co-educational and non-streamed. All the classes had studied topics related to human anatomy such as 'a healthy diet' and 'pubertal changes and associated body care'.

These were the strategies used to obtain and record the students ideas, as described by Tasker (1984).

1. Written Survey of Ideas:

(2)

The focus of the study was introduced to the selected class:

"we are interested in the ideas you have about
what things are inside your body."

A response sheet was distributed (see Appendix A) and it was stated:

"we are interested in how each of you think

about this so we will be giving everyone a prepared sheet on which you will write your own ideas."

Students were directed to fill in the appropriate details at the top of the response sheet. They were then instructed:

" Now write down all the things that you think of as being inside your body... Do this privately, remember it is not a test and that we are interested in how people as individuals think about this.... Put the name of only one thing in each box and don't worry if you are unsure about spelling. Give it a go. If we can't work it out we can ask you about it later."

This was completed by most students in 15 minutes. Response-sheets were collected and the group was informed of the next step.

2. Individual Interviews:

After scrutinising the response sheets, students were selected for interviewing on the basis of the number and range of responses given and on a desire to keep a gender balance. The sample was biased towards students who had given a high number of responses.

Selected students were met and invited to participate further. They were interviewed in a room so that there was audio privacy but so they could view class-mates therefore developing a supportive atmosphere.

The interview followed these steps:

1. Organising information into groups. Response-sheets were returned to the student. He/she was asked to cut out the boxes containing items and to sort these into groups. Once the student was satisfied with the groupings, he/she then labelled the groupings.
2. An outline of the student, who lay prone on a sheet of newsprint, was drawn by the researcher. The student was

(3)

then asked to draw into the figure one of their group of things:

" Could you please draw into your body this group of things? Can you draw them in the place you think of them as being, how big you think they are and the shape they are to you."

The students focussed on a new group of things once the previous ideas had been explored. If they saw an inter-relationship between the groups then these were discussed and the links drawn into the diagram.

RESULTS & DISCUSSION

1. Number of Things

A range of responses were noted, as shown in Table 1. These were sorted into the following categories:

Category A = 'thing' is a specific material component of the human internal anatomy, e.g. red blood cell, liver.

Category B = 'thing' is a non-specific material component of the human internal anatomy, e.g. organ, flesh, tubes.

Category C = 'thing' is found within the human body but is not a material component, e.g. food, air, germs.

Category D = 'thing' is a material part of the external anatomy of humans, e.g. toe-nails, hair.

Category E = 'thing' is a dynamic element of the human physiology e.g. pulse, vision, personality, feelings.

Sample	Size	Mean	Range	A	B	C	D	E	29	1911-30	63	32	3
2	1	30	21 5-36	72	21	3	2	1	29	19	3-42	76	20
2	2	-	31 16 5-33	61	36	1	1	-	30	17	2-36	68	
29	3	-	-										

Table 1: Ranges of responses for five classes

As can be seen in Table 2, the most frequently listed 'thing' was the Heart.

(4)

One class had been on a camp at which one of the students contracted appendicitis. Therefore, this was reflected by the high frequency it was identified in the response sheets of this class relative to the others, where it was rarely reported. While all of the classes had worked through the "Pubertal Changes and Associated Body Care" Health Syllabus unit, only 5 to 10 per cent of the sample listed sexual organs on their response sheets.

Form 1-2

Sample	(n = 149)	%	Heart
76-79 %			Brain
70-75 %			Liver, Lungs, Blood, Veins
61-69 %			Muscles, Spine, Kidneys, Flesh
31-47 %			Intestines, Teeth, Vocal Cords, Red Blood Cells

11-30 %	Tonsils, Appendix, Taste Buds, Adam's Apple, Ribs, Airways
5-10 %	Estrogen, Fallopian Tubes, Womb

Table 2 Most frequently listed 'things'.
(Percentage figures indicate proportion
of response sheets containing 'thing'.)

2. Grouping Things

Selected students were asked to group their responses. They were questioned about the criteria they used for making these decisions. We found that the kinds of groupings made by the selected students, fell within four broad categories. These were:

- | | |
|--------------------|--|
| A. Functional. | e.g. 'blood and blood circulation'
'things to do with
breathing' |
| B. Geographical | e.g. 'things in the head' |
| C. Same Kind | e.g. 'organs'
'bones' |
| D. Other
label' | e.g 'groups students did not
label' |

(5)

Table 3 summarises these findings.

Mean Number	
of Groups	
Functional	5.6
Geographical	16.2%
Same Kind	41.8%
Other	37.2%
	4.6%

C. Bones
bone

eg. 'through kind of like your
marrow'

Sample size n =16	A	B	C
56%			
31%			
12%			

Table 4 Students' ideas of muscle movement.

CONCLUDING COMMENT

This study was limited by the size of the sample. Nevertheless, the process enabled the researcher to gain an insight into the ways these students viewed their bodies. When comparing this study with Tasker's, similar results and observations were reached.

The students had a good knowledge of the number of things that were inside their bodies. However, few of them naturally organised these 'things' into functional categories, as would a scientist.

In the Health Syllabus, health is viewed as a process, rather than a product. Learning experiences need to be shaped so that students develop a functional viewpoint of human anatomy.

REFERENCES

- Osborne, R.J. & Freyberg, P. Learning in Science: The Implications of Children's Science, Heinemann Publishers, Auckland, N.Z., 1985.
- Tasker, R "The Inside Story: Children's Ideas About The Things They Have Inside Bodies", Unpublished manuscript, Wellington College of Educ., 1984.

APPENDIX A

Name:
Form: **Age:**

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6

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8

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