Contextual Teaching and Learning Project Brief

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But What Did They Learn? Evaluating Pre-Service Teachers' Knowledge in Context

In Spring, 1999, as part of the Contextual Teaching and Learning (CTL) Project at the University of Georgia, my co-teacher, Marty Carr, and I designed and taught the first special CTL section of EPSY 2020: Learning and Development in Education. EPSY 2020 is the introductory course in educational psychology required of all students who plan to earn a teaching certificate at the University of Georgia. It is typically the first education course for most undergraduates, taken before they are admitted to individual majors. What and how our students learned in EPSY 2020 needed to serve as a true "foundation" for the rest of their learning in the project.

Twenty-seven students registered for this special section. Most were sophomores, from 19-21 years old, and all planned to teach at the middle or high school level, in math, language, history, government, science, home economics, or business. The course ran for 15 weeks, plus a final exam. In addition to the traditional readings in and outside of the class textbook, short classroom lectures and whole-group discussions, students learned through in-class activities, biweekly student journals, an outreach project and paper, contextualized exams, and collections of student responses (for a more complete description of this course, see Knapp, 1999).

Course Objectives

EPSY 2020 is designed to help pre-service teachers construct viable, usable knowledge of the foundational theories of educational psychology. In this contextually focused section of EPSY 2020, we wanted our students to see how the disciplines they planned to teach could be connected to their future students' lives and goals. We particularly wanted them to develop a beginning understanding of the following elements of contextual teaching and learning, which are supported by and embody foundational principles in educational psychology:

Principles of Contextual Teaching and Learning

AC **!** Students are actively engaged in constructing knowledge and solving problems. (Resnick & Klopfler, 1989)
MC **!** Learning in multiple contexts gives students experience in using what they have learned to identify and solve problems in new contexts (transfer). (Hatano & Greeno, 1999)
COOP **!** Students learn from one another through cooperation, discourse, teamwork, and self-reflection. (Vygotsky, 1978)
REAL **!** Learning is closely tied to "real world" issues through outside-of-classroom experiences and simulations. (Cronin, 1993; Newmann & Wehlage, 1993)
PE **!** Students prior experiences are valued and seen as fundamental to learning. (Greeno, Collins, & Resnick, 1996)
DIV **!** Teaching is flexible and adapted to the needs of diverse learners. (Sternberg, 1997; Stodolsky & Grossman, 2000)
SOC **!** The ways in which students can contribute to the improvement of society through their learning and resultant actions are emphasized. (Bilig, 2000; Wade et al., 1999)
ASS **!** Student learning is assessed in multiple meaningful contexts. (Darling-Hammond, Ancess, & Falk, 1995; Shepard, 2000)
PS **!** Higher order thinking and problem solving are emphasized above meaningless memorization and recitation of facts. (Anderson, 1993; Bruner, 1990)
SD **!** Students are encouraged to make choices, develop alternatives and be self-directed, sharing with the teacher responsibility for their own learning. (Ames, 1992)
CC **!** The classroom context evidences the kind of caring, respectful relationships between teacher and students and among students that are conducive to learning. (Noddings, 1995).
(adapted from the CTL Conceptual Framework, 1999, www.coe.uga.edu/ctl. Preceding each element is the coding abbreviation used for it in Table 2 below.)

Finally, we wanted to teach them using these principles, both because we strongly believed this would result in the most effective learning for our students and because we know that new teachers tend to teach the way they themselves have been taught.

Results

Standardized Course Evaluations

On the standard University of Georgia course evaluation form, students anonymously rate each of their courses/teachers on 35 characteristics on a scale of 1 (low) to 5 (high).

Students' responses on this form were analyzed for evidence that students saw the applicability and relevance of the information they learned in the class, paying particular attention to ratings of specific course characteristics that meshed with the principles of contextual teaching and learning.
Overall, students rated the course as "highly valuable," with a mean of 4.29 on a scale of 1 (low) to 5 (high). Students perceived that in this course they were free to express their ideas (4.67 on a 1 to 5 scale), and were encouraged to think for themselves (4.75). Students also felt they were encouraged to ask questions (4.75) and to see beyond the course to other applications (4.58). These and the rest of the scores were unusually high for a required undergraduate course, and among the highest the first author has seen or received in five years of teaching this particular course. The 11 written comments (optional for students) were mainly positive as well and tended to reflect the goals of the class, like that of the student who wrote "Dr. Knapp had logical ways of teaching that exhibited the types of teaching that we were trying to learn. She 'practiced' exactly what she taught, and that was very encouraging."

