# Study On Applying of Creative Thinking And Information Teaching Into The Courses Of Special Topics Making – Take Training Contestants For Scientific Exhibition as An Example


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***Abstract*** — *The purpose of this study was to apply information technology and self -made teaching medium into the courses of special topics making.*

*Carry out teaching activities in coordination with methods of creative thinking teaching, collaboration study, diversification measurement and etc., there are two major parts, i.e., self-made teaching medium and teaching activities.*

*The first part, use Microsoft Power Point, Microsoft Publisher and Hyper Cam, these three software to make self-made teaching medium.*

*The second part, take creative thinking teaching to encourage students to have divergent thinking and convergent thinking, and design the teaching activities by bringing up assumption questions and draw up the methods for solving problems. After the investigation of willingness and basic aptitude test, there are 12 objects of study selecting from the students in the four classes of information program in the second grades of technical and vocational school, and carry out an experimental teaching to them for six months.*

*The discovered results from the experimental teaching were, students could realize the thinking process of the whole question clearly, finished products of special topics could be modified and improved independently, adopt information software to assist teaching could promote students' absorb ability and increase study efficiency. The three set of finished products from teaching activities are "Intelligent household administration system", "Intelligent automobile instrument panel control system" and "Mini conveyer", in the name of the school, they participate in the scientific exhibition contest of high and elementary school in Taipei city, and they respectively won the Most Superior, Superior and Good awards in technical and vocational school of electron electronic and information division, and the one with Most Superior award got further award of champion in electron electronic and information division. The conclusion of the study is that if teachers could use this experimentation method more livelily, it could really promote talented students' ability in making of special topics and creativity.*



***Index Terms*** — *Creative thinking; Information Technology, Courses of Special Topics Making, Training Contestants*


## Introduction

1. Research motivation and origins

"Information" is already part of our life, with fast the improvement on information technology communication between countries is getting more frequently, and also the rapid growth in computer software. In the school, whether you are administration staff, student, even headmaster and teachers all need to information facilities at work, hence let information become part of the teaching activity has already become a trend and direction in the modern education.

The meaning of computerized teaching is teaching is teachers use computer technology during classes and after school activities to educate student's ability to "make use of technology and information" and have spirit to "voluntarily explore and research", unable student to "think independently and solve problems" and complete the

"life planning and learning" (Kuo-En Chang, Rong Ching Chen,2001).

"Scientific technology is originally come from humanity", this sentence is come from Finnish Mobile producer Nokia advertisement. We all know that the development of scientific technology is come from human's unlimited imagination, and the use of the scientific technology achievement has realized human's imagination and dreams. Student who attend the scientific technology competition at the early stage are mostly due to take part in the competition, not because they are interested in scientific research. Hence, their research topics are mostly appointed by their instructors, student just need to follow the instruction given by teacher step by step, they would be able to complete the experiment, complete lost the objective and spirit of the research competition. The material does not want to repeat the mistake taken in the past, and hope that it can explore student interest and curiosity in science, lead them to discover problems from humanity life, so to think about problems, solve problems, and finally create problems. Using information technology and educational media in the specific topic producing course, with the creative thinking teaching, cooperation learning and diversity examination methods to implement the trainings on teaching activity design of senior vocational school information and scientific competition players

2. Research Objectives

This research is based on above described research motivation and origins, the research objective are as follow:

A. Develop a framework diagram of self-made education media and teaching CD
B. Trains the teaching activity design of senior vocational school information and scientific competition players.

## Research Methods

This research is making use of the self made education media and self edited teaching activity design, take student of second year information course in senior vocational school who willing to take part in investigation and basic competency test, choose 12 of them as research object, make use ofactivity research methods to carry out 6 months implementation teaching.

## Self-made educational media design

Self-made educational media design edition is base on core problems and unit problems, and include four unit problems into educational media.

