



Individual Learning and Collaborative Knowledge Building with Wikis: An Experimental Study

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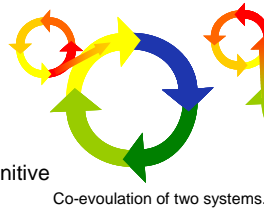
Wiki-supported knowledge building

Wikis are compilations of web sites on the internet or on an intranet. They cannot only be read by users but they can also be edited online. Wikis can be employed without special software, they are very easily accessible and simple to use. Users can create content and hyperlink it with other contents, they can add, delete, and change any part of the text if they want to.

Systemic point of view

To describe individual learning and knowledge building with wikis, we take a systemic point of view. There are two different systems: The cognitive systems of the user and the social system wiki (the corresponding community respectively).

The interplay between people's knowledge and the information available in the wiki enables a co-evolution of the two systems.

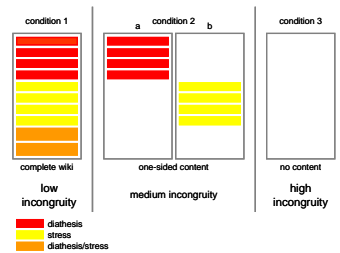


Method

We provided a wiki which informed about the mental disorder schizophrenia. Different positions about the causes of schizophrenia (genetic or biological sensitivity vs. social environment and psychosocial stress as main factors) were presented in the wiki.

Participants (n=61, mean age 24.6 years) had to improve the wiki by using short scientific newsletters with information about the causes of schizophrenia which they had received before.

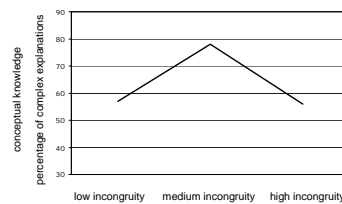
We built different versions of the wiki to manipulate the incongruity between the information in the wiki and the participant's knowledge. The scientific newsletters were the same among all conditions.



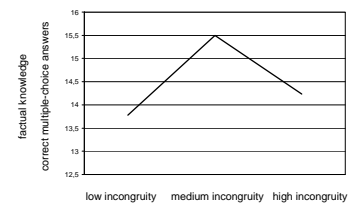
Four different versions of the wiki.

Results

As expected, participants acquire more conceptual and factual knowledge in the medium-incongruity condition than in the high- and the low-incongruity conditions.



Conceptual knowledge in the three conditions.



Factual knowledge in the three conditions.

Four processes of learning and knowledge building

We differentiate between externalization and internalization on the one hand, and assimilation and accommodation on the other hand. Externalization is an activity in which people introduce their own knowledge to the wiki. This can activate deeper elaboration of knowledge. Internalization is the activity in which people take up information from a wiki. This might expand people's individual knowledge.

Assimilation is the process in which individuals use their prior knowledge in order to comprehend new information. In the process of accommodation people change their knowledge by dealing with new information. Here, people truly change existing knowledge instead of simply assimilating new information into prior knowledge. We assume related processes in the social system wiki: Users can simply add new information (assimilation) or they can restructure the text and try to integrate new information (accommodation).

	externalization	internalization
assimilation	quantitative knowledge building	quantitative individual learning (acquisition of factual knowledge)
accommodation	qualitative knowledge building	qualitative individual learning (acquisition of conceptual knowledge)

Four Processes of knowledge building.

Cognitive conflicts

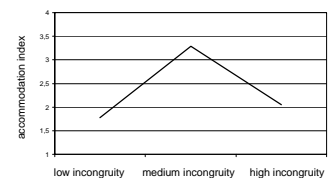
People try to keep equilibrium between their existing knowledge and the information from the environment. New information which is not in line with prior knowledge causes cognitive conflicts. People's motivation for externalization and internalization is a result of the incongruity between people's knowledge and the information available in the wiki.

Hypothesis

We assume that an incongruity between people's knowledge and the information in the wiki on a medium level leads to more knowledge building compared to low and high incongruities. The medium level of incongruity ought to lead to an increase of conceptual and factual knowledge, too.

To measure qualitative knowledge building we analyzed every added sentence and counted the phrases which contained a combination of arguments or an allusion to the interaction between the different positions about the cause of schizophrenia.

This accommodation index shows significantly more qualitative knowledge building in the medium-incongruity condition than in the low- and the high-incongruity conditions.



Accommodation index as evidence for qualitative knowledge building.

Publications

Cress, U., & Kimmerle, J. (2007). A theoretical framework of collaborative knowledge building with wikis – a systemic and cognitive perspective. In C. Chinn, G. Erkens, & S. Puntambekar. (Eds.), *Proceedings of the 7th Computer Supported Collaborative Learning Conference* (pp. 153-161). New Brunswick: International Society of the Learning Sciences, Inc..

Cress, U., & Kimmerle, J. (2008). A systemic and cognitive view on collaborative knowledge building with wikis. *International Journal of Computer-Supported Collaborative Learning*, 3 (2), 105-122.

Moskaliuk, J., Kimmerle, J., & Cress, U. (in press). Learning and knowledge building with wikis: The impact of incongruity between people's knowledge and a wiki's information. *Proceedings of the International Conference for the Learning Sciences 2008*.