COUNTRY NOTES 1
Dutch Technology Education Developments: a comment

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The Vol. 2, No. 1 issue of the International Journal of Technology and Design Education contained a lot of information on developments in the Netherlands. Doornekamp wrote an article on his research into gender differences in knowledge, skills and attitudes in primary education; Van der Velde informed the readers about national developments with respect to the introduction of Technology as a separate subject in Dutch secondary schools. it would not be appropriate to fill much more space on such a small country in a following issue. Nevertheless, when the Editor encouraged me to write a response to the aforementioned articles, I felt the need to add some of my own insights on the Dutch situation that might be helpful to readers in other countries. But bearing in mind the amount of space that has already been devoted to the Dutch situation, I will be brief and confine myself to two points.

Applying a philosophy in curriculum development

Van der Velde on page 55 and 56 sketches five characteristics of technology. Although he did not mention this explicitly, they were taken from my own research work and adopted by the attainment target group in an early version of their final report. What he does not mention either is the fact, that this five characteristic classification was not really used as a basis for the attainment targets the group stated. This can still be recognised in the final version of the attainment targets. The English version Van der Velde presents of the attainment targets (pages 58 and 59) tends to hide this problem. I will only mention a few examples of this:

— one of the consequences of the first characteristic (the humans-technology relationship) Van der Velde mentioned (again taken from my dissertation) was the need to pay attention to the historical dimension of technology. The Dutch text of the attainment targets explicitly confines this to post world War II history!

— the fourth characteristic states the need for balancing designing, making and using skills. The attainment targets confine designing mainly to making technical drawings. UK readers especially will be hard put to understand what is left of the nature of technology when design is limited to that.

— the technology-society relationship, mentioned as characteristic five, can be recognised in the attainment targets. The relative attention this aspect gets is very small, however. Note that in the list of SLO objectives, it is explicitly mentioned that part A (the manufacturing products, i.e. making workpieces) takes 40% of the time and part B (work with and understand products) takes 46% of the time. From this follows, that for part C (form an opinion on the application of technology and the resulting effects on society) just 14%

is left. Van der Velde seems to recognise the lack of balance, as he does not make the calculation that results in just 14% for part C. The attainment targets clearly show that no attempt was made to take the philosophy as a starting point. Rather the educational practice, that is largely based on experience in vocational schools with a heavy emphasis on skills learning, was taken as a basis. This holds also for a more detailed level. To mention one more example:

— one of the attainment targets deals with 'technological systems' (see p.59 bottom left). The specific aspects of this, mentioned in the original Dutch version of the attainment targets differ somewhat from Van der Veld's translation: energy conversion in fuel and electrical motors, dynamos, central heating and solar panels, application of the profile of materials, and statistical construction principles are mentioned. An engineer's response to this will no doubt be: what is the relationship between these issues and the heading 'technological systems'? What is the basis for the selection of the applications that are mentioned so explicitly (motors, dynamos, etc.)? The point I want to make here is one that is not a Dutch problem only. It seems to be rather uncommon yet to make use of general technological and engineering concepts and principles. Of course it must be admitted immediately that it is not an easy task to identify these concepts, because the search for such general principles is as recent as the second half of this century. At an international conference, organised by the Organisation for Economical Co-operation and Development (OECD) In Paris, 5-8 November, 1991, this was mentioned both by David Layton and myself in our introductory and closing remarks for the discussion on Technology as a special case in 'Science, Maths and Technology Education' (the main theme of the conference and of the project that OECD conducts). But without the search for applying these kinds of concepts and principles all technology education programmes will show a lack of coherence that frustrates one of the main aims for technology education: helping pupils to acquire a balanced perception of technology as a discipline and as a phenomenon in our culture. The pupils lack such an understanding when they enter our programmes, as was found in all PATT-researches that were conducted so far (see Fisher's review of the fifth international PATT conference on pages 60-61 of the Vol. 2, No. 1 issue). Is it a pity that Doornekamp in his article does not refer to these studies, although the PATT questionnaire served as a starting point for the attitude part of his own research. Here I would certainly have expected Falco de Klerk Wolters's dissertation to be mentioned in the references, but alas, even in a small country like the Netherlands it seems to be hard to bring ideas together.