As shown in Fig.1, teaching topics can be classified into four main units:

(1) How many knowledge do you know

This topic can be classified into digital logic, PowerPoint software operation, Publisher software operation and Hardware learning four units.

Due to the process of player training, players must already known some basic knowledge and skills, these knowledge and skills are the important basic competency for players during competition. Hence, to ensure each trainer already have these basic knowledge skills, teachers must implement teaching base on these content. The reaching methods in this part are mainly involved descriptive teaching and operational teaching. As this part is belong to learning of already known knowledge, thereby the main learning of methods for students are the traditional lecture for student to carry out repeated practicing,

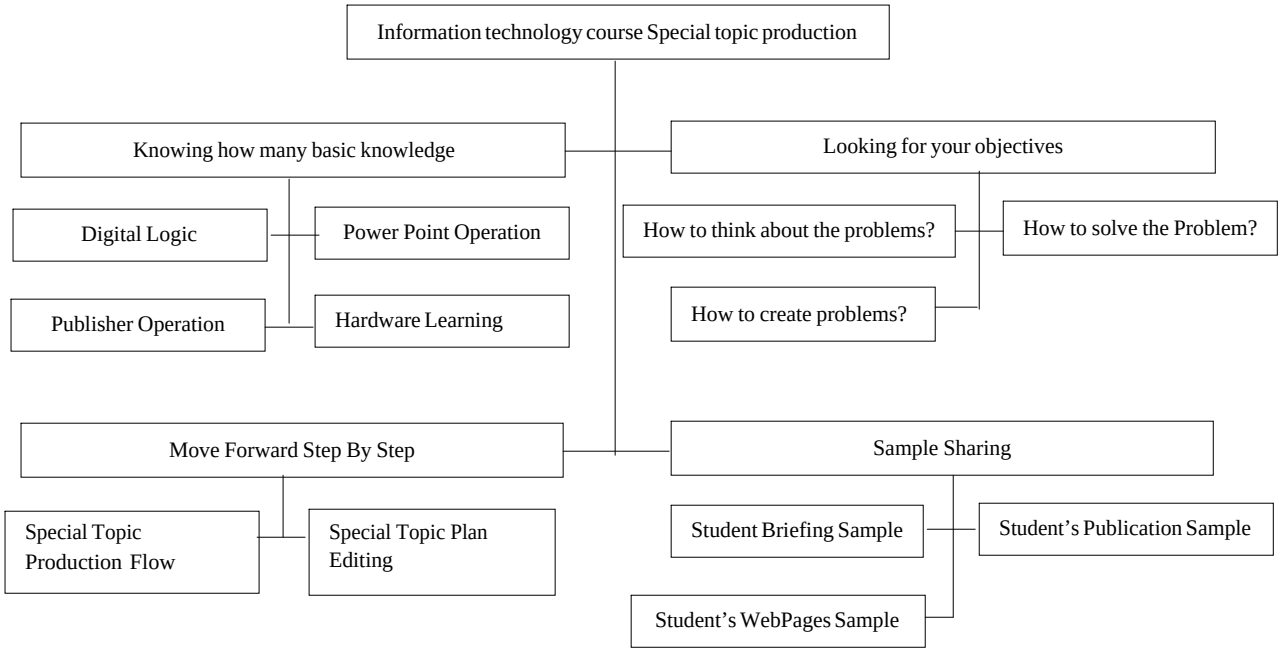


FIGURE 1
EDUCATIONAL MEDIA FRAMEWORK FIGURE

(2) Looking for your objectives

This topic could classify into how to think the problems, how to solve the problems and how to create problems 3 subunits.

The main objective of this topic is to train the players who attend the competition, to have the hobbit of independence thinking and trains them having systemic concepts on problem solving, through creative thinking teaching provide brain stimulation and the teaching activities of the concepts association. Student can learn about the systematic thinking, avoid the trap of lost thinking, prevent thoughts rigidify and so on through teaching activities. Finally, it could train student to have competency to create problems, which is discover the reality and pheromone different from the daily life, explore basic principles from the research, and also have the competency to set up the research topic and objective.

