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Technology education curriculum issues in secondary schools: a comparative study between Britain and Kuwait

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Abstract
The aim of this research paper is to explore how Kuwaiti Technology Education within a National Curriculum can be improved. The paper describes research into differences between Technology Education in Britain and Kuwait. The research procedure has been to look at selected key points in the philosophy and practice of Technology Education and a number of experts have contributed ideas from both countries; their responses have been recorded and the answers have been analysed in terms of each context, culture and historical traditions of education. The main research method used was an open-ended questionnaire. The questionnaire was devised in consultation with colleagues and issued to selected professionals working in the area of Technology Education in Britain and Kuwait.

Introduction
The education system in Kuwait developed quickly after 1936, and its quality improved to a very high degree. Three new schools were opened by the Council between 1937-1938, two for boys and one for girls.

Secondary education started in 1937 with the opening of one class for boys, and a second class was opened the following year, 1938. But it took the Council until September 1953 to open its first distinct secondary school, which was called Al-shuwaikh High School. The development of secondary education for girls was similar to that for the boys, one year after establishing the first secondary school for boys, the first secondary school for girls named Al-mirgab was opened (Abdul-Ghafur, 1983).

In Kuwait there are separate schools for male and female pupils, but the curriculum, the academic year, and the school times are the same for both. The teaching week is Saturday to Wednesday, while Thursday and Friday comprise the school weekend. Schools days start at 8:00 in the morning and finish at 2:00 in the afternoon.

The development of the education system in Kuwait was badly affected by the second world war. Being a British Protectorate, Kuwait paid dearly for the war efforts of the Allies. The number of students was increasing dramatically, and the budget could not cope with the increasing expenses. With the end of the second world war and the increase in the oil revenue, the government was able to designate a bigger slice of the national budget for education purposes. More schools were built and consequently, more students were enrolled in the new schools.

Technical and vocational training was introduced as well by opening the institute for Religious Studies in 1947, the institute for training Women Teachers in 1952, and the Industrial College in 1954.

The Structure of the Education System in Kuwait
Compulsory education in Kuwait applies to the first eight years of schooling covering elementary and intermediate education (i.e. age 6-14 years). Free education, however covers all stages of education (i.e. kindergarten, elementary, intermediate, secondary and higher education). This applies to Kuwaiti nationals, non-Kuwaiti nationals are treated in two different ways; university lecturers, teachers, doctors and diplomats can send their children to government schools, whilst other residents have to send their children to private schools, where only nominal annual fees are collected. Figure 1 illustrates the stages of education in Kuwait:
Technology in Kuwait has become a very controversial issue over the last few years. Some Kuwaiti individuals believe that Technology Education is not necessary because technology can be transferred from developed countries; others see this process as very costly, therefore Technology Education should be developed in Kuwait in order to share in the world wide technology development.

A comparative study between the UK and Kuwait was thus compiled to investigate opinions regarding these controversial issues.

Various questions were asked:

- Is Technology Education in Secondary Schools meeting the needs of the pupils, with regard for preparing them for entry to university courses?
- Is Technology Education in Secondary Schools equipping the pupils to work in the area of technological industry? Justify your answer please.
- Do you regard Technology as essential element of 11-16 education?
- Should Technology Education be divided into more than one main subject (e.g. Design and Technology plus Information Technology) or into more areas? If more, what are they?
- How would you improve Technology Education in the National Curriculum (e.g. more time and resources devoted to teach this subject)?
- Does Technology Education need to have much more up-to-date technological content?
- Has your delivery of Technology Education in the National Curriculum been influenced by Culture/Religion? Please explain.
- How do you see the relationship between Technology and Science?

- How important is precision of workmanship in Craft, Electronics, etc. If you regard precision of workmanship as important, what would you forfeit in order to raise the standard in the time available for teaching?
- Where does aesthetic appreciation fit into Design and Technology?

