COLLABORATIVE AND AUTONOMOUS LEARNING AND ORGANIZATIONAL SYMBOLISM

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1 INTRODUCTION

Constant increase of students and enlargement of class-size in universities requires entirely new mode of instruction to accommodate ever increasing and diversifying students. On the other hand, drastic development of information and communication technology enables us to foresee possibilities of a new style of instruction covering from primary to higher education, or lifelong learning in a coming society. If we follow a traditional framework of teaching, the cost of education per student shoots up, hampers the satisfactory education and even force universities bankrupt. Shift from teaching to collaborative and autonomous learning is indispensable for the future development of higher education in the comprehensive framework of lifelong learning society. In such perspectives, however, autonomous learning is easy to say, but difficult to design and also too complex to accommodating learners' diverse needs. We have proposed a framework of instructional designing in the previous report titled of 'Metaphor, Image, Model and Proposition for Designing Autonomous Learning' (Nishinosono et al., 2005), in which four procedures are suggested as illustrated in Figure 1; (1) starting from educational norms, proceeding to practical syllogism and reaching actions, or voluntarism action theory, (2) application of scientific findings such as psychology, cognitive science and so on, (3) learning from other instructional expertise or educational practitioners, and (4) intuitive and creative ideas and its realization.

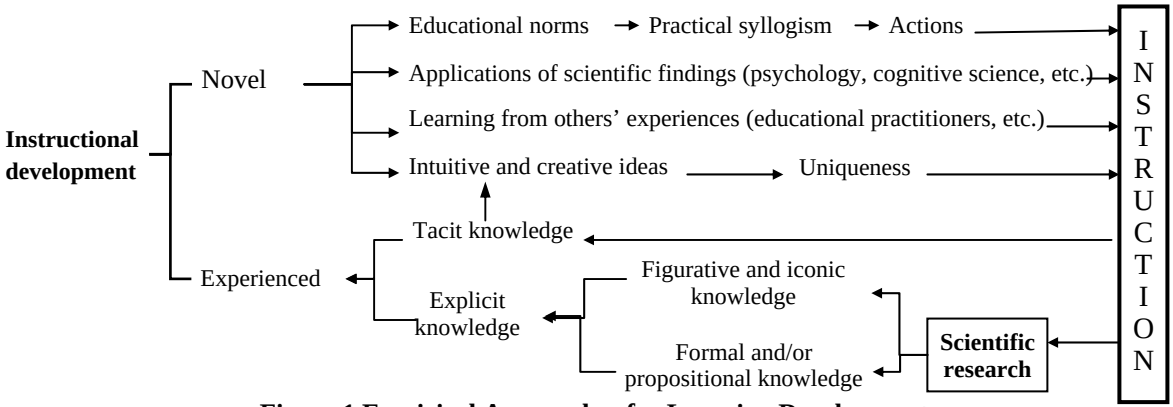

Figure 1 Empirical Approaches for Learning Development

In the practical works in uncertain and rapidly changing circumstances, it is very difficult to start from ethical norms persuasive to diverse youngsters. This approach has been traditionally taken in academic institutes such as schools, university, churches and other formal educational establishment, but does not approve effective for solving problems in the changing and diversifying society. In the second procedure of applying scientific findings to real problems, we cannot wait such findings before solving urgent problems existing just in front of us. At present, behavioral science, cognitive science and social cognitive science are expected effective to develop instruction, but real instructional problems are too complex and difficult to be dealt merely with scientific findings. In the third procedure of traditional apprenticeship systems, personal and

intimate contacts with experienced teachers and other professionals were most effective way of transmitting expertise from one generation to another. However, such close contacts are disappearing in schools and faculties due to overloaded works and scarcity of flexible time in dairy workplace.

At the same time, the Internet is providing new communication opportunities among all stakeholders involved in education. Personal intuitive and creative ideas can be circulated among professionals and scrutinized through practical instruction and scientific investigation. This expert knowledge of instruction needs new media for expressing tacit knowledge, describing original ideas and conveying innovative pedagogy among instructional professionals. One possibility of such media is to enlarge our communication media from language oriented descriptions to symbolic expressions including iconic, figurative as well as linguistic notations.