(3) Move forward step by step

This topic is separated into special topic production flow and special topic plan editing two units.

The main purpose of this topic is to explain the whole learning, experiment and production flow of special topic production, as well as how to write a complete and systematic special topic plan, it also includes the future competition flow items that need to pay more attention on.

(4)Sample sharing

This unit includes student briefing sample, student's publication sample and WebPages samples.

The main purpose of this topics is to offer the reference sample of student's work, allow students have more concepts and understanding of briefing, publication and WebPages model, avoid insufficient understanding with the operation, and have the problems of not knowing where to start.

## Education activity design of senior vocational school information and science competition player

The relation figure between teachers and students is shown in Fig.2. The bottom of the figure is where students start learning; the time of learning is horizontal, form bottom to top. At the start of implementing teaching activity, the main resources for student to absorb Knowledge is mainly from teacher framework, teacher could provide already-known basic knowledge to student through descriptive and operational teaching method, to establish bases towards scientific research, hence it appeared to be the pyramid shape. After these, With the increasing learning time, student's learning method would gradually change from teacher's framework to mainly base on self learning method, the sources of knowlege skills are no longer come from teachers, it is actually come from the learner himself, thus it would has inverse pyramid appeared. The teaching activity is described as following:

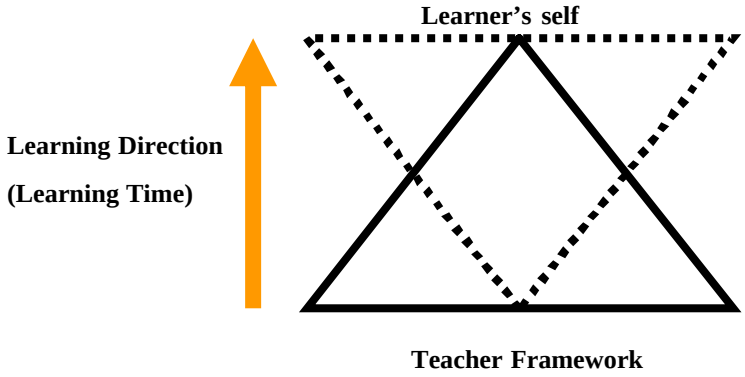


FIGURE 2
RELATION FIGURE BETWEEN TEACHER AND STUDENTS

1. Basic knowledge narrating

Teacher aims at basic professional course that student might use during information topic production, as shown in table 1, it includes digital logic, Power Point briefing software operation, Publisher software actual operation practice, provide academic and techniques assistant, explanation and actual practices.

There are three small parts of digital logic that are mainly use descriptive teaching method to carry out teaching activity, it is going to explain the concepts of arithmetic calculation and complement calculation clearly, and also give student enough practice, including practice during classes and doing homework. For practicing Power Point and Publisher software operation and hardware practice, classes are given descriptive teaching and actual practice activity, through teacher's operation student can observe how to use software to learn and imitate the structure, after getting familiar with it, they can implement by themselves.

2. Grouping

Grouping is decided by students during free time, teachers are only at the position of assisting. Instruction teacher also appointed the deadline for group leader to hand in the group lists.

After grouping, teacher would use brain stimulation techniques, and also make use of imagination method for students to describe and share their daily hearing and the problems related to science. After activity completed, use group discussion activity, moreover each group would have a topic to discuss.

| | | |
|---|---|---|
| **Unit name: Knowing how many basic knowledge** | Digital Logic | Arithmetic calculation (change from 10 to 2 conversion) |
| | | Arithmetic calculation (change from 10 to 16 conversion) |
| | | Complement calculation |
| | Power Point Operation | Start Power Point |
| | | Power Point Operation |
| | Publisher Operation | Press Release Operation |
| | | Foldout Operation |
| | | WebPage Operation |
| | | Save WebPage |
| | Hardware Learning | Welding Practice |
| | | Practice the Coupling Coil Cornering |

