Learner Custom-made Studying Modeling based on ICT

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Summary

Recently it has been expanding to all kind of education fields. It centered to individual education which is adjustable to individual education grade, is possible by discarding from uniform education. The education with same contents, they can be divided into various educations according to individual grade and necessary. In this paper, customized learning would be arranged according to learner's condition by selecting learning contents after dividing competency into Emotional Intelligence, Technology Awareness and Knowledge Management.

Key words:

Learning Design, MOT, Competency, e-learning.

1. Introduction

E-learning includes all studying by using with information and communication technology. Generally checking e-learning service progress, first, professor is in charge of creating, combining, amending and saving studying contents at LMS through authoring tool and in charge of supplying a lesson to learner and tracking a result of lesson and then in charge of supporting studying activity such as board, resource center and community[1]. LMS helps manager and school register totally professor and management of school activity easily. Nowadays, it will be knowledge society which information has key role in the society so that e-learning becomes to correspond to this society and then is enlarging to the all over the education step by step. E-learning which has been applied to companies and universities actively in the late of 1990, Recently it has been expanding to all kind of education fields. The reason why e-learning has much attention is that it has effective education system which is able to meet current environment as like international business, lifelong study, development of technology, increase of internet usage and unrestricted propensity of workers. Considering feature of e-learning opportunity of education can be arranged to transcend time and space and approach opportunity of education is available and education fee would be minimized and also, continuous re-training is available. In addition, centered to individual education which is adjustable to individual education grade, is possible by discarding from uniform education. Even for the education with same contents, they can be divided into various educations according to individual grade and necessary. At e-learning environment, it breaks a custom that learner should take a uniform educations with one-sided from professors and it's possible for learner to have active communication with professors and lesson details by 1:1. In order to have a customized studying, first, individual education grade should be considered and then systemic training schedule should be planed accordingly. For this, individual education grade should be analyzed. So, In this paper, I'd like to enhance learning effect by applying to learning design after analyzing competency. Competency is consisted with several factors complexly, not only factor. It is related with intellectual ability such as mathematical ability, language ability, and ability of space perception, understanding ability reasoning power and etc. As well as emotional factors such as patience, endurance, temperance, self-possession and stability including social ability. In this paper is to suggest effective learning to competency which is essential for the studying.

2. Learning Design

Learning Design is that learner should obtain his suitable education, aimed to his goal by performing ordered learning activity units under specific flow of education environment. Learning design is focused on learning activity instead of learning object. Since most teachers and trainer are usually applying their own learning principle, there seems hundreds answers accordingly. Learning design has been standardizing various learning regulations, scribing learning environment and learning activity in order to unify them into one framework. There are OUNL-EML[2], IMS-LD[3], CDF[4], LMML[5], Targeteam[6], PALO[7] and TML[8] regulations, related with learning design[9][10].

2.1 IMS-LD

UML has been developed at Open University of the Netherlands(OUNL) but they have decided not to develop anything after releasing EML 2.0 version. IMS-LD is the one which has been expanded after that. But related website with OUNL is operating continuously[2]. IMS-LD is a

regulation to use learning scenario and is explaining type of development for learning design as like theater.

2.2 CDF

CDF have been developed by Swiss Federal Institute of Technology(EPFL). It uses the ARIADNE Course Description Format(A‑CDF) for the description of courses. A completed CDF takes the form of an XML text file and is used in conjunction with an LMS to generate online courses.

2.3 LMML

Learning Material Mark‑up Language(LMML) have been developed by University of Passau, Garmany(UP). It is based on a meta model for knowledge management in order to be used in different application domains. It uses the concept of Course as a unit of study. LMML provides sub-language for various educational fields.

2.4 Targeterm

TArgeted Reuse and GEneration of TEAching Materials(Targeterm) have been developed by Universität der Bundeswehr, München(UB). Targeterm is a system for supporting the preparation, use and reuse of teaching materials. It also supports representing, structuring and managing content used in all kinds of learning situations.

