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Challenges and responses: the revisions of national curriculum standard for technology education in Taiwan

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Abstract

This paper discusses the forces that drive the revision of the national curriculum in Taiwan. The framework of current standards for technology education is also analyzed. Finally, the strategies of implementing the national standard are presented.

Several forces have driven the revisions of the national curriculum for elementary and secondary schools in Taiwan. These include public involvement in education, changes of economic structure and global influences.

Living Technology, the course title for technology education in Taiwan, is a requirement for secondary students. The new national curriculum in Living Technology for junior and senior high schools was announced in 1994 and 1995 respectively. The total hours of Living Technology for junior high are 108 and 64 for senior high. The four content organizers for the course are technology and life, information and communications, construction and manufacturing, and energy and transportation.

The new curriculum for junior high schools was implemented in September of 1997 and the one for senior high schools will be started in September of 1999. Many efforts including public hearings, teacher in-service training, researches, publications, conferences, purchasing equipment and school evaluation have been made to implement the new curriculum.

Keywords: National Curriculum standard, technology education, Taiwan

Introduction

Taiwan has enjoyed economic prosperity since the seventies. In recent years, dramatic changes in the politics, society, and industrial structure have been observed. These changes bring several challenges to the educational system. One way to cope with the challenges is to revise the national curriculum standard.

Living Technology, the current subject title of technology education in Taiwan, is the major course that exposures students to modern technology (Tsai, 1995). As part of the required total curriculum, technology education is also revised constantly. In the following paragraphs, the forces that drive the revisions, the framework, and the implementation strategies of the national curriculum of technology education are presented.

Forces that Drive the Revision

Several forces have driven the revision of the national curriculum for elementary and secondary schools in Taiwan. These forces include public involvement in education, changes of economic structure and global influences.

After the lifting of martial law in 1987, people in Taiwan have been directly involved more and more in public affairs. Investing in education for children is always the top family business for people in the nation. Therefore, education has gained much more attention lately. Many educational reform movements were initiated by various interest groups. Some of them experimented with new instructional materials and strategies in public schools. Some even bypassed the regular

school system and formed new types of schools. These voices from inside and outside of the educational community stimulated the Ministry of Education to consider a revision of the national curriculum standard.

Economically, although Taiwan did well in the seventies and eighties, it relies on labour-intensive industries, such as textiles. The increase of labour costs as well as strong competition from adjacent countries, such as China, Thailand and Malaysia, has forced the country to move its industry toward higher technology. The government aims to turn Taiwan into a "technological island." So far, the country is moving in a steady path toward this goal. The major export goods are now IC chips, computers and their peripherals (Directorate-general of budget, accounting and statistics, 1998). The demands for knowledge workers are higher than ever. This shift has also had a profound impact on the need for revising the school curriculum.

Taiwan, as a democratic state, has a lot of interactions with other countries. The interactions bring in new ideas and reflections to the educational community. Therefore, the members of the community try to exploit this global influence to reform education and to push for the revision of the national curriculum standard.

National Curriculum Standard for Technology Education

Living Technology, the course title for technology education in Taiwan, is a requirement for secondary students. The new national curriculum standards of Living Technology for junior and senior high schools were announced in 1994 and 1995 respectively. The total hours of Living Technology for junior high are 108 and 64 for senior high (Tsai, 1997).

The goal of Living Technology for junior high schools are four: (Ministry of Education, 1994):

1. Understanding of the meaning, evolution, scope and importance of technology as well as its impact on human life, society and culture.

2. Being able to use basic tools, equipment, materials, products, processes and methods of technology.

3. Knowing the disciplines and occupations related to technology and exploring one's own interests, aptitude and talents in certain aspects of technology.

4. Increasing the abilities of adjustment, judgement, problem solving and creative thinking for living in a technological society.

