

## Slides with English text that are explained in Persian

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The common pattern of presentation in the Iranian medical community is lengthy English text in slides that are presented orally in Farsi, both in conferences and classrooms. In this paper, we aim to further explore this phenomenon based on a theory in the domain of cognitive science named the cognitive load theory (CLT).

According to Atkinson and Shiffrin's model introduced in 1968, human memory consists of three parts: sensory memory, working memory, and long-term memory. Information first enters the sensory memory, and if received adequate attention and reaches the level of consciousness, it enters the working memory, which, unlike the other two memories, i.e. sensory and long-term memory, has a limited capacity [1]. Interestingly, working memory has two separate and independent channels for processing visual and auditory information with a limited and predetermined capacity (dual-channel theory). As a result, the speed of learning in humans restricts [2].

In 1988, Sweller proposed a theory of learning called the CLT, in which the three key components of the cognitive structure, i.e. memory systems, learning processes, and types of the cognitive load imposed on the working memory, were merged. According to this theory, because of the limited capacity of the working memory, any factor that imposes an excessive load on this memory will disrupt the learning process [2]. Here three types of loads are introduced:

1. Intrinsic load is related to the task. The more complex the information that must be processed by the working memory, the greater the load imposes.

2. Germane load refers to the situations when some instructional formats could increase cognitive load and improve learning as well.

3. Extraneous load is the load resulting from the learner's use of the working memory to focus on something other than the task or learning [3]. When the teacher talks about the anatomy of the stomach and the related slide has a long text, the learner has to look for a picture about the stomach's anatomy in another source to understand. As a result, she is using her working memory for something other than learning which in turn reduces learning.

Now let's get back to our main question about long English text slides that are presented orally in Farsi. There are two is-

ues here; the first is that the text is long, and the second is that it is in English.

Studies by Kayuga and colleagues in 1999 showed it is more effective to present the text orally than is presented visually. But in simultaneous oral and visual presentation, because of image processing, an additional external load leads to reduce learning. Therefore, considering the limited and independent capacity of dual channels of sensory memory, the text of the slides should not be too long [4].

On the other hand, English text slides for non-English speaking audiences and for those who have not read the text in English before can impose an additional cognitive load. This is because the audience has to think about the meaning of words and even search for their meaning. Conversely, for those who are familiar with both English texts and terms, reading and understanding the Persian translation of the terms may lead to additional load. Therefore, it is recommended to use short English text in the slides and to use language that imposes the least extraneous cognitive load on the audience.

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