2.5 PALO

PALO have been developed UNED University, Spain. PALO is an Educational Modeling Language. It describes courses organized into modules that contain learning activities, content and an associated teaching plan. PALO defines learning scenarios by mean of instructional templates.

2.6 TML

Tutorial Mark-up Language(TML) have been developed . ILRT, University of Bristol, UK(ILRT). It is designed to support several different types of question within the same content model. It is also designed to separate the semantic content of the layout or on‑screen format from a question.
following compare the preliminary information model.

- Main scope of the entities in the information model

CDF: Limited to content and the required resources(staff, physical and software)
OUNL‑EML : Content and process
LMML : Limited to content and domain specific
PALO : Content and process, Five layers of abstraction (Content, Task, Structure, Sequence and schedule, Management)
Targeteam : Limited to content

TML : Limited to questions(separates content from formatting)

- Main semantic entities in the information model overview

CDF: Course metadata scheme(general, target learner, sessions type, sessions, communication resources, teachers, locations)
OUNL‑EML : UoL(learning objectives, prerequisites, roles, activities), learning/support(environment, learning method, process, description), properties(Conditions & Notifications)
LMML : Course(module, structure model, content module, structure object, media object)
PALO : Course(module, activities, lo, embedded learning content)
Targeteam : Module(Hierarchy of paragraph sized issues)
TML : Question types, Choices, Hints, Reponses, Score.

- Unit of Learning & Role & Activity

CDF: Course, Fixed(Learner, teacher), SessionList
OUNL‑EML : Unit of study, Any(at least one of type learner), Activity
LMML : Course, Fixed(Learner), StructureObject
PALO : Course, Module, Fixed(Tasks)
Targeteam : Module & Issue, fixed(Learner)
TML : The scope of TML is so much different that it is left out of this mapping.

- Resource

CDF: Location(Communication resource)
OUNL‑EML : Environment(knowledge object, test object, tool object, index/search, communication, announcement)
LMML : Media object
PALO : knowledge domains of semantically linked material

3. MOT

The Modeling with Object Types(MOT) knowledge representation technique, its corresponding MOT editor for object-oriented modeling tool, provide a way to build graphic models showing knowledge types and the relationships between them. With this set of primitive graphic symbols, it is possible to express various fields of knowledge as graphic knowledge models, from simple taxonomies to ontologies, more or less complex learning designs, delivery process, decision systems, methods etc[11][12][13][14].

A basic MOT model is composed of six types of knowledge objects and six types of links. Each object type is represented by a geometrical figure as shown on Fig 1. Concept describe the nature of the object of a field(the "what"). Procedure describe the series of operations used to act on object(the "how). Principle are general statements intended to describe objects properties, of concepts to establish cause-and-effect links between them(the "why"),

or to determine which conditions apply to a procedure(the "when"). If only one occurrence is possible, we are dealing with fact or example, trace or statement.
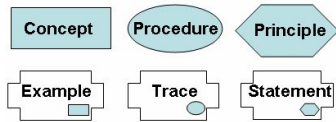

Fig. 1　Types of knowledge units in MOT.

The knowledge relationships are by arrows bearing a letter that specifies the type of relationship: Composition(C), Regulation(R), Specialization(S), Precedence(P), input/output(I/P) and Instantiation(I). Among these six relationship are the following[3] [4]: Clink means "a composed of". That is, relates abstract knowledge to one of its components or parts. Rlink means "rules" and "governs". between two or several concepts establishes a law or a relationship or the principle controls the execution of the procedure or the selection of other principles. Slink means "a sort of". That is, connects two abstract knowledge of the same type and one abstract knowledge object to a second one that is more general than the origin. Plink connects two procedures or principles which the first one must be completed or evaluated before the second one can begin or be applied. I/Plink connects a concept to a procedure and a procedure to a concept. The one is that concept is an input to the procedure and the other is that is the product of the procedure. Ilink.relates abstract knowledge to corresponding types of individuals, respectively examples, traces or statements. Fig2 presents Learning Design as MOT[16].
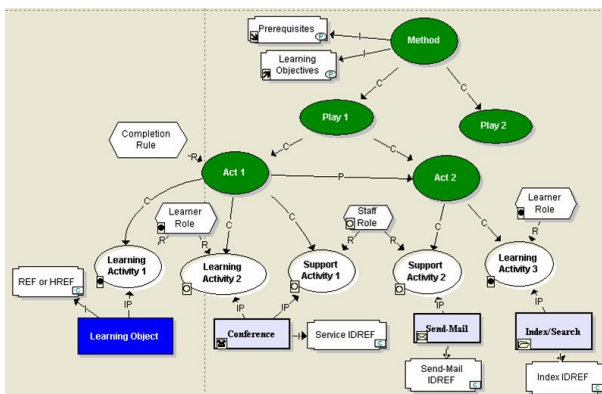

