

## Collaborative Online Learning: A Constructivist Example

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### Abstract

While many other disciplines have implemented constructivist pedagogical changes, psychology has been slower to implement similar educational reform. In this article we describe a constructivist method to teach group processes. Pretest/Posttest data indicate this type of learning experience results in significant increases in students' content knowledge in four targeted areas (American Psychological Association writing style, group processes, social psychology, and research methodology) from the beginning to the end of the semester. Student perception data indicate students learned "content" as well as "process" information in the online collaborative course.

**Keywords:** On-Line Collaborative Learning, Electronic Group Development, Social Constructiveness, Video-Conferencing, Webboard, Chat Rooms, File Manager, Course Content Evaluation, Student Perceptions, Project Guides (peer mentors), CORAL Pedagogy, Social Psychological.

### Introduction

Constructivism is a decades-old philosophy that suggests that learners develop (or construct) their own knowledge through examination of their experiences, i.e., by making meaning of their own world (e.g., Dewey, 1938; Piaget, 1970; Vygotsky, 1978). While other fields have embraced this type of learning as more effective than traditional objectivist methods, such as lecturing, and have implemented educational reform to reflect this perspective, psychology, and other social sciences, have been much slower to accept and utilize this form of learning (U. S. Department of Education, 2004). In fact, discovery learning, which is sometimes misinterpreted as a constructivist method, has been criticized as an instructional method of the past in a recent article in the *American Psychologist* (Mayer, 2004), one that did not meet the expectations it promised.

While some interpret constructivism as pure discovery learning, such assumptions are based on fundamental misunderstandings of constructivist pedagogy. Constructivism is not the same as unguided discovery learning, i.e., as group work with little or no guidance from the instructor. This erroneous

assumption that the two concepts are equivalent implies that students must develop their own knowledge without the aid of instructor-designed activities that lead students to understand course concepts. Nothing could be further from the truth. Constructivist teachers do not assume that students must “reinvent” science. Instead, they utilize activities and discussion to draw knowledge out of their students. As Vrasidas (2000) notes, “learners should be provided with the tools, resources, and support necessary to manage their own learning and assigned tasks” (p. 9).

These two teaching methods (activities and discussion) illustrate two basic schools of thought within the constructivist paradigm: personal and social constructivism. In personal constructivism, knowledge is developed through cognitive activity that interprets and organizes, or reorganizes, experiences. In social constructivism, knowledge is developed through cognitive activity that occurs during the discussion of experiences with other people. The social interaction is necessary for the cognitive interpretation, organization, or reorganization to occur. However, it must be noted that some, but not all, group work is constructivist. For example, cooperative learning, whereby students divide up parts of assignments and complete those parts on their own, is not (social) constructivist in nature because students do not interact together in ways to encourage cognitive reorganization. Collaborative learning, on the other hand, whereby students interact and build on each other’s ideas, is constructivist in nature.

Similarly, not all learning activities are constructivist. Mayer (2004) distinguishes between activities that are cognitive and those that are behavioral, and rightly so. It is important to note that not all learning activities are constructivist in nature. Constructivism, by definition, involves cognitive activity that allows for an understanding of our world. Student participation in activities that lack cognitive engagement is not considered constructivist in nature.

Given the large quantity of supportive research on constructivist methods, coupled with the endorsement of these teaching methods by the Department of Education and the National Research Council (e.g., National Research Council, NRC, 2000) one can assume that constructivist teaching methods are effective, not only in other disciplines such as the “natural” sciences, but in social sciences as well, as long as appropriate group and individual activities are provided.

In this study we present evidence supporting constructivist teaching in an online social psychology laboratory course and describe a constructivist teaching method for the study of social psychological and group processes, one that provides guidance to the students developing their knowledge. An assessment of this method is also addressed using instruments that evaluate content knowledge gained by students and that evaluate whether students have gained any “process” skills, i.e., whether students developed any new procedures or skills that can assist their learning.

