How Can We Share Teaching Experiences in Different Countries through ICT?
- Concepts, Models and Propositions for Instructional Design and Analysis -

NISHINOSONO Haruo

Bukkyo University

Kyoto, Japan

E-mail: nisinohr@bukkyo-u.ac.jp

Abstract: Information and Communication Technology (ICT) enables pre-service and in-service teachers to share their experiences with one another while in different places. In other professions such as architecture, medicine, engineering, etc, specific symbols and models are used to express ideas and inventions. In the educational profession, there are no common symbols or models for teachers to express their ideas or to share experiences. This paper proposes a procedure of instructional synthesis and analysis, concepts for teaching, graphic representation of models and logical expression of instructional propositions to enable teachers to share their experiences through ICT.

Introduction

The new Information and Communication Technology (ICT) comes to teachers' desks and into classrooms enabling teachers and children to communicate each other from different places. The Internet, Cyberspace, Computer-Mediated Communication (Ryan 1992) and other concepts emerging from ICT are opening a new era in education on a worldwide scale, connecting people from different culture and countries. Computational communication technologies can play a vital role in the formation and successful operation of work-based learning communities, (Gordin, et al, 1996). Direct communication between children in foreign countries is spreading widely on the Internet despite their insufficient fluency in foreign languages. On the contrary, teachers cannot share their teaching experiences fully with others in a different culture or even within the same county due to the different frameworks used to express ideas and professional experiences. In professional areas such as engineering, medicine, music and other disciplines, members can express ideas, inventions and efforts in common international languages or symbols which are different from daily spoken languages. The teaching profession also needs an internationally understandable language to facilitate communication among teachers from different areas. This paper examines the possibility of sharing experiences among teachers in different workplaces through ICT.

A Framework for Generating Lesson Plans

In the case of conventional lesson plans, we start by describing educational aims and goals, specify instructional objectives and predict teaching and learning events which may occur in the classroom. In this procedure, we start from our educational intention and aims and move to instructional contents, teachers' actions, teaching materials, students' activities and other remarks. However, when we start to develop our ideas from educational norms, educational values differ from teacher to teacher, from school to school and from society to society. It is not difficult to express ideas as expectations and philosophical views in written statements, but it is hard to reach common agreement on educational goals and subsequent teaching, or to describe instructional events which will occur in the teaching process in advance. The same description of teachers' intentions and instructional objectives does not necessarily result in a similar learning or common visible student outcome due to differences in teachers' experiences. Teachers' intentions in written form are easy to read, but it is difficult to reach a common understanding and agreement, to modify the statements or replace them with other statements. On the other hand, when we start from students' activities, learning environment and a visible outcome, it is possible to describe them, to reach same agreement after critical discussion on visible

events, to collaborate each other and work together to assess and support students' learning.   In this context, we try to describe the physical and psychological environment needed for an effective learning by means of concepts, models and propositions.

There are two directions to follow regarding instructional design.   One is to start from our specific intentions and aims for instruction, proceed to images, models and a rational sequence of teaching, develop a concrete lesson plan and conduct it in the actual classroom.   Another direction is to start with a flexible instructional strategy, conduct the lesson, observe the teaching-learning process, analyze the behavior of teacher and students in the classroom and predict teaching-learning events for the next lesson.   In the real teaching situation, both directions are taken into consideration to generate a lesson plan.   The designing procedure proposed here consists of several components; images, codes/categories, synthetic and analytic concepts, empirical models and propositions, which form sequential steps shown in the following figure in English and Japanese.
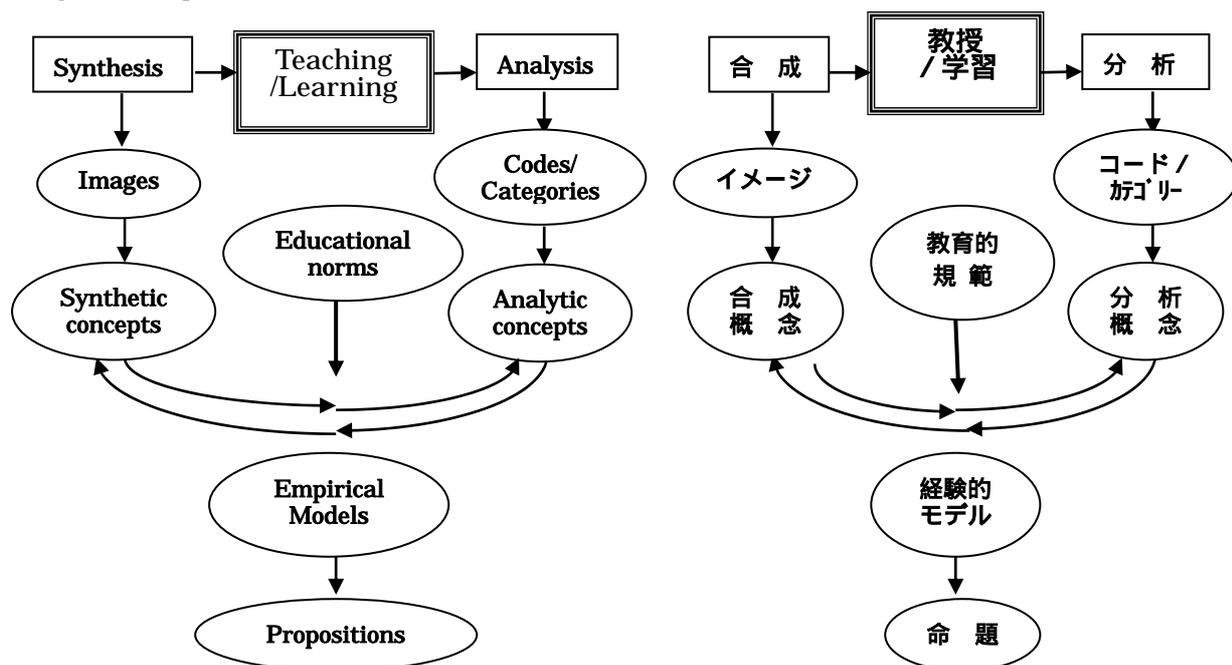