TABLE 1

MATERIAL USED LISTED TABLE OF BASIC KNOWLEDGE SPEECH

3. Collecting information

As shown in Table 2, this is the self-edited material unit in this stag;

| | |
|---|---|
| **Unit name: Sample sharing** | Student briefing sample |
| | Student's publication sample |
| **Unit name: looking for your objectives** | How to think about the problems? |
| | How to solve the problem? |

TABLE 2

MATERIALS USED LISTED TABLE OF COLLECTING INFORMATION

Leading students to learn how to look for the information and data they require, thereby learning how to think about the problems and how to solve it through learning. Though brain stimulation between students and instructors they learn how to get ideas which means creativity and innovation. At the same time, guide students to collect information from the library, use Web site's searching function to collect specific topic, also explain the concepts related intelligent assets, respect other people's intelligent assets, protect self rights and how to correct and make use of other people's information.

Teacher can play the sample document that made by students, and ask students to divide work in unit grouping. On the other side it can be the reference when students are thinking their topics, moreover, remind students of focusing on the content when they are making briefing, publication, written report and Web pages, other special effects are use as assistant, if the use other's information ,they must give the notation of the information sources. They must also tell students the marking standard.

4. Deciding topics

Teacher could guide students to find the topics from daily life, and also making use of the brain stimulation method that has described in previous chapter to organize each group member's idea, moreover organize the topic

direction and the title of the topic. Next analysis and discuss the problems need to solve rise from the topic decided by group. Teacher can use tree diagram method to lead students to divide their own question down, by dividing big problems into several sub-problems, then divide each of these sub-problems into several tasks. It enables students to have more understanding with their specific topic.

Table 3 is the self-edited material unit at this stage:

| | |
|---|---|
| **Unit name: Looking for your objectives** | How to create problems? |

TABLE 3

MATERIAL USED LISTED TABLE IN DECIDING TOPIC

5. Special topic plan production

Through previous discussion, let group members divide the works, complete their individual plan report. They plan report including briefing, written report and achievement presented web pages.

Teacher plays the sample document of student's work, which can be the reference for students when they think about their task, on the other side also remind students of focusing on the content when they are making briefing, publication, written report and Web Pages, other special effects are used as assistant. Moreover they must tell students the marking standard.

Table 4 has shown the self-edited material unit at this stage:

| | |
|---|---|
| **Unit name: Move Forward Step By Step** | Special topic production flow |
| | Special topic plan editing |
| **Unit name: Sample Sharing** | Student's WebPages sample |

TABLE 4

MATERIAL USED LIST TABLE FOR PLAN PRODUCTION

6. Teaching test

Students' learning review is mostly based on diversification review method to proceed, including plan publication, and 3 major review territories, teaching review framework is shown in Fig 3.on presenter's oral and expression ability to see if they are able to explain the plan content clearly, as well as if the briefing work is completed. Finally the emotional part is mainly review whether the students' interaction with group during learning process is harmonious, if they are able to learn from each other. Each review mark table has three reviewer marking column, they are given by instructor, professional and marks given between students.

## 7. Special topic plan publish

Before presentation, students can use publisher software that they have learned before to make some invitation card, and invite headmaster, course supervisors and teachers from each course or even professional scholars from outside of school for this presentation, give students some instructions, suggestions, and criticism.

Let each group as a unit, present their group topic plan briefing to teacher and the rest of the class, other than review the achievement of students' topic plan, it can also train their competency to present on stage and spirit of group cooperation. During the presentation, teacher could also make use of V8 to record students' presentation process, and

take photographs for records.

## Discover the research result

This research make use of self-made educational media and the implementation teaching designed by teaching activity, the implementation result discover that;

1.Student could clearly understand the whole problem thinking flow

2.Able independently revise and improve the completed products.