Fig. 2　Learning Design as MOT+.

4. Competency

Concept of competency has been suggested first by David McClelland, psychologist at Harvard University in 1973[16]. Definition of competency is various but let's sees major definitions on it. Competency is one of immanent feature which individual person has, to bring successful result during achieving some roles. Competency is also individual feature, related with effects for superior activity or conformity at job or situation. It is very extensive concept to include ability to transfer information and technology against to new situation. Competency is able to measure and related with his jobs and also is one of feature or ability, based on feature of individual activity. If checking competency, it will be helpful to increase ability of learning. Even superior learning design is supplied, customized learning, it's not possible, if individual competency wouldn't be analyzed. Competency is consisted with various factors, not only factor. In order to have effective training, intellectual ability such as understanding ability, judgment ability, speed of understanding and reasoning power as well as metallic factor, which is influenced to learning, and emotional factors such as concentrating ability, achievement motivation and emotional stability should be considered. Next several examinations in order to check up competency have arranged simply. There are many labs for examination test and many kinds of labs but I focus on sensitivity, intelligence and humanity only[17].

Fig. 3　Result of sensitivity test.

Fig. 4　Result of intelligence test.

Fig. 5　Result of humanity test.

In this paper, competency would be used by using ETK framework. The model consists of three vital components. Emotional Competence(E), Technology Competence(T),

Knowledge Competence(K). Together they constitute the ETK model[18][19].

4.1 Emotional Intelligence

EI(Emotional intelligence) has been defined by Peter Salovey ar Harvard University and John Mayer at New Hampshire University in 1990[20]. They said that "We define Emotional intelligence as the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions"[21]. Bae－on makes Bar－on EQI(Emotional Quotient Inventory) which is consisted with self-judgment in 133 which are EI examination tool and Schutte has prepared 62 questions, based on ideal models of Salovey and Mayer[22]. And there are many measurement tools then. When to receive attention of EI is in 1995 on the "Emotional intelligence" by Daniel Goleman in 1995. He has divided EI in 5 sections with self-awareness, self-regulation, motivation, empathy and social skills and then it has been divided into 2 sections, personal competency and social competency under Emotional competency framework[23]. Fig 6 presents emotional intelligence in the ETK model[19].
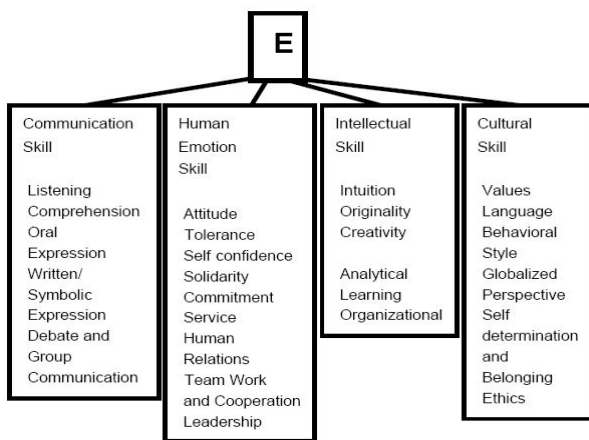

Fig. 6 Components of Emotional Intelligence

4.2 Technology Awareness

Technology helps provide the organization the competence and the tools to achieve the proper execution and implementation of its strategies, its operations and its tactics. Technology competence includes technology acquisition, transfer and blending, telecommunications and IT management, research and development and innovation.