### **Collaborative Online Research and Learning (CORAL) Course Design**

In particular, we describe our Collaborative Online Research and Learning (CORAL) method whereby students from two universities, enrolled in two different courses, form groups who work together on semester-long projects designed to help them learn about group processes. Teams comprised of students from both universities complete a research proposal on a topic pertaining to both course topics. While engaged in the completion of the proposal, team members observe their group’s behaviors.

Throughout the semester, student teams complete collaborative analyses that are designed to help students learn social psychological concepts. For example, students study Tuckman’s (1965) stages of group development, group roles, communication patterns, group norms, persuasion, social loafing, social influence, in-groups and out-groups, homogeneity bias, the self-serving bias, and superordinate goals. Students read several relevant articles on the topics, complete activities designed to illustrate concepts by using their own group’s behaviors as examples, and report their team’s group processes in a collaboratively written paper. (The actual assignment descriptions can be found at <http://coral.wcupa.edu>.) Students use a variety of technological tools to communicate across, and within sites, to complete assignments. This includes discussion boards, video conferencing, file managers, online calendars, and chat rooms. (For a more detailed description of the CORAL course design, see Treadwell & Ashcraft, 2005.)

## How is CORAL constructivist?

The CORAL model can be described as constructivist for a number of reasons. First, there is no lecturing in the CORAL courses. Instead, students use both their in-class time and out-of-class time to read assigned articles, understand assignments, interact with their fellow teammates, and complete assignments as teams. Thus, there is a movement away from the objectivist (lecturing), and teacher-centered mode of teaching to one that is more constructivist, and learner-centered, i.e., an approach that allows students to develop their own knowledge. As Vrasidas (2000) notes, "In a constructivist course, the learners have a lot of control over their own learning and are given the opportunity to negotiate content, assignments, procedures, and deadlines." (p. 9). This is certainly true of our CORAL courses. Students determine research proposal topics and design as long as topics are relevant to course subject matter. This means that not all students in a CORAL course will learn the same thing because different teams will choose different topics for their research proposal. This is also characteristic of a constructivist teaching pedagogy: Constructivist teachers do not assume that all students need to learn the same material (Vrasidas, 2000).

Student teams also have much to say about their team's deadlines for papers and decide how best to complete assignments. For example, teams determine whether they should discuss matters over chat rooms, discussion boards, or video conferencing. This too is constructivist. Vrasidas (2000) notes learners should be provided with the tools needed to manage their own learning and to complete assignments, and instructors essentially become facilitators, helping students to develop their own knowledge. CORAL does this: students are given assignment guidelines, resources, and tools such as discussion boards, chat rooms, file managers, and video conferencing so that they can learn. CORAL professors are present to answer questions and make suggestions that assist students in their learning. Student assignments are designed specifically with the objective of helping students understand course concepts by examining their own experiences in a team setting, applying social psychological concepts from their readings, along with applying social psychological terminology to team organization and development. As a result students embrace constructivist teaching/learning in a simulated real life team setting.

Finally, our approach is social constructivist in nature as a result of assignments being completed collaboratively. To meet this standard, students learn that interaction is essential to complete assignments successfully and that social interaction is the hallmark of social constructivism. Learning takes place, according to this approach, because students discuss material and assignments collaboratively, thus bringing about cognitive changes (i.e., learning).

Additionally, we employ the use of project guides. These are students who have previously taken a CORAL course and who serve as peer mentors to those students who are currently enrolled in the CORAL course (Treadwell, Ashcraft, Teeter & Ritchie, 2006). These project guides help students to understand course assignments, the collaborative process, group processes, and technology. They serve as a buffer between the students and the professors and gradually socialize students to understand that learning is based on 'social interaction' in task completion. They also serve to move students away from the teacher-centered model to a collaborative learning student-centered model. This does not come easily to most students but the influence peer mentors (project guides) have on their peers should not be underestimated. A project guide structures the learning experience just enough to make sure that students get clear guidance and parameters within which to achieve the learning objectives, yet the learning experience should be open and free enough to allow for the learners to discover, enjoy, interact, and arrive at their own socially verified version of truth. The interactions students have with project guides are social constructivist in nature as is the idea of the professor being a facilitator rather than a lecturer. Thus, the course is student-oriented, rather than teacher-oriented.

