Collective Working-Memory Effect

Theory

The collective working-memory effect is based on cognitive load theory, suggesting that group learning could be more effective than individual learning if the complexity of the material to be learned was high. Sharing the load of processing complex material among the group participants and their working-memories enables more effective processing and easier comprehension of the material to be learned. This assumption was experimentally confirmed, suggesting that

- "*... **for high-complexity tasks, group members would learn in a more efficient way than individual learners, while for low-complexity tasks, individual learning would be more efficient**.*"[1)]

This effect is the result of a **trade-off between** *transaction cost* (communication and coordination with the group) and reduction in cognitive load due to sharing the overall load with other group members.[2)]

Still, the researchers are cautious generalizing the results from laboratory to classroom settings.

- "*It can be assumed that the complex pattern of interactions between cognitive, motivational, and social factors that characterize a real life context would add 'noise' to the data and cause the effects to be less pronounced...*"[3)]

Practice

Collective working-memory effect in practice means that learning of more complex material should be more successful when done in group than individually.

Research results

A recent study confirmed the described effect, especially in case of **medium task complexity**:

- "*The hypothesis that group members would achieve the same test performance with low complexity tasks, and higher test performance with high complexity tasks than individuals was confirmed with a significant interaction between condition and task complexity. Performance on tasks of medium complexity were particularly enhanced.*"[4)]

1) , 3)
Kirschner, Femke, Fred Paas, and Paul A Kirschner. Task complexity as a driver for collaborative learning efficiency: The collective working-memory effect. Applied Cognitive Psychology 25, no. 4: 615-624, 2011.

2) , 4)
Kirschner, Femke, Fred Paas, and Paul A. Kirschner. Individual Versus Group Learning as a Function of Task Complexity: An Exploration into the Measurement of Group Cognitive Load. In Beyond

Knowledge: The Legacy of Competence, edited by Jörg Zumbach, Neil Schwartz, Tina Seufert, and Liesbeth Kester, 21-28. Dordrecht: Springer Netherlands, 2008.