The structure and concepts of Living Technology for junior high schools are as follows:

I. Technology and life

1. The development of technology
 - a The meaning of technology
 - b The evolution of technology
2. The interactions between technology and society
 - a The relations between technology and life

II. Information and communications

1. Information and communication systems
 - a Introduction to information and communications
 - b Computer applications
2. Communication style
 - a Blue prints reading and design
 - b Graphic arts communications
 - c Electronic communications

III. Construction and manufacturing

1. Construction systems
 - a Introduction to construction
2. Construction and life
 - a Using and maintaining house equipment
3. Manufacturing systems
 - a Introduction to manufacturing
4. Manufacturing and life
 - a Design and producing products

IV. Energy and transportation

1. Energy and transportation systems
 - a Introduction to energy and transportation systems

2. Using energy
 - a Energy and power
3. Ways of transportation

The goal for Living Technology for senior high schools are three: (Ministry of Education, 1995):

1. Understanding and assessing the impact of technology on individual, society, environment and culture.
2. Developing technological knowledge and skills for solving problems and the ability for advanced studies in technology.
3. Cultivating the appropriate technological concepts and attitudes and developing interest in studying technology.

The structure and concepts of Living Technology for senior high schools are as follows:

- I. Technology and life
 1. Technological society
 - a Characteristics of technological society
 - b The scope of technology
 2. Resources and environment
 - a Using resources
 - b Environmental pollution
 - c Environmental protections
- II. Information and communications
 1. Information technology
 - a Computer and information
 - b Information and management
 - c Computer and communications
 2. Graphic arts communications
 - a Editing and reproductions of graphic arts
 - b Drafting and design
 3. Electronic communications
 - a Basic principles of electronic communications
 - b Equipment for electronic communications
 - c Electronic communications equipment for using at home
- III. Construction and manufacturing
 1. Construction systems

- a Planning, construction, and management
 - b Structures and equipment
 - c Intelligent building
2. Living environment
 - a Landscaping
 - b Interior design
3. Manufacturing technology
 - a Material processing
 - b Manufacturing management

IV. Energy and transportation

1. Energy and power
 - a Types of energy and their applications
 - b Using electric power
 - c Power generators
2. Transportation systems
 - a Forms of transportation
 - b Transportation networks
 - c Transportation vehicle

The Implementation Strategies

The new curriculum framework for junior high schools was implemented in September of 1997 and the one for senior high schools will be started in September of 1999. It takes many efforts to implement the new curriculum standards (Tsai, 1995; 1997).

Teachers are always the keys to the successful implementation of a new curriculum. During the initial stage of developing the framework in the earlier 90s, several public hearings were conducted nationwide. These hearings enabled the teams developing the framework to communicate with the first-line teachers and ensured that the teachers' opinions were taken into account (Lee, 1994).

After the Ministry of Education announced the standards, workshops in teaching the new curriculum were provided by teacher training institutes for the teachers. Meanwhile, the teacher training programmes also adopted the standards for revising their courses. Moreover, the new requirements for teacher certification in teaching technology were also established.

There is a big gap between the statement of the curriculum standard and instructional design in the classroom. To help the teachers teaching the new curriculum, the government

was generous in funding the researches for developing technology learning activities. At the same time, publishers also published textbooks and supplementary materials. Furthermore, domestic and foreign experts were invited to speak at various conferences to advise the teachers on how to design and implement the instructions.

To implement the new curriculum, the government also provided schools with some additional funding for purchasing equipment. To ensure the quality of teaching, ten senior high schools are randomly selected each year for evaluation. The evaluation team visits the schools to check the instructional activities, administrative support, and spending and also carries out interviews with teachers and students. The results are reported to the educational authorities.

Conclusions

Taiwan is an island with little natural resources. The only way to survive in today's rigorous competition is to develop its abundant human resources. Education is the best way to achieve this goal. The challenges are always there and the responses have to be made. The revision of the national curriculum is a recursive process. Although the new standards are just on the way, a new run of revising them has already been initiated.

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