

# COLLEGEWIDE PROMOTION OF E-LEARNING/ACTIVE LEARNING AND FACULTY DEVELOPMENT

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## ABSTRACT

Japanese National Institutes of Technology have revealed a plan to strongly promote e-Learning and active learning under the common schematization of education in over 50 campuses nationwide. Our e-Learning and ICT-driven education practiced for more than fifteen years were highly evaluated, and is playing a leading role in promoting e-Learning and active learning. It is essential to do faculty development in order to promote the methods within the college. In this paper we described the actual approaches in our college.

## KEYWORDS

e-Learning, active learning, faculty development, Model Core Curriculum

## 1. INTRODUCTION

In Japan, the former Ministry of Education, now referred to as the Ministry of Education, Culture, Sports, Science and Technology (MEXT), substantially revised the standards for establishing universities in 1991, as Japanese government promoted the decentralization of power by announcing a policy to ease restrictions. In the revisions, the related laws including the School Education Act and the standards for establishing universities were drastically amended, which allowed individual schools to flexibly develop unique education and researches based on its own educational philosophy and objectives, while responding appropriately to advancement of learning and the demands in society. The related legal revisions led to the elimination of the details of the standards including curriculum. (Akiyoshi Yonezawa, 2006.) Under the revisions, the requirements of the standards were eased, on the other hand however, a policy that universities themselves should assure quality of education and research was employed. Consequently, universities were required to conduct self-inspection and assessment of quality of education and researches. Considering the changes related to education, it is a natural tendency to introduce ICT-driven education and e-Learning in Japan, MEXT is also strongly promoting the use of active learning and e-Learning in elementary, secondary and higher education.

In the schematization of education of Japanese National Institutes of Technology (NIT), in addition to showing “Core (a minimum standard)”, the minimum skill level and content to be studied for all the students of NIT, “Model”, a guideline for further advancement of NIT education, is presented to respond to more advanced social request. The curriculum is promoting both “Model” and “Core”, so the name “Model Core Curriculum (MCC)” is used. MCC is organized from the viewpoint of the advancement of NIT to respond to social needs. The direction of NIT is as follows: (1) The fostering of engineers who can be active internationally in response to the globalization of society and industry, (2) The fostering of innovative human resources who can contribute to the sustainable social progress, (3) The expansion into the composite, integrated fields that respond to the needs of the local communities and industries. MCC clearly specifies the targets for students to attain from the viewpoint of 10 items: mathematics, natural science, art and social science, basis of engineering, Specialized Engineering Categorized by Field, Engineering Experiments and Practical Skills Categorized by Field, Substantiation of Specialized Skills, Versatile Skills, Attitude/Orientation, Comprehensive Learning Experience and Creative Thinking Power.

## **2. SCHEMATIZATION OF EDUCATION AT COLLEGES OF TECHNOLOGY AND THE PROMOTION OF E-LEARNING/ACTIVE LEARNING**

### **2.1 The Promotion of e-Learning and Active Learning**

NIT is promoting positive introduction of e-Learning and active learning (e.g. Bonwell, Charles C., and James A. Eison, 1991, Bergmann, J.; Sams., 2012, and Lage, M.; Platt, G.; Treglia, M., 2000.) so that students can attain their target. Several colleges, including our college, are playing a leading role in the field. Our e-Learning and ICT-driven education practiced for more than fifteen years were evaluated, and our program was picked up as a project of the “Acceleration Program for Rebuilding of University Education (AP)” started by MEXT in 2014. (N. Ogawa et al, 2015 and N. Ogawa, A. Shimizu, 2015.) Our AP program, funded by MEXT for five years, is promoting the improvement of the environment for active learning, such as ICT-driven equipment, e-Learning and teaching materials and the implementation of all the above.