Figure 1. Procedure for instructional synthesis and analysis in English and Japanese

In other professions such as construction, architecture and chemistry, internationally understandable symbols, concepts and models are available to express ideas and facilitate communication.   When we start to develop a lesson plan from a prescription of teaching-learning events, it is easy to select common symbols, concepts, models and propositions from a database of instructional materials and to describe the lesson plan with such elemental components.   If a theoretical model applicable to the lesson is available, it is suitable to adopt it for effective teaching.   Whole configuration of symbols, concepts, models and propositions constitutes a structured lesson plan and represents specific educational aims.   Graphic representations of symbols and concepts for instructional design enable teachers to develop their ideas and revise them ceaselessly. These components stored in a database are applicable to other instructional situations to be utilized by other teachers.   In this context, the components of symbols, concepts, models and propositions are free from any specific educational values.

The proposal described here aims to give in-service as well as pre-service teachers a new framework for preparing instructional plans in daily teaching.   They construct a lesson plan by selecting images/models and propositions stored in computers.   They can add and store new images, models and propositions at will.   They start writing lesson plans in a very primitive way using pictorial images, proceed to the stage of keywords or concepts, represent ideas in graphic models and describe judgment and explanations in propositions.   The revising procedure is vital for improving an initial lesson plan before experiencing the actual situation to be observed in the classroom and reaching a refined plan to enable realizing and assessing the intended instructional goals.   New models and propositions will be created endlessly just like new car models emerge one after another.   Components for the synthesis and analysis will emerge always and will be far

too many to memorize.   In spite of such a multiplying of components, we can store these components and utilize them to express our experiences through ICT.

Appendix I shows a tree structure of variables and Appendix II PowerPoint slides representing a few examples of images and models.   Appendix III represents examples of propositions.   The method for instructional design is named a MACETO model representing meaning/values, activities/actions, concepts/contents, environment, tools/techniques and outcome.   The following table shows pairs of components in both English and Japanese   If a teacher describes a lesson plan in English, it will be simultaneously translated into Japanese, and vice versa.

English	Japanese
M: meaning/values	M:
A: activities/actions	A:
C: concepts/contents	C:
E: environment	E:
T: tools/techniques	T:
O: outcomes	O:

Table 1   Pairs of variables in English and Japanese

Each component has a number of items arranged in a tree-structure as shown in the following table. Other variables of MACETO are given in Appendix II.

English	Japanese
1. Meaning/Value	1.
1.1 Contextual/situational	1.1
1.1.1 Interest and inquiry into subject matter	1.1.1
1.1.2 Self-awareness	1.1.2
1.1.2.1 Self-recognition through learning and achievement	1.1.2.1
1.1.2.2 Social recognition through learning and achievement	1.1.2.2
1.1.2.3 Experiences in the past	1.1.2.3

Table 2   Some variables in tree structure

If there is a correspondence between English technical words and the foreign equivalents, teachers in different countries can exchange their experiences through English as an international language.

