# Global e-learning System for Technical Support Engineers

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*With the increasing globalization of business, Japanese manufacturers are trying to strengthen the system for managing after-sales service activities at overseas branches so as to make themselves stand out from competitors. For this purpose, securing and training engineers for technical support is one of the most important issues. KOBELCO CONSTRUCTION MACHINERY CO., LTD. (KCM), one of the most globalized companies in the Kobelco group, has deployed an e-learning service for training support engineers since 2009. Having released the e-learning service for Japanese engineers first, KCM has extended it to the overseas branches since 2011, and at the end of 2013, in approximately 20 countries, the e-learning service was effectively being used as a common platform for educating engineers. Through those experiences, this paper discusses the possibilities and challenges in the use of IT for grooming after-sales service technical support engineers in the overseas branches.*

## Introduction

With the rapid progress of globalization, manufacturers in Japan have moved their production bases overseas, and products made at home and abroad are being sold and used all over the world. Accordingly, in addition to establishing a system for local production (MONODZUKURI) and supply, establishing a structure for local after-sales service and support has become a key factor for the manufacturers in making them stand out from others to survive in the globalized market of the future.

KOBELCO CONSTRUCTION MACHINERY CO., LTD. (hereinafter referred to as "KCM") is the most globalized company in the Kobelco group. This paper introduces a system for training engineers to engage in global after-sales service based on information technology (IT), called e-learning (an education tool based on computers and networks). Referring to actual cases, it discusses the issues in training human resources for after-sales service at overseas branches, also taking up the possibility of further exploiting IT.

## 1. KCM's system for global after-sales service

KCM has a Customer Support Center, Sales and Marketing Division that serves as a central base in Japan, and has established an after-sales support system for eight separate areas of the world. Worldwide, there are approximately 4,000 after-sales service engineers engaged in support work so that customers can use the high-performance, high-quality construction machinery produced by KCM comfortably on a daily basis. The training of these service engineers is conducted in dedicated training facilities and is based on special education curriculums. In 2009, the facilities in Japan started introducing e-learning in some parts of the curriculums. This method of instruction has also been disseminated to overseas branches since 2011. As of the end of 2013, an e-learning system is being provided to after-sales service engineers in about 20 different countries as a universal education tool. **Fig. 1** shows screen-shot examples of a multilingual e-learning system.

## 2. Examples of introducing e-learning at KCM

### 2.1 Method of introducing e-learning

In general, e-learning has been used for remote learning and correspondence education services that are based on digital learning materials provided by, for example, education companies; it has also been used as a tool for educating and training students and employees at colleges and companies, etc. The former use could be referred to as a "content-providing type" and the latter as an "educational/training-tool type." The e-learning used by KCM must have the functions and characteristics of both types.

Specifically, the Sales and Marketing Division of the Customer Support Center in Japan serves as the mother base for after-sales service around the world. It uses e-learning worldwide as a tool for simultaneously sending and providing information on common basic technologies and the most up-to-date maintenance technologies required for the maintenance checkups and servicing of the product (construction machinery).

Next, the local trainers who are actually in charge of educating and training local service engineers at local after-sales service branches use the training contents provided in the system by the mother base.