Pre- and Post-understandings of Real-life Uses for Academic Knowledge

During the first week of the semester and again during the last week of the semester, students were asked as an instructional activity to "List as many ways as you can think of that the subject you will be teaching could be useful to your students in their current or future lives outside of school" (wording was slightly changed at the end of the semester to avoid the appearance of repetition). Responses were coded into one of three categories: an unrealistic response (e.g., "people need to know accounting to balance their checkbooks") was coded as a zero (0). A response was scored as a one (1) if it was somewhat meaningful and realistic, but that lacked depth and detail (e.g., mathematics would be useful for "building things"). Only a detailed, meaningful response that indicated awareness of specific instances in which the knowledge could be used was scored as a two (2) (e.g., "mathematics could be used to understanding the odds of successfully winning the lottery" or "for understanding what '50% off' really means on a label in a store"). Results are summarized in Table 1 (see page 4).

As Table 1 shows, in January, the 27 students in the class came up with a total of only 56 responses to the question. The majority of these responses (35) were scored 0 because they were unrealistic or were unlikely to be meaningful to their future students. Nineteen of these responses were scored 1 because they were meaningful and realistic but lacked detail. Only two of the 56 responses in January were scored as a 2, indicating that the students gave a response that was meaningful, realistic and detailed.

In April, at the end of the course, the students came up with more than three times as many responses to the same basic question. Even more importantly, their responses were more realistic and thoughtful. Of the 170 responses, 54 were coded as being meaningful, detailed and realistic enough to be scored as a 2; *26 times* the number in January. The majority of responses (75) were coded as a 1, indicating that students suggested applications that were meaningful and realistic but that lacked sufficient detail. Only 41 of the 180 responses were coded as 0 because they were unrealistic or unlikely to be meaningful to future students. Thus, nearly all the increase in quantity was attributable to ideas that were at least partly feasible--the number of meaningless ideas suggested remained nearly the same.

What students told us they learned; answers to Part II of the final exam

Part II of the final exam asked students to do the following:
Choose three(3) important things you believe you have learned in this class about children's learning and development. Write about what you learned, how you learned it, and why it is important learning for you; that is, how will it specifically affect the ways you plan to teach?.
Students' responses to this question were analyzed to discover which of the basic elements of contextual teaching and learning they discussed, and what level of understanding and application their discussions demonstrated. In order to measure not only the number of students asserting/describing a particular principle, but also the depth of learning that had occurred, responses were further coded as follows: one (1) indicated any basic description or explanation of the principle; a two (2) was given to responses which also included a good example of the principle taken from the student's or other people's past experiences; the highest value, three (3), was assigned to only those responses in which students were able to clearly and realistically describe how they might use the principle in their future educational practice. This type of instantiation in *specifically envisioned future practice* (Knapp, 2000) is the best measure we can have at this time of students' ability and disposition to transfer their learning in our class into their future actions as teachers. Here are examples of each level of coding:

Level 1 response: Accurate description or explanation of the principle
This class didn't teach me that students are like blank slates, as some basic classes would have done....I learned that not only do certain people learn for different reasons than others, but also that all classes

will have a variety of types of students with different reasons for learning - or not learning, if that is the case.

Level 2 response: Example of principle from experience
(SD) Children need to learn how to think for themselves because they're not always going to have someone there to make decisions for them. I grew up letting people do the thinking for me, and I still struggle with making my own decisions. I'd rather a teacher give me "by-the-book" instructions to work with because this is the only way I've been taught. Growing up my dad would tell me to do something because he said so, no reasons why. I've only just begun to realize the importance of thinking for yourself. Teachers do not need to just spat off lectures to students, and students shouldn't believe that everything an elder tells them is true....We need to think for ourselves, use our knowledge, apply our knowledge.