2 FROM PRACTICES TO GENERALIZED TECHNOLOGY

2.1 Learner-centered Instruction

In the conventional procedure of instructional designing, we usually start from a specific theory to practical development of instruction. Programmed instruction follows behaviorism science and inquiry learning does cognitive science and/or social cognitive science. However practical lessons in classrooms are too complicated and diversified to follow one specific theory. Our presumption of instructional designing is to transform lessons from teacher-led ones to student-centered collaborative and autonomous learning. We started our instruction from empirical development in 1999 and repeatedly revised it through systematic analysis by using a variety of symbolic representations for instructional designing: iconic symbols, cartoons, graphics, pictures and so on. Iconic symbols and figurative representations are widely used in the fields of electric engineering, mechanical engineering, chemical engineering, architectural engineering and so on.

We designed a course 'Introduction of Instructional Technology' of which number of students attended in a classroom varied from 90 to 280 during last seven years. We kept the strategy of designing collaborative and autonomous learning, in spite of the students' confusions and embarrassment at the initial stage. Through repeated revisions of instructional materials utilized in the successive lessons, generalized procedures and techniques have been recognized and critically scrutinized by the authors. From this empirical approach in the framework of Figure 2, the following five steps and two hypotheses are proposed for instructional design in ubiquitous learning society.

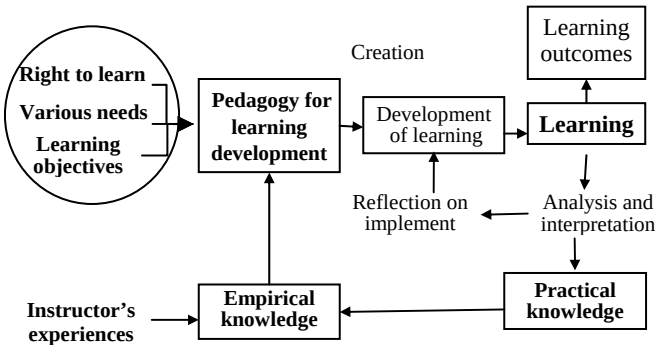

Figure 2 Framework for Learner-centered Instruction

(1) Sharable vision
(2) Metaphor and/or analogy
(3) Image
(4) Model
(5) Proposition

Working hypothesis 1: If we succeed in making learners' internal conditions satisfactory such as meaning, intention, necessity of learning and preparing collaborative atmosphere, they can overcome difficulties of external conditions and work hard autonomously.

Working hypothesis 2: Experiences with instruction are accumulated tacitly as well as explicitly, of which explicit knowledge can be described in a set of iconic and/or figurative

representations and formal propositions to be easily communicated among instructional professionals.

From these steps and hypotheses, generalized techniques and rational sequential procedure for designing the collaborative and autonomous learning in ubiquitous ICT environment emerged and gave us confidence of revising the instruction systematically.

2.2 Learning Theme and Assessment Scheme

From our last seven years' experiences, the learning theme is critical for realizing the collaborative and autonomous learning. The instruction was carried out by team learning as well as integration of teamwork and personal work. Learning themes should be sharable and understandable among all participating students and meaningful to them. They should have common knowledge or none of relevant information to start equally. If a part of team members are well familiar on learning theme and others are ignorant, it is very difficult to manage effective learning by active participation.

Learning theme: Each team should propose a plan of ideal school (hopefully in 2020) and develop lesson plan to instruct a basic subject such as arithmetic or national language.

The assessment scheme is another critical factor for realizing collaborative and autonomous learning. Present students are evaluated by teachers or instructors and very passive to learn autonomously. We have to change their perceptions of learning. At the early stage of lesson, the whole assessment scheme is disclosed to participants and explained in detail. Table 1 shows the allocation of score to each item. In the Japanese system, full score is always 100 points and over 60 points is passable.

