

A Constructivist Approach to Introductory Psychology

Thomas Ludwig, Psychology Department, Hope College (ludwig@hope.edu)

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Abstract

This study tested the application of two principles of learning: *constructivism*, which holds that students learn by constructing internal representations of the concepts and principles, and *learning by teaching*, which affirms that student motivation and understanding are enhanced when students teach concepts and principles to other students. The study compared two traditional sections of introductory psychology with a smaller alternative section that replaced the instructor's lectures with collaborative learning projects involving oral presentations and website construction. Except for class size, all other factors, including textbook, quizzes, tests, and lab reports, were held constant across the course sections. Assessment included pre-post measures of student motivation and engagement, as well as course evaluations at week 5 and at the end of the semester. Performance on content mastery assignments (i.e., quizzes, tests, and lab reports) was comparable for all sections, indicating that eliminating the lectures did not interfere with the alternative group's learning of course material. Course evaluations and student motivation measures revealed that students in the alternative section reported substantially greater engagement in the course and made greater gains in skills and learning strategies, compared to students in the standard sections.

Introduction

In recent years there has been growing interest within higher education in two pedagogical principles: *constructivism* and *learning by teaching*. Constructivism as an educational philosophy grew out of the writings of John Dewey (1938) and Jean Piaget (1973; see also Piaget & Inhelder, 1967), and was popularized in the United States by Jerome Bruner (1990). According to this viewpoint (sometimes called "cognitive constructivism"), students learn by constructing internal representations of the concepts and principles of the academic discipline. The "learning by teaching" movement is rooted in cognitive constructivism, but also in the "social constructivism" perspective of Lev Vygotsky (1962), as well as in the work of an expanding group of European educators, exemplified by Jean-Pol Martin (2007) and Joachim Grzega (2005). This movement proposes that student motivation and understanding is enhanced when students teach concepts and principles to other students.

Taken together, these two pedagogical principles have implications for the optimal design of learning environments: Learning should be enhanced when instructors encourage students to use active techniques (such as experiments, observations, and hands-on

problem-solving) to *create their own knowledge*, and then to *reflect on* (through private journaling, essays, or blogs) and *talk about* (through group discussions and oral presentations) what they are doing and how their understanding is changing.

Previous research has demonstrated that a constructivist approach can lead to effective learning by experienced students in upper-level courses (Hmelo-Silver et al., 2007; Liu & Matthews, 2005), but perhaps is less practical with novice learners (Kirschner, Sweller, & Clark, 2006). The present study assessed the applicability of constructivist principles to a first-year general education setting by comparing two traditional sections of introductory psychology with a smaller experimental section that met in a computer laboratory rather than a standard classroom. The purpose of the comparison was to test the effectiveness of a collaborative constructivist approach to instruction—namely, having students “create their own meaning” by developing materials on core topics within psychology, and then teach each other by making in-class oral presentations and “publishing” their materials on an instructional website for the course.

The main variable manipulated in this project was pedagogical approach—traditional (lecture-based) vs. constructivist (project-based). If the two principles described above influence student learning and motivation in an introductory undergraduate course, the constructivist group should show improved levels of performance on the content assessments (in terms of comprehension, retention, and application of the course material), and would also show higher levels of motivation and satisfaction with the course. Unfortunately, because of the limited size of the computer laboratory in which the constructivist sessions occurred, class size was a confounding variable, possibly increasing the performance and motivational advantage that could be expected for the constructivist group.

Method

Participants

All participants were drawn from the population of Hope College students in PSY 100 – Introduction to Psychology during the Fall Semester of 2008. The *standard pedagogy group* consisted of 71 students voluntarily enrolled in two ordinary 35-student sections of introductory psychology. They ranged in age from 17 to 21 at the beginning of the semester. This group contained 44 females and 27 males. The *alternative pedagogy group* consisted of 16 students (10 females, 6 males) ranging in age from 17 to 18 at the beginning of the semester. These students were recruited from the pool of incoming first-year students who expressed a interest in psychology. These students voluntarily chose to enroll in the special section, knowing that the pedagogical approach would be different from a standard introductory psychology course.

Procedure

The class sessions for the *standard pedagogy group* included a mixture of lecture, video clips, small-group discussions, and demonstration activities. On average, about two-thirds of each class session was devoted to lectures by the instructor, with the use of student response devices (“clickers”) as a regular feature of the lectures.

