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Mutual Observation

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1. Inspired by Ginsburg's complaint [Ginsburg, 1981], that the "soft" methods of research, in particular the clinical interview, have hardly, if at all, been subjected to critical investigation, I dare to offer researchers a new suggestion. If the aim of a clinical research is to probe the mathematical ideas of young children (age 3-12), it often happens that the interview does not reveal the real thought. Questions like "Why?" or "How did you do it?" are often answered by "I just did it" or "In my head", cut-and-dried answers.

2. Personally I have formed the habit of noting down precisely all I notice, though the consequence is long waiting times for the children. In order to break these up and to create a relaxed atmosphere, I read aloud all I write down. As an afterthought this appears to be a good technique to break through the barrier of the usual answers.

3. Let us look at a few moments of such an interview.

Patrick (7;9) had to check with the calculator whether $40000 \times 30000 = 1200000000$.

However, the result does not fit on the screen of the calculator, which does not allow for more than 8 figures.

The calculator shows the result 12.000000.

"That big, it can't be", Patrick says. I write it down while repeating: "That big . . .", Patrick immediately completes: "it can't be".

Children often take part in the investigations by spontaneously completing sentences, most often by repeating literally what they said.

If I change a sentence without changing the meaning, it may be accepted. If I note down "Wrong" instead of "It is wrong", no protest arises. But as soon as — intentionally or not — I change the meaning the subject will protest when I read it.

Roy (8;0) checks with the calculator whether $3 \times 4 = 12$.

"Correct", he says. I write down: "Roy says: 'Wrong'", and read it. "No, I said: 'correct'", Roy reacts, "I can figure it out myself" (he means without the calculator).

If emotional utterances are noted down and the text is read immediately, the children get more interested in the investigation.

Patrick (7;9) tries $6\%1$ with the calculator. He had been given the task to invent problems with the result 6.

"Yes, I got it. Six per cent one is . . ."

I write down what he says, and I read it: "Yes, I got it . . ."

He smiles bashfully and says: "You note down everything I say".

Such reactions show the interest children take in the interview.

"That is too bad", Ikos (13;1) exclaims, wondering about the 0 preceding in the protocol the remarks I have written. "Or does it mean Onderwijzer (Teacher), and you are a teacher?"

"No, it really means a digit 0 because I do not yet know what the calculator is going on to do".

When I record even this little talk, which has nothing to do with the proper work, he judges this method:

"That is too bad, you note down everything".

By making children aware of one's method, one creates a relaxed atmosphere and has them take an active part in one's work.

In particular if working at the kindergarten level, the

interest in recording and the record is great.

Priscilla (5;9) is working at a jigsaw puzzle. I note down what she is doing. Wendy (5;0) is casting an interested glance at what I have written and says: "I can already read my own name. What is written here?"

I read what Priscilla has done. At this moment Priscilla looks up from her work, bends forward in order to look over the paper, recognises her name and says: "It is wrong".

By the reading aloud the children discover they are concerned. So they are inclined to correct what they think is wrong. They support one's research on various levels: at that of writing as well as at those of observing and interpreting.

I am counting while Priscilla (5;9) moves the 39 beads of a closed chain one by one.

After 39, however, I continue counting as though nothing has happened. She continues moving the beads though she stops counting.

We are going as far as 100, 101, 102, 103

"Stop", she exclaims.

I read her the piece of the record: "100, 101, 102, 103. stop!"

"Why?", I ask her.

"Because one must count only once, because it is only one bead", she explains. "One ought to count once, otherwise it does not work".

The immediate reading of the record of the situation urges the children to realise what they have done and thought. By reflecting on their own thoughts and acts they become our co-observers.

Edwin (7;8) and Marco (7;10) are given problems to be performed with the calculator: $10 + 10 =$

It is difficult to follow both of them at a time precisely.

Edwin, indeed, performs $10 + 10 =$ with the calculator and gets the answer "20", that is with a period after the digits.

Marco's answer does not show a period.

I read the record: "Edwin has a period and Marco hasn't. How is it possible?"

Marco thinks a short while and then says: "I just pressed 20"

By the reading the children realise what they have done and grasp what we wish to know from them.

4. Let us summarise what happens if we read the record to the subjects.

a. Firstly, the method creates the desirable relaxed atmosphere. This appears from the fact that the children interfere with work that is properly the task of the researcher, that is with recording precisely.

b. The children notice — some of them with a certain astonishment — that the notes of the observer concern themselves. Many of them were never aware of it. They are proud of the fact that all they say is being recorded.

c. They add corrections if they think something is wrong.

d. In order to help the interviewer to record they need to realise what they actually did think and say and what they did not.

e. They reflect on their own thought and in this way become co-observers.

f. In this way they understand properly what we would like to hear from them, which is not clear from our why and how questions only.

5. The technique of reading aloud at the same time what has been recorded and interpreted creates for the observed child the chance to recognize himself in the text and to correct it, if need be before the text itself assumes a more official character. Children almost never make improvements in texts they are shown *afterwards*.

By this technique the subjects are allowed to fulfil an investigating function themselves. We make good use of the fact that observing people — rather than systems — always *is* mutual. It is not only the experimenter who observes but in fact the subjects too observe the experimenter, and it is better to use this feature than to ignore it.

Though various techniques for clinical interviewing have been proposed, it seems to me that the possible role of the subject as an investigator has never been considered.

"Thinking aloud" has been one of the techniques that has been proposed. By this, it was argued, the experimenter could hear what the subject thought. Or a pair of subjects was interviewed rather than a single one in order to discover their ideas through their mutual exchanges. Surprisingly, in all these techniques only the action of the subject as a subject is considered. The experimenter is to be disregarded; as an observer he does not take part in the happening. He sees the happening but is not seen — sometimes he is, literally, behind a one-way mirror. He does not feel the need to tell the subject what he thinks about the happening, not even what he thinks he has observed.

6. Mutual observation, embodied by the technique of simultaneous reading, does away with this unscientific attitude of the experimenter by declaring the subject competent to judge the experimenter's observations and interpretations. It also implies acknowledging the independent existence of children's ideas, which in fact are the basis of the subject's judgements — independent even of official subject matter.

For this reason mutual observation is more than merely a different kind of observing. It is the confrontation of ideas, those of the child with the official ideas from the subject area that the experimenter presents. Through his judgment of the experimenter the subject reveals his own ideas.

7. In the research praxis the experimenter repeatedly wonders what is happening in the interview. The experimenter alternately acts as participant and as viewer in order to clear up obscurities. Object situations and meta-situations alternate with each other if we postulate that recording and rereading happen simultaneously, rather than one after the other. In fact the interweaving of object situation and meta-situation is also characteristic of everyday instruction. The teacher is continually in the alternating positions of participating and viewing. This justifies the assumption that psychological research employing mutual observation means more for actual instruction.

Reference

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