

The last ten years: change in Malta.

Abstract

Technology Education was introduced to the Maltese National Minimum Curriculum in December 1999. In this paper will focus on the two texts that have since been produced to guide the subject in the local context. Can the work of two groups find compatibility when they start from different perspectives?

The setting.

Given its full meaning, Pupils Attitude Towards' Technology has not been the concern of Malta for the last 20 years. When the first conference was held, Malta was experiencing a success with the trade schools that students opted to go to after two or three years of secondary education. It was in 1995 that these few schools offered Technology Education. The programme for Technology Education was implemented in the trade schools through recommendations made to the Minister of Education in the report 'A Curricular Frame Work for the Proposed First Cycle of Studies at the Trade Schools' submitted in 1993. Paragraph 2.2.5 details that there would be a subject called Technology Education and that it would occupy eight 45 minute periods in a week of thirty five periods.

In a time line the year 2000 was a pivotal point in the development of Technology Education in Malta. The implementation of a new vocational education and training caused the Technology Education programme of the trade schools was transferred to the general secondary schools and the transfer of students of secondary school age to trade schools was stopped. Technology continued being an optional subject for students in their 4th and 5th year of study, having now five 45 minute periods a week. There was, initially, no move to offer the subject to younger students.

In December 1999 it was determined that Technology Education would be included in the National Minimum Curriculum. While a working group was established to determine particular aspects of the implementation of this subject, and later was to construct a curriculum, another group in the form of the Department for Technology in Education was created in 2002 and determined its own route. This work will examine the two routes in the light of the demands of the National Minimum Curriculum.

National Minimum Curriculum.

'Creating the Future Together: National Minimum Curriculum' (Ministry of Education, 1999) sets out the principles and objectives of the curriculum in Maltese schools. As such it is a rationale of what the teaching should accomplish rather than a description of the content of what should be taught. In the Preamble (pages 13&14) it is noted that 'Tomorrow's Schools' (1995) set the process in motion. In this document the

implementation of Technology Education in the trade schools is commented on and it is suggested that there was a need to rethink the notion of curriculum to provide space for the opportunities the subject offers (pp. 49-50).

Technology education should, ideally, provide students with the thinking tools they require for the future and should be introduced forthwith.” (Tomorrow’s Schools:50)

‘Creating the Future Together’ distinguishes fifteen principles. It is in this section that the most substantive statement is made about Technology Education. Under the principle of relevance to life, it is stated:

Technology is a unique aspect of human life-experience. It forms part of our country’s cultural heritage as do literature, science and art. For this reason, technology should be studied as an integral part of the education system. The teaching of design and technology in schools ensures that today’s pupils are suitably prepared to live and work in a technological world. This is fulfilled through the teaching of technical awareness, design methodologies, and the application of problem-solving skills to real life problems. The teaching of design and technology stimulates both intellectual and creative skills and develops the personal qualities necessary to ensure that a project is successfully developed from the conceptual stage through to the creation of the final product.(page 33)

This is the fourth principle. In the section it is preceded by a paragraph saying that students need to see a relevant link between what they learn and their own experiences and that the learning should help them throughout their life. Within the context of Technology Education, it is also worth examining Principle 2, Respect for Diversity, which states:

... to standardise knowledge, with the focus on being on content rather than learning outcomes, numerous students feel marginalised by the system, viewing it as irrelevant to their needs. (page 30)

Fourteen objectives for the curriculum are detailed. Each objective is recorded under the sub-headings of knowledge/ information, skills and attitudes. Objective 12 details these under the overall heading of ‘Greater Awareness of the Role of Science and Technology in Everyday Life’ (pages 65, 66). These pages, shown in appendix, mention technology (or words based on technology) 13 times, whilst science (or words based on science) is mentioned 26 times. While eight statements deal only with science, no statement deals only with technology.

This section of the objectives of the curriculum clearly refers to scientific knowledge and scientific language without the recognition of technological knowledge and language. While the document gives no lead as to the contributors, it must be pointed out that at the time it was assembled there was no Education Officer, Assistant Director or Director of the Education Division with experience in Technology Education. The Faculty of Education was represented by a philosopher and a curriculum development specialist.