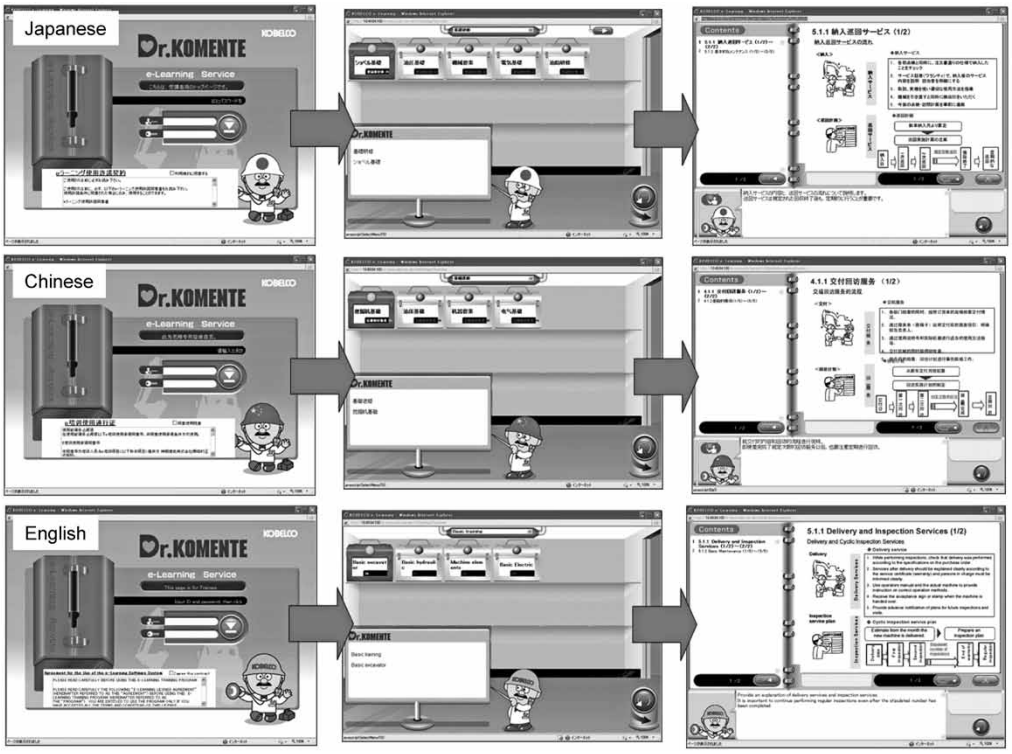


Fig. 1 Screen-shot examples of a universal e-learning system for technical support engineers

The system is thus exploited as a tool for educating local service engineers and training them effectively and efficiently.

### 2.2 Ways of introducing e-learning

#### 2.2.1 Adoption of private cloud method

In order to use e-learning to provide content, as well as for education and training, KCM established an e-learning environment with a multilingual system based on a private cloud system using the internet. This has provided trainers at each branch with an e-learning environment dedicated to their branch so that they can use the education/training tool at their discretion.

#### 2.2.2 Unitization with training program

This provision is not limited to use as an education/training tool, but extends to "universal" e-learning materials from the Customer Support Center at the mother base. A set of learning materials has been combined and compiled in a package in Japan and is provided as a suite of training programs. Local trainers can select necessary items from the suite in accordance with the actual situation at their branches. The programs can be followed in order, or else repeated.

#### 2.2.3 Evaluation based on universal learning materials and index

As of the end of 2013, five types of universal learning materials had been prepared, comprising approximately fifty training programs. The training programs cover the "common basic technologies (1. Basic hydraulics, 2. Machine elements, 3. Basic electricity, and 4. Basic excavator)" required for maintenance checkups and servicing and "5. Product model training" (**Table 1**). The learning items in each training program are followed by a set of completion tests at the end, and it is so set up that all the questions must be answered correctly to complete each session of the training program. The system allows the trainers at each branch to confirm the results of the completion tests and attendance records. These can be used in a variety of ways, as determined by the branch. At a branch in China, for example, e-learning is treated as an education item that must be completed prior to group training at their local training facility: that is, the completion of e-learning is required for a trainee to participate in the group training. The trainers, on the other hand, check the results of the completion tests so that they can devise teaching methods for the group training.

Meanwhile, the system allows the Customer Support Center at the mother base in Japan to check on how many service engineers in each branch are participating in sessions using the learning