Level 3 response: Principle instantiated in specifically envisioned future practice
(PS) I learned in this class that learning is a mastery skill. Just because you don't do well on a certain subject doesn't mean you take the bad grade and move on. A teacher needs to allow the students to look over the concepts they didn't understand and try and correct them. The whole point of teaching is to ensure students take away from the class as much as possible, not an arbitrary letter grade. If a student passes a class with a 70, that means they didn't retain at least 30% of what you taught. In my class I hope to apply this to tests much like your tests were given. If there is a multiple choice section on the test, and a student gets the answer wrong, they can receive some portion of the points back by researching and writing a summary of all they now know about the particular concept.

The results of these analyses are summarized in Table 2 (See page 4).

Students were allowed to write about any three "important ideas" they had learned in the class; they were not given the list of CTL principles or any other list of ideas to choose from. Therefore, the numbers in Table 2 do not represent the total number of students who *could have* explained or even exemplified these principles; rather they represent the students who chose to discuss, describe or exemplify these principles as part or all of one or more of the three most important things they thought they had learned. Thus, these figures are as much a measure of students' valuing of these principles as they are of students' understanding of them.

Table 2 clearly shows that some of the principles of contextual teaching and learning have become important elements of many students' understandings. For example, many students chose to write about the need to adapt instruction to diverse learners, the benefits of classroom discourse and group work, and the need for a classroom context of respect and caring. Of those who chose to write on these ideas, most provided a clear, concrete example of the principle discussed, and at least some demonstrated the ability to explain how they specifically planned to use this principle in their teaching in the future. A significant number of students also wrote about, gave examples of, or made specific plans to emphasize active learning, connections to 'real-world' contexts, students' past experiences, problem-solving and critical thinking, multiple meaningful assessments, and student choice and self direction in their future teaching.

However, two principles, using multiple learning contexts to enhance transfer and emphasizing the contributions that students can learn to make to society as a whole, just as clearly did not "get through" to most of our students. The latter principle is the main focus of the service learning course our students will have later in their programs, so we may not need to worry about addressing it more fully in our class. But the principle of teaching in multiple contexts to enhance transfer is basic to the whole idea of contextual teaching and learning, so in our revision of the course, we have added a reading specifically on this topic and also plan to call students' attention to the "multiple contexts" in which they themselves are learning through our class (see Knapp, 1999).

Conclusions

Since this study was conducted in the first year of our project, we were not able to measure whether and how effectively students will be able to "transfer" what they have learned into their actual teaching practices. Follow-up studies of this first group of graduates from the Contextual Teaching and Learning project are needed to address this question.

On the whole, however, considering that EPSY 2020 is an introductory course for mainly sophomore students, both the quantity and quality of learning our students did in this special section of EPSY 2020 is impressive. The evidence cited here shows that they are coming to understand how their various subject matters can be connected to students' real-world needs and occupations. They are alive to the need to provide authentic experiences for their students. Most of them have come to value and understand at some level some basic principles of contextual teaching and learning. Many can tie these principles to concrete classroom examples. Some have already "hit the mark," demonstrating a genuine understanding of and commitment to using these principles in their own teaching practice.

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Project Web Site: http://www.coe.uga.edu/ctl

Table I: Students' suggestions on "what is useful" in the subjects they plan to teach

Month	Total Suggestions	Suggestions rated 0	Suggestions rated 1	Suggestions rated 2
January (n = 27)	56	35 (62%)	19 (34%)	2 (4%)
April (n = 26)	170	41 (24%)	75 (44%)	54 (32%)

Table II: Student writing about contextual teaching and principles on the final exam question about "three important things you learned in this class."

Category Codes	AC	MC	COOP	REAL	PE	DIV	SOC	ASS	PS	SD	CC
Total mentions	11	3	15	20	20	33	2	9	15	37	37
No. of students discussing or describing (n = 26)	10	3	11	12	14	19	2	8	13	21	22
Students giving examples at level 2 or higher	7	2	11	8	10	13	0	5	10	15	17
Students describing specific plans to use (level 3)	5	0	5	5	7	5	0	4	8	9	6

Note: Category abbreviations which head the columns refer to the list of CTL elements above.