Working Group

The publication of 'Creating the Future Together' led to working groups being established to work on 18 different themes in the national minimum curriculum. Of these, only three were subject (discipline) related: Science in the primary school, Co-ordinated Science in the secondary school and Technology Education. For Technology Education the working group comprised of two lecturers from the Faculty of Education (myself included), two instructors from the trade school programme, a head of a trade school, a church school teacher (with previous knowledge of the programme in England) and a science specialist from the independent sector. The brief for each of the working groups was toward the implementation of their specific topic, not the content. Thus the report of the working group (chairperson: D Purchase) on the theme Technology Education is very sparse on what should constitute the subject. In recognition of what the trade schools had already been attempting to develop and deliver the following is stated:

The whole emphasis of the Working Group is that Technology Education must be considered a new subject to the curriculum. This is not to downgrade the efforts of the Trade Schools, nor to diminish the programmes that seem set to be transferred to the general secondary school. It is to recognise the changes necessary to create a 5 to 16 curriculum subject that will terminate in a SEC level examination. (Giordmaina, ed., 2000: 134)

[SEC: the school leaving examination set by the Matriculation and Secondary Examination Support Unit of the University of Malta. SEC is equivalent to the English General Certificate of Secondary Education (GCSE)]

With this recognition the working group were claiming the ability to focus on what would be rather than to focus on changing what was. In approaching this they recommended that the Technology Education programme to be implemented should, by utilising a design-and-make approach, follow a course of study that centred on the domains of production, energy & power, communication, control and biotechnology and that the study should be a core study for all pupils. The group also recorded their attachment to the curriculum objectives of values, holistic development, respect for (and allowance for) diversity, stimulation of analytical, critical and creative thinking skills (ibid:134 and to Technology Education being the right of all students (ibid:133).

Curriculum construction

At the end of the 2000, the working group was commissioned to construct a subject curriculum for Technology Education in the secondary phase which was completed by March 2001. This curriculum was constructed around the domains the group had recommended in their report, with a design and make approach to the teaching and learning being emphasised. It included the expectation that students in forms 1 to 3 would complete two projects for each of the domains of production, energy & power, control and biotechnology. In form 4 the expectation was for a minimum of three projects and in form 5 that the students would identify their own design and make assignments.

Communication, it was expected, would be experienced in all projects and did include the use of ICT.

The group was joined in the later stages by a representative of the primary sector and a representative of the trade schools programme to ensure a synergy with the previous programme and the programme to be devised for the primary phase.

Department for Technology in Education

The Department of Technology in Education, Education Division was created in 2002. While there is a lack of practical experience of delivering Technology Education in the senior members of this department, they have a team of support teachers, mainly instructors from the previous Technology programmes. The Design & Technology team is completed by three previously appointed subject coordinators. The new department has organised its group of support teachers to determine the nature of Technology Education in Malta. In doing so the new group opted for the route of resistant materials, electronics, food and textiles. The change in emphasis has also meant a change in title, and now the subject is called Design & Technology.

The newest format of Design & Technology in Malta can be seen most readily through the site at http://schoolnet.gov.mt/des_tech/ (click on 'What is D&T', click on 'Presentation'). This details that during the first two years of secondary education, pupils should complete four design and make tasks, one for each of resistant materials, electronics, food and textiles. In the next two years, with double the time allowed, the pupils should complete eight design and make tasks. The fifth and last year is stipulated for the Extended Project of the SEC examination.

Examining the changes

The significant changes made by the new group to the recommendations of the working group have not resulted in the formulation of a new curriculum document. They have, however, submitted a draft syllabus to MATSEC as part of the process of providing such an examination.

The first significant change in the way materials and components are referred to. The curriculum lists materials and components as 'generic families' and the choice of which to use to the design and make aspect of the programme. In the syllabus the materials and components are separated according to the sections noted. The curriculum states:

As production implies making and as energy and power, control and biotechnology can only be visualised in three dimensional form, the interwoven nature of the study can only be achieved by a management that ensures the pupils move from design to making understanding the explicitness of a given topic (page 4).

In the syllabus the areas of study are expected to be examined separately, although all candidates would have to answer questions on each of the four areas (page 1).

Assessment provides another significant change. It must be remembered, however, that the syllabus will eventually be published by an examination board. The new group may well have had to respond to that influence. In the marking scheme for the Extended Project the marks to be awarded have been divided into three bands, one for design, one for making and one for evaluating. As it has been suggested that the syllabus would cover the work of the third, fourth and fifth form of secondary education, it is possible that this form of assessment would be used throughout that period of time.

The curriculum argued for holistic assessment. On page 15 it is stated that Technology Education is an holistic experience and that component parts of that experience should not be separated.

The subject content of the syllabus for resistant materials (pages 14 to 18) does not mention energy and power in any manner, yet this section contains the content for mechanisms. Power and power supply units are noted in electronics (page 22) and this includes mention of 'solar type batteries' but no other alternative source of energy. Neither food nor textiles mention energy and power. Production is catered for by the inclusion of :

- E) know the process involved in manufacturing*
 - i One off*
 - ii Batch production*
 - iii Mass production (page 14)*

While this statement is transcribed from resistant materials, it is copied for both food and textiles. Biotechnology appears only in the section on food.

The concept of values is not presented in the syllabus, a concept that is embedded in the statements of design in the curriculum. Words such as select, judgements, apply and use, are used throughout the curriculum where as the syllabus has a greater dependence on words such as know and define. It can therefore be put that the curriculum tends toward propositional knowledge to a greater degree than the syllabus.

