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The Worldwide Development of Design and Technology in the Primary School

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Abstract
In England, technology education was laid down in the National Curriculum 1990. This has since been revised twice. “The subject … helps pupils to become discriminating and informed users of products, and to contribute to their home life and the community … (it) broadens their understanding of industrial production and commercial practice.” (DfEE, 1999)

In contrast, James Yen-shun Wei (1999) from Taiwan presented a paper at the Second International Primary Design and Technology Conference 1999, which emphasised the importance of cultural, social, ecological, environmental and human nature in technology education.

My paper explores what prompted this movement and which countries have introduced it. It examines the differing emphases that countries place on the delivery of primary design and technology education with a view to values and the balance between cultural and industrial influences. The research is only in its initial stages and the information revealed is a snapshot of the initial literature search.

Keywords
curriculum, global, international, primary, technology, worldwide

Design and technology was introduced into primary schools in England in 1990 at the beginning of a worldwide movement. Technology education is now taught at primary level in many other countries where it is developing towards a multi-disciplinary knowledge area in which practice and theory are combined and questions on values and attitudes are raised.

As part of a study of the worldwide development of primary design and technology, this paper examines the differing emphases that countries place on design and technology education, the values of the subject and the balance between cultural and industrial influences.

In England, technology education was laid down in the National Curriculum, 1990, which has since been revised twice. “The subject is intended to prepare all young people to participate in a rapidly changing world … It helps pupils to become discriminating and informed users of products, and to contribute to their home life and the community. As they develop systems and make products which enhance the quality of life, design and technology broadens their understanding of industrial production and commercial practice.” (DfEE, 1999)

In 1991, Kenneth Clarke, Secretary of State for Education, said that the technology orders were a “broad-based introduction to the way the adult world tackles designing and making,” rather than a “retreading” of craft subjects (Hendley, 1995). It was intended to be beneficial for all regardless of future careers. The processes involved in technology activities like planning, designing, making and evaluating were intended to increase critical thinking.

Hendley, 1995 described the design and technology of England and Wales of 1990, as “a place where the abstract and practical met” and a subject with the “ability to end the rigid separation of the academic from the vocational”. Changes published in November emphasised values and citizenship, specified key skills and “personal, spiritual, moral, social and cultural” (www.nc.uk.net November 1999). Thus, not only was technology education in the UK introduced to enhance economic performance but also to encourage the human development of young people.

Similarly, in his study of Zimbabwe, Chinyamunzore (IDATER 96) stated that trends in the developed world favour education that focuses on cognitive development rather than specific skills, whereas developing countries tended to have craft-based vocational/technical education curricula. However, in trying to address social mobility and to become economically viable, Zimbabwean educationalists have recognised the need for sound primary technology education.
Technology education development in South Africa has been interesting, as reported by Middleton (1996), Ter Morshuizen (1997) and Sherwood (1999). The success of NGO initiatives led to the national education department and regional departments to work collectively on technology curricula for schools – this is the national initiative ‘Technology 2005’ – which aims to have technology in all schools by 2005, including at primary level.

In the curriculum there is a strong emphasis on technology as a problem solving process, but it also recognises that technological design provides a context within which to integrate cognitive and manipulative skills in ways which should uniquely enhance learning; it seeks to enhance understanding of the made environment; and it acknowledges that technology is rooted in culture and values (Sherwood 1999).

Reporting on Botswana, Moalosi (1999) wrote that following a curriculum review, in 1990, technology education was introduced at first in three selected schools and later across the whole country, with the view that this will “promote economic development, political stability, cultural advancement, national identity and overall quality of life”. Although the implementation of technology education in Botswana has been sketchy, there has been a move to recognise the holistic values in technology education; this has also been the case in Zimbabwe and South Africa.

Sharpe (1996) did a comprehensive survey of technology education implementation in North America. He found in Canada each province exercised autonomy on the curriculum. Most Canadian provinces had introduced a technology education programme and most states in the US had a similar programme called ‘industrial arts’. In an overall analysis, Sharpe wrote that technology had become a “vital element of the school curriculum, that formed the core of a discrete area of study as well as an element that cuts across and through the whole school curriculum”. However the norm across North American schools is that technology education is recommended at junior high school. In the primary years, students only gain an awareness of technology through the integration of it across the curriculum (Hendley, 1995).

In 1994 and 1995 new national curricula were introduced in Taiwan. According to Tsai and Yang, (IDATER 1999), the objective was to turn Taiwan into a “technological island”. Fang and Tsai in the CRIPT conference papers of 1999 highlighted the impact of a holistic, integrated approach in elementary schools – “its purpose is to provide students with the ability to make critical decisions” and “enabling students to be involved in social activities and become good citizens”.

Gaul (IDATER 1995) explained the situation in Hungary. There had been a nationwide technological competition, the outcomes of which had a positive influence on technology education. Georgieva (1995) reported at IDATER on Bulgaria, that it was believed that the development of pupils’ thinking was the reason behind the inclusion of technology education at all levels.

In Poland, Nowak (1998) explained that technology had “a 90-year tradition” as a school subject although previously known as ‘practical technological exercises’ and before that ‘manual work’. Changes were introduced in 1990, cross referencing the subject with science and defining its aim as to “develop the practical and technological skills one needs at home and at school”. Nowak gave examples of the skills and the curriculum content that I summarise as being vocational. In 1997, Poland made further changes, which were less vocational. The objectives were to develop pupils’ thinking, imagination and communication. However the teaching styles were highly prescriptive and didactic.

Benson reported (IDATER 99), on the second international primary design and technology conference from CRIPT that many countries such as China, France, Japan, Poland and Taiwan were investigating different teaching and learning styles of solving problems to develop critical and creative thinking as a foundation for decision making. From studying the CRIPT papers of the previous conference in 1997, I have found technology education developments in Australia, Germany and the West Indies. In 1993, Raat, Mottier and de Vries published the findings of a broad study comparing technology education in Belgium, Denmark, France, Germany, The Netherlands and UK. They reviewed the nature and implementation of technology education, identifying the different priorities and approaches of each country. Representatives
from Australia, Czech Republic, Finland, France, Germany, Kenya, The Netherlands, Nigeria, Mozambique, Slovakia, Sweden, Taiwan UK and USA contributed to the PATT-Sweden conference in 1996. At the conference the need for comparing and exchanging experience and ideas with other countries was shown – we can learn considerably from each other’s different experiences. There are enormous problems in making comparisons – an understanding of the structure and organisation in the different education departments is vital and is linked to the society in which it operates and therefore has great influence over.

In some of the countries discussed, technology education is seen as a discrete independent subject, whereas in others it is integrated with other subjects for example as an applied natural science in France or as part of ‘world orientation’ in Flanders, Belgium (Raat, Mottier, and de Vries, 1993). The advantages like easy timetabling and avoiding overloading the curriculum, and disadvantages like reinforcing the children’s misconceptions of technology and inadequate non specialist facilities and teaching staff, demand further investigation and debate in developing the best methods used for technology education.

Other differences noted between the various countries need further research and analysis. For instance subject content and objectives, the status of the subject and whether or not there is a national or local directive on technology education, it is also interesting to examine which countries have and have not been successful in fulfilling their national strategy. My initial research has revealed the common strands in primary technology education. These are that technology education:

a) is hoped to improve a countries economic and technical performance
b) should be accessible to all because technology is an essential part of the lives of everyone
c) develops the humanistic capabilities of young people, for example, their moral, cultural, creative and analytical capabilities.

This study cites the most important argument for beginning technology education at a young age is to enhance the cognitive development of young children and to reduce the gender specific aversions in evidence in older children.

References


