

Analysis of cognitive load theory



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Cognitive Load Theory

Cognitive theorists believe that an individual has a limit to their mental capacity and that if too much information is provided at once, the individual runs the risk of a cognitive overload which can lead to errors and reduce learning and performance. In addition, cognitive overload reduces space in working memory (WM) and inhibits learning and problem solving (Farrington, 2011). Cognitive Load Theory (CLT) was developed by John Sweller in the 1980s. CLT refers to the effort of the working memory. This theory does not imply that there is a limit to our capacity of cognition, but there is a limit to how many new elements we can hold in our working memory. In 2010, Sweller along with Van Merriënboer outlined three types of cognitive load, intrinsic, extraneous, and germane (Farrington, 2011).

Sweller and Van Merriënboer identify intrinsic load as it has to do with the level of difficulty one has in processing novel information that is a part of the task itself. To assist in managing intrinsic load, use various types of scaffolding (Farrington, 2011).

Extraneous load refers to the way that new material is presented to the learner or performer. There are a few ways to avoid extraneous load, for example changing the nature of traditional learning tasks, or streamlining the way information is presented (Farrington, 2011).

Germane load where working memory has challenges with the learning task. Being able to decrease extraneous load can enhance working memory to make more available for intrinsic and germane load, which optimizes learning and performance (Farrington, 2011).

Cognitive Load Theory Research

It has been more than 20 years since the initial CLT hypothesis has emerged. Since then there has been a plethora of research focusing on the different forms of cognitive load, different populations, and different stimulus. However, with recent research the limits and potential are more clear which allows for more solid predictions to be made. Other research, such as independent reviews instead of focusing on the broad research and future direction of CLT, the more current research focuses more on the theoretical or methodological flaws in CLT. The purpose for this type of review is to keep the focus on the future of the theory, and to be able to expand on the previous reviews (Murphy, Groeger, & Greene, 2016).

Additional research to CLT suggests that evolutionary processes have affected the way that working memory processes cultural and social information. Evolutionary educational psychologists have discovered that certain forms of information are processed with lower working memory loads than others. Some differences in aspects of associated working memory systems that are related to cognitive load theory are a result of sex differences in evolutionary pressures. Evidence suggests that there is a link between working memory and gender-specific differences in the way that external stimuli is processed. Therefore, current research suggests that the evolutionary perspective should be connected to the CLT because of the possibility of physical and psychological sex and gender differences in the eyes, brain, and working memory in how the CLT is affected from how each gender views and retains information (Bevilacqua, 2017).

The Benefits of Cognitive Load Theory

Cognitive Load Theory has made contributions into the study of how people learn, and the productivity related to tasks. According to CLT the working memory has limitations with learning a new task. However, CLT combined with unlimited long-term memory, which is for familiar tasks, together enable individuals to deal with complex problems and acquire complex knowledge and skills. CLT focuses a more on learning task characteristics, and less on learner characteristics. This helps to manage working memory and optimizes learning through instructional design. Using the updated model of CLT that includes attention to working memory and long-term memory, shows how individual learning is affected with CLT (Ayres & Paas, 2014).

Limitation of Cognitive Load Theory

The biggest limitation I found was the fact that there are so many factors that can affect an individual's working memory as well as his or her long-term memory that further research on CLT will be required to completely cover all aspects such as gender differences, environment, distraction etc. In addition, research on affective factors also need to be considered (Ayres & Paas, 2014).

References

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