



HOW FORMATIVE ASSESSMENTS INCREASE STUDENT OUTCOMES WITHIN A SCIENCE CLASSROOM

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Introduction

Assessments have always been prevalent within the classroom. From a pedagogical standpoint, formative assessments (FA) have always been seen as good teaching practice. FA's purpose is to inform teachers of best practices and of the student's level of understanding. The goal of this study is to understand how formative assessments aligned with Next Generation Science Standards (NGSS) increase teacher clarity, responsiveness, and impact student outcomes.

Methodology

To help the study proceed, students will be given:

- Pre-Assessment to assess current knowledge.
- Eight FAs will be given to help the teacher understand
 - if each concept was learned, and how it informs the next portion of the unit.
 - Starter Questions, quick quizzes, and Mouse FAs were given
- A post-assessment was given to determine how much the students learned and how the formative assessments impacted student outcomes.

Throughout the genetics unit, the teacher will be keeping a teacher journal to determine if clarity and responsiveness were achieved as a result of the FAs.

Research Questions

1. How does the use of FAs aligned with NGSS standards increase teacher clarity and responsiveness when implemented within a genetics unit?
1. How does the implementation of NGSS aligned FAs increase student outcomes within a genetics unit?

Data Analysis & Results

A mixed methods approach was used to address the two research questions by using qualitative and quantitative data.

- A teacher journal to look at how teacher responsiveness and clarity were addressed through the voice of the teacher. Inductive analysis was used to address the patterns and themes which are student learning, student growth, teacher change, and teacher responsiveness.
- A paired T test, comparison and normalized gains was used to show how formative assessments impacted student outcomes, teacher clarity and responsiveness.

The results showed higher student and teacher growth. From the eight formative assessments that were used, the researcher noticed a higher amount of student questions and learning that were taking place throughout the genetics unit.