The questions were asked to find out whether Technology Education as understood in the UK exists in the Kuwaiti curricula. Also positive and negative aspects of teaching, learning and training practices of technology in the UK needed to be examined, to see how Technology Education could be improved in Kuwait without importing negative consequences. Looking at the last question, for example, this question was included because the concept of the aesthetic is substantially different between Western and Islamic cultures. It was interesting to see whether these two countries with different cultures see aesthetic aspects of technology differently and how they differ in their National Curricula in Technology Education.

The Nature of Technology

As there is no generally accepted definition of technology in either the UK or Kuwait; describing and categorising the ‘practice of technology’ is difficult, especially in comparative terms between the two countries.

Pacey (1983) sees technology as having three aspects: the ‘technical’ aspect, which is concerned with the associated knowledge and skills, the ‘cultural’ aspect, which focuses on the underlying values, the ‘organisational’ aspect which relates to the economics and sociology of the conduct of technology and employment of its outcomes.

Definition may either assist categorisation, or be contradictory. Schon (1983) observes with regard to his comments on the reflective practitioner that while the practitioner cannot accept his colleague’s view of knowledge, he cannot describe his own. Sometimes, indeed, the practitioner appears to say that his kind of knowledge is indescribable. It follows that a generally accepted specification for Technological Education is similarly illusive.
However technology’s goal is to solve a problem or to make something happen. In that sense, technology is very different from science, because the goal of science is understanding, not action. Technology includes the knowledge of processes, not just the formal or cognitive aspects, but also informal knowledge. That is, the techniques utilised in making things and performing the services that we associate with technology, and the products of the human mind and ingenuity, hand and mind working together, are concrete manifestations of technical knowledge. When examining the word technology, ingenuity is rooted to it; it is the work of the creative person and the inventor. This reinforces that technology is not only practical but also theoretical.

Technology also involves applying not just scientific knowledge but also other types of knowledge. Although the truth of this is recognised by every practising engineer, it tends to alarm university teachers, because it suggests that technology involves not just the respectable theoretical knowledge gained from studying science, but also the more uncertain practical knowledge gained from experience, craft, apprenticeship and other sources. But because the knowledge in question does not yet have an established theoretical scholarship it does not mean that is not important, or that we should somehow deny its existence in the practice of technology.

The definition of technology leads to several main complementary sets of educational aims:

- To give children an awareness of technology and its implications as a resource of the achievement of human purpose, and of its dependence on human involvement in judgmental issues.
- To develop in children, through personal experience, the practical capability to engage in technological activities.
- To help children acquire the resources of knowledge and intellectual and physical skills which need to be called upon when carrying out technological activities.

Technology in education normally includes; identifying aims and objectives, planning and learning environment, exploring and structuring the subject matter, selecting appropriate teaching strategies, helping students develop new ways of learning, evaluating the effects and effectiveness of the teaching and learning system, and using the insights gained from evaluation to understand that system, and where possible to improve it.

**Technology in the UK National Curriculum**

How does Technology fit in the National Curriculum.

National Curriculum Technology intends to develop general practical capability, preparing pupils to handle complex problems in their future personal and working lives (N.C.C.1989).

Looking at the UK National Curriculum the assumption is made that the terms ‘curriculum’ and the ‘content of education' mean one and the same thing. This a valid assumption if by the content of education is meant the full course of study to be followed in becoming educated. This last is in fact the oldest known meaning of the word ‘curriculum’. In contemporary writings, however, the ‘course of study to be followed' is frequently translated into ‘the subjects to be studied' or ‘the educational experiences to be provided’, and not infrequently into the actual ‘subject matter to be covered'.

The 1988 Education Reform Act established the UK as the first country to make technology part of the compulsory curriculum for all pupils age 5 to 16. It is a pioneering venture and not everything can be expected to go smoothly. Getting technology right in school should bring benefits to the education of individuals, the economy, and ultimately the quality of life of us all.

The whole purpose of technological education in the UK National Curriculum is the attempt to override old distinctions, especially to break out of the low status of technical education and to bring the best concepts underlying technological education from higher education into the schools. It is also an attempt to demonstrate that technology is an appropriate and important subject for the education of all
children. In the UK, Science is treated quite separately from Technology though recent improvements to the National Curriculum have modified this. But, for example; Electronics is in Technology rather than Science.