#### **2.1.1 The Targets of MCC and its Management by the e-Learning and the ICT-driven System**

The teachers are proceeding with the following work, integrating them with each other, in order to meet our targets, following the curriculum created based on MCC: (1) Improvement of lecture and teaching method (Ex. group work, workshop-type learning), (2) Cooperation among teachers, (3) Improvement of educational evaluation and checkup method (Ex. interview and oral examination, portfolio of students and teachers), (4) Development of teaching materials, (5) Activities of Faculty Development (FD) and Staff Development (SD). In order for our college to be a higher education institution that contributes to local industries, it is essential to have a viewpoint of industry-college-government cooperation as well as regional cooperation.

#### **2.1.2 The Development of e-Learning and ICT-driven Education Environment at Our College**

As described earlier, our college is leading the way in the promotion of active learning among all the National Institutes of Technology. More precisely, we are improving the environment for active learning including ICT-driven equipment, e-Learning and teaching materials and promoting educational practice with them as the AP, funded by MEXT for five years.

In the academic years of 2014 and 2015, we introduced Projectors with an electronic blackboard system into about three-fifths of all the classrooms through bids at the expense of the AP budget. Furthermore, the wireless LAN device was set up for use in all of the 25 classrooms in all five grades (from the first to the fifth grade) of all the five departments, so that the introduced LMS systems, such as Moodle and Blackboard, can be used in class. STORM Maker, software for making teaching materials, was introduced to make teaching materials for storing in LMS. The special characteristic of STORM Maker, which has an automatic voice synthesis function, simplifies the process of making content based on materials. Therefore, we can easily create teaching materials with voice for e-Learning with the work of entering character, without recording narration voice. Both male and female voices can be synthesized, depending on use and characteristics of teaching materials. Moreover, we introduced more than 160 Tablet computers (Toshiba), 50 notebook PC (Fujitsu) and 20 surface (Microsoft). All of them were introduced for lending and set up for connecting to all the access points of the wireless LAN for e-Learning in class.

The introduction of the electronic blackboard makes it possible to draw and write on its surface with a dedicated electronic pen, without connecting to a personal computer, and digital data of drawing and writing can be recorded and stored in a file server connected to the network. Using the projector control toolbar displayed on the projection screen of the electronic blackboard, teachers can easily select and control students' tablet screen by operating on the screen. (Figure 1).

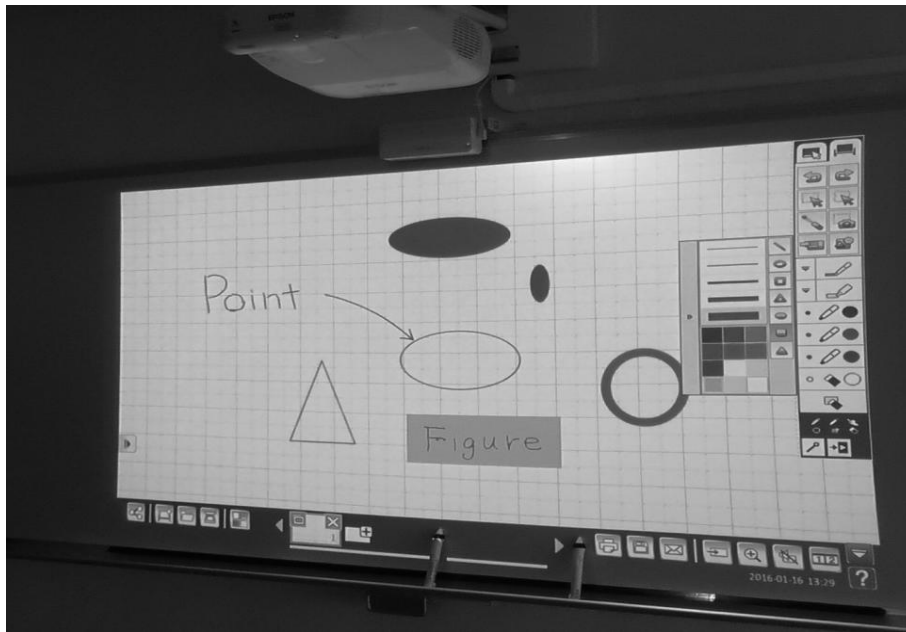


Figure 1. Digital drawing on an electronic blackboard with an electronic pen, without connecting to a PC

It is necessary to consider the following two things for practicing active learning according to MCC curriculum: (1) How to use the e-Learning system and ICT-driven equipment, (2) Educational methods of active learning and e-Learning. The teachers have different degrees of knowledge and skills regarding the two items, so it is important to improve the teachers' knowledge and skills through FD in order to promote active learning and e-Learning within our college. In the next chapter, we will describe the upward spiral of ICT-driven education through FD in our college.