Table 1 Score allocation to each item	Score
Attendance in the course	20
Quantity of report(more than 10 pages)	20
Quality of report	30
Teamwork competency (mutual evaluation)	20
Openness of learning outcomes on the Web	5
Instructor's adjustment	-5~+5
Total score	100

Regarding the qualitative evaluation of reports, all students are required to declare one level out of fours according to their self-evaluation of which criteria for judgment is given and explained in the course. At the end of course students submit their reports with a declaration of level. Instructors divide the reports into four categories according to students' declaration and adjust the declared level and categorize into one of seven levels. These procedures are shown in Figure 3 and open to students. When we show them clear criteria, students can judge their levels quite reasonably. At the same time, they are required to assure the quality of learning outcomes. The disclosure of assessment scheme is also very effective to enhance autonomous learning.

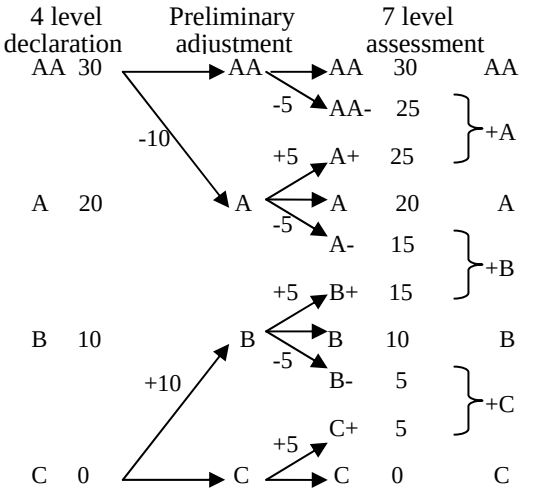

Figure 3 Level declaration and Assessment

2.3 Pedagogy for Instructional Design of Learning in a Ubiquitous ICT Society

The above-mentioned learning theme and assessment scheme were ambiguous at the initial stage, but gradually clarified by repeating revisions. It is difficult to decide which part of the

designing procedure comes first. In spite of such changeable process, we reflect always to learning theme, tangible outcomes and assessment schemes for effective instructional designing. Metaphors, images and models are very effective to express tacit knowledge, share ideas, modify them and communicate each other among those involved in the instructional designing and its execution. The following items are specifically developed for a course 'Introduction of Instructional Technology' and applied for developing instructions of two classes accommodating more than 400 students in total with two instructors and one teaching assistant working collaboratively.

Sharable vision: the above-mentioned learning theme for common understanding of goal.

Metaphor and/or analogy: brewery technology for student's personal development and three different types of paragliders; always falling down parachute, slowly descending square-shape paraglider and freely flying modern paragrider for describing the failure and success of team learning.

Image: graphic representation using PowerPoint.

Model: a template for generating more concrete learning events; MACETO representing Meaning, Action, Contents, Environment, Tools and Outcomes.

Proposition: judgmental propositions expressing instructor's experiences and procedure of clarifying tacit knowledge to the formal explicit knowledge.

This technology has been developed along repeated revisions of instructional practices.

