

Special Issue on Information, Computing and Telecommunications

(Guest Editors : Prof. Jin-bao Li and Prof. Shou-xu Jiang)

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Published by International Information Institute

Indexed by *Scopus, JDream, Mathematical Reviews, Zentralblatt MATH, ProQuest, Swets, EBSCO*

The Design Concept of Self-Determination Based On-Line Learning Platform

Pi-Shan Hsu, Te-Jeng Chang and Kuo-Hung Tseng

Ching Kuo Institute of Management and Health, Keelung, Taiwan 20301

National Taiwan Normal University, Taipei, Taiwan 10610

Graduate Institute of Business and Management, Meiho University, Pingtung, Taiwan 91202

pshsu@ems.cku.edu.tw

Abstract

Based on the self-determination theory (SDT), learners can improve their learning achievement through promoting self-determination competence. E-decision thinking competence supports optimal decision making under on-line problem solving context. Different from past researches, both SDT and e-decision thinking competence are taken into consideration in developing the design concept of a self-determination based on-line learning platform (SDBOLP) in order to construct an effective on-line learning platform. The characteristics of the design concept of SDBOLP include: strengthening autonomy by self-determination learning path, promoting e-decision thinking competence by dynamic real-time based learning effort curves, constructing relatedness in on-line community context by on-line interactive discussion.

Key Words; Self-determination, On-line learning platform, E-decision thinking

1. Introduction

As a result of information and communication technology (ICT) progress, it is very important to integrate learners' decision making competence with information expertise in education system and enterprises. Therefore, the most important goal of on-line education is to cultivate learners' independent decision making competence in order to adapt into fast changing ICT evolution. The key points of on-line education include systematic problem solving and decision making by utilizing information expertise [1, 2]. Hence, the design concept of an effective on-line learning platform should consider independent problem solving, information processing, and decision making.

According to SDT, self-determination action and value are converted by internalization and integration, which can improve learners' learning achievement through promoting self-determination competence [3, 4]. e-decision thinking competence supports optimal decision making through cultivating effective information processing and problem thinking abilities under on-line problem solving context [2, 5, 6]. In order to achieve independent problem solving, information processing and decision making, the design concept of an effective on-line learning platform in this study should consider both SDT and e-decision thinking competence, which is different from the design of traditional on-line learning platforms. For future researches, learners' e-decision thinking competence will be assessed and evaluated through on-line learning in SDBOLP in order to verify that learners' learning achievement can be improved through promoting e-decision thinking competence.

2. Literature Review

The basic design concept of SDBOLP is based on SDT and e-decision making competence.

2.1 Self-Determination Theory (SDT)

SDT is an ideal organizational motivation [7], which emphasizes:

1. The importance of human's inner resources on personality development and self-regulation behavior;
2. The conversion process of the behavior facilitated by extrinsic motivation to self-determination;

3. The influence of social context on the conversion process of self-determination.

Deci and Ryan [7, 9, 8] classified traditional motivation into intrinsic and extrinsic motivation which included three psychological needs, such as, autonomy, competence, and relatedness. Different motivation regulations are developed according to the level of self-determination. Those motivation regulations represent a continuous concept from non-motivation, extrinsic motivation to intrinsic motivation, which also represents the motivation from lower level of self-determination to higher level.

Internalized motivation is a conversion process of regulations from non-motivation, extrinsic motivation to intrinsic motivation [8]. Internalization only occurs when individual is motivated to accept and convert different values and approaches into himself [9]. Different behavior characteristics are generated in light of different levels of internalization [10, 11]. In summary, SDT in education application emphasizes the influence of intrinsic motivation on individual's self-determination behavior in social context. SDT pays attention to the outcome of intrinsic motivation and learning behavior which are promoted by individual's internal resources.

