Conceptual Model of Adaptive System for Learning KCTC operators

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적응형시스템을 이용한 과학화전투훈련의 운용자 교육 모델 개발

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요 약

In this research, new conceptual model is being established to advocate a hypothesis during the hands-on to guarantee an effectiveness of the training with a scientific procedures and techniques under the management of KCTC training system. From this, current requirements of facilitator's qualifications and technical standards can be correspond with educate and their individual characteristics. Establishing education model basis will increase facilitator's training and conservatism in the representative KCTC training operative as the actual fight; contribute to effective training procedures. Like this model, it can be flexibly applied to the units in armies' actual training in circumstantial situations other than KCTC training; also can be applicable in many quarters.

1. Introduction

As of today, since knowledge information society has come as well as the change of security environments, national defense's tasks gradually became complicated and versatile talented people are demanded. Also, organized managements of personal and unit training costs are increasing as the usage of advanced scientific technology in weapon systems are miniature. Increased usage of training grounds and large scales of maneuvers, adoptions and developments of scientific education trainings are demand such as training using computers (simulation, simulator, using scientifically developed equipments during training(miles, embedded equipments), training with virtual reality technique and internet(imaginary education & experiences), educational training used by networks(dispersed interaction of mission stimulator) and training using composite cinematography. KCTC, the Korea Combat Training Center is the reason of the attention with these backgrounds. It is the only unique scientific up-to-date training camp under the army of education headquarters based on the effectiveness of usage in scientific training techniques to apply the actual-fight assessments. Scientific battle training team is formed with 3groups with one banner of program supporting team(S-1, S-2, S-3), training team (control commander center of exercise, obervation 1-2 dep, post-review 1-2 dep) and 11 infantry battalion. Excellent units are selected to participate in the training annually by the army. It is necessary for KCTC (Korea Combat Training Center) operators to control science combat training system that they must receive training for how to control KCTC system. Currently, simulator based learning

systems are used to training for KCTC operators. These learning systems just simulate real operational environment and does not teach how to control KCTC system and plan missions given. The adaptive learning system which will be developed with conceptual model could provide KCTC operator with more effective learning. Specialized and high-technology man power expansions are urgently required where the scientific trainings are composited with many knowledge-based systems. Under this atmosphere, ranking certificates related to scientific battle training system is arranged where can be achieved with annual assessments; promotion incentives are granted.

However, professionalism of the educational programs is still not satisfactory in the decent point of view. To demonstrate a developed ability, establishing educational model is required where institutional system's labor forces need more efficiently promoted specialists. Until now, it was difficult to be seen as an actual specific elevated education where applying conventional military education combining certain characteristics of the scientific battle training.

Therefore, in this research establishment of optimized educational conceptual model and a hypothesis of applications will be suggested based on the related studies. Objective of This Study is development of the conceptual model of adaptive system for learning KCTC control procedural knowledge.

2. Adaptive learning system

Adaptive learning system is provided by individual's knowledge level, learning style, preferences, learning background and conditions to individualize the contents depending on the learners; many learning systems attempted to support the idea[7]. In the view of the teaching operators of KCTC training system, they are much difficult targets than individuals who contain different tactical intelligence and allow circumstantial judgment based on their past experiences[9]. In this study, targets' levels may vary and individual characteristics can be strong with KCTC system operators; to find pros and cons with external major literatures to composite a optimum conceptual model.

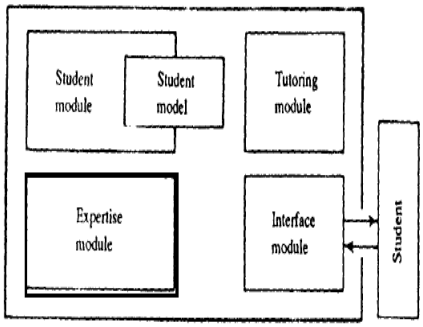
Many theses related to developments of adaptive learning system and the suggestion of the conceptual models have been processed in the many past years and continuously suggested by people. P.L. BRUSILOVSKI's "The Construction and Application of Student Models in Intelligent Tutoring Systems" gives the best logical reasoning of the conceptual models regarding KCTC's system operators. This paper surveys research results in the development and application of student models in intelligent tutoring systems. A classification of student models is given together with model development methods. Adapt to trainee with gathering data about the trainee's movements and using this information to dynamically modify the presentation and functionality of the system in clearly defined ways[1].

Through these studies, major focus is to provide individual levels of the learning system, yet proper advices are not offered within the learning process system.

3. Establishing basic adaptive learning system model

As a controller of the training, operator's abilities of the performance are very important as it is aiming for a scientific training. Proficient movements are required to be shown as one since the training is for large troops where all the training processes are real-time monitored. We started to consider of definition about a conceptual model: a conceptualmodel consists of units with attributes (concepts, theoretical constructs) andrelations between those attributes and concepts based on theoretical constructs.[6] Study related to establishing adaptive model is started from the suggestion of P.L. BRUSILOVSKIY's "Structure of an ideal intelligent tutoring system", and applied important indexes from

the foreign related researches as a major factor of the adaptive model.



[Fig. 1] Structure of an ideal intelligent tutoring system[1].

Under the "Structure of an ideal intelligent tutoring system" by P.L. BRUSILOVSKIY represents learner's module prepared by different levels of the individual's adaptive system with interface module. This tutoring system of expertise module deals with knowledge generation and verification, and timeliness of system knowledge of the student reflected in the student-model, and functions of teaching support becomes the major factor in the tutoring module[1].