### 3. UPWARD SPIRAL OF E-LEARNING AND ICT-DRIVEN EDUCATION THROUGH FACULTY DEVELOPMENT

In the 2014 academic year, we established the office for promoting active learning as a collegewide organization and have been practicing active learning. The members of the office consists of the representative teachers of all the departments (Mechanical engineering, Electrical and Computer Engineering, Electronic Control Engineering, Civil Engineering, Architecture, liberal arts, natural science), which makes it possible to exchange information smoothly between the office and each department. This system will be maintained in the future. Also, the members of the office learn newly introduced the e-Learning system, ICT-driven equipment and the approaches of active learning in advance, and each member conveys new information to his/her department. Moreover, the office is playing a leading role in promoting active learning by implementing the following two kinds of FD at every faculty meeting: (A) teaching methods of active learning, (B) How to use the e-Learning system and ICT-driven equipment. In our college, we regard teaching methods of active learning and the use of ICT-driven equipment as important cores, and we have an idea that a variety of active learning can be practiced by combining teaching methods, the e-Learning system and methods of using ICT-driven equipment with each other. Actually, some teachers, inspired by the FD sessions held at faculty meetings, have created and practiced his or her own methods of active learning. Table 1 shows the FD sessions related to e-Learning and ICT-driven education held at our college this academic year. It has been decided that from the next academic year the FD sessions will be held just like this academic year so that the teachers can acquire more advanced skills.

Table 1 shows the dates of the FD sessions held at our college, the type of activity performed, people that the sessions targeted, results and expected effect. It also shows the problems presented through discussion after each session. The measures against the problems were compiled after each discussion. In our college,

we are planning to hold similar FD sessions in future academic years in better ways. Therefore, the analysis and proposed coping strategies described in Table 1 will be useful.

Table 1. The content of the FD sessions of our college held in the 2015 academic year

Dates	Type of Activity Performed for Promoting AL	people that the sessions targeted (headcount)	Results, Expected Effect	Problems	Measures against the Problems Described in the Left Column
Faculty Meetings: Apr.1, Jun. 3, Aug. 5, Sep.18, Nov. 18, Feb. 10, Mar.14	Our College, collegewide level (FD on the teaching of active learning and ICT-driven equipment)	All teachers (about 80 people)	The FD lecture sessions are effective because they are held when all teachers get together.	There are different needs, because the teachers have different degrees of skills.	A wide variety of subjects are treated.
FD meetings: May 7, Oct. 14	Our College (collegewide level)	All teachers (about 80 people)	Useful lecture by visiting lecturers	General topics, not concrete content	Concrete content is treated at FD regarding AL conducted at faculty meetings.
(1) May 26-28 Workshop of Blackboard (basic) (2) Jun. 1-3 Workshop of Blackboard (intermediate) (3) Jun. 8-10 Workshop of Blackboard (advanced)	Our College (collegewide level)	All teachers (about 80 people)	To acquire how to use Blackboard (basic, intermediate, advanced) and practice active learning in class)	Some teachers cannot attend workshop because of other school affairs. The teachers have different degrees of skills.	The same content was presented for three days, considering the teachers' schedule. The participants were free to select the level among three (basic, intermediate, advanced).
Workshop of Moodle was held three times in Jun.	Our College (collegewide level)	All teachers (about 80 people)	To acquire how to use Moodle and utilize it in class	Some teachers cannot attend workshop because of other school affairs.	The same content was presented for three days, considering the teachers' schedule.
Jul. 23 (Akashi) Oct. 14 (Gifu) Dec. 3 (Kyoto) Mar. 1 (Maizuru) The 2015 AL promotion study team of the third block	The third block Committee members of AL promotion study team(the colleges that belong to the third block)	The number of colleges that belong to the third block multiplied by two committee members of each college	NIT, Akashi and Gifu Colleges, leading colleges of AL, are supposed to lead the other colleges within the third block to the positive practice of AL.	Each college has a different perspective and degree of penetration of AL, which makes it difficult to have a common understanding of AL.	To respond to diverseness among colleges, first, it is necessary to assess the position of each college by conducting a survey of the teachers who belong to the third block.