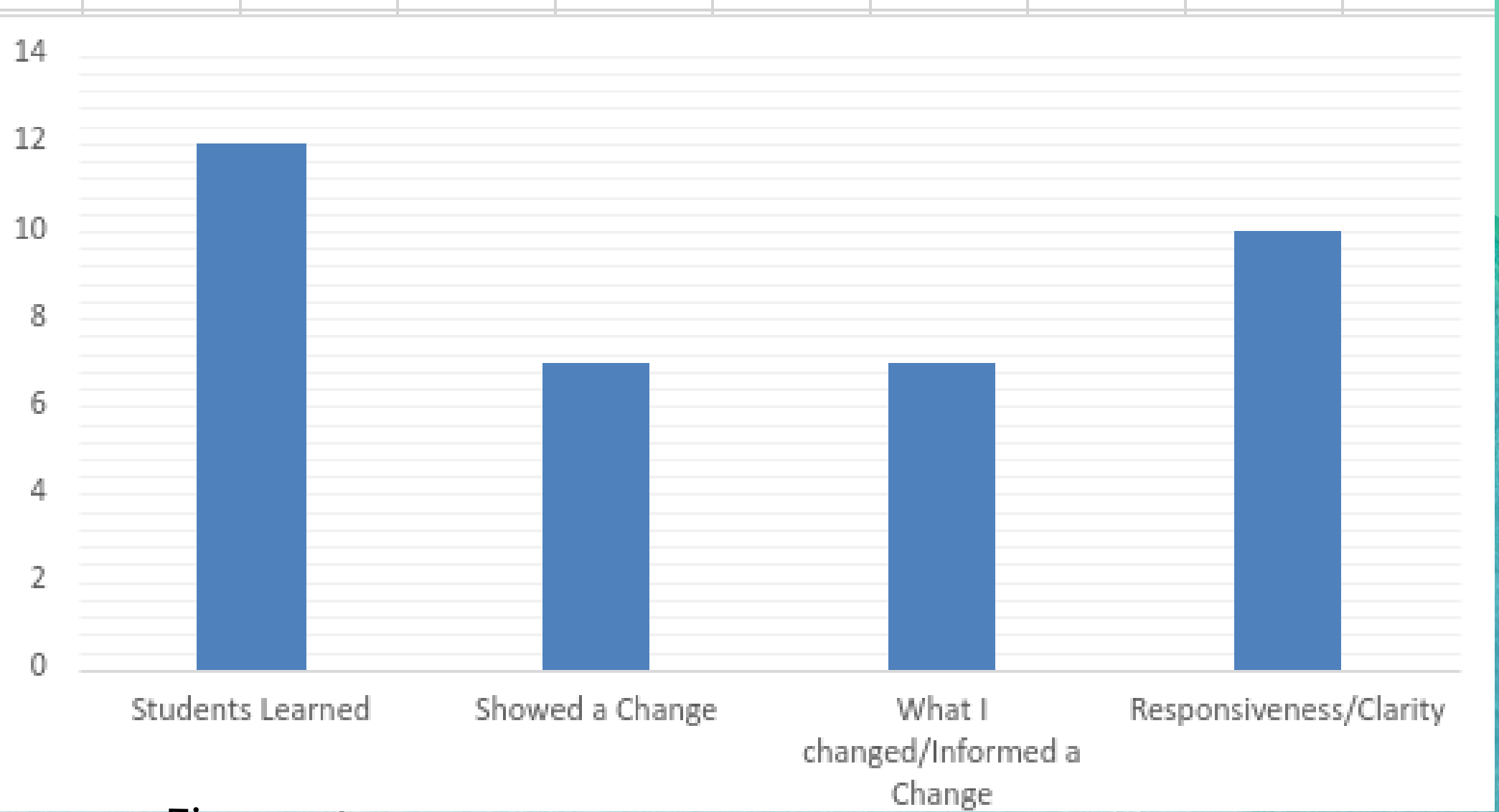


Figure 4. Patterns and themes of teacher journal

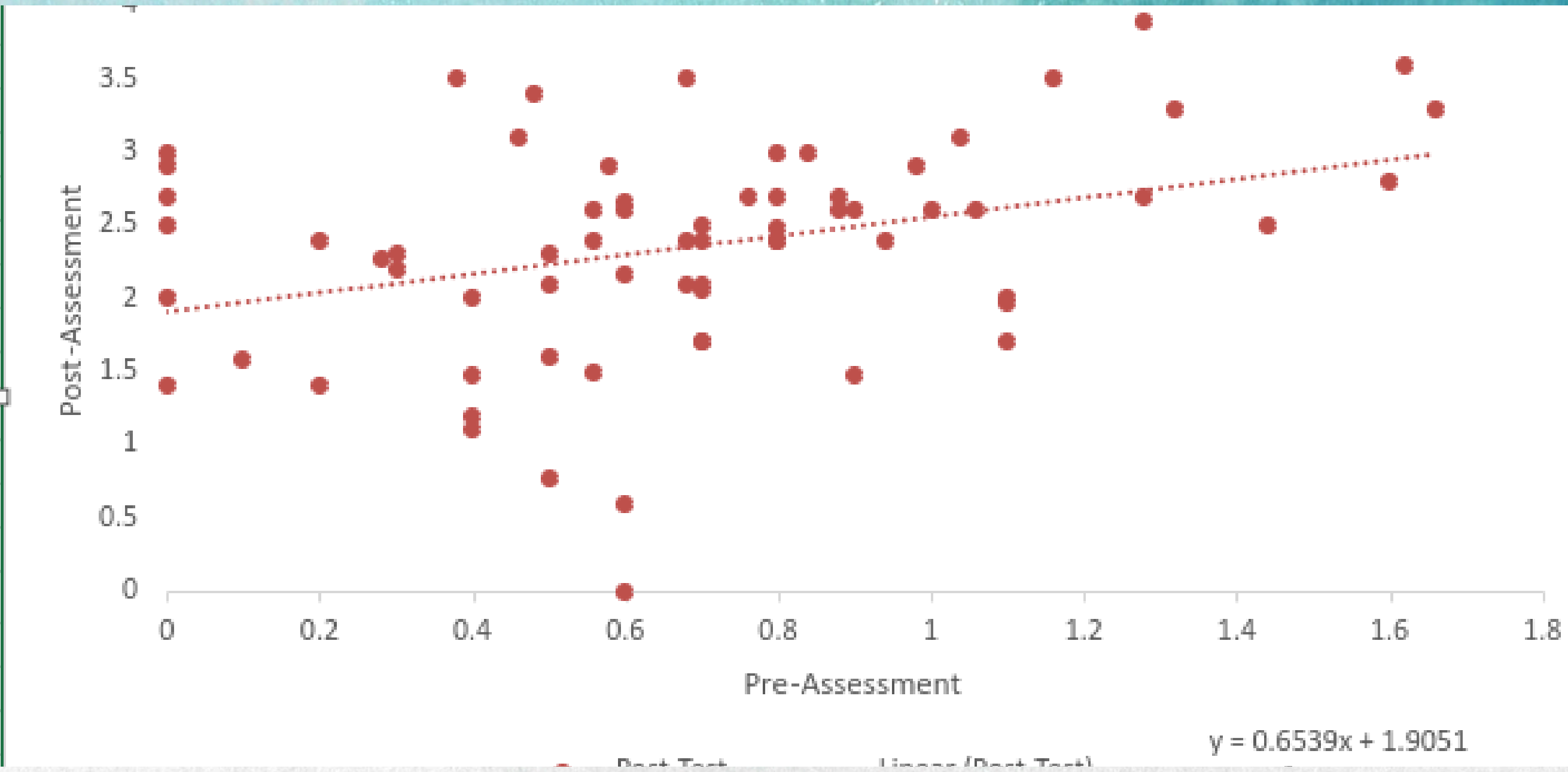


Figure 6: Pre-and Post-Assessment Scatterplot data to indicate student growth.

Claim Evidence Reasoning

C: Implementing FAs aligned with NGSS standards within a genetics unit enhances teacher clarity and responsiveness, facilitating more effective instruction and student understanding.

E: Over the course of the unit,

- Students scored an average of 0.68 and a 2.35 on the pre-and post-assessment thus shown an increase in student learning..
- By using a paired t-test was contrasts with eight FAs against he post-assessment. I got a p-value of 0.000287. Having a desired P value > 0.05 allowed me to fail to reject