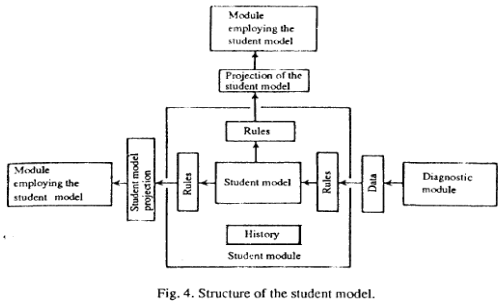
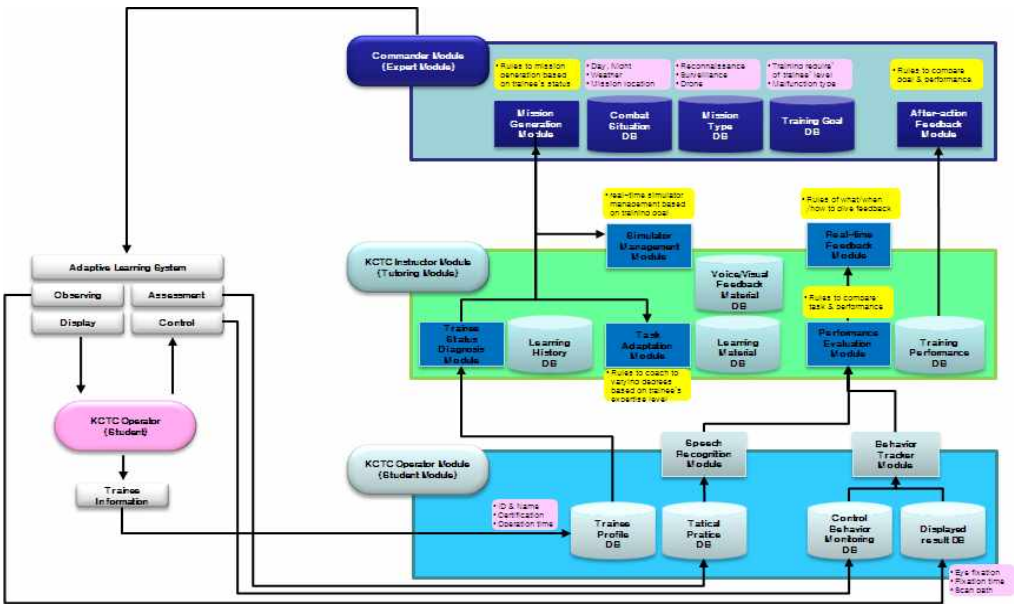


Fig. 4. Structure of the student model.

[Fig. 2] Structure of the student model[1].

It attempt to represent the structure and functions of a student model in an interactive tutoring system in which all components use a student model for adaptation to a student. The central aspect of this system will be the student model itself which reflects the individual features of the user-student and the ongoing picture of student knowledge both on the subject matter and on the system itself, the system Structure:, and interaction. A suitable Korean-style KCTC training system conceptual model was established focusing on the existing studies.



[Fig. 3] KCTC Adaptive learning system conceptual model

Figure 3 is a KCTC training's conceptual model to cultivate abilities to assess and observe the result of real-time datas from the training conditions in order to provide a leading exponent of general regulation and domination to allow successful training system. Modules can be divided in to three types: student, tutoring and expert. In student module, basic education is processed where learner's name or affiliation information is collected to appease and tactical technique education is implemented while observing equipments and being assessed of the

training. In the tutoring module, it begins with diagnosis of the learner and allows higher difficult training than past learning system to effectively discourtesy the real-time battle formation. During these processes, various conditions may occur yet will master the flexibility of reasonable assessment ability as an operator. Next is the expert module, which is the representative training, processed under detailed regulations of each duty and may have some alterations within the terms of the units and allow technical, skillful processes provided individually.

3.1 Proposed Hypothesis

① Operator module using Displayed datas(simulated combat result) will improve performance of training system. Displays are an excellent tool to determine objectively and accurately where the operator is looking and where soldiers attention were focused and carried out. It could be used in operator performance evaluation & visual assessment.

② Using operator's verbal protocol during real-time training could improve faculty of control power of training the troops in KCTC. After analyzing operator's verbal protocol in real-time, giving appropriate aural feedback to operator could provide more similar to actual situation such as under the engagement.

4. Conclusions

Adaptive-learning system can adjust individuals' learning content under their various characteristics and many learning systems attempted to support the idea. With the proposed conceptual model from the research, it could provide effective performance evaluation of trainee based on displayed datas & tactical protocol analysis and could provide more efficiency real-time feedback to improve training performances. Conceptual model of this study could provide KCTC operators with the opportunity to practice various missions at more real tactical situations while they train troops what they get permission to take part in KCTC program. In this study, flexible yet freely-adaptive learning system is designed to specific KCTC military operators. Suggested models were composed with practical applications which can easily be adapted during the actual training to overcome the limits of the past research. It is individually structured to be adapted easily under the learner's intellectual level, state of understanding the concepts, and preference of the study is the biggest strength. This research is suggesting adaptive-studying models targeting current assigned KCTC training operators which may be is limited with past army educations related with duties of Euducation of Job mainteanance. Thus, with the standard of current application system, effectiveness analysis will be implemented under the feedbacks from the training and postmortem procedures of the operators.

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