4.3 Knowledge Management

Technology today has the capability to capture vast amount of data at great speed. This should be processed into useful actionable information. Knowledge competence includes visioning and strategic planning, benchmarking, knowledge protection, relevant knowledge acquisition, human resource development and training, business plan protocol, assessment and continuous expansion.

5. Learning Design Modeling

Fig. 9 is to have customized learning after filling out competency on each image at learning design. Competency has been expressed with Emotional intelligence, Technology Awareness and Knowledge Management and required target competency and actual competency have been arranged.
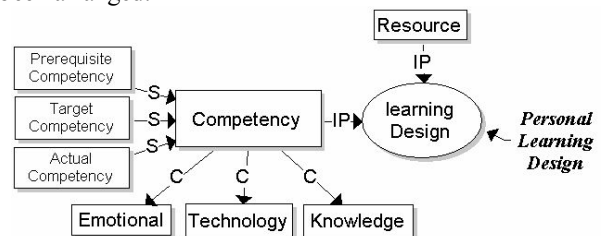

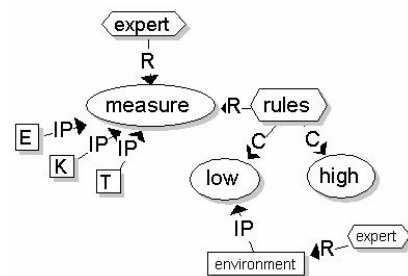Fig. 9 Custom-made Learning Design

Fig. 10 Measure of ETK

If competency shows high value after examination, resource with high grade by using the value would be used. If it has low value, resource with low grade has been abstracted and then used. If the value is very low, after increasing the value, then learning will be suggested accordingly. Competency cannot be increased rapidly so that suitable environment should be arranged.
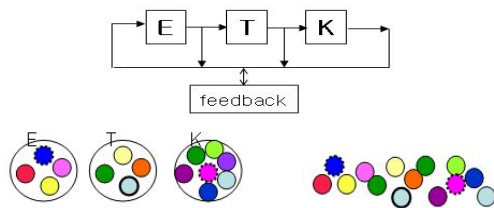
Fig. 11 Units of ETK Component.

As like Fig. 11, element of ETK is regarded as each. Emotional Intelligence is regarded as one unit as diaplayed on the Fig. 6, Communication skill, Human Emotion skill, Intellectual skill, Cultural would be regarded as each. Technology Awareness is regarded as one unit, Telecommunications & IT management, Technology Acquisition & transfer and blending, research and development, innovation would be regarded as each. Knowledge Management is regarded as one unit, visioning and strategic planning, benchmarking, knowledge protection, relevant knowledge acquisition, human resource development and training, business plan protocol, assessment and continuous expansion would be regarded as each. By selecting necessary area with ETK feedback continuously, can be examined used. For example, if you would want to know communication skill, Cultural skill and Human emotion skill among Emotional Competency, you can select them and then examine and use then separately. Or in order to have Communication skill and Technology Acquisition only, required parts can be selected and used. If education program designer needs all of ETK, those parts can be used accordingly.
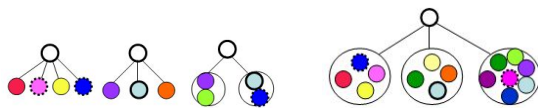

Fig. 12 Select of ETK Component.

6. Conclusion

Since learning environment and concentration grade are different for each, there should be individual different at a class. Even a student, who has interest in learning, depends on conditions and it would be reflected to the class differently. Even class learning, it cannot consider all individual status and conditions for all, but e-learning can consider individual conditions if measuring and using individual competency then it would make high affection to them. In this paper, customized learning would be arranged according to learner's condition by selecting learning contents after dividing competency into Emotional Intelligence, Technology Awareness and Knowledge Management. If having customized learning design after measuring competency of learner, learning design than

uniformed class has better effects. In order to have learning design, first, individual competency needs to be measured and then learning course should be placed then. In the future, to make various type of resources and study to apply them to learning design, which are suitable to competency, should be arranged then.

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