

Experiences of Technology Education in Sweden

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My first impressions of Sweden are probably as accurate a picture as any I subsequently formed as the week went by. There is a cleanliness, a formality about the little airport at Linköping which was apparent even in the dark of the evening, and a warmth and a welcome evidenced by the three people waiting to meet us; a concern for detail and good planning and care for our comfort. This is unashamedly a subjective account, taking a holistic view of the country, the people I met and therefore the context within which I perceived their teaching of technology. I cannot compare their National Curriculum to ours as I am unable to read Swedish, so what I learned was from what I saw and experienced, but coming to a foreign country gave an overview which was illuminating for me and for my hosts. This was certainly the case as I visited schools, homes and the university and talked to students from infants to trainee teachers, and to those teaching them. It was my experience that I learned most from questions which were put to me, because they revealed the questioner's viewpoint, and the same was true from the lecturers listening to my questions, because they were different from those they might normally have expected from people familiar with their system. I shall describe what I saw and experienced. I emphasise that I am no expert, simply an observer. I hope that what I have learned will be as valuable to you as it has been to myself and my colleagues in clarifying the issue of technology in schools.

Bjornkärrs skolan was the first visit, a school built about ten years ago 'When Sweden had some money'. It is a one-storey building made on a scale in which children can feel at ease, centred on courtyard garden which the pupils help to maintain and towards which many of the windows face. The corridors are wide with a work-bench running along one side, opening out here and there to allow a round table with small chairs to be used for group work, or a display case or bookshelves to be placed strategically. The classroom had rows of desks, pale wood to match the floor, an overhead projector as standard equipment, each child having their own place with their text books and workbooks tucked away under the sloping lid of the desk. The children came in from playing in the snow, leaving coats, hats and shoes in the spacious cloakroom and slipping into flip flops kept in their own places. Their homes, were new timber chalet bungalows or

blocks of new flats, on an estate on the edge of Linköping. The impression was one of good design and planning and comparable to a well-off suburban estate in Britain.

A peripatetic teacher had brought with him an impressive collection of hands-on home-made musical instruments for the children to investigate. After a short introduction to the subject of sound the children dispersed into their groups to go through a worksheet which accompanied each instrument. They played with the pan pipes, the tea chest with broom handle and string attached, the plastic bottle maracas or one of the many other intriguing choices. There was plenty of room as they spread into the space in the corridor, and obvious enjoyment as they worked. They tended to be in single sex groups of two or three, a mixed ability class as in other state schools. I was struck by the similarity to a musical sounds project which I had recently run, not very successfully I admit, with a Y9 group, which had started out in a very similar manner of investigation leading to the designing and making of instruments from recycled materials. What a perfect opportunity this would be for joint design and technology and music project. It seems that this concept is foreign to the Swedish approach. We asked to see the Slojd workshop, to see what the approach was to making things. We saw an immaculately laid out woodwork room, with girls and boys using traditional hand tools and an electric sander with great confidence. This was a place where skills were of greatest importance. As we understood it, the children were not taught designing in the sense of being given a brief and finding a solution. Their work was much more directed. In the textiles room, boys and girls were learning hand and machine stitching, not all with the greatest enthusiasm but were well behaved and orderly. Some were stitching their name on to a shoe-bag, others were drawing the clothes onto a glove puppet shape which was then cut out and stitched round. Along the side of the classroom were ranged three hand looms, child sized, with small pieces of cotton and wool fabric in the process of being created.

Coffee and cakes were provided in the attractive, clean and colourful staff room, while little Swedes tidied up the garden outside the window. A truly idyllic setting.

That evening I gave a talk to a small group of students and teachers concerned with maths,

physics and slojd teaching. I described the design process and talked about primary school children working with construction kits and using computer control to manipulate models. We were politely, if quietly, received. In talking afterwards it became apparent that our concept of technology was quite a lot wider than theirs. We realised that we needed to define the parameters of what we call technology in school. It was no use talking about our attainment targets or the design process without setting technology in a British context. We had to explain the breadth of the subject as we teach it, the varied use of materials, its relationship to physics, maths English and history to name a few. In particular we had to describe the planning, drawing and evaluating elements, which we had not seen in Bjornkärrs Skolan.

The following day we were on the train to Atvidaberg to meet Jan and be shown round two more schools. The price of the ticket took us aback somewhat but then it was noticeable what care and attention to detail there was in the design of the interior of the train. There were tear-off plastic bags, supermarket style, for rubbish by each seat, and the head-rests were adjustable in height to suit every size of person from five to adult. My companion made a trip to the lavatory and reported impressive cleanliness. Thirty-five minutes of gentle rocking through pine woods, little outcrops of rock and clusters of neat brown and white timber farm buildings brought us to our destination where Jan was waiting to greet us in his usual courteous manner. We were entertained with a most elegant offering of coffee and smorgasbord before being taken to Alle-Skolan, a 500 strong upper school, for 13 to 16 year olds. It was an attractive, light building, set in an open position with small pine trees softening the landscape around, and the atmosphere was quiet and well disciplined. We were invited to watch a physics lesson for 15 year olds, in which children were learning about electrical circuits. Each group of two or three had a text book which was written to be used with its own support material, a perspex board with sockets for test leads at each corner, and what amounted to a proto board manufactured in small sections and glued to the perspex. There was enough space for components to be manipulated easily and the connecting strips could be clearly seen on the underside. With this board each group was provided with a compartmented box holding

all the components needed to build the circuit described and illustrated in the book. I was impressed with the success rate of the groups, and with the amount of learning that was made possible by this well thought out and produced package. I thought of my Y 11 class at home, struggling to make a security or safety device. This equipment would have made my teaching a whole lot easier. However, in this lesson the achieving and writing up of the exercise was the objective. Because this bit of technology was part of the science department there was no requirement to apply the knowledge to a practical project as there would be in a D & T lesson at home. It was a pleasure to be able to talk to the children and share in their learning, and to realise that electronics is an international language; 'transistor' and 'diode' posed no insuperable barriers.

