

---

**NEWSLETTER**

---

## **The Effects of Metacognitive Scaffolding on Scientific Concept Learning in Senior Primary Students in the Context of Virtual Scientific Inquiry: An Empirical Study**

*By Shan, M., Xu, R., Shangguan, C., & Zheng, Y.*

*Correspondence to: Meixian Shan, Nanjing University of Posts and Telecommunications, China. E-mail: [mxshan@163.com](mailto:mxshan@163.com)*

**S**CIENTIFIC concept study is an essential component of science education. A virtual scientific inquiry platform is an effective device for facilitating students grasping scientific concepts through inquiry-based learning. In a virtual scientific inquiry setting, metacognitive scaffolding that integrates the “predict-observe-explain” (POE) strategy can play an exceptionally significant role, given the absence of face-to-face tutoring from the teacher. Adopting experimental research design, this study seeks to investigate the effects of metacognitive scaffolding on scientific concept learning in senior primary school students in the context of virtual scientific inquiry.

### Research Findings:

- In all regions chosen, girls, on average, had higher levels of empathy than boys. There were greater gender differences in empathy ability among North American adolescents than among East Asian ones.
- Metacognitive scaffolding can significantly enhance the capacity of senior primary students for scientific concept understanding and transfer, but without noticeable effects on their capacity for concept recognition.
- Metacognitive scaffolding is effective in improving students’ confidence judgements in scientific concept learning, indicating it can boost their self-efficacy by encouraging self-monitoring and reflection.
- Metacognitive scaffolding can improve students’ performance in scientific concept transfer by supporting their confidence judgements in this area. Path analysis results reveal that metacognitive scaffolding significantly positively predicts students’ confidence judgements, which in turn, significantly positively predicts their performance in knowledge transfer.

### Suggestions:

- Plan learning tasks with explicit objectives and support student self-monitoring and reflection at the initial stage of scientific concept study.
- Increase guidance and feedback for students to assist with their self-regulation and reflection at the stage of conceptual understanding.
- Devise diverse learning scenarios to foster students' capacity for knowledge transfer at the stage of conceptual transfer. Metacognitive scaffolding can aid students in identifying and applying concepts previously learned to new scenarios by offering prompts and directions.
- Encourage students to conduct self-evaluation and reflect on their performance and perceptions of various learning experiences to further enhance their confidence judgements.

*Source: China Educational Technology, 2024; 2024(12):73-80.*