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Pupils consciousness of their mental processes

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Pupils consciousness of their mental processes

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Abstract

We are all conscious of a wide range of our stronger feelings and desires, though not conscious of them all. Most teachers are also conscious of possessing and using a wide range of more general concepts such as the use of triangles for strength, or use of levers and flowcharts. However, we and our pupils only slowly and in a very variable manner develop consciousness of the range of our feelings and concepts and of the way we use them. This paper discusses the meaning of consciousness and its typical features, the advantages of becoming conscious of our concepts and tactics, disadvantages that can arise, and the various ways that have been used to help pupils become more conscious. Descriptions will be given of methods and results from published curriculum developments, within and outside technology teaching.

I propose in this paper to review the meaning, typical features and extent of the phenomenon we call consciousness and then its advantages and disadvantages, leaving time to discuss these at the end. I am assuming that teachers will be more interested in the ways available to us if we decide to help pupils to consciousness. I have extracted these from studies of methods which claim a general success.

Meaning

If we are awake and not fainting or brain damaged we are conscious of some aspects of the world around us. Nowadays it is generally considered that we have formed, built up or constructed concepts about certain aspects of the world and can recognise them among the total input we are receiving from our senses. We can be conscious of triangles if, and only if, we have formed concepts of triangles and can use them.

We form concepts of our own mentality and mental activities in exactly the same way, but with more difficulty. This involves forming concepts of possessing certain concepts, and concepts of what our minds are doing with them. Indeed we have to form the concept that we have a mind. In everyday speech we call this being conscious of some aspects of our own minds but some people call it metacognition. This term is a bit narrow but it does help us to see that cognition about cognition is involved.

Normal sequence of development

Babies must start simply. We can assume they are conscious very early on of powerful polar concepts such as the concept of mother's presence. This concept has a strong positive polarity or positive tendency, and what we learn to call positive feelings, but there will be negative ones too. However the baby's concept of these as feelings will be vague and simple compared with that of a psychologist or teacher.

It is generally agreed also that babies very early on form a concept of themselves as able to move arms and legs at will, as a start to their self concept, but babies cannot tell us about any of this.

Beyond this, children develop, check, store and use concepts about their own mentality in a very patchy way, just as they do with their separate initial concepts of the external world. Concepts that link and make connections, making more sense of this patchiness, go on from here.

With time, we form more and more polar and other concepts and become conscious of more feelings, tendencies and motivations. However we can still build up quite complex and vague motivations such as antagonism to certain kinds of authority or fear of some kinds of people without for various reasons clearly being conscious of these. This is a fertile field for novelists. We have all heard about "Freudian Ships" read stories about the boy who was unconscious of loving the girl next door until the last chapter, and thought he loved the beautiful temptress.

Tactics

Children also form concepts of having, and of bringing into use, tactics like tearfulness or bragging, to improve their skills in getting what they want. This is not the same as unconsciously producing tears or showing off, even if the effect is the same.

Technology and science-type concepts

Technology teachers will all be conscious of using science and technology-type concepts such as leverage when we want to move something that is heavy or stuck. But concepts like leverage can be formed and used unconsciously, too. The Assessment of Performance Unit (1) tells us that very few of the top primary school children who are obviously using a science-type concept to get a successful solution to a problem can tell you how or why they got that solution. They are not conscious of having and using that concept. Adults are the same use the concept that water keeps its volume constant even when its shape changes, but only become conscious of this concept when we train to be teachers. In experiments a few years ago, adults were tricked into believing they were using one concept to solve puzzles, when they were actually getting results, solutions, and predictions that proved their unconscious minds had moved on to a better theory. Being able to use a concept is not the same thing as being conscious of having it. The conceptualising involved in being conscious is at a higher level of building and we only know about a few of the age and stage limitations like those Shayer and Adey have studied for science all CASE (2). There are stages depending on general stage of development, but a great deal must depend on family and school experience too. Some ten year olds can talk in a very conscious manner about how they use ideas, though most cannot. Some twelve year olds can talk in a conscious manner about how their own motivations are influenced, when most still think that pleasure in

sugar pop and revulsion from cabbage are permanent attributes of pop and cabbage, and not their own mental reactions, subject to change and development.

The group of teachers who worked out the Aquarian Scheme (3) feel they can fairly easily help average twelve year olds to be conscious of successfully using, in varied contexts, concepts and tactics like flowcharting. Feuerstein, (4) who worked with severely disadvantaged ten to fourteen year olds in Palestine, worked out careful methods, similar to the Aquarian methods in many ways, of teaching them tactics needed for coping with school lessons, and these have been used for, ten to twelve year olds, in Somerset, via slightly modified methods. These were tactics like collecting information from sources beyond these already before you. The CASE Project (2) helped young adolescents to cope with third level science concepts, generally regarded as very difficult. A tactic like flowcharting is easier because you can actually experience it.

The Aquarian Group found science concepts took longer, but their starter concept, the slow transfer of heat into food, had to be used in many practical applications and modifications that brought in practical use and open ended invention. This is a much easier concept than the CASE one, but consciousness is not the same as forming the concept. The consciousness of possessing and using a science type concept seemed to be new to many twelve year olds. They thought of lessons as being about making a food, not gaining a concept.