Implementation of the Procedure in Pre-service Education

The procedure of synthesis and analysis for instructional design was introduced during the course 'Instructional Technology' to confirm its applicability in pre-service education.   Students in this course were requested to follow these instructions.

1. Describe an imaginary lesson to be developed in workgroups with images and models and elaborate it further according to their own ideas.   Explain the rationale used to design such lesson referring to documents of instructional standards (issued by the Ministry of Education and/or Local Boards of Education in Japan) and literature on education.
2. Develop a lesson plan using images and models referring to the MACETO model to select synthetic and analytic concepts.   The plan should be relevant to children's activities, learning situations and the educational environment.
3. Report their learning experiences during the course and evaluate them referring to the learning plan prepared at the beginning of the lessons.

At the beginning of every session, 'Topics for this week' and 'Learning plan of this week' were distributed. The class was conducted by showing the lesson plan of this course through PowerPoint presentation and handouts of 'Learning plan of this week' to be filled and submitted at the end of each session.   Students worked hard collaboratively in groups as well as individually to accomplish their tasks.

Pre-service students have a long history of attending classes in elementary and secondary schools. They hold rigid and sustaining images on teaching from these experiences. At the initial stage of instructional designing, they tend to refer to such images and follow the experienced framework to generate lesson plan. It is hard for them to change the framework and accept new types of instruction not written in the form of a conventional lesson plans. New types of software such as PowerPoint enable us to express ideas in a flexible way and to revise them with ease. Repetitive revisions enable us to refine these ideas and making them relevant to instructional events observed in the real teaching situation. In this context, components used to describe a lesson plan should be flexible enough to change its structure at a very early stage of designing.

The following figure shows the image of a whole course representing students' ambiguous states at the beginning, gradual clarification, creative contribution, panel presentations and submission of final report. This image has an entirely similar structure and representation in English as in Japanese without any modification.
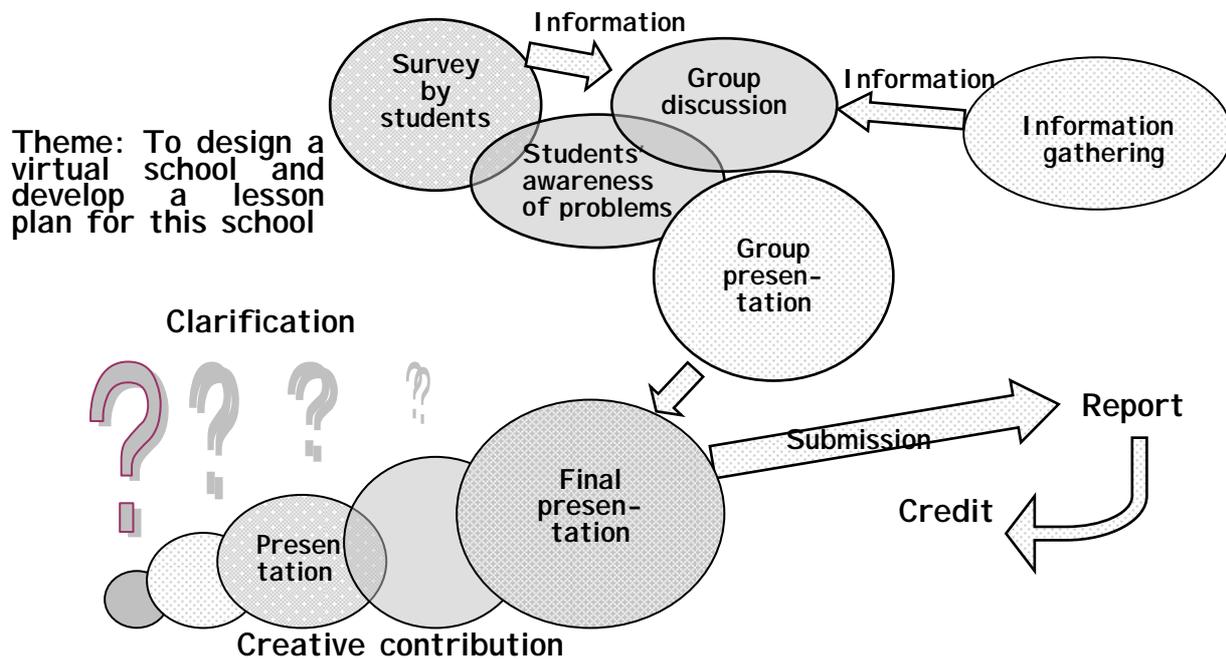
Figure 1. Instructional procedure of 'Instructional Technology' representing graphic images

