

Presentation Speech

Good morning, ladies and gentlemen. I feel very honored to be able to attend this presentation. I am very happy to be able to communicate and learn with you here.

First of all, please allow me to make a short self-introduction. My name is Ting-Wen Chang and I am from Athabasca University, Edmonton, Canada. I am standing here today, mainly to share with you a topic that our project team is currently studying. It is mainly a kind of Recommendation Mechanism Based on Students' Working Memory Capacity in Learning Systems. I think our research is very valuable. Of course, this research is also more promising. I think everyone will agree with me after listening.

Let us officially start with WMC. what is WMC? it is the abbreviation of working memory capacity. Many studies have shown that students' learning performance is susceptible to cognitive abilities such as their working memory ability (WMC). Our WMC is very limited and can easily be overloaded in learning activities that require complex cognitive tasks. From the aspect of capacity, WM is capable of holding only about seven (minus/plus two) elements (or chunks) of information for a brief period of time. From the aspect of duration, Driscoll found that new information retained in WM without rehearsal is forgotten after a very short time.

So we can think that WMC has a close relationship with the students' learning ability. After research, we found that students with learning difficulties usually have lower WMC, hindering them from remembering key information and causing structural learning activities to fail. Therefore, our research task is to establish a recommendation mechanism to provide teachers with meaningful suggestions and suggestions to avoid students' WMC overload and strengthen the teaching design of the learning system.

I will elaborate on the following research results, our research results and future research directions. Cognitive load theory (CLT) is a teaching theory based on human cognitive architecture, CLT has emerged as the basis of instructional design guidelines intended to assist in the presentation of information. But it specifically addresses the limitations of WM under its three categories: intrinsic, extraneous, and germane cognitive loads. Intrinsic load is associated with the nature of presenting the material itself.

Therefore, we propose a recommendation mechanism based on WMC. The recommendations provided in our mechanism are distinguished based on the level of WMC at which a student performs in the learning sessions and are provided to the teachers according to CLT and the features of WM. The recommendation mechanism considers two types of WMC results of a student: the WMC identified in one session (called session WMC) and the total WMC from all sessions. If a student has high total WMC but her/his session WMC is low, the recommended information for high WMC is displayed. If a student has low total WMC but her/his session WMC is high, the recommended information for low WMC is presented.

Based on the above studies, we summarize some of the recommendations for different levels of WMC. First for high WMC students. Increasing learning space, it can be helpful for high WMC

students to get the most out of the domain. Promoting deep processes, high WMC students have a better ability of using strategies to transfer the knowledge into long-term memory effectively. Attending learning activity, and using metacognitive skills. teachers should encourage high WMC students to use their metacognitive skills to think about what happens when they have difficulties in learning, which leads to deep thinking and to understanding of what kind of problems they face.

Secondly for students with low WMC. The recommendations for low WMC students focus on how to reduce the cognitive load. Decreasing learning space, decreasing the learning space into particular parts would reduce the intrinsic load by presenting less information at a time. Rehearsing learned information, Rehearsal would be an effective way to help students remember and transfer the learned information from their WM to the long-term memory. Training metacognitive skills, as such mind maps can help students to better understand their own thinking processes and facilitate connection of new knowledge with learned knowledge. Preventing overload, a limited number of facts should be provided in order to prevent overload. Using multimedia resources, multimedia resources such as animations and simulations are suggested to be part of the learning experience to facilitate students understanding and help them learn difficult concepts. At last, attracting attention, to help students focus on critical information without distraction of irrelevant information, critical information should be highlighted and be described with additional explanations.

Above, I mainly introduced our recommendation mechanism. In short, it is based on different levels of students' WMC in learning systems. Then we will actively carry out the research behind us. Our future work will focus on extending the proposed mechanism to additionally consider other cognitive abilities, such as inductive reasoning skill, associative skill, and information processing speed.

So most of the content I want to end here is over. I believe that everyone will gain something and think about it. I hope that we can learn and discuss together now. For any questions you have during the speech, or for any good comments and suggestions on the follow-up work, everyone can speak positively, thank you. Do you have any questions?