Work in Progress – Exploring Teacher and Student Differences in Assessment of Constructivist Practices

Taylor Martin, Pat Ko, and Stephanie Baker Peacock
University of Texas at Austin, taylormartin@mail.utexas.edu, patko@mail.utexas.edu, speacock@math.utexas.edu

Abstract – **Student and teacher versions of the Constructivist Learning Environment Survey (CLES) are used to measure whether a class environment is consistent with constructivist practices. While studying STEM classrooms, we found differences between how teachers and students score the CLES. Since different perceptions of class norms may impede student learning, we propose to investigate possible causes for the differences.**

Index Terms - Constructivism, Learning environment, CLES, K-12, STEM education, teacher student perceptions

INTRODUCTION

In Spring 2010, we observed 11 different high school science, math, and engineering classes taught by 10 different teachers. Each of the classes was part of a public school district within the metropolitan area of a large city in the Southern United States. In each class, we administered the student and teacher versions of the Constructivist Learning Environment Survey (CLES). After averaging across each of the five CLES subscales (Personal Relevance, Uncertainty, Critical Voice, Shared Control, and Student Negotiation), we noticed a difference between the teacher and student responses.

Originally created by Taylor and Fraser [1], the CLES is a Likert scale survey that is used to measure whether student and teacher perceptions of a classroom are consistent with constructivist education practices. There are separate student and teacher versions of the survey, but they only differ in the point of view expressed in the questions. Both versions of the surveys have been used extensively and several studies have judged them reliable [2].

In general, our teacher responses tracked the average student response, i.e. rarely did teachers score a category very high while students scored it low, or vice versa. However, in several of the subscales, teachers scored the classroom environment items substantially, but not significantly, differently than their students did. In our preliminary literature search, the only reference to differences between student and teacher scores were by Johnson and McClure [2] who noted that with respect to CLES scores, teachers frequently have more positive views of their class than their students. However, they did not attempt to explain the cause of this phenomenon.

DISCUSSION

A difference between teacher and student CLES scores may indicate that the teacher and his/her students have different expectations of the roles of each party, or the limits of acceptable behavior. Each of these has the potential to limit opportunities for students to learn and for teachers to gauge student learning. A student who does not believe that his/her feedback will change how the teacher explains concepts will not provide the feedback that the teacher needs to make the modifications. For this reason, it is important to determine whether a teacher's view of the learning environment differs markedly from the students' view, and whether the teacher is able to resolve the difference so that they have a common understanding.

Two possible sources of differing classroom perceptions are dissimilarities in calibration and communication. Differences in calibration exist when the teacher and students do not score the same practices at the same value. For instance, in a classroom where the teacher believes he or she listens to and addresses student concerns, the teacher may score the environment highly (5 out of 5) for the CLES question "It is OK for students to express their opinion." However, a student may rate the classroom atmosphere lower (4 out of 5) than the teacher because not all concerns were resolved to the student's satisfaction, or the class rules require the students to raise their hand and be called on before speaking. It is plausible that differences in culture, class expectations, and previous experiences could affect how a person calibrates his or her responses.

Communication difficulties may also cause a difference in scores. If a teacher does not directly express the acceptable class norms, the students may make incorrect assumptions. If no student takes the initiative to question the way they are taught (perhaps due to a prior unpleasant experience) a teacher may not be able to demonstrate that he or she is receptive to those issues. It is possible that some types of communication problems may resolve themselves over the school year as different situations are encountered.

RESEARCH PLAN

We are currently in the beginning phases of this work. Each of our initial research questions explores one possible source of the discrepancies we observed between the teacher and student CLES. First, do teachers and students in a high school STEM class have similar scoring methodologies (calibration) for the CLES? Second, are high school STEM teachers accurately communicating their vision of the classroom environment to their students? As we continue the literature search, we may modify the questions and/or the following plan.

Starting in Fall 2011, we will investigate these issues with high school STEM classes in several metropolitan school districts in the Southern United States. The teacher/student CLES and a new written instrument, being developed by us, will be administered to each teacher and all students in each class. To explore communication issues, the new instrument will ask questions about classroom events (e.g. Can you name a time when the teacher connected what you were studying to something that happens in your daily life? Has anyone in class ever asked, "Why do I have to learn this"?). Other communication questions will address hypothetical situations (e.g. How would your teacher react if someone complained saying the class makes no sense?). To explore calibration issues, participants will be given a list of classroom practices or presented with short vignettes and asked CLES questions based on that hypothetical classroom. Like the teacher and student CLES, the new instrument will have a teacher version and a student version that will differ only by the point of view expressed in the wording of the question, e.g. "How would you react…" versus "How would your teacher react…"

Our goal is to survey 24 high school STEM classrooms with these two instruments over the next two years to yield 24 teacher and approximately 450 student surveys. Some teachers teach multiple classes and we will be collecting data from more than one of their classes. In addition to overall effects, we will analyze the results by class type (i.e. science, math, or engineering). Student expectations of school and class norms may change as they progress through high school, so we also plan to analyze the results by taking into account class grade level (lower, upper).

CLOSING REMARKS

In any classroom, we believe it is important that the teacher and students have the same understanding of the classroom culture. Differences could mean that students are not taking advantage of available opportunities and resources. By investigating the sources of these gaps, we hope to provide feedback to teachers that may be used to help them foster learning environments that more accurately reflect their visions.

REFERENCES

[1] Taylor, P. C., Fraser, B. J., and Fisher, D.L. 1997. "Monitoring constructivist classroom learning environments." *International Journal of Educational Research*. 27, 4, 1997, 293-302.

[2] Johnson, B. and McClure, R. 2004. "Validity and reliability of a shortened, revised version of the constructivist learning environment survey (CLES)." *Learning Environments Research*. http://www.springerlink.com/content/t220411667l6j15q. Accessed 3 April 2011.

AUTHOR INFORMATION

Taylor Martin, Associate Professor, STEM Education, University of Texas at Austin, taylormartin@mail.utexas.edu

Pat Ko, Graduate Student, STEM Education, University of Texas at Austin, patko@mail.utexas.edu

S. B. Peacock, Doctoral Student, STEM Education, Department of Curriculum and Instruction, University of Texas at Austin, speacock@math.utexas.edu