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The model of teaching practice for trainee teachers of technology at the junior high school, Taiwan, R.O.C.

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Abstract
Taiwan is equipped with many outstanding science and technology programmes. It has a policy to increase vocational/technical schools and improve the quality of their teaching. All these conditions have made Taiwan an advanced-technology-oriented nation and also stimulated its economic growth.

According to the Teacher Education Law promulgated in 1994, teachers have to pass a pre-examination, undertake one year of teaching practice and then, to pass the post practice examination to become qualified teachers in Taiwan. The field, to be called “living technology” instead of “industrial arts,” will have a new national curriculum from 1998. Clarifying the content of teaching practice and its process for trainee teachers is very important.

This paper defines the content of the teaching practice for trainee teachers. DELPHI and a questionnaire were used. Finally, a model was developed by means of the evaluation by experts. The development of instruments for the evaluation of teaching practice is the subject of the following study.

Introduction
Technological Education’s Contribution to the Economy
Taiwan is made up of only 36,129 sq-km, and its population is only 21 million, but it has foreign exchange reserves that are second only to Japan’s. In terms of international trade, its volume in 1994 amounted to US $180 billion, 600 times higher than its record of 1950 when the registered trade volume was only US $300 million. During the past four decades, Taiwan has witnessed a rapid economic growth partly as a result of its quality of education. Especially noteworthy, is Taiwan’s technological education which has contributed to its considerable economic prowess as one of the Asian ‘tigers’.

Technological education in junior high schools plays an important and essential role as a base of Taiwan’s education. Taiwan is equipped with many outstanding science and technology programmes designed to promote technological education. Meanwhile, the policy to increase vocational/technical schools and their quality has led Taiwan toward advanced technological development. At the same time, people in this country are very diligent. All these conditions have made Taiwan an advanced-technology-oriented nation and also stimulated its economic growth.

Need for Teaching Practice for Technology-based Trainee Teachers
Teacher education has played an important role in developing technological education and maintaining continued economic growth in Taiwan. According to the Teacher Education Law promulgated in 1994, university graduates first need to take a pre-examination and second, undertake one year of teaching practice. Finally, trainee teachers must take a post practice examination to become newly qualified teachers1. This shows that for teachers to become qualified they must have finished their pre-service teachers’ education and passed the pre-examination, post practice examination after undertaking their initial teacher training. A new national curriculum will be introduced in 1998. The field of industrial arts in secondary schools will be replaced by the new field of ‘living technology’ in Taiwan2.

The goal of this new curriculum is to explore technology and its impact on mankind; to learn the process and methodology of technology by means of material, tool, and machine. Problem solving, creativity, and cooperation with others are stressed. Raising student interest in technology is also emphasised2.
As a result, the content of teacher education must be updated. The current one year of teaching practice for trainee teachers remains an important part of teacher education. This implies that teaching practice should remain a required stage during the process of producing qualified teachers under the new future curriculum in Taiwan. However, there is no defined content or model for teaching practice currently in this country. Therefore, the content and model for teaching practice must be clarified before 1998.

**Purpose of the Study**

The purpose of this study is to clarify the content of teaching practice and its model for 'living technology' in junior high schools.

**Research Framework—Method and Process**

On the basis of the literature analysis, current situation and theory, related research was explored. A questionnaire was then developed and edited by means of the Delphi Technique. Ken Volk indicates that the process of Delphi Technique has the following general steps:

1. Group members, whose consensus of opinion are sought, are identified. These members, who are usually experts in the research topic(s), become the Delphi panel.
2. First, a questionnaire is developed by the researcher and sent for each panel member to rank order the items. A questionnaire may also be sent asking each panel member to generate a list of goals or issues towards which a consensus of opinions are sought.
3. A second questionnaire is sent for each panel member to rank order the items. The results of the first questionnaire are presented in a second questionnaire. This questionnaire shows the preliminary level of group consensus (Mean) along with each member’s earlier response.
4. Third, the results of the second questionnaire are also presented in a third questionnaire. This questionnaire also shows the preliminary level of group consensus (Mean) along with each member’s earlier response.
5. Each panel member ranks each item again and, if desires, provides a brief explanation for any differing opinion.
6. The results are tabulated and presented in a final statement, representing group consensus.

The Delphi Technique was applied three times. The sample was composed of nine experts. Finally, the investigation of a large sample, which includes trainee teachers (109), helping teachers (72), and supervisors (23), was implemented. The total sample is 204. Based on statistical analysis, the content of teaching practice was clearly defined.

Based on the above, a model of teaching practice was set up after a review by eight experts whose majors are either living technology or teaching practice. The research framework is detailed in Figure 1.

