

Action Research

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EDU-7701

Fall 2016

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Step 1: Identify the problem

Common Core standards have provided a structure for educators to ensure that students reach reasonably equal curricular benchmarks across the board. However, this does not mean that students being taught the same curriculum, even in the same school with the same materials, but by different teachers, will enjoy the same success.

For example, despite the popularity and exceptional evaluations of two different teachers who happen to share a classroom, materials, supplies, and curriculum, students in one class tend to score significantly higher on unit quizzes and exams than do students in the other class. The only observable difference between the teachers is the method by which they present and review required laboratory exercises which make up 20% of students' overall course grades.

Teacher A introduces and explains the labs, organizes lab groups, and grades labs when students have handed them in as complete. Grades on student labs range from exceptional to failing, consistent with student grades on unit quizzes and exams.

Teacher B introduces and explains the labs, organizes lab groups, but then goes over the labs, providing the correct answers to students before collecting them for grade. Grades on student labs are typically 100%, significantly higher than student grades on unit quizzes and exams.

Despite the higher lab grades, students in Teacher B's classes tend to score much lower on the NYS Regents Exam than students in Teacher A's class.

Step 2: Devise a Plan

At a recent Superintendent's PDP day, teachers gathered in curricular groups and were supplied with BOCES data showing a breakdown of their students' regents exam scores by class, student, and question. Teachers used this data to identify the 5 questions, standards, or areas in which their students performed well, and 5 questions, standards, or areas in which their students performed poorly. We then shared with each other the strategies, methods, and/or materials they used in each other those areas.

Teachers A and B were already aware of the discrepancy in their student scores and compared questions and curricular areas in which their students differed the most. Neither was surprised that the most significant differences focused on areas taught with or supported by labs.

Neither teacher A or B were willing to change how they assigned and reviewed labs, but both recognized the need for student accountability for the laboratory information.

Rebecca M. Valette (2006) writes about the practice of using laboratory quizzes to increase laboratory effectiveness. In her article, Valette is addressing the use of Laboratory quizzes as a means to encourage and support college student's use of a separate language laboratory and states that "this system of testing increases lab effectiveness by freeing lab personnel from attendance enforcement, stimulating students to participate more actively in the lab, increasing teacher participation in lab activities, and helping to integrate lab practice with student performance in class. "

Together, the teachers came up with a plan to institute a collaboratively designed Laboratory Quiz after each lab to ensure student's competency with the material before moving ahead.

By doing this, Teacher A hoped to decrease the wide range of lab grades among his students and Teacher A hoped to strengthen her student's independent responsibility in lab groups where they might have previously put in minimal work knowing that she would supply the answers afterwards.

As I work collaboratively with both Teacher A and Teacher B, I was involved with the development of the rubric for measuring Lab Behavior on a scale of 1-20 and was asked to be responsible for collecting that data to ensure continuity of observation between the classes.

Step 3: Act to Implement the Plan

Both teachers continued their own process of laboratory exercise lessons, but now students were told that there would be a quiz on the next day following each laboratory exercise and that the lab quiz grade would be averaged into the grade on the lab exercise itself.

Step 4: Observe

Teachers A and B observed students in laboratory groups and recorded anecdotal data on time on task, group cooperation, and completion time for two labs before the quizzes were implemented and again afterwards. Quantitative data was collected on both lab and lab quiz grades.

Step 5: Reflect and Share

After 3 lab cycles, Teachers A and B met to compare data. As she had expected, Teacher B's students showed only a minimal increase in on-task behavior (17/21 failed the first lab quiz with grades of 64 or less), however, subsequent labs showed a slow, but gradual increase in both on-task behavior and increased quiz grades.

Surprisingly, Teacher A's students showed no difference in on-task behavior, but scored similar initial quiz grades (15/23 failed the first lab quiz). However, Teacher A's student lab quiz grades increased on subsequent quizzes at a higher rate.

At a follow-up meeting, Teachers A and B decided that, at the end of this quarter, they will compare student 1st quarter (pre-lab quiz) and 2nd quarter (post-lab quiz) grades and follow up with a simple survey on how students felt about the lab quizzes (A. "Lab quizzes helped me increase my class grade." B. "Lab quizzes brought down my class grade." C. "Lab quizzes had no affect on my class grade")

Attachment: Laboratory Rubric

Name: _____

Lab Name: _____

Partners: _____

Earth Science

Lab Scoring Rubric

CATEGORY	5	4	3	2	0
On Task	Used time well in lab and focused attention on the experiment.	Used time pretty well. Stayed focused on the experiment most of the time.	Did the lab but did not appear very interested. Focus was lost on several occasions.	Participation was minimal OR student was hostile about participating.	No participation, and/or copied others work.
Data	Accurate representation of data.	Mostly accurate representation of data.	Some of the data is accurate.	Very little of the data is accurate.	Data is missing or incorrect.
Graphs/Maps/Diagrams	Professional looking and accurate representation. Graphs, maps, and/or diagrams are labeled and titled.	Mostly accurate representation. Graphs, maps, and/or diagrams are not labeled and titled.	Some of the graphs, maps, and/or diagrams are accurate.	Very little of the graph, map, and/or diagram is accurate.	Graphs, maps, and/or diagrams are missing or incorrect.
Questions	Answers are correct and illustrate a through understanding of the lab.	Most answers are correct. Most concepts are understood.	Some answers are correct. Some concepts are not understood.	Few answers are correct and concepts are not understood.	Questions are missing or incorrect.

Grade _____

Works Cited

Valette, R. M. (1967). Laboratory quizzes: A means of increasing laboratory effectiveness. *Foreign Language Annals*, 1(1), 45.