According to SDT, more internalized motivation regulation results in more sustained positive behavior [7]. More extrinsic motivation is converted into self-determination and intrinsic motivation can be sustained through satisfying individual's autonomy, competence, and relatedness [9]. Then the level of self-regulation is promoted to influence the positive learning achievement. In contrast, negative learning achievement is taken place because of higher control regulation. Therefore, authors implement SDT as the learning approach in designing SDBOLP, and authors expect SDBOLP to promote learning achievement.

2.2 e-Decision Thinking Competence

E-decision thinking competence possesses the abilities of critical thinking, problem analysis and solving, e-information processing technology, and tool aided decision quality [12]. Therefore, e-decision thinking competence includes the ability of information processing and problem thinking, and the ability of problem thinking includes critical thinking and mental training.

E-decision thinking competence is cultivated by the assistance of context cognition to conduct problem thinking and decision making in e-information processing technology environment [2, 5, 6]. e-decision thinking competence is taken place while people face challenges to problem thinking, logical analysis, and risk management in decision making process. People with e-decision thinking competence achieve the optimal decision making by utilizing the ability of e-information processing together with mental training to conduct standard operation in decision thinking process.

3. Method

This study aims to develop the design concept of SDBOLP according to SDT and e-decision thinking competence theory. E-decision thinking competence indicators are embedded into the situational questions in SDBOLP. Hence, e-decision thinking competence can be assessed while learners conduct on-line learning in SDBOLP. Authors use Hermeneutics method, which is a qualitative research method to construct e-decision thinking competence indicators through continuous construction and interpretation by experts [13].

However, the construction of e-decision thinking competence indicators will not be elaborated in this study. This study focuses on developing the design concept of SDBOLP which conforms to SDT and e-decision thinking competence theory.

4. Design Concept of Self-Determination Based On-Line Learning Platform (SDBOLP)

The purpose of developing SDBOLP is to evaluate the relationship between self-determination based learning approach, e-decision thinking competence and learning achievement under on-line learning context. Therefore, situational questions are designed in SDBOLP according to learning-assessment blended approach, which

facilitates learners to conduct problem solving and decision making through problem thinking and information processing under on-line learning context. In addition, the system layout structure and learner-platform interface of SDBOLP all conform to SDT. In summary, authors tend to promote learners' e-decision thinking competence by self-determination based learning approach on SDBOLP, which results in better learning achievement.

4.1 System Layout Structure of SDBOLP

The system layout structure of SDBOLP is shown as Figure 1:

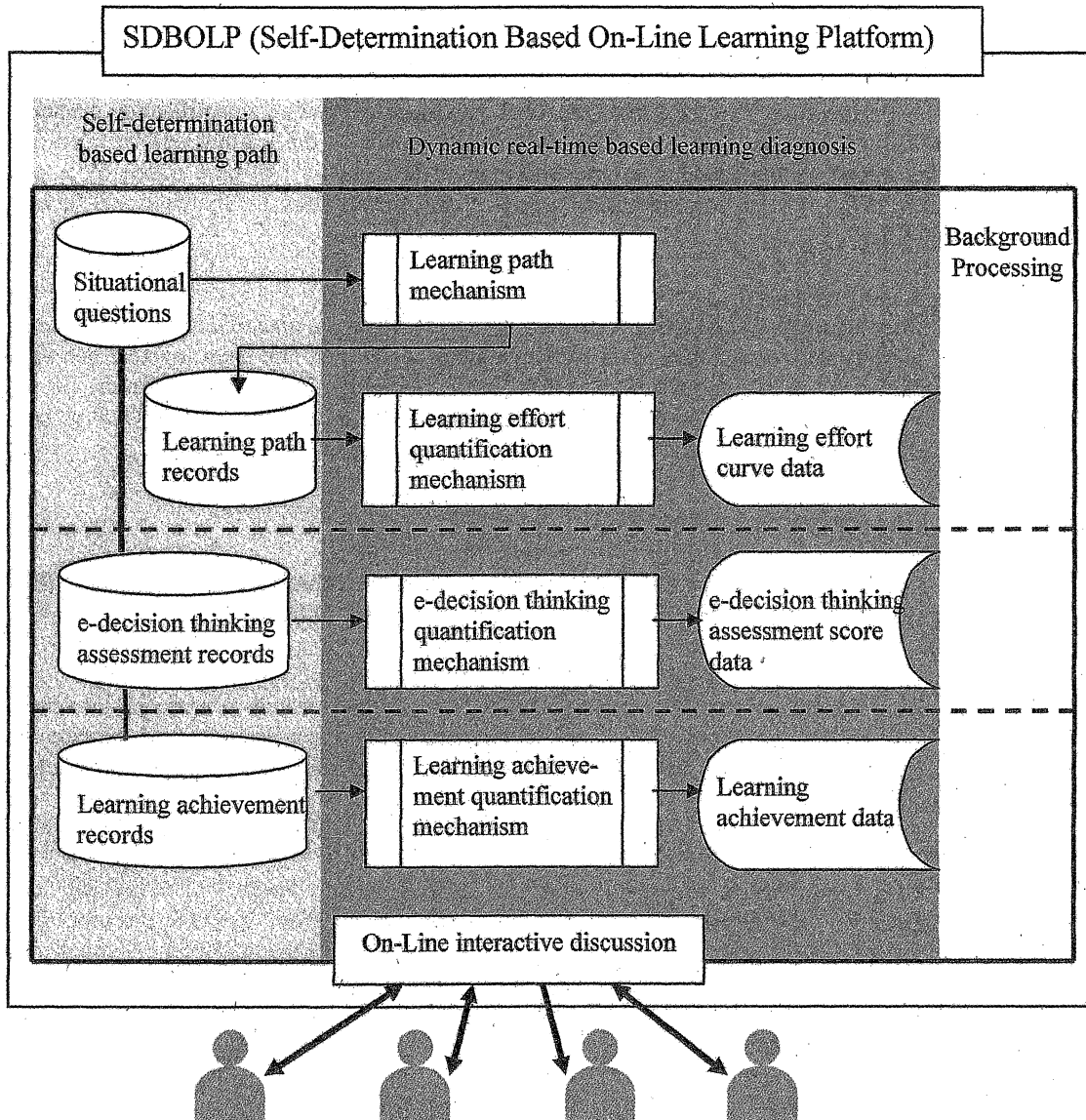


Figure1. The System Layout Structure of Self-Determination Based On-Line Learning Platform (SDBOLP)

The system layout structure of SDBOLP includes three functional layouts: self-determination based learning path, dynamic real-time based learning diagnosis, and background processing.

Layout I: Self-Determination Based Learning Path

A learner is asked to login SDBOLP by entering assigned identification number and password. The situational question is designed to simulate specific ICT related problem solving context and also used for assessing e-decision thinking competence. Each situational question has 7 sub-questions. One of e-decision thinking competence indicators is assessed while a learner answers the corresponding sub-question. Four steps, which are

1st answering, 2nd answering, hint, and 3rd answering, are designed as the path of answering process. Learners can decide the answering path under self-determination condition. In SDBOLP assessment is learning because the situational question is designed according to a learning-assessment blended approach. Hence, different answering paths represent specific learning paths and all learning paths are self-determination based. The records of learning paths related and e-decision thinking assessment records for each specific learner are recorded while the learner answers situational questions.

Layout II: Dynamic Real-Time Based Learning Diagnosis

In this layout, all related learning records generated from the SDBOLP by answering situational questions are stored in several databases such as situational questions, learning path records, e-decision thinking competence assessment records, and learning achievement records. Learning achievement records and e-decision thinking competence assessment records are converted into numerical data by corresponding quantification mechanisms. Learning path records are converted into numerical learning effort data by the learning effort quantification mechanism and then output in the learning effort curve format at dynamic real-time based by a graphic conversion mechanism [14, 15]. The learning effort curve is a user friendly tool for dynamic real-time based learning diagnosis [14, 15].

