

March 2021

Research Updates

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Summary

Simulations from medical, teacher, and other higher education domains were analyzed.

A large positive effect of 0.85 reported for simulations compared to alternative learning environments. Better outcomes were realized from simulations that used technology and had greater authenticity.

Reference

Chernikova et al, 2020

Simulation-based learning in higher education: A Meta-analysis

Review of Educational Research, 90, 499-541.



Meta-analysis

Simulation-based Learning

Simulations for Problem Solving Better Than Alternative Learning Methods

ANALYSIS

Simulations are especially useful when real-life practice opportunities are 1) limited 2) hazardous, 3) time consuming, and/ or benefit from instructional support. 145 experiments from medical education, teacher education, and other higher education domains were analyzed. Simulations refer to interactions with a real or virtual object, device, or person and the opportunity to alter the flow of the interaction

RESULTS

Compared to no training or alternative learning approaches simulations improved learning with a large positive effect of 0.85. Simulations that included higher levels of technology support (e.g. programmed mannequins in medical education or virtual reality) were more effective than simulations that did not use technology. High authenticity simulations that represented all aspects or one aspect of a situation were effective.

IMPLICATIONS

The advances of technology such as immersive virtual reality or programmed mannequins allow greater use of simulated learning environments for teaching problem-solving and complex reasoning skills.

The analysis recommends the use of technology, authentic scenarios, and learning support (scaffolding) to maximize benefits of simulations.

APPLICATION

Consider the use of simulations for work domains that involve problem solving such as troubleshooting, diagnosis, sales, and tasks involving analysis. At beginning stages of learning, support in the form of pretraining or examples is recommended. Cost-benefits in work-force learning can be realized for tasks that offer limited real-life opportunities, involve high risk, or can be time consuming to complete.



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