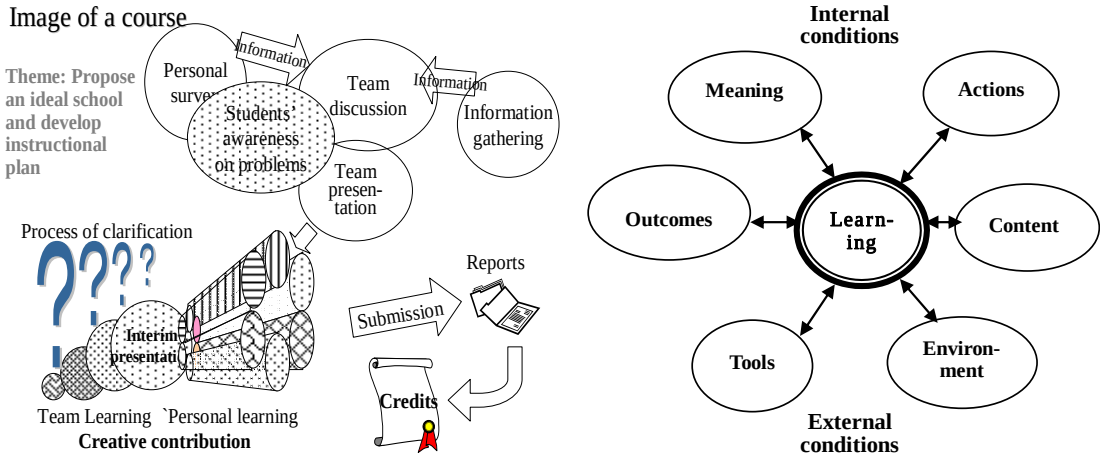

Figure 4 Image of a Course and MACETO Model for Instructional designing

3 ORGANIZATIONAL SYMBOLISM AS THEORETICAL FRAMEWORK

Problems in education are getting more and more complex and interrelated. Recent problems are not solved by unilateral application of research findings and educators' personal efforts. Teamwork is dispensable to tackle such complex problems, overcome individualistic and isolated professionals in the present school and enhance collaboration at the workplace. Systematic approaches should encourage teachers and all stakeholders in education to collaborate and stimulate educational activities to integrate different worldviews. They require more comprehensive and multi-dimensional reflections from the various expertise viewpoints. Experiences, tacit knowledge, intuitive ideas and creative discussion with colleagues are very effective way for finding appropriate solutions to the complex problems. One teacher cannot provide final solutions to these complex and changing circumstances and make students easy to work confidently.

Our research started from an empirical implementation of instruction for the large number of undergraduate students having diverse background and heterogeneous competences. These

instructions were carried out twice a year for seven years since 1999. The research was a process of trial and error at the beginning and proceeded gradually to systematic analysis, interpretations and rational revisions. During these repeated improvements, we needed a theoretical framework for effective development and implementations. At the same time, we needed to investigate this discipline for a teaching subject in the graduate course. In-service teacher education requires us to explore theoretical framework suitable to their dairy works and easy to apply to complicated instructions. The theory of symbolism seems to be appropriate to our requirement. The symbol here includes any sign, picture, figure, graphics, illustration, aural language as well as written language. The organizational symbolism covers a very wide range from behaviorism to hermeneutics to phenomenology. Objectivity and subjectivity in this theory are not dichotomy, but two extreme ends on one axis. It provides a framework to interpret the culture of any organization such as class, school, institution, community and so on. The theory and techniques in qualitative analysis are now developing very fast. They provide tools to analyze and interpret instructional processes as well as learning outcomes qualitatively. These theories are very promising for solving the complex problems that reflect the diverse backgrounds of instructors and students. Thus we started our instructional development from tackling with dairy instruction, proceeded to systematic revisions, and finally to a theoretical framework to make teamwork collaborative and efficient.

4 CONCLUSION

The instructional design for collaborative and autonomous learning equipped with ubiquitous ICT is entirely deferent from the conventional instruction, in which we start from specification of instructional objectives, proceed to its development and evaluate the outcomes at the end of instruction. On the other hand, instructional design for collaborative and autonomous learning starts from learners' Right to Learn, their needs and learning objectives. Every learner should have a clear foresight on his/her goal, competences of making a plan of learning and collaborative communities with colleagues. The assessment scheme should be disclosed for them to make a plan of autonomous learning more effective.

Pedagogy for instructional development in ubiquitous ICT society requires a new instructional technology for eliciting tacit knowledge from educational expertise and expressing them as explicit knowledge for circulating among professionals through the World-Wide Web. From this viewpoint, the following five steps have been applied and proved effective for instructional design in ubiquitous learning settings; (1) Sharable vision, (2) Metaphor and/or analogy, (3) Image, (4) Model and (5) Proposition.

Two following hypothesis have emerged from our experiences and seem indispensable for developing collaborative and autonomous learning.

Working hypothesis 1: If we succeed in making learners' internal conditions satisfactory such as meaning, intention, necessity of learning and preparing collaborative atmosphere, they can overcome difficulties of external conditions and work hard autonomously.

Working hypothesis 2: Experiences with instruction are accumulated tacitly as well as explicitly, of which explicit knowledge can be described in a set of iconic and/or figurative representations and formal propositions to be easily communicated among instructional professionals.

From our experiences, we conclude that the organizational symbolism can be a theoretical framework suitable to develop a universal collaborative and autonomous learning in ubiquitous ICT society.

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