Layout III: Background Processing

In the background processing layout of SDBOLP, all the involved databases, quantification mechanisms, and graphic conversion mechanism are modularized as individual objects and then link them together according to specific output purposes. Such layout design provides better flexibility in the consideration of system modifications or upgrades. In addition, the on-line interactive discussion is designed in SDBOLP to have all involved learners and instructors communicate interactively while they conduct on-line learning.

4.2 SDT Based Characteristics of SDBOLP

SDT constructs human needs on three psychological needs: autonomy, competence, and relatedness [9]. The SDT based characteristics of SDBOLP conform to three psychological needs of SDT:

Strengthen Learners' Autonomy:

The layout design of self-determination based learning path facilitates learners in self-determining learning paths. Learners conduct goal setting and express decision independently in the self-determination process [8, 9]. Therefore, SDBOLP strengthens learners' autonomy through promoting the abilities of goal setting, independent expressions, and decision making.

Satisfy Learners' Competences

The layout design of dynamic real-time based learning diagnosis facilitates learners in diagnosing learning progress in order to achieve optimal decision making according to learning effort curves at dynamic real-time based. Then learners are able to reinforce learning achievement by evaluating and supervising learning progress independently [8, 9]. Therefore, SDBOLP satisfies learners' self-determination and e-decision thinking competences through promoting the abilities of evaluation, supervision, independence, and reinforcement.

Fulfill Learners' Relatedness Demand

SDBOLP construct community context through on-line interactive discussion which constructs relatedness between all involved learners and instructors in SDBOLP. Therefore, SDBOLP fulfills learners' relatedness demand by constructing community context for all involved learners and instructors.

4.3 Main Functions of SDBOLP

In order to conform to three characteristics of SDBOLP mentioned above, the design concept of SDBOLP includes the following main functions which are different from the design of traditional on-line learning platforms:

Self-Determination Learning:

4-step answering mechanism [14, 15] is applied in the situational questions on SDBOLP. The flow chart of 4-

step answering mechanism is shown in Figure 2. The self-determination points at each answering step and hint are linked to be a specific learning path according to a learner's autonomous choice. That is, learners conduct decision making autonomously at every self-determination point and generate specific learning paths. Therefore, self-determination learning is a learning approach having learners conduct decision making autonomously in order to strengthen autonomy.