## Method

### *Participants*

Participants consisted of 181 students enrolled in a 200 level social psychology laboratory course, a 300 level social psychology course, or a 400 level social psychology seminar. The same instructors offered

the courses and data were collected over eight semesters (four years). Participation was voluntary inasmuch as the students were free to enroll in other sections offered in their departments using more traditional methods. Students signed a consent form to participate in the research completed during the course.

### *Instruments*

*Course Content Pre- and Post-tests.* To assess students' learning of subject matter, four ten- question, multiple choice tests assessing knowledge of topics covered during the courses were administered at the beginning and end of each semester. The four topics covered in the tests related to development of (a) research proposals, (b) American Psychological Association (APA) writing style, (c) group processes (e.g., group norms, communication patterns, group roles, Tuckman's, 1965, stages), and (d) social psychological concepts (e.g., in-groups and out-groups, social loafing, superordinate goals, attributions, persuasion, social influence).

*Students' Perceptions.* Students also self-reported their perceptions of knowledge gained in the four targeted areas of (a) research methodology, (b) APA writing style, (c) group processes, and (d) social psychology and in their development of "process" skills (skills that were involved in the learning process, such as interpersonal, time management, and negotiation skills). This was measured using a seven-point Likert scale ranging from "very much disagree" to "very much agree" that was administered at the end of the semester. Students indicated how much they agreed or disagreed on the topics (see Student Perception Scale in Appendix).

## **Results**

### *Pre- and Post-test Learning Questionnaires*

Dependent samples t-tests were used to see if posttest scores were higher than the pretest scores in the four content areas. The results of the t-tests were significant in all areas ( $p < .001$ ). Results are summarized in Table 1. Table 2 compares the pre- and post-test means for the four content areas; (APA writing style, research methodology, social psychology, and group processes).

Table 1. *T-test Results for Pre-Posttest Learning*

Content Area	df	t	p <
Research Proposal	179	-8.744	0.001
APA Style	180	-5.419	0.001
Group Processes	167	-13.645	0.001
Social Psychology	158	-14.298	0.001

### *Students' Perceptions of Learning*

Students also self-reported their perceptions of knowledge gained during the course of the semester in the four targeted areas using a seven-point Likert scale administered at the end of the semester, (see Appendix). Results are listed in Table 3 and indicate that students believed that they learned "a lot" in the four content areas. Results also indicated that students perceived that they improved on a number of "process" skills. For example, students believed they improved their social skills and time management skills, skills that can assist them in other collaborative learning environments.

Table 2. Pre- and Post-test Means and Standard Deviations for the Four Content Areas

Content Area	N	Mean	Standard Deviation
Research Proposal Pre	180	6.944	2.04
Research Proposal Post	180	8.222	1.73
APA Style Pre	181	5.144	1.98
APA Style Post	181	6.099	2.28
Group Processes Pre	168	5.779	1.78
Group Processes Post	168	7.893	1.76
Social Psychology Pre	159	5.566	1.82
Social Psychology Post	159	7.824	1.81

Table 3. Means and Standard Deviations for Students' Perceptions of Learning

Item	N	Mean*	Standard Deviation
<b>I learned a lot about:</b>			
Tuckman's stages	63	6.29	0.71
Group Roles	63	6.16	0.79
Group Processes	63	5.76	0.91
Social Psychology	63	5.40	1.23
In-groups and out-groups	63	5.84	1.11
Superordinate Goals	63	5.70	1.16
Attributions	63	5.43	1.27
APA style	63	5.35	1.08
How to write a research proposal	63	5.59	1.28
Research methodology	63	5.38	1.26
How to collaborate	63	6.38	0.73
How to use technology	63	5.92	1.29
<b>I improved my:</b>			
Interpersonal skills	63	5.89	0.72
Communication skills	63	6.10	0.61
Negotiation skills	63	5.75	0.78
Time-management skills	63	5.76	1.25
Writing skills	63	5.38	1.16
This course was beneficial to my professional development.	63	6.00	1.03
I was responsible for my own learning in this course.	63	5.59	1.10
I learned a lot in this course.	63	6.08	0.89