Sep. 24: Workshop of projectors which have the functions of electronic blackboards & tablet PC (the fosterage of trainers: for the members of AL promotion WG)	For the members of AL promotion WG of our college	For the members of AL promotion WG(seven people)	How to use projectors which have the functions of electronic blackboards & tablet PC. How to conduct AL classes using equipment.	The teachers have different degrees of skills.	Workshop for the members of AL promotion WG was held, aiming at fostering trainers who would instruct the faculty members. The instructions for teachers by trainers are supposed to be conducted within each department. By doing so, trainers can conduct detailed instructions and respond to different teachers with different skills.
Sep. 25, 28, 29: Workshop of projectors which have the functions of electronic blackboards & tablet PC (for all teachers)	Our College (collegewide level)	All teachers (about 80 people)	How to use projectors which have the functions of electronic blackboards & tablet PC. How to conduct AL classes using equipment.	The instruction of how to use equipment is insufficient for actual use. Some teachers cannot attend workshop because of other school affairs.	In the workshop held at a classroom of each department after school, teachers actually operated projectors which have the functions of electronic blackboards & tablet PC. The same content was presented for three days, considering the teachers' schedule.
Sep. 1-4: Workshop of cybozu	Our College (collegewide level)	All teachers and college staff	To acquire knowledge of procedure/methods for managing various information within college.	Some teachers and college staff cannot attend workshop because of other school affairs.	The same content was presented for four days, considering the teachers' schedule.

#### 4. CONCLUSION

We have come to recognize the importance of diversity through the practice of active learning, e-Learning and various FD sessions conducted in our college. Active learning, which is a flexible way of teaching, adds diversity. Furthermore, since active learning is practiced in all subjects of our college, the existence of a large variety of subjects produces diversity. There are various suitable ways of doing active learning for each subject. In addition to this, the fact that teachers select different ways of active learning for the same subject produces more diversity. Since active learning itself is a flexible, learner-centered approach, focusing mainly on students' initiative and independence, diversity is an important objective of active learning. With the idea that dealing with diversity is important, we are giving detailed responses to the diverse needs of the faculty, shown in the rightmost column of Table 1, when holding FD sessions in our college. Just like students'

initiative and independence, the faculty should also learn and develop the content presented at the FD sessions at his/her own initiative. It is essential to seek a better way of active learning and practice it, depending on his/her degree of skills, his/her individuality and the characteristics of each subject.

It is important to enhance teachers' skills for teaching and student counseling/guidance along with systematic curriculum to make collegewide, organizational deployment of education work effective. It is necessary for each teacher to improve not only his or her teaching ability but also his or her skills of using ICT-driven equipment in order to practice education based on e-Learning and active learning. This requires the improvement of the coordinated training system, sharing and publicity of model education examples, and the system of properly evaluating teachers' education examples. Also, it is necessary to introduce the system of teacher evaluations and student counseling/guidance conducted within a campus (peer review). In our college, we consider it important to do continuous improvement performed by sharing and evaluating the education examples, which, we believe, makes high-quality e-Learning and active learning penetrate within the college. These methods work well by both a shared understanding of the objectives of the curriculum and the curriculum itself by teachers and the effort for improving teachers' skills for teaching and student counseling/guidance. Considering the importance of organizational deployment of education curriculum, it is necessary to hold organizational workshops (FD) concerning the objectives of the curriculum, education content and methods, keeping in mind that the characteristics and creativity of education should not be impaired.

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