3.Use information software to assist teaching can increase the students' absorption ability, and also strengthen the learning effect.

4.3 group works of this teaching activity, "Intelligence Home management system" "Intelligence car meter control system" and "Mini transportation box", are represent school to participate primary and junior high school science competition in Taipei, they have won gold ,silver and bronze rewards in Electronic and Electrical and information in Senior vocational school group.

5.Group that won the golden reward has won the electronic electrical and information course champion in senior vocational school group.

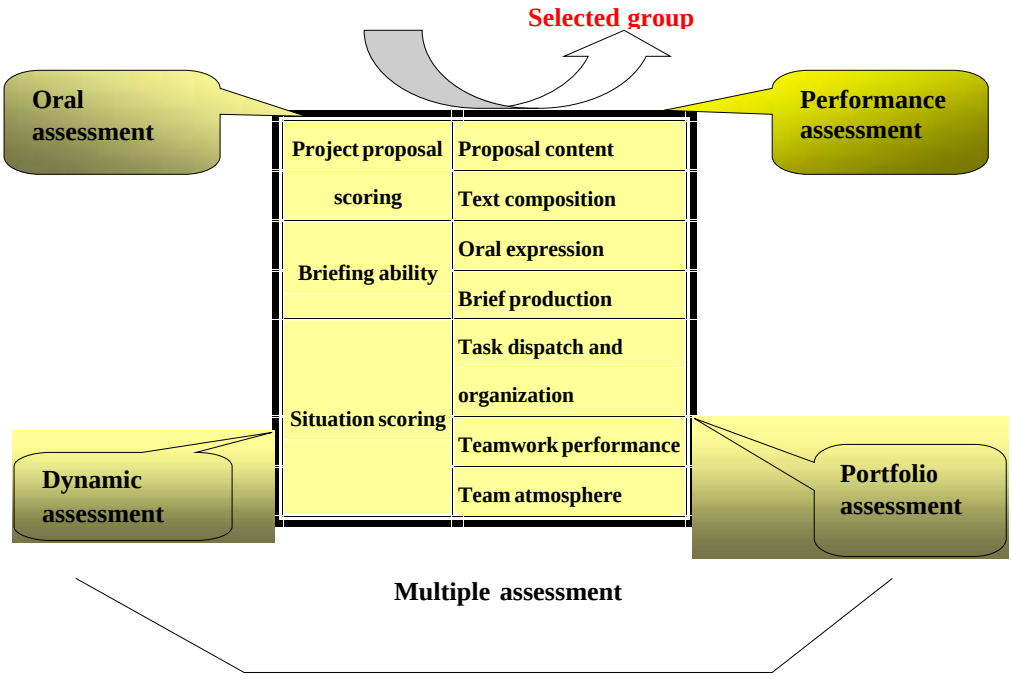


FIGURE 3
TEACHING REVIEW FRAMEWORK

## CONCLUSION

This research has discover the following conclusions from this research result:

If teacher can freely use self-made educational media to assist teaching, which can help student in think, revise and improve the problems independently, increase learning effect.

If teacher can freely use teaching activity design in this research, it can actually increase student's special topic production and creation competency.

Futher research can promote to each different course teaching in senior vocational school.

## REFERENCES


[1] Shi Chuan Wong (2000). The meaning and content of integrate information science into teaching. *Information and education,* 80, 23-31.

[2] Rong Ching Chen (2001). A study of integrated information into visual art instruction in the elementary school. *Research of Course and Teaching research on postgraduate thesis of National University of Normal.*

[3] Chian Cang Gong (2001). An action research of integrated information technology in health and physical education. *Research of Cours e and Teaching research on postgraduate thesis of National University of Normal.*

[4] Intel (2002). Intel Teacher to the Future with Support form Microsoft. *Intel Teacher Plan lecture handout material.*