Two of the major differences between Kuwait and Britain is the part religion and culture play in education and the design of the educational system itself. These areas need to be examined. For example in Kuwait, science education has been influenced by culture and religion, because it is the Islamic foundation which enables pupils to build a holistic view of faith, religion, culture and the world in which they live. With culture and religion the positive effects of Technology will be maintained and controls of the use of technology will be in place. Therefore misuse of Technology should be kept to a minimum.

Secondary Education in Kuwait

The duration of secondary education for boys and girls is four years, of which the first two years provide general education and, in the third and fourth years, students chose to specialise in either literary or scientific sections.

The role of secondary education can be characterised as the following:

It helps the student to develop an independent character within the framework of the Arabic and Islamic culture. It prepares the student for a positive role in the community through reinforcing the importance of the family, the value of education, the appreciation of the artistic values, the ability to found strong and constructive social relations, and the importance of the constructive investment of spare time. It prepares the student for practical life, and for continuing his/her education at universities or colleges. (Ministry of Education, 1994)

This can be done by helping to identify the capabilities and limitations of the student, and accordingly help him/her make the right choice. It provides the experience which develops the skills of scientific reasoning, innovative thinking, and self education in the student. It prepares the student to be a responsible citizen, who understands his rights and duties, and appreciates Kuwait’s natural resources. (Ministry of Education, 1988).

Secondary Education in Kuwait applies two systems of schooling. First and most wide spread is the general (two semester) system, and the second is the course system which depends on the hours attended for each course. However, the application of the second one is very limited.

The two-semester system divides the academic year into two semesters, with equal courses and class hours. Students are tested at the end of each semester, and therefore the psychological burden on students was greater in the older system because they had to attend one final exam at the end of the academic year.

In Kuwait secondary schools two components of technology are presented: Computer Studies in years 1 and 2, and informal time of one hour per week of workshops. The Home Economics component is presented for girls only, but for all girls, throughout secondary education.

As one can see from figure 2 (see p178), Technology Education is not a subject on the Kuwaiti curriculum. This is a fundamental difference from the UK. What is important to note is that science education includes much study of applications, the framing of questions in technological contexts. Like the UK it is strongly dependent on laboratory work. It is more applied than, say, in the USA. However, there is no design or creativity in the Kuwaiti science teaching in the sense that it is experience by the UK pupils.

Research procedures

To compare Kuwait and British curricula and analyse the significant differences. Ten questions were devised; twelve participants took part, six from each country. There were two experts in the field of Technological Education, two University professors, and two Secondary Technology Education School teachers, in each country.

Each applicant was interviewed personally. Where practicable the answers were tape
In other cases written answers were received. The questionnaire, like the formal interview, is an instrument that uses a set of predetermined and prearranged questions given to respondents for obtaining standardised, quantifiable data. The same questions are asked of all respondents so that comparable information can be gathered. The researcher using this instrument must rely on experiences, logical reasoning, and some general rules for assisting in its development. Defining the problem is the first step in planning research. Once the problem is defined, aims and objectives are formed.

Information gathered from the sampling could have been quantified (forced or multiple choice questions) or codified (open-ended questions) so that it can be analysed and reported quantitatively. The latter was selected here. A criticism of descriptive procedures is that they depend heavily on verbal behaviour of respondents and judgement of the observer. A record of the conversation is made for later recall and as a source for comparing other respondents. Errors are ever present in research, and interviewing is no exception.

**Respondent’s Answers from Kuwait**

It was conclusive from all respondents that there was a need to improve Technology Education; it is not meeting the needs of the pupils, therefore not equipping the pupils to work in the area of Technology. They all believed that in order to cope with the

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Figure 2: Educational scheme for the secondary stage in general education.
Source: Educational Schemes for General Education, Ministry of Education in Kuwait, pp.11-12.
technology in the world, a better type of Technology Education needs to be implemented. Any programme that does not have Technology Education will generate a shortage in the area of the technologists required to maintain Kuwait's economy. The pupils will not be able to face or understand the technological world with confidence.