\* Based on a 7 point scale; 1 = I strongly disagree; 7 = I strongly agree

## Discussion

Results of the study indicate that CORAL's social constructivist teaching method is an effective strategy for student learning. The pre/post-tests of student content knowledge indicated a statistically significant increase in knowledge of course content in all four of the targeted areas, i.e., students learned about APA writing style, research methods, group processes, and social psychological concepts, with the use of the CORAL pedagogy. Their test scores on these topics increased from the beginning of the semester to the end of the semester. In fact, the greatest gains in student knowledge were in the areas of group processes and social psychology. The two areas represent a simulated view of the workplace where students have to rely on each other to complete assigned tasks. Thus, through their collaborative energy and observations of how their team worked, they learned how the constructivist model works. Furthermore, students agreed through self-report that they learned a significant amount of course material through their participation in the CORAL courses. For example, students indicated that they learned "a lot" about Tuckman's (1965) stages, superordinate goals, in-groups and out-groups, etc. In other words, students were able to develop their own knowledge about group processes through interactions with team members, examination of their own behaviors, and discussion of their own team's processes.

In summary, results indicate that social psychological topics can be taught successfully in a social constructivist manner, provided that appropriate levels of guidance are supplied to students, as is the case in CORAL. Experiencing social psychological phenomena first-hand and allowing students to construct their own knowledge through metacognitive processes not only permits students to learn course content, but also encourages the development of life skills, including for example, time-management, critical thinking, negotiation and communication skills. Constructivist learning has been assessed as preferable to other traditional forms of teaching and learning and this study supports the former findings. We are also convinced that broadening the constructivist teaching methodology to other social science courses would be beneficial for students.

The learning environment should also be designed to support and challenge the learner's thinking by providing appropriate guidance, i.e., learning activities. We advocate giving team members ownership of the assignments (tasks) so they can create solutions allowing them to move forward in answering problems they encounter and become increasingly responsible for their own learning. The critical goal is for project guides and facilitators to support the learner in becoming an effective thinker. This is achieved by assuming multiple roles, such as consultant, tutor, and coach. A constructivist learning environment is thus an intervention where activities (tasks) are used to provide team members (learners) with an opportunity to discover and collaboratively construct meaning as the intervention(s) unfolds. Team members are respected as unique individuals, project guides serve as peer mentor(s), and instructors take on the role of facilitator(s).

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## **APPENDIX**

### **Student Perception Scale**

Name (first & last): \_\_\_\_\_ Date: \_\_\_\_\_

On a scale of 1 to 7 indicate how much you agree/disagree with the following statements.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
<b>Very Much Disagree</b>			<b>Very much Agree</b>			

#### **I learned a lot about:**

1. Tuckman's stages.
2. Group Roles.
3. Group Processes.
4. Social Psychology.
5. In-Groups and Out Groups.
6. Superordinate Goals.
7. Attributions.
8. APA Style.
9. How to Write a Research Proposal.
10. Research Methodology.
11. How to Collaborate.
12. How to use Technology.

I improved my:

1            2            3            4            5            6            7

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Very Much Disagree

Very much Agree

- 13. Interpersonal Skills.
- 14. Communication Skills.
- 15. Negotiation Skills.
- 16. Time-Management Skills.
- 17. Writing Skills.
- 18. This course was beneficial to my professional development.
- 19. I was responsible for my own learning in this course.
- 20. I learned a lot in this course.

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