Table 1 Example of e-learning training programs

| | Category | Title of e-learning training program (example) |
|---|---|---|
| Common basic technical field | ①Basic hydraulic | (1)Construction machinery hydraulics: mechanism<br>(2)Basic information on hydraulics<br>(3)Pump overview/ Hydraulic pump input and output variability<br>(4)Misc. (total 14 programs) |
| | ②Machine elements | (1)Machine element and metallic material<br>(2)Metalworking<br>(3)Welding, flame cutting, penetrant test<br>(4)Misc. (total 12 programs) |
| | ③Basic electricity | (1)Electricity and electronics<br>(2)General knowledge of electricity and electronics<br>(3)General knowledge of electric and electronic parts<br>(4)Misc. (total 9 programs) |
| | ④Basic excavator | (1)Excavator outline<br>(2)Hydraulic system<br>(3)Construction machinery with Mechatronics<br>(4)Misc. (total 17 programs) |
| | ⑤Product model training | Special technical information about new product models |

materials and suite of training programs provided from Japan, and to confirm how much they have understood. The universal learning materials and common evaluation index are used for confirming and evaluating the skills and knowledge levels of service engineers in each area.

## 3. The place and role of e-learning and its importance

### 3.1 Issues in human resource development and the place of e-learning

In contrast to Japan, overseas branches for after-sales service are experiencing a higher rate of people leaving their jobs. This has created a human resource issue. Hence, overseas branches have a strategy of training as many novice service engineers as possible in a short period of time and selecting qualified persons from among them for further instruction. In Japan, the developing of human resources is usually accomplished through training for a certain period of time in a training facility. Meanwhile, for the instruction of service engineers at overseas branches, it is considered, at present, to be more cost effective to use IT to impart as much of the required knowledge as possible in a short period of time and to train and strengthen service personnel through field practice.

Our group companies, including KCM, have put e-learning into practice as a tool for assisting skill transfer at the manufacturing sites in Japan. In Japan, however, there is a custom of apprentice-style education and, in many cases, e-learning is regarded only as a supplementary tool for that education. In developing nations, on the other hand, there is a strong inclination toward obtaining skills and careers. Hence e-learning is likely to be used more proactively there than in Japan and is functioning as an effective educational tool.

### 3.2 Future possibilities of using IT and technical subjects

KCM plans to proceed further with globalization and needs, more than ever, to quickly start up an after-sales service system at newly established overseas branches, as well as to maintain and improve the technical quality of after-sales service on a global scale. In the meantime, the position and role of e-learning is continuing to change. Specifically, exploiting the characteristics of the education tool to achieve immediate and simultaneous effectivity, e-learning is changing its function from that of a supplementary tool for conventional group training to that of a major training tool.

On the other hand, there are several technical challenges that must be resolved before e-learning can truly work as an educational/training tool. One is to address the information leaks in differentiation technologies (i.e., the technologies making the company stand out from others) through education concerning its products and technical details, as provided by KCM. The current system takes this into account in its mechanism; however, further modification will be required to expand the system on a global scale. It is also important to make the learning materials and contents compatible with the language of each overseas area, as well as to further expand the contents to meet local needs. KCM currently uses learning materials in three different languages: English, Chinese and Japanese. However, for grooming novice engineers in developing nations, the company recognizes an increasing

need to provide learning materials in their mother languages. The strengthening of the translation system will remain a technical challenge in the future providing of technical information globally. It may also be necessary to enrich the method of conveying technology and spirit by nonlinguistic measures such as games.

Finally, in establishing e-learning as the major training tool, the most important issues include strengthening conformity and cooperation with corporate schemes for developing human resources and the policies governing personnel affairs. Conventionally, it has been difficult to quantitatively confirm and evaluate the effect of education policy and the developing of human resources, which has mostly been evaluated only qualitatively. However, with the recent prevalence of IT and the improvement in its performance, as represented by smart devices, the time is coming when information on the training of human resources can be tied together with information on job performance to allow the comprehensive processing and use of such information. Hence, for the developing of human resources at overseas branches in the future, e-learning will be conducted in close cooperation with the corporate scheme for developing human resources and the policies governing personnel. Thus e-learning is expected to evolve into an educational tool that is more effective and more directly linked with job performance than ever.

**Conclusions**

In order to establish a global after-sales service system, KCM has introduced and is expanding e-learning as a tool for universal education. KCM will strive to adapt its knowledge and methodology to the after-sales services of other group companies engaged in the machinery business, so that customers all over the world will be satisfied with the performance of KOBELCO group products and with the service they receive after purchasing.