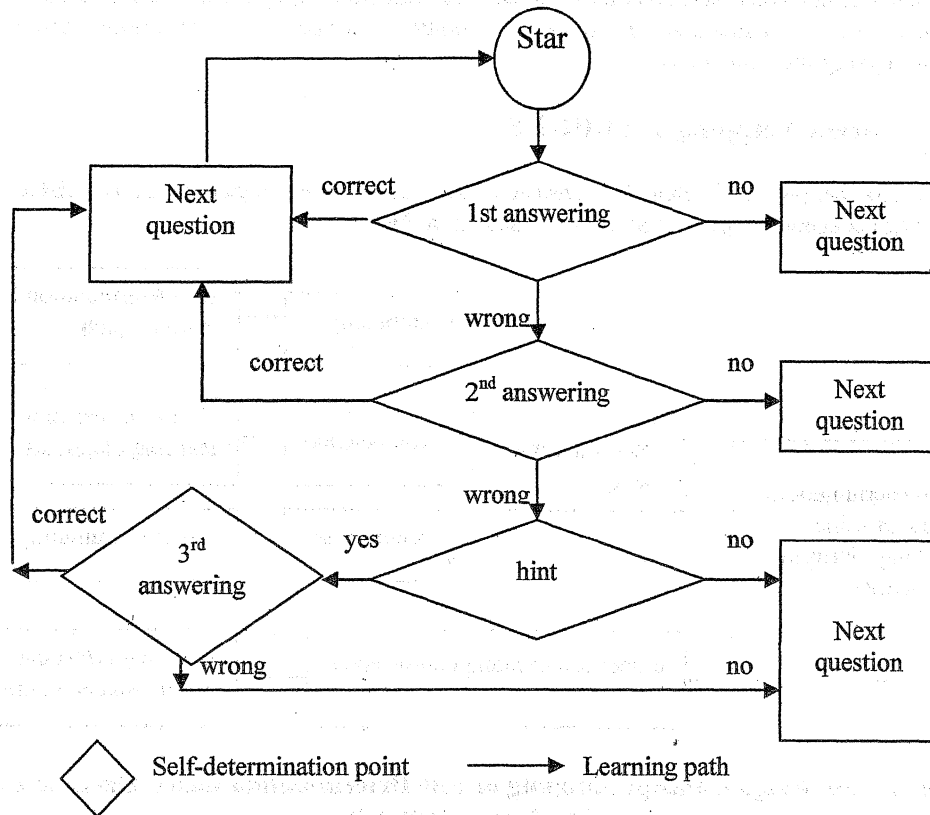


Figure 2. The Flow Chart of 4-Step Answering Mechanism

Learning Effort Curve Aided e-Decision Thinking

SDBOLP converts learners' learning path records into learning effort curves [14, 15] at dynamic real-time based. The learning effort curve is shown as Figure 3. By utilizing the user friendly learning curve as an effective interface tool for learning diagnosis[14, 15], a learner goes through a problem thinking and decision making process by supervising and evaluating the learning effort curve in order to determinate learning paths. Therefore, e-decision thinking competences can be built up independently with the aid of dynamic real-time based learning effort curves.

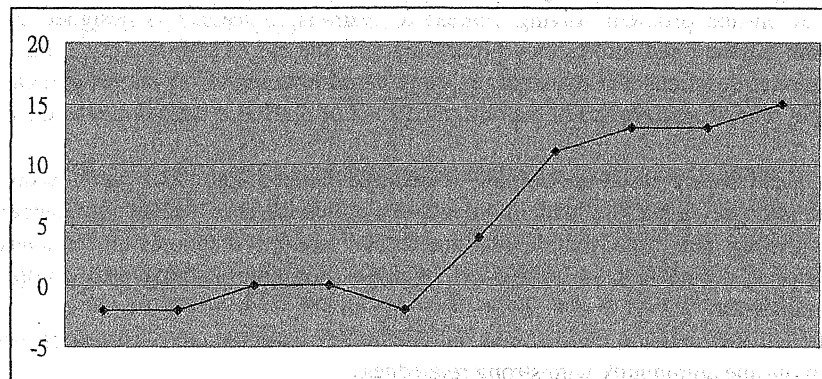
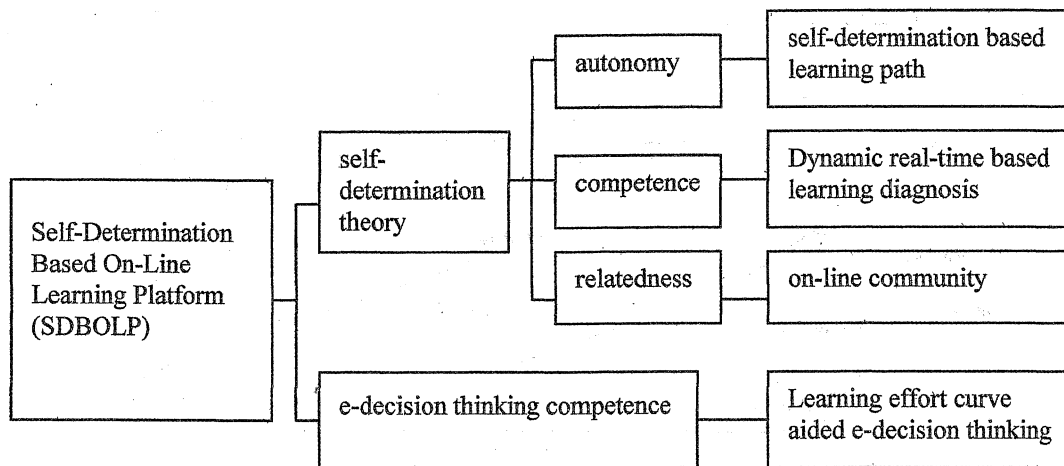


Figure 3. Learning Effort Curve**On-Line Community**

Learners use the on-line interactive discussion to establish relatedness with other learners and instructors. On-line interactive discussion constructs community context through building up social relation ties between learners and instructors. Then the relatedness in on-line community is formed [9, 8]. Therefore, relatedness can be established through on-line community.

