

## Reverse Engineering Fosters Students Confidence in Data Analysis and Lab Report Skills

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**Introduction:** Students consistently struggle with composition of writing lab reports particularly the data/analysis section. I wanted to identify a strategy observed in the workplace to help my students strengthen the quality of their lab reports. Reverse engineering is a common application in engineering design that I learned about during my summer work experience at Piper Plastics. Reverse engineering is a process used to figure out the form, fit and function of an existing object. In my experience reverse engineering has increased my knowledge and understanding of engineering immensely. I found this fascinating and wanted to find a way to incorporate a reverse engineering strategy into a 10<sup>th</sup> grade biology classroom. I wanted see if reverse engineering could increase my students' skills in writing lab reports.

**Intervention:** After finding ways to incorporate this strategy in the classroom, I decided to compare traditional teaching strategies to reverse engineering strategies to support student's data analysis skills, quality of lab reports and students self-perception. The reverse engineering strategy consisted of a handout where students analyzed and interpreted data prior to the experiment. I collected three different surveys throughout the year to capture students' perception and analysis skills. After the use of a reverse engineering strategy, students wrote lab reports which were graded with a rubric. I gathered field notes to capture connections between the reverse engineering strategies and lab experiments.

**Findings:** There was no direct correlation of students' data analysis skills to the implementation of reverse engineering. However, students' self-perception of their knowledge of lab reports increased 54% and students' analysis skills increased as a result of the reverse engineering strategy. Over the course of the year students who scored well on lab reports, did well in their data analysis skills. Most students showed growth in analysis skills from beginning of the year to mid-year but remained constant though the use of reverse engineering. Looking at overall lab report score there was no measurable difference of quality of students writing, but at the end of the year a majority of students were able to identify the main components of lab reports.

**Plan of Action:** Although the reverse engineering strategy did not directly impact students' data analysis skills or quality of lab reports, it did have a big impact on students' self-perception of lab reports. Students gained confidence throughout the year when writing lab reports. I discovered how important it was to support students in writing lab reports and to consistently allow them opportunities to practice analyzing data. I will continue to use reverse engineering to foster students' confidence in scientific writing. Additionally, I plan to separate the data and analysis sections of lab reports to assist student in differentiating between data and data analysis. My future students will benefit from extra support provided to them when writing lab reports. Students will continue to gain confidence in scientific writing as I continue to use reverse engineering strategies.

