論文の要旨
Supporting EFL Reading Comprehension by Using of KB-Mapping Method and Analysis of Cognitive Process
（英文読解支援へのキットビルド概念マップの活用とその認知プロセスの分析）

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In language learning contexts, reading comprehension (RC) is an important learning activity that requires a special ability from the learner to reap its benefits. RC poses many challenges since learners may experience such issues as slow reading, insufficient vocabulary comprehension and poor recalling. In general, RC involves two levels of processing, shallow and deep processing. Deep processing involves semantic structural processing, which happens when we encode the meaning of a word and relate it to similar words. Shallow processing involves grammatical structural and phonemic recognition, the processing of sentence and word structure and their associated sounds. Some researchers have described memory recall of stimuli as a function of the depth of mental processing. For the purpose of this research the reading comprehension is defined as "the learner's ability to understand completely and memorize the important information that is included in the text that he is reading".

RC in a Foreign Language (FL) context is a special case of RC; it is a complex, dynamic, multi-componential and multi-dimensional task in the learning process. It is a continuous process of multiple interactions between the readers' background knowledge in their Mother Language (ML) and the knowledge exposed to in the FL. Broadly speaking, RC of FL is the same as the ML reading comprehension but it is slower and less successful than ML reading. This can be explained by the fact that the reading process is dependent on many factors such as the level of the readers' language proficiency, the subject matter of the text, text difficulty and task demands.

KB-mapping method is a special kind of graphical organizers of information and it has proved the efficiency of KB-mapping in many learning fields. In advance, it has some special properties which help the learners to get a better understanding. We planned to investigate the effects of applying method in supporting EFL RC. In this thesis, we are proposing the method of KB-mapping as a method to support this learning activity. KB-map is "a framework to realize automatic diagnosis of concept maps built by learners and to give feedback to their errors in the maps". KB-map is a special kind of concept map, the creation of concept map consists of two steps: the extraction of the concepts and the relations from the text and the selection of the responsible relation that connects two concepts together. In KB-mapping, the supervisor makes the first step by creating the goal map from text and after that he can generate the kit from the goal map by dividing the goal map to concepts and relations, providing learners with this kit. After that, learners are tasked to build the concept map (called learner's map) by using the concepts and the relations that provided in the kit.

One of the important research field in FL RC is the English as foreign language (EFL), this research topic is very important and common in all countries. The results of the researches in this domain in any language can be applied for the other language. In this thesis, we are investigating the usability of KB-mapping method in supporting RC of English text, as EFL.

In the learning engineering research, when proposing a new method to support a learning task, it is important to explain "what are the effects of this method on learners' behavior, understanding and comprehension". Also it is important to explain "why this method is effective". In this research,

to do so, we propose to examine of the cognitive process of the learners during the learning process. In order to check the effects of use, we have compared the proposed method with two commonly used graphical organizers in EFL RC, Selective Underlined strategy (SU), which is a common used strategy in the classes of EFL RC, and Scratch Build (SB) concept mapping method, which has been investigated as advanced method to support EFL RC. We have found that KB-mapping has the same efficiency as the other, form the short term viewpoint, but it has better efficiency from the long term viewpoint. Also to explain these results, we have analyzed the cognition process of learning EFL RC by using KB-mapping and SB-mapping methods. We have found that KB-mapping method helps the learners to avoid sentence by sentence map building style, and SB-mapping method does not. Throughout the experimental use, the main difference between the KB-mapping and SB-mapping method is the map building process, the progress of map building is a very important factor, it can express the performance of the learners during the learning process, and also it can give important information about the learners' comprehension. We have examined the cognitive process throughout the progress of map building, by monitoring the map building process and compare with the text sequence. The outline of this dissertation is elaborated in the following passage.

In Chapter 1, the introduction about supporting EFL RC is presented. A throughout survey of some related researches which tried to support this learning activity is presented in Chapter 2. In Chapter 3, we introduce the SU strategy and the KB-mapping method in details, and describe an experiment, that is comparing KB-mapping method with the SU strategy, which is common used strategy in the classes of EFL reading comprehension. This experiment indicated that KB-mapping method had the same efficiency as SU strategy for the short term viewpoint, but it has a better efficiency for the long term viewpoint. In Chapter 4, the details of SB-mapping method are introduced, another experiment, that is comparing KB-mapping and SB-mapping methods. This experiment indicated that KB-mapping method had the same efficiency as SB-mapping method for the short term viewpoint, but it has a better efficiency for the long term viewpoint. The following chapter Chapter 5 describes another experiment compared again KB-mapping method with SB-mapping method, applying more detailed investigating method for the cognitive process by monitoring the building progress of the two methods, in order to investigate "Why KB-mapping method is more effective than SB-mapping method in recalling the comprehended information after a while". Finally, further discussion, the conclusion of this assentation and future work directions are given in Chapter 6.