Class sessions for the *alternative pedagogy group* emphasized active learning in a structured collaborative format. Students in this group were assigned to four-person teams that worked together to gather and develop resource materials, construct class presentations, and build an instructional website to display their work. Each team developed three ten-minute presentations across the semester. Because there were no lectures, a portion of the class time each week was devoted to work in project teams. In addition, each team met one hour per week outside of class time to brainstorm ideas, film video clips, and practice their presentations.

Both pedagogy groups read the same textbook, took the same 30 online quizzes over textbook material, took the same five in-class unit tests, and participated in the same two major lab exercises culminating in formal lab reports.

The project assessment employed a pre-test of prior psychology knowledge, followed by regular assessment of content mastery using the quizzes, tests, and lab reports. In addition, all students completed pre-post measures of student motivation and engagement, using the Motivated Strategies for Learning Questionnaire (MSLQ). This self-report instrument, which has been administered in hundreds of colleges and universities in the USA, measures components of learning such as goal orientation, problem solving, perceived task value, and critical thinking. Finally, standard course evaluations were administered at Week 5 and again at the end of the 14-week semester.

Results

Content Mastery

At the beginning of the course, the two groups did not differ in prior psychology knowledge, as measured by a content pre-test. Across the semester, the alternative pedagogy group consistently performed at or above the level of the standard pedagogy group, ending the semester with a 2.5% advantage on the online quizzes, a 3% advantage on the in-class tests, and a 4% advantage on the lab reports. However, none of these differences were statistically significant, indicating that the students in the alternative pedagogy group were neither helped nor hurt by the elimination of the lectures and the introduction of collaborative projects—at least in terms of their comprehension of the basic course content.

Student Motivation and Engagement

Results from the Motivated Strategies for Learning Questionnaire (MSLQ) were tabulated for Week 1 and Week 14. Independent groups t-tests were performed to

compare the two pedagogy groups on each of the MSLQ items. At the beginning of the semester, the alternative group showed several significant differences ($p < .05$) from the standard group: They reported being more interested in the course topic, perceived the course topic as more useful, and reported preferences for course material that “arouses my curiosity” and for learning “on my own, without help.”

At the end of the semester, several new differences ($p < .05$) emerged: The alternative group reported that they were more likely than the standard group to relate new information to what they already knew, to set academic goals for themselves, to prefer challenging course material, to think the course material will be useful, to see applications to other areas of life, to anticipate using strategies learned in this course to solve problems in future courses or career, and to enjoy thinking about the other side of issues. In general, this suggests that the students in the alternative pedagogy group had made greater gains during the semester in acquiring learning strategies and perspectives that predict academic success in future courses.

Course Evaluations

Evaluations were conducted at Week 5 and again at the end of the semester (Week 14). Independent groups t-tests were conducted to compare the two groups on each evaluation item. Already by Week 5, the evaluations revealed that the alternative pedagogy group rated the course significantly higher ($p < .01$) in helping them develop skills in the use of computer technology and library research facilities (4.4 vs. 2.2 on a 6-point scale), in helping them develop oral communication skills (4.9 vs. 3.0), and in fostering creativity (5.1 vs. 2.8). The results were similar for the Week 14 evaluation, with the alternative group rating the course significantly higher ($p < .01$) in fostering the use of computer technology (4.6 vs. 2.5), oral communication (5.3 vs. 3.0), and creativity (5.1 vs. 3.3). In addition, the alternative pedagogy group included many positive comments about the value of working on team projects, presenting their projects in class, and learning from the other teams.

Discussion

The purpose of this study was to compare the effectiveness of a collaborative constructivist approach to instruction—namely, having students “create their own meaning” by developing content materials and teaching each other through oral presentations—with a traditional lecture-based approach. In contrast to the relatively passive role that students played during a lecture session in the standard pedagogy group (as isolated individual “consumers” of pre-packaged instruction), students in the alternative pedagogy group interacted much more with each other and with the course material (as “creators” of customized instruction), as they gathered and filtered information about human behavior, analyzed its source reliability, compared it with textbook material, and considered ways of presenting it effectively to help other students comprehend the principles.

Did the alternative pedagogical approach have an impact on the students? Assessment results suggest that eliminating the traditional lectures did not reduce the content comprehension of students in the alternative pedagogy group. Instead, by freeing class time to be used in collaborative projects, this constructivist approach appears to have increased student motivation and engagement in the class, as well as nurtured skills that will be very useful for these students in the remainder of their college courses.

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