E-Learning Content Design
and Implementation
based on Learners' Levels

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Abstract—**The modern techniques of content design should not depend on restrictions of schedules and physical spaces. Still, the learning that depends on the contents provided from a server is difficult to implement effectively without taking into consideration learners' levels. The learning should fit the learners' abilities. In this study, we propose the methods of developing learning content that fits the individual levels. Evaluations for individual levels are presented as the first level and the second level. The first level presents "evaluation learning" for each paragraph of the learning, while at the second level evaluations are carried out through "Trying the following" and "Trying oneself". "Checking Test" as part of the "sum of learning" is carried out during the first evaluation. Also "Trying oneself" is carried out as commensurate learning according to learners' levels.**

Index Terms—**Learning self-initiative, e-Learning, bi-directional learning.**

I. INTRODUCTION

21ST century represents an information-oriented society and requires new learning methods fit to the current of the times in unlimitedly increasing knowledge and rapid changes of education environments [1].

The modern techniques of content treatment are migrating towards the continuous learning in learning culture and learning spaces, escaping from the restrictions of schedules and physical spaces

However, it is in the situation that there is insufficient good quality content that uses the web-based learning methods. These methods enable learners to study on their own according to their own abilities [2].

Good quality of content refers to constructing properly the levels of difficulty and the learning objectives to be achieved on the basis of the given contents of assignments and given learning condition and environment [3].

Still in case of the most modern education contents, like videos, texts or animations, etc., only one direction method is used. Sometimes the methods of grafting games and simulations for inducing learners' interest are used, but anyway they are carried out as unidirectional process provided

from the server, and normally they do not consider learners' levels.

Because of this, effective learning is difficult and the fact that learning fits the learners' abilities is difficult to achieve.

Accordingly, in this study, we suggest the method of developing learning content that fits correctly the individual levels of learners.

For this, this study provides "learning evaluation" for each learning paragraph and evaluates individual levels. These evaluation values are arranged to carry out learning suitable for learners' levels. They are presented in a verification corner (part of the window) of various window forms such as multiple choice forms, OX forms, filling up blanks, matching pairs, etc.

Also, in case of tasks requiring practices, practical learning is possible by carrying out the task using the mouse events or keyboard inputs through "Trying the following" or "Trying oneself" procedures.

For the moment, learners' levels are evaluated indirectly by practice tasks that are repeatedly performed. The next task is decided according to the evaluation results of the previous task.

This paper first analyzes the related work (Section II) and then presents the system that implements the proposed method of e-learning based on the evaluation of learners' level (Sections III and IV). Finally, conclusions are drawn (Section V).

II. RELATED WORK

The more e-Learning education based on Internet increases, the more studies are taking place for ensuring the high quality of content and its deployment ([4], [5], [6]).

Some studies are centered on learning with self-initiative and improvement of the creativity. In general, we cannot affirm that self-initiative learning effectiveness depends upon how efficiently these initiatives are used in learning [7].

Good quality of e-Learning education depends on properly carrying out education of learners' levels and achievement of the objective of learning, given content of the tasks and the learning circumstances and environments [3].

Simulation of the learning content using web document formats and multimedia have been provided through various ways to induce learners' interest and make them study continuously. Still, the learning keeps depending on the high quality content provided from the server [3].
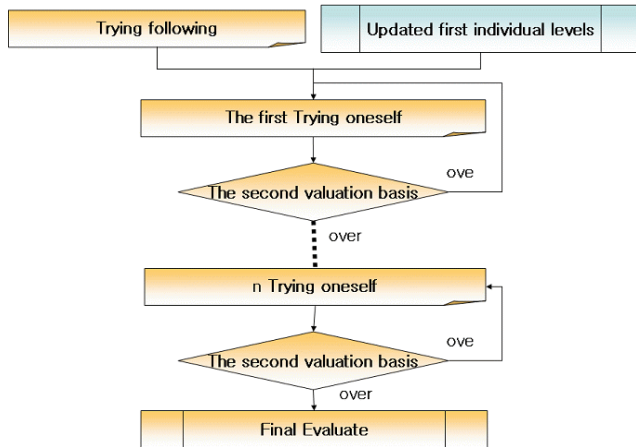
Fig. 5. "Trying oneself" during the second evaluation of the individual levels.

CAD requiring practices was chosen as learning content subject. The content composition is divided into subject decision, introductory portion, developing portion, arranged portion and evaluation portion.

A. Subject Decision

The stages are composed as presented in Fig. 6 to induce learners' curiosity and motivate them about the subject before the learning begins.
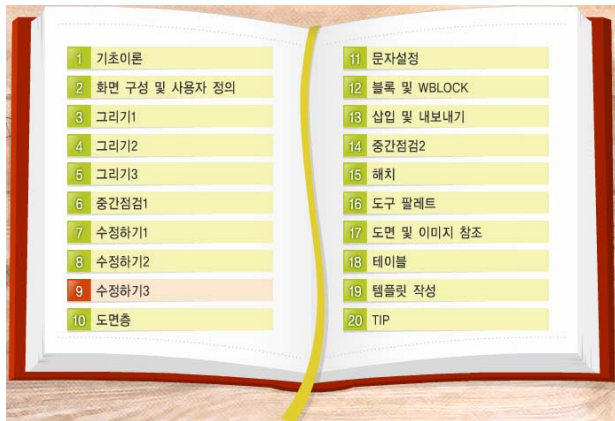

Fig. 6. Subject decision.

Fig. 7. Review of learned data.

Fig. 8. Preview of learning process.

B. Introductory Portion

This portion explains the content learned in previous periods as presented in Fig. 7, to make the learners to review the content learned before.