Since Technology Education started to appear in the curricula of different nations there has always been the question as to what constitutes that body of knowledge and understanding that we shall be teaching. In each locality decisions on the content have been made by groups of people organised to do so. These decisions cannot be unchangeable because of the dynamics of the whole school curriculum and the rapidity of technological change. In this case, no debate has ever been held to find expression of need for the changes that have been so briefly outlined. Prior to the change the subject coordinators had been engaged in the task of constructing syllabi from the curriculum. They recommended the establishment of a group of teachers to take the work further, with the group being determined according to the abilities in the domains of the curriculum. This recommendation was not acted upon and the work accomplished thus far was stopped.

It has been said during a syllabus panel meeting that the new pattern, following that of the English examination system was better suited to the needs of Malta. If that is so, the question that must finally be answered is why the syllabus does not more closely resemble that of the English examination boards.

Implementation

In 1995 seven trade schools started delivering Technology Education. In June 2000 that number was down to four. In September 2000 nine general secondary schools were equipped to offer the subject to 4th and 5th former, using the syllabus of the trade schools. In March 2005 there are fourteen general secondary schools offering the subject: that is fourteen out of a total number of fifty eight secondary phased schools in Malta. In 2002/03 eighty eight instructors and teachers successfully completed a Faculty of Education Certificate in Technology Education. In the schools many of these instructors are lightly loaded, some with ten or fewer periods in a thirty five period week.

It was recognised by the working group that there would need to be a financial investment in Technology Education. While it is shown that the investment is being made in terms of equipment, the continued implementation is delayed because many schools require building works to be accomplished. There is no outcry from the junior lyceums and church schools about the subject as, particularly for them, the examination has not been established.

Reflections on the matter of status

The original status enjoyed by Technology Education in Malta found a reflection in the status accorded to the trade schools. Through the years that followed that introduction the two main political parties of Malta confirmed and followed through with a belief that the subject was beneficial to our students. Educationalists of renown such as Professor Kenneth Wain and Professor Ronald Sultana, a philosopher and a sociologist respectively have connected their names to the need for the subject through ‘Tomorrows Schools’ and their actions as Deans of the Faculty of Education in helping to establish a Technical Design and Technology course.

A status of importance was confirmed when the working group for Technology Education was created and when the Education Division created the Department for Technology in Education and included Technology Education along with ICT in its responsibilities. A status of importance has been given by the fact that the Department is working to issue a call for tenders, through the Foundation for Tomorrows Schools, for the purchase of around Lm500,00 (approximately Euro1,160,000).

There are, however, approximately 19,000 secondary aged pupils who cannot gain any advantage from the subject at this time. Approximately 4,500 have been given the option to study it. In no school does an entire cohort of students follow the Design & Technology programme. Ours is a selective and non-mixed education system and Design and Technology is still to be found in the lowest tier of the selection and in only two girls’ schools of the same level.

Conclusion

Technology Education came to Malta in an attempt to revitalise the trade schools. The benefits of the subject were taken up through Tomorrows Teachers and Creating the Future Together. Why have all the pieces not fallen into place?

The most basic reason that can be ascertained is that the work of Design & Technology was established in the Department for Technology in Education after the work of the working group was completed. This was their first opportunity to make a major impact on the area. While the curriculum had been worked on to provide a syllabus structure, the new group had to ponder whether the curriculum would succeed or whether it should be replaced. That, in many ways, was of course their job. The choice was whether to risk the new structure or to turn to a more established system and use that to determine how to meet their needs.

What can be established from the two documents used is that the two groups took different routes in the matter of knowledge construction. Propositional knowledge and procedural knowledge both have a place in the building of technological knowledge. While the working group constructed their document around the application of knowledge to a purpose, the new group have used the route of acquiring knowledge more for the sake of the knowledge itself.

In my previous work as a teacher in England, the management structure was in place for the coming of the new subject in 1990. Advisors and inspectors were geared up to provide the courses and support that teachers required for the start of the new venture. In Malta that structure was missing. The recognition that Technology Education would be included in the National Minimum Curriculum should have been followed up with the appointment of a member of the Education Division to have responsibility for the area and to serve on the working group or a member of the working group should have been given the responsibility.

The curriculum constructed and submitted in March 2001 was compiled by Mr. D. Purchase, Mrs J. Camilleri, Mr. Saviour Frendo, Mr. George Rye, Mr. Emanuel Zahra and Fr. Salvino Vella. The co-opted members to ensure synergy were Mr. Philip Camilleri and Mr. Joseph Buttigieg. The document was never published although it is in the public domain having been given to instructors on the Certificate in Technology Education course and to student of B.Ed. Technical Design and Technology.

The draft syllabus presented to MATSEC is unpublished. It may be said to be in the public domain as it is being discussed by a panel comprised of representatives of the University, representatives of the church schools and the representatives of the Education Division.

References.

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