

Preparing Future Teachers to Meet the Diverse Needs of the Classroom Guided Interactive Virtual Environments (GIVEs) for Case-Based Learning

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Introduction

How can we help teachers in preparation to effectively apply teaching principles to meet the needs of all students? The increasing diversity of school populations brings the corresponding need to understand how to accommodate instruction so that all children can perform to their full potential. Major education organizations have consequently made efforts toward improving teacher preparedness in students' diversity. For example, one of the strategic goals of the American Association of Colleges for Teacher Education (AACTE) is "to ensure that all educators can serve diverse learners" (AACTE, 2006, p. 2). Preparing teachers for the economic, ethnic, and individually diverse student populations is also an essential goal of the Task Force on Teacher Education of the American Association of State Colleges and Universities, an organization representing institutions who prepare 54% of United States teachers. Nevertheless, only a small percentage of teachers that are charged with educating culturally and linguistically diverse students and students with disabilities report feeling prepared to meet the needs of these students (U.S. Department of Education, 1999).

The overarching goal of this project is to help find instructional methods that can help aspiring teachers identify different sources of diversity in the classroom and apply educational theory and research in ways that promote the learning of all students.



Objective

The goal of this project is to examine whether and under which conditions may virtual classroom cases promote prospective teachers' ability to apply teaching principles to serve the diverse needs of the classroom. To answer this question, we integrated two sets of classroom cases in an interactive instructional program for teacher education: 'Virtual Classroom Exemplars', which depict model, evidence-based teaching practices and 'Virtual Classroom Dilemmas', which present classroom issues that beginning teachers are likely to face in the inclusive classroom.



Research Questions

Based on a careful examination of current research in the learning sciences, we identified several open research questions about the design of classroom cases and case reasoning methods for technology-based teacher education. In particular, we were interested in answering the following research questions:

1. Do virtual classroom cases promote prospective teachers' ability to apply teaching principles into practice?
2. Do prospective teachers learn better from classroom cases in visual format (i.e., video, animation) or text format?
3. What are some effective methods to help prospective teachers learn from classroom cases?
4. Should prospective teachers be taught about learner diversity before or after instruction on teaching principles?
5. Do prospective teachers need problem-solving instruction to effectively think about classroom dilemmas?

Methods

We conducted a total of eight experimental studies that included a mix of quantitative and qualitative methods. Our sample consisted of students who were enrolled in the teacher education program at the University of New Mexico. In each study, participants were randomly assigned to either a treatment or control condition. Our outcome learning measures included a conceptual test (knowledge of teaching principles), a transfer test (application of exemplar practices to novel classroom scenarios), and a problem-solving test where participants were presented with a classroom dilemma and asked to identify the issue at stake, evaluate the teaching practices of the portrayed teacher in the case, and propose evidence-based strategies that may help solve the issue. In addition, we used surveys to examine students' perceptions about the learning experience.

Main Findings

- Prospective teachers who learned teaching principles by observing virtual exemplar cases were better able to transfer the modeled practices to new classroom scenarios than a control group that learned the same teaching principles with no exemplars. The effect sizes ranged from medium to large ($\eta^2 = .11$ to $.24$).
- Classroom exemplars in visual format (i.e., videos and animations) were remembered significantly better than those in text format--especially after a whole semester of instruction, and promoted more favorable attitudes towards learning. The effect sizes were large ($\eta^2 = .17$ to $.21$).
- The effectiveness of the virtual cases increased by directing students' attention to relevant information (medium effect size, $\eta^2 = .09$) and by breaking the cases into smaller chunks of information (medium effect sizes, $\eta^2 = .11$ to $.13$).
- There was a clear advantage for early instruction on individual and group differences in the classroom. Prospective teachers who were provided with knowledge about learner diversity before being taught teaching principles were better able to apply such principles to solve classroom dilemmas (large effect size, $\eta^2 = .32$).
- Prospective teachers who learn teaching principles in combination with instruction about learner diversity have more favorable learning perceptions than those who learn teaching principles alone (medium effect size, $\eta^2 = .09$).
- Finally, we found evidence for the need to provide prospective teachers with a problem-solving model to help them analyze classroom dilemmas effectively (large effect size, $\eta^2 = .35$).

Implications

The findings show that virtual classroom exemplars can serve as effective models for teacher education. Although classroom vignettes and written cases are widely used in teacher education, our research suggests that this format may not promote encoding and motivation as well as visual classroom exemplars. Nevertheless, we also found evidence that these visually demanding tools should be segmented and relevant information needs to be signaled to help the novice teacher effectively bridge theory and practice.



In addition, our findings show that two conditions for effective learning from virtual classroom dilemmas are: (a) to provide a theoretical framework about learners' individual and group differences before instruction on teaching principles, and (b) to provide a problem-solving model as a tool to think about classroom issues. The results of our studies suggest that the early development of a schema for identifying differences among learners coupled with explicit problem-solving instruction and practice can make significant improvements in future teachers' ability to apply pedagogical knowledge and knowledge of learners to meet the diverse classroom needs.

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