Also, it presents the tasks to learn at this time (Fig. 8) and construct the scheme of the task performance results to be presented in advance as shown in Fig. 9.
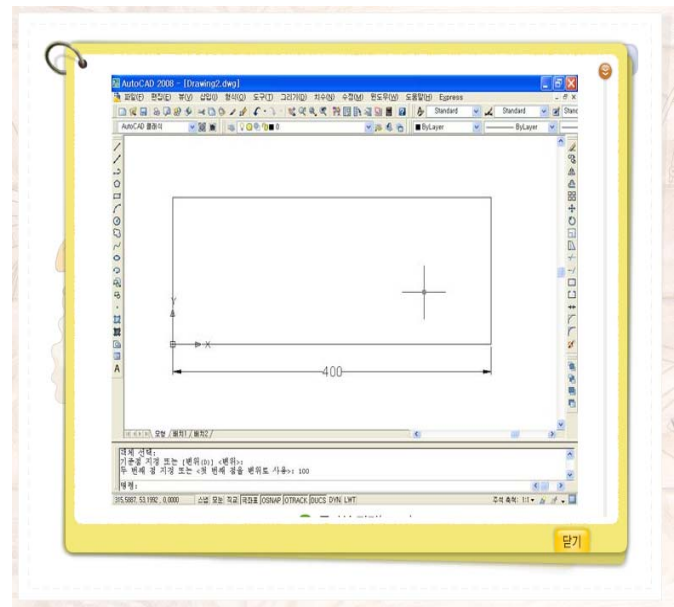

Fig. 9. Preview of learning results.

C. Developing Portion

Developing portion includes "Laying basic competence", "Learning guide", "Taking rest", "Learning evaluation", etc. The learning content is composed in the way that it is sufficient for each task and for each possible subject, considering all the techniques needed for content development, centered on media content.

1) Laying basic Competence

The learning provides the basic knowledge requirements to solve the proposed tasks as shown in Fig. 10, i.e. the concepts that the user should be familiar with.
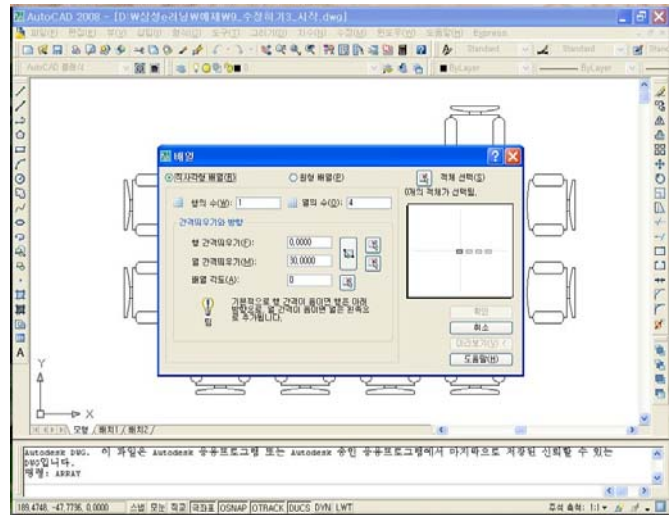
Fig. 13. Sum of learning.
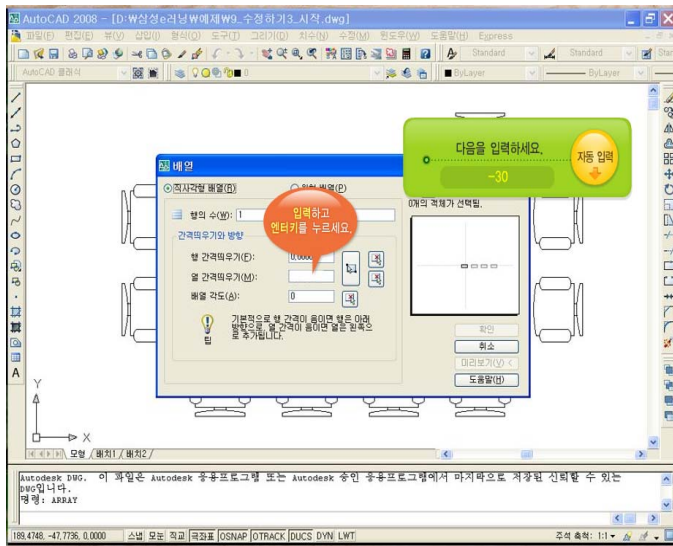

Fig. 14. Trying oneself.

Fig. 14. Trying the following.

If learners' levels come out as low in reevaluation, the system does not present the next task and asks to repeat the practices, and if the scores are high then the learner is allowed to perform the next task.

V. CONCLUSION AND FUTURE WORK

This paper presents e-Learning content that allows for self-initiative learning and takes into account the individual differences. In this way we improve Web-based Learning by introducing there an education engineering theory.

Namely, first, we evaluate the individual levels and carry out "Checking Test" learning that is suitable to the levels through "Laying the basic competence" of learning content, learning guide, taking rest and learning evaluation.

Also, the second evaluation of individual levels is carried out through "Trying the following" and "Trying oneself" of evaluating portion. The learners' learning levels were considered during the next task performance and we observed that the learners' levels rose through repeated learning, thus, improving the learning quality.

This can augment the efficiency of learning through bi-directional procedures utilizing a variety of learning methods, instead of unidirectional learning.

The learning that considers the learners' levels suggested in this paper would make implementation of education contents of a new type that does not make *a priori* segregation of learners according to their age or sex.

In future, the studies are needed to solve various problems related to the use in actual education sites. Also, we would like to apply an education methodology even one level higher and implement various instruction-learning theories according to the curriculum content.

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