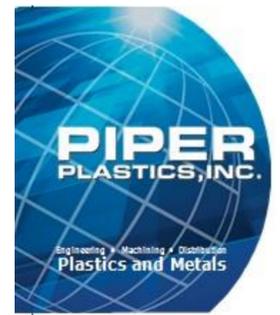


Reverse Engineering Fosters Students' Confidence in Data Analysis and Lab Report Skills



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Problem

- Students consistently struggle with composition of lab reports
- Students are weak in data analysis skills

Industry

In my summer work experience at Piper Plastics, Inc. I observed reverse engineering (RE) as a common application found in manufacturing facilities. Engineers analyze existing parts in order to replicate or modify their structure. I required students to use reverse engineering prior to conducting lab experiments to reproduce results in order to analyze data and write lab reports.

Questions

- To what extent did my 10th grade high school biology students increase in data analysis skills, quality of lab reports, and in student self-perception of lab reports using reverse engineering strategies?
- What is the relationship between data analysis and quality of a lab report?

Methods

- Title I School
- 64 Students
- Surveys
- Rubrics
- Field Notes

57% of students had little to no experience writing lab reports at the beginning of the year.

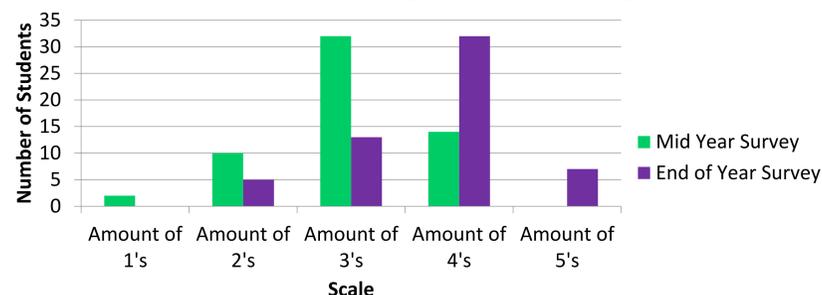
Timeline

Month	Data Gathered
August	Student Pre-Survey n=65
January	Student Mid-Year Survey n=58
February	* Started RE Strategy * Mouse Lab (RE & Lab Report) & Birds & Worms Lab (RE & No Lab Report) Field Notes
March	Deer Lab (RE & Lab Report) Field Notes
April	Microbe Lab (No RE & Lab Report) Field Notes
May	Student End of the Year Survey n=60

Findings

- Reverse engineering had no measurable contribution to students data analysis and lab report skills, but student's self-perception of their knowledge on lab reports did increase with the use of reverse engineering strategy.

Student's Self Perception on Lab Reports



- A majority of students claimed the reverse engineering strategy gave them insight and understanding in analyzing data.

Student Quotes

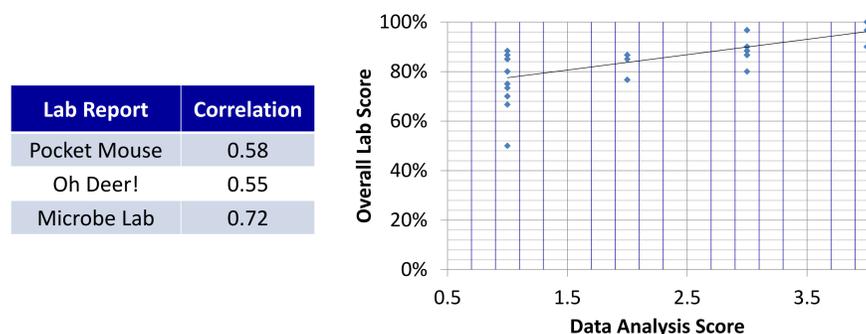
"Pre-lab data has given us an inside/preview to what we were going to do."

"The pre-lab data helps by informing us on what we are about to learn."

"Pre-Lab data has helped me to have a better understanding of how to look at data and to infer things."

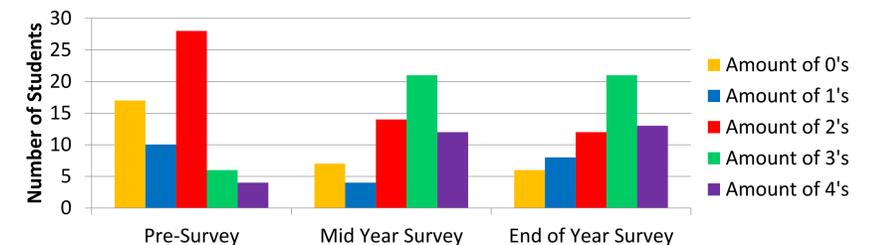
- Generally students who did well on their data analysis skills scored high in their lab reports.

Microbe Lab Correlation



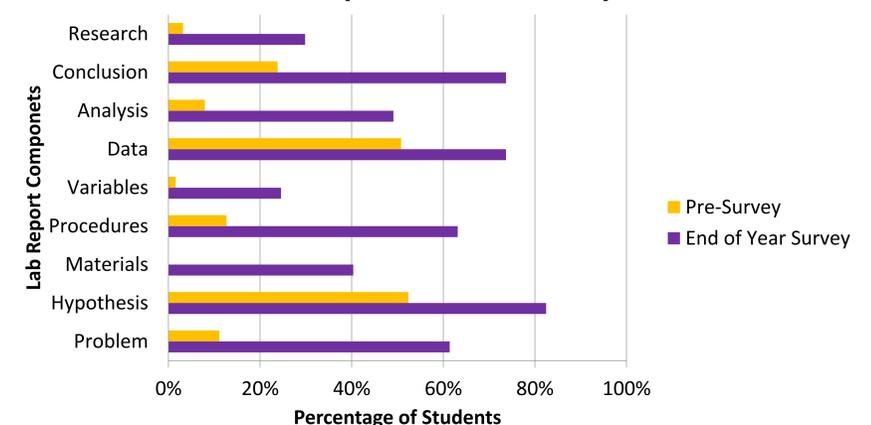
- Most students showed growth in their analysis skills from beginning of the year to mid year and remained constant until the end of the year.

Data Analysis Survey Results Over Time



- Looking at overall lab report score there was no measurable difference of quality of students writing, but at the end of the year majority of the students could identify the main components of lab reports .

Main Component of Lab Reports



Implications

- Develop a more supportive environment for students when writing lab reports.
- Revise the lab report assessment to reflect the true quality of students writing.
- Continue to implement reverse engineering to support student confidence.
- Create more distinction for between data and analysis sections on lab reports.

References:

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