4.4 Design Concept Mapping of SDBOLP

The design concept mapping of SDBOLP is constructed according to the design concept of SDBOLP interpreted above. The design concept mapping of SDBOLP is shown in Figure 4.

**Figure 4. The Design Concept Mapping of Self-Determination Based On-Line Learning Platform (SDBOLP)****5. Conclusions**

Self-determination is promoted through satisfying the psychological needs of autonomy, competence, and relatedness according to SDT, which results in better learning achievement. Furthermore, e-decision thinking competence supports optimal decision making through cultivating effective information processing and problem thinking abilities under on-line problem solving context. Hence, this study focuses on developing the design concept of SDBOLP which conforms to SDT and be able to cultivate e-decision thinking competence under on-line problem solving context. Context cognition is constructed by applying situational questions in SDBOLP, which provides an on-line problem solving context to learners. SDBOLP is designed to assist learners in conducting problem thinking and information processing with the aid of self-determination based learning path provided by situational questions and dynamic real-time based learning effort curves generated by the learning diagnosis technique. The characteristics of the design concept of SDBOLP are summarized as the following:

- Situational questions are based on learning-assessment blended approach, which is designed to construct self determination based learning path in order to strengthen learners' decision making autonomously.
- The learning effort curve, a dynamic real-time based learning diagnosis tool converted from learners' learning paths, is designed to assist learners in self-determining learning path by optimizing e-decision thinking competence.
- On-line interactive discussion builds up social ties between learners and instructors, which is designed to construct an on-line community with strong relatedness.

6. Acknowledgments

This research was supported in part by the Taiwan National Science Council (NSC 99-2511-S-254-001-MY3).

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Biography

Dr. Pi-Shan Hsu received Ph.D. degree in the Department of Industry Education at the National Taiwan Normal University (NTNU). Her research interests include dynamic assessment technology, learning diagnostic techniques, adaptive e-learning, and Creativity. She has published research findings, including adaptive e-Learning, dynamic assessment technology and learning diagnostic techniques, in some SSCI, SCI and EI journals. She is an associate professor of Human Resource Development at Ching Kuo Institute of Management and Health, Taiwan. Since 1993, she has been a teacher more than 20 years. She played a major role in several research teams of the national projects from Taiwan's National Science Council which focuses on creativity and learning diagnostic technique development.

Dr. Te-Jeng Chang received Ph.D. degree in the Department of Industry Education at the National Taiwan Normal University (NTNU). His research interests include dynamic assessment technology, cognitive load, learning diagnostic techniques, adaptive e-learning, and organizational learning. He received the Master of Science degree in mechanical engineering from the University of Michigan, USA. Since 1990, he has been worked in mechanical manufacturing industry more than 23 years and been the executive operation officer for several global enterprises. The practical experiences in both applying e-learning for human resources training and constructing organizational learning environment and system enlighten him in related researches.

Dr. Kuo-Hung Tseng is a chair professor at Graduate Institute of Business and Management, Meiho University, Taiwan. His research interests are web problem-based learning, concept mapping (CMPING) and knowledge transfer in web system. He has published research findings, including e-Learning and knowledge transfer, in some SSCI journals. He has held the position of a Dean of Business and Management College, an Academic Vice President, a Director of Research and Development, a Director of Teaching Practice and Guidance and a Chairperson in the University as well as a Chair of the Applied Science Education Discipline, and a Consultant of Science Education Division in Taiwan's National Science Council.