Conclusion

The course can be described in the form of images, concepts, models and propositions that are exportable to professional teachers through the Internet or other communication technology, enabling them to share professional experiences on teaching. There is no clear cut distinctions between image and model, but the image represents teachers' ideas and expectations, while the model represents teaching and learning events observed in actual classes in the form of conceptual figures and concepts. Synthetic concepts are derived from images and are intention-oriented; analytic concepts come from an analysis of teaching/learning process and are behavior-oriented. There is no continuous or reliable procedure for converting a lesson plan from concept to empirical model. This requires intuitive ideas and back and forth repetition to refine the lesson plan. If we succeed in standardizing symbols and concepts internationally, it is possible to share our teaching experiences in other countries.

Teachers try to predict learners' activities in a class, develop instructional materials, provide an interesting learning environment, select tools for effective learning, support students' learning and then expect to achieve their instructional goals. There may be various procedures to develop instructional plans, teaching

in classroom and evaluation after teaching.   This developing procedure should be described in internationally understandable symbols and languages to enable teachers to share their experiences with people from different cultural backgrounds.

Researchers propose models to apply scientific knowledge to solve problems in teaching/learning, and teachers adopt them to improve their teaching.   Many models have been proposed to make this procedure rational and effective so as to achieve predetermined educational goals and instructional objectives. However, the unilateral application from theory to practice is not always effective in the complicated real situation.   Teachers have to develop their own framework to confirm applicability of their knowledge accumulated from previous experiences.   In this circumstance, they have to equip themselves with the competency to originate practical knowledge suitable to solve problems tackled in their work place. Teachers share a strong feelings of the ineffectiveness of instructional theory as taught in teacher education schools, especially, regarding pre-service education.   Experienced teachers nominated by the Local Board of Education in each school district supervise novice teachers and give them advice on teaching during the first year of their professional careers.   Nevertheless, novice teachers heavily rely on their individual experiences but share them with colleagues only occasionally.   This procedure reproduces empirical consistency and professional continuity in successive generations among teachers.   It is hard to change the framework of writing lesson plans in the conventional style or to introduce a new concept of instruction.   However, it is indispensable to develop a new style of lesson plan that enables teachers to express ideas in very primitive state and revise them repeatedly in order to create a refined lesson plan.

References

Nishinosono, Haruo (2000): 'Integration of Working, Learning and Researching in Teacher Education', paper presented at SITE2000 held in San Diego, USA

Ryan, R.(1992): 'International connectivity: A survey of attitudes about cultural and national differences encountered in computer-mediated communication. *The Online Chronicle of Distance Education and Communication.*

Bump, W et al. (1999): 'Virtual Teams in the Classroom' Proceeding of SITE1999,

Gordin, D.N., Gomez, L.M., Pea, R.D., Fishman, B.J. (1996): 'Using the World Wide Web to Build Learning Communities in K-12' Journal of Computer-Mediated Communication. Vol. 2. No. 3

Appendix I : Tentative list of concepts/keywords used to design lessons (about 400 items are stored)
1. Meaning/Value
  1.1   Contextual/situational
      1.1.1   Interest and inquiry into subject matter
      1.1.2   Self-awareness
          1.1.2.1 Self-recognition through learning and achievement
          1.1.2.2 Social recognition through learning and achievement
          1.1.2.3 Experiences in the past
  1.2   Awareness of problems
      1.2.1   Social problem: economy, environment, social welfare, information, health
      1.2.2   International problem: peace, poverty, development, education
      1.2.3   Community problems
      1.2.4   Personal problems
  1.3   Preparation for future
      1.3.1   Preparation for entrance examination
      1.3.2   Acquisition of certificates
      1.3.3   Preparation for specific profession
  1.4   Self cultivation: (details omitted)
2. **Activities & Actions:** (details omitted)
3. **Contents/Concepts:** (details omitted)
4. **Environment:**   (details omitted)
5. **Tools/Techniques:**   (details omitted)
6. **Outcome:**   (details omitted)