**Results and Implications**

**Content**

Tseng discovered that the major contents of teaching practice included: objectives, competencies, strategies, and environment. In his analysis there are 72 detailed items in total. The items for objectives are listed in the following sequence: (1) teaching materials and strategies, (2) teaching activities, (3) classroom management, (4) management of appliances and equipment, (5) safety management of school workshop, (6) competence in undertaking responsibility independently, (7) planning of a school workshop and its installation, (8) professional growth, (9) good links with students colleagues, (10) good relationships with parents, (11) competence in guiding students toward participating in technological activities, (12) competence in guiding student behaviour, (13) competence in administrative affairs.

The items for competencies are listed in the

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**Diagram:**

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Current Situation of Teaching Practice → Theory & Research of Teaching Practice → Delphi & Investigation → Model Set up → Conclusion & Proposal
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Figure 1: Research Framework
The items for teaching methods are listed in the following sequence: (1) to observe the teaching situation, (2) to be interviewed by supervisors or mentor teachers, (3) to observe the behaviour of new teachers, (4) to have seminars with supervisors and mentor teachers, (5) to be interviewed by mentor teachers or professors, (6) to simulate the points of others' teaching, (7) to increase teaching time by months, (8) to develop a plan for professional development, (9) to write a research paper for projects (10) to solve problems encountered by trainee teachers (11) to receive training in administrative affairs or student guidance.

The items for advisors are listed in the following sequence: (1) teacher training schools, (2) supervisors, (3) principals, (4) advisory teachers in the field of living technology, (5) administrators, (6) other advisors in teachers centres for holding workshops, (7) supervisors of technology education.

The items for characteristics of teacher training schools are listed in the following sequence: (1) good teaching by schools, (2) supportive guidance of teaching practice, (3) teaching of normalized schools, (4) ideal quality of guided competencies, (5) adequacy of teaching installation, (6) sufficient qualified teachers, (7) multi-climate of classroom management, (8) adequacy of interactive schools, (9) sufficient opportunities for professional development, (10) ideal quality of administration, (11) multi-spaces for classrooms, (12) sufficient opportunities to implement practical arts education, (13) proximity to universities from which trainee teachers in training have graduated.

The items for the delivery system are listed in the following sequence: (1) to develop a manual of teaching practice, (2) specify criteria for selecting schools, (3) to encourage mentor teachers, (4) to develop a manual for mentor teachers, (5) to develop a manual for trainee teachers, (6) to increase teaching hours for guiding trainee teachers, (7) to publish related information on teaching practice, (8) to cultivate mentor teachers, (9) to proclaim a system for trainee teachers to offer feedback, (10) to give allowance to mentor teachers, (11) to hold seminars for trainee teachers, (12) to establish different levels of teachers.

Model

Based on the CIPP model proposed by Stufflebeam et al. (1971)\(^5\), the model for the teaching practice of living technology teachers is shown in Figure 2\(^5\). This figure indicates input, process, and product during the stage of teaching practice. As for students who graduate from universities and obtain 26 credits of professional education, they first must pass a pre-examination to become qualified teacher trainees. Thus they have the basic teaching competencies of 'living technology' before their teaching practice. These teaching competencies were included in an integrated research project that was completed by this author. The major competencies of skill and knowledge for 'living technology' are as follows: education profession, subject teaching profession, technology profession. There are 120 detailed items in total\(^6\).

Then, trainee teachers experience the "process" of teaching practice and pass the evaluation of teaching practice. Naturally, they will have better competencies than they did before the teaching practice. This stage is called "product." Further, this model is immersed in a "context" which includes salary, schools features influencing teaching practice, their policies, etc.

If trainee teachers cannot produce the predicted product, they can go back to the stage of "process" or "input" to re-experience...
the feedback route in Figure 2. Once they complete the stages in the model, they can take the post practice examination to become formally qualified teachers.

Conclusions and Recommendations

This study draws the following conclusions:
1. To predict a product for beginning practice, it is necessary to experience the “process” of teaching practice in a good environmental “context.”

First, in order to ensure trainee teachers begin in a good teaching environment, good software and hardware, a salary and policies need to be in place.

Second, the following items are important for fulfilling the process of teaching practice: objectives, competencies, guided methods, advisers or units, characteristics of teacher training schools, and a delivery system.

2. The model established by this study provides a route for implementing teaching practice.

In this study, Figure 2 follows the CIPP Model. This model is composed of input, process and product and points out the route for a successful teaching practice.

3. Further studies are necessary to develop instruments which evaluate the product of teaching practice for trainee teachers.

The model in this study will be the foundation for developing an evaluative format for assessing instruments that will be used for the examination of teacher licenses in the near future in Taiwan.

This study recommends the following:
1. Software and hardware installation should be improved to assure a good environment for teaching practice.
2. To promote the efficiency of teaching practice, it is necessary to strengthen objectives and to improve the content, and strategies for the implementation of proper teaching practice.
3. The model proposed by this study might provide a reference for teaching practice.

References