Higher level concepts of our own minds

We can develop higher level concepts of many kinds about our own minds, such as the compound concepts which the CASE study explained to pupils, concepts of the procedure of transferring concepts from one context to another, concepts of a will, sublimation, an external source of creative ideas, of a tendency to stereotyping, of personal inability to do maths, of a mental and spiritual self and its relation to the universe, of constructivism or idealism. Some of these concepts have been tested by scientific methods and found to have limitations. Others are alternative concepts about our minds, still not sorted out.

Advantages and disadvantages of leaving pupils unconscious of their own mentality

There is no all or nothing about this. Pupils as well as ourselves can be conscious here and not there. I will outline some advantages and disadvantages.

Pupils who are unconscious of their own mental activities can certainly learn and think out solutions to problems. They avoid the hassle and effort of building up this consciousness, which may be very hard for some people. We often meet adults who say they can only learn by doing. However it is rare to learn difficult concepts in an unconscious learn-by-doing manner and pupils

can be limited to repetition of easy ones.

Invention is possible unconscious, indeed creativity is rarely conscious if it is quick and easy. Sometimes however long hours of reverie and years of trying to think are involved. Most inventors use special tactics for this such as putting aside time; avoiding self criticism for a period; group discussion to spark off ideas; use of a new viewpoint; suitable physical conditions; preparation by clarifying the problem and acquiring precursor ideas that may point in a helpful direction. A teacher can provide any or all of these to pupils who are unconscious of these methods or tactics, but if pupils are to manage it for themselves they must be conscious of what is going on, of the whole procedure of helping creativity.

All of our unconscious inventions have to be checked out against practicality, unlike ideas based on perfect conscious logic. It is strange to see how confident small children are about their ideas, however, even when adults know they cannot work. Only those who have lost confidence feel their ideas are doubtful. We all get a better balance when we realise consciously that everybody's unconscious inventions and ideas have to be checked out by logic or practical trial.

Many children have also formed their own conscious ideas of how human minds work, and these ideas may be unhelpful. Many think that learning means learning by heart or that it means understanding and not the ability to use ideas. Many have that curse of British technology, the idea that it is bad to use other peoples ideas: the NIH factor, over-emphasising total novelty. Very many think that inventive ideas come from outside, and only to those who have a special gift. Some have a personal misgrasp, thinking that they are permanently careless or unable to understand. These unhelpful ideas cannot be lost: they can only be modified, and probably only consciously.

One strange feature of consciousness is that we seem only able to call up and focus on or attend to one small area at a time, whereas we can often unconsciously do several different things at once. Keeping a problem in focus can also be very tiring, needing special tactics. We therefore need unconscious thinking.

However, once pupils are conscious of possessing and successfully using concepts and of the process of building them up and clarifying them, they can direct their efforts more economically. Success also motivates them to attain more concepts: witness the passion of many primary school children for classifying everything. This motivation is important for the effort of attaining very difficult concepts and for science concepts. These can be useful, and, being highly organised, make for quick retrieval when needed for thinking.

Teachers have problems in helping children who are at very different stages. Lovell (5) describes how many years ago Cox noticed that children can also be put off by a feature of higher level learning. This has also been worked by the Headstart project for pre-school education in the USA, and by Shayer

(6). The effort put in by teachers and pupils may seem to have little or no immediate effect. It may be only years later that the effect is shown, and then it shows typically over a wider area than that in which teaching was given. Cox who took time to show girls how electric lamps worked, found they improved over other girls more and more, over a period of many months. The Headstart pupils showed practically no advantage in the primary school: only later. CASE showed improvements at GCSE level in many different subject areas. Teachers may therefore not be willing to try this unless they can keep a class for a long period or if the whole school or department co-operates. Maybe primary school teachers have a better chance, but when College lecturers have to help students to think consciously about learning, rather than just taking notes, they can suffer resentment for up to a year.

Methods that have been used

I have extracted this list of features by studying the detailed methods suggested by Feuerstein and the Somerset Skills Course, by CASE and by the Aquarian Food Studies Scheme. There is nothing shatteringly novel about this list but these projects each seem to use almost all the features below, altogether.

1. A suggested order of teaching, starting with simple ideas and then building on these in progression.
2. The concepts involved have an immediate utility and pupils can use them with success. The same applies to tactics. They allow pupils to invent freely.
3. Experience of what it is like not to have the concept, eg to have a problem or see a confusion, solved when the concept is built up and used. This means organising a striking situation that shows what is involved.
4. Focussing on the concept and getting away from thinking the lesson is only about the context that was used to introduce it.
5. Repeated discussion of the concept or tactic involved, eg with simple puzzles, and realistic practical use, transferring to other situations, eg pupils suggesting other everyday uses. Relating back, reminding each other to use, not forget, the concept for a new problem. A specific name helps, as does embodiment eg in a flowchart. Chances to tell others. Self assessment in relation to the concept or tactic may result in cheating at first, but it helps consciousness. Talk about the difficulties of building up or using, of experiences with it.
6. Once pupils are conscious of one type of mental activity, eg of compound concepts, they can transfer and build on this. Complex concepts like a design strategy can be made more conscious by travelling that road step by step and then looking back at records of the whole path.

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