Appendix II : Images and models for instructional designing using PowerPoint
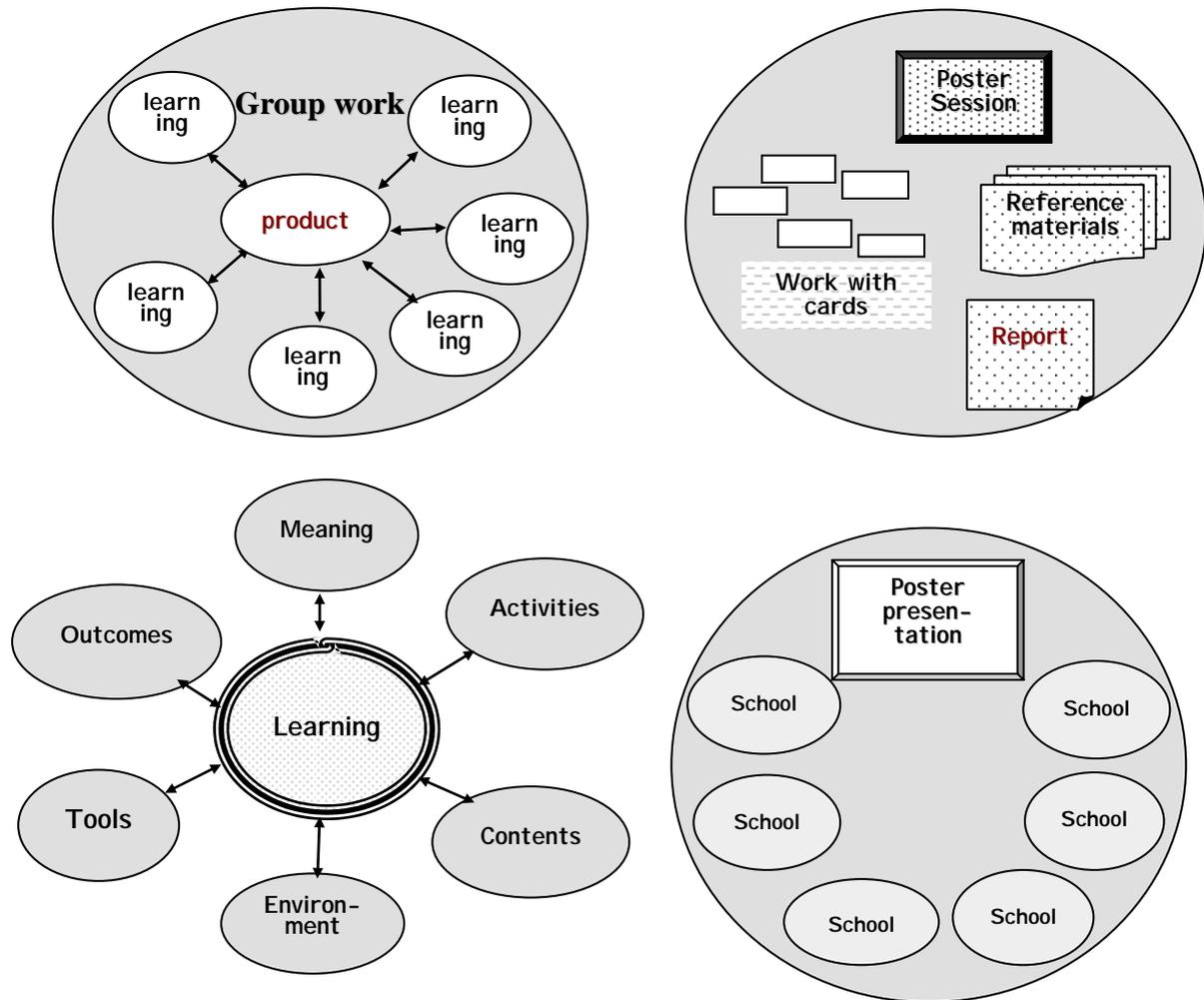
Appendix III : List of instructional propositions (about 60 propositions are stored)

It is possible to develop students' competency for instructional designing through a sequence of training sessions to form pictorial images, key concepts, graphic representations, models and propositions.

Alternative strategies regarding degree of freedom in learning

1. When we increase the degree of freedom in learning and give more initiative to students, learning results in a wide range from excellent to poor outcomes in quality and quantity.
2. When we decrease the degree of freedom in learning and give less initiative to students, learning results in more reliable but a mediocre outcome of less quality.

When we feel confident by a gradual formation of an outcome in ourselves, we realize the meaning of learning.

There are two possible ways to proceed to forming empirical models.

1. Students observe recorded teaching, take notes and analyze them.   After this analysis, they try to describe the process in keywords and put them in a graphic representation.
2. Students repeat describing their own experiences in keywords and show activities in a graphic representation, and succeed to express relationship and procedure in a model.

To recover autonomous learning, it is effective to concentrate on developing a lesson plan dominated by activities, rather than one dominated by contents of the subject matter.

To manage a large group of students to learn autonomously, it is effective to form groups or clusters of groups, to encourage active participation and let them recognize their responsibility for autonomous learning.