Two streams in technology education

The second point I want to make, is the two stream situation that threatens Dutch technology education. It is not mentioned by Van der Velde and yet I think it is quite relevant for a good appreciation of the Dutch situation and it may help people in other countries to avoid mistakes that we seem to have made in the past. As can be seen in Van der Velde's scheme of the Dutch educational system, pupils have to choose between vocational and general education right after primary education. As Van der Velde explained very clearly in his article, technology education in the Netherlands was developed originally in vocational schools. Comparing the practice of technology education in all secondary schools (both vocational and general) clearly shows that the attainment targets were derived from vocational practice, but enriched with some specific issues: e.g. some robotics to include the 'high tech' aspect and textiles as a girl-friendly material. Elaborations of the attainment targets by the SLO and other institutes of the Dutch educational support system schools for general education do not accept this as they feel the need for a more stimulating and challenging content, that takes design and problem solving activities more seriously. The danger we face now is that two streams will emerge: a vocational stream, characterised by:

— practical skills as the main aim of technology education,
— emphasis on making and using skills,
— a very weak relationship (if any) with science, and a general stream, characterised by:
— practical skills both as an aim and as a means to enhance teaching and learning concepts and principles,
— a balance between designing, making and using skills,
— a clearer relationship with science.

This problem, as far as I understand, already has SLO's attention and they are now working towards a new version of their curriculum proposal, that fully takes into account the call for a broader subject that can be heard in the schools for general education. I do hope that they will be able to prevent a two stream situation to arise and that they will suc-

ceed in challenging the vocational schools to rethink their practice and take into account the more recent developments, that are discussed at an international level. It would seem to me, that when this is accomplished, the Netherlands could be a forerunner in combining the strength of various approaches that can be recognised in various countries: a crafts tradition with a conceptual approach and the use of relevant context like transportation, communication, construction and production. They will certainly be sustained by the teacher training institutes that are faced with the fact that the retraining programmes to become technology teachers are mainly taken by teachers in general education (most vocational schools already have teachers for General Techniques, that are also permitted to teach technology education without further inservice training). These teachers are more interested in a new approach that incorporates design and problem solving skills than in the tradition 'General Techniques' approach. This led the Pedagogical Technological College (Dutch abbrev. PTH) to developing a new philosophy of technology, based on my five characteristics of technology as a basis for the technology teacher training programme of this institute. So far teachers seem to be willing to adopt this approach, although it is still to be seen whether they will succeed in translating this approach to secondary school activities.

At this moment a retraining programme. In 1993 this group of teachers will start teaching technology with their new approach. It would be much more interesting for UK parents to visit these teachers than look for the practice of technology in most vocational schools, as a Channel 4 programme on UK television reported in October 1991. I was very concerned when I heard that they came back with enthusiasm about the thorough skills teaching that they had seen in the Dutch vocational schools instead of the 'softer' design approach they had seen in the UK schools. Let UK Design and Technology educators be well aware of the fact, that many countries try to learn from the experience gained in the UK in the past decades. Let them keep the gains from those years carefully and not give up the idea that pupils are better served by teaching them designing and problem solving skills than by merely teaching them craft skills that are more temporary than we often realise.

This is more than a matter of 'attitude' as Van der Velde suggests on p.58 of his article. It is a matter of an overall aim that should pervade the whole technology education programme, both in its cognitive and its affective and its psychomotor aspects. Innovative thinking is one of the main expectations industry has of technology education (as was stated by an industry representative at the fifth PATT-conference) with a lifelong relevance for all citizens. We are challenged to develop a type of technology education that serves this need. Thereby international co-operation is indispensable. May the *International Journal of Technology and Design Education* contribute to this co-operation in the coming years.

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