They believed that Technology Education should be one complete programme, not separated, because Technology integrates with each area. The learning process should be gradual, three main goals were highlighted:

- To instil “technological patriotism”, where self-developed technology is acting.
- To prepare the pupils to work in their country and discover the need to work within areas which may need science-based employees.
- To prepare them for university education.

Increasing the time spent teaching Technology Education and concentrating on working together was proposed rather than debating negatively, and wasting time. This would increase the Technology Education's quality outcomes.

The respondents believed that Science looks at the Why? What? and How? and interprets these questions by coming up with equations and theories, whereas Technology examines the applications of the science. This is a strong Kuwaiti view.

The precision of workmanship is extremely important; without it any work would be looked at as incomplete and inaccurate. In order to maintain this high standard, more resourcing has to be put in the area of technology education and made a priority.

One respondent stated that Kuwait is a small country with a small population and the time has not yet come to be an industrial country. The importation of middle class workers is at present sufficient to meet the needs of Kuwaiti industries. However there was opposition to this view; others remarked that Kuwait lacks middle class workers, therefore pupils need to be encouraged from secondary schools in order for them to work the technology markets. So, the time has come for Kuwait to be self-reliant, not to depend on workers from other countries.

The Kuwaiti government before the Gulf war could afford to import the middle class workers (e.g. engineers, technicians, etc.). However, the war had great impact on the economy and privatisation was implemented. Now a realisation of the need to educate middle class technology workers is apparent.

Respondent's Answers from Britain

The overall response to the first two questions was “NO” Technology Education is not meeting the needs of the pupils, therefore it is not preparing them sufficiently for work or university.

It was agreed by all that Technology Education was an essential element to equip pupils with appropriate skills to enter industry. Quote ...

We live in a world where our lives are daily influenced by Technology in many forms old and new, some sound knowledge of technology must be helpful to any citizen.

Technology does not need to be developed into more than one subject. They agree with the Kuwaitis' response that its input is to emphasise the unity of technology and deal with it as one subject.

To improve Technology Education teachers should be trained more effectively, and greater emphasis given on precision of manufacture, and better quality evaluation work. Technology Education needs to be kept up to date; however some of the up-to-date material is not available in all schools.

One respondent was unable to see how religion and culture affect Technology Education. However the other respondents agreed that culture affects Technology Education, but not all necessarily believed religion affected Technology Education through culture.

Technology is value dependent, values are culture dependent, therefore, Technology is culture dependent. Religion influences culture. This issue is of prime importance and part of the real quality of Technology Education.
Respondents believed that Technology and Science have different entities. Science is a major information resource for Technology. Design and Technology provides the tools for Scientific Research.

Science represents one boundary to which one moves towards these skills which must be developed alongside Technological Skills.

Within Technology Education it is important to teach precision, pupils should not be given the impression that ‘any old job will do’. A balance should be struck between craftsmanship and broader content without sacrificing any aspect totally.

It is essential to appreciate the beauty of Technology Education, pupils from primary schools should learn this appreciation. However in order to appreciate Technology Education one must recognise that problems need to be addressed. Firstly, Technology Education teachers need to be trained well, especially those coming from industrial backgrounds. As one respondent stated ... “I think the most effective improvement would be to produce more and better technology trained teachers”. Secondly; the equipment need to be updated to keep up with the changes in Technology Education.

**Conclusion**

British respondents were able to talk more in depth on the subject of Technology Education in the National Curriculum, because Technology Education is already in place on the National Curriculum and is being developed. Kuwaiti respondents agreed that Technology Education will have to be implemented in schools. The best way of doing this would be to look at other countries where it is already in the curriculum and learn from their procedures and practices where might best fit in with the traditional aspects of Kuwait - that is, religion and culture.

It was noted that the concept Technology Education does not exist within Kuwaiti curricula. However the practice of it is apparent, but very limited and it does not meet the country’s long-term strategies to develop and solve problems technologically. This reinforces the fact that not much effort has been made to improve it, therefore neglect has set in.

In order to cope with the world economies, Technology Education in the National Curriculum must be resourced, and made a compulsory subject in Kuwaiti schools.

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