Next stop was the local primary school, Langbrott-Skolan, where I made friends with Leif, an exuberant seven year old who was excitedly experimenting with a battery and a bulb, a paper- fastener switch on a block of wood and a pair of connecting leads to see what would conduct and what would resist electrical current. He tried his zip, my ring, the goldfish tank, the table top and leg and finally the radiator which mysteriously for him didn't conduct. He had worked out by this time that being metal it should have made the bulb light up. I had to find out the Swedish for paint to explain what was stopping the current. The enthusiasm of the children was apparent, only hampered in some instances by mixed groups of boys and girls where the boys' enthusiasm caused the girls to be elbowed out of the activity.

This lesson took place in a very bare basement; spacious and well maintained but empty of any classroom equipment save tables and chairs, and table tennis tables. It gave the impression of a games room which was used for the technology lessons as well, but I never got round to asking why this should be so. The children had plenty of space and could move around freely, which was perhaps good enough reason to be there. Again we were impressed by the quality and the quantity of the equipment used for this lesson, which I found quite enviable, and also by the fact that the objective was to experiment and write up the results in a scientific manner, rather than to try to use the knowledge gained in a practical project. There seemed to be the feeling that if

children were to make things with their hands they should make something beautiful rather than make something experimental that might not work. We didn't have time to see any other classes in this school, which was tantalising. We talked about children making things later on in our visit, and found a great reluctance to children using construction kits as part of their learning process. The feeling was that kits were crude and mechanical, and would hamper or at least restrict or direct a child's creativity.

Construction kits seem to offend the natural affinity which the Swedes have with the unspoiled landscape around them, much as the use of mechanical tools offended the sensibilities of the craft teacher. The sensitivity to the beauty of their country and to natural materials seems to me to be a strong element in the Swedish character, which is exemplified in the Slojd craft teaching, and which finds the industrial approach to designing and making unacceptable. I think there is a slight feeling that to introduce children to industrial concepts too young is to corrupt them. But there was also the realisation as we talked that perhaps theirs was a more narrow approach to making in school and that there was a case for introducing designing at a younger age, rather than wait till students progress to further education.

All this was excellent learning for us and helped us deliver our seminar talks with a little understanding of the background from which our listeners came. My talk was an explanation of the design process as I was taught in College according to the National Curriculum, with a sample folio as visual aid and my experience of the reality of teaching it as opposed to the theory. I think people were quite intrigued, though they were so polite it was difficult to judge their reactions. I was asked some good questions, including one about designing and another about working hours, and one pointed out an omission in my design folio, revealing a precise mind which I guessed belonged to an engineer. The last educational establishment we visited was the Slojd teacher training department of the university. This was of great interest to us because we could see the principles behind the teaching. Here we saw projects made by the trainee teachers which were set within the context of school and which were designed to facilitate the teaching of maths or physics. For instance one project was a reproduction of an ancient device to tell

the time from the angle of the sun, another was a board game which gave children practice in addition and subtraction, another a model submarine to demonstrate water pressure. There was a simple hovercraft using a disc of wood and a balloon, a wind gauge, and a humidity measurer using a long hair which would lengthen or shorten according to the moisture content of the air. There was an adaptation of a table tennis bat with large holes in, each with a number. This was a game for young children's maths — a ball falling through one hole meant 'times two', through another meant 'times six' and so on. All were superb teaching aids, and all were made by trainees to take with them when they started their work in school. In maths and in physics, Slojd plays an important part in using the practical and the play element in teaching. We talked long and hard over our different approaches. I was impressed by the quality of the students' preparation for teaching and by their practical approach to it. They were interested in my questioning of the motives of the trainees — I wanted to know why they had made the things we were seeing, had they had perceived a need themselves? The answer was no, these were standard projects for trainees to make, part of the course and not individual designs. There lay a difference between Slojd and design and technology. They were training teachers of maths partly by showing them how to make their own teaching material which on the face of it looked very much like design and technology projects, but which sprang from a different aim and which had different objectives. I came away inspired to use my free periods to make working models to use in the classroom. An interesting thing I learned about teaching in Sweden is that a teacher's hours are laid down in their contract, including hours spent in preparation, and also that they are not required to be on site during free periods, and that if asked to cover for an absent colleague they receive remuneration for their pains!

My lasting impression of our visit in Sweden was one of care and gentle formality, combined with sensitivity and attachment to the heritage of craftsmanship. Coming home my impressions were of a messier, more diverse and altogether less orderly country. We have much to learn from each other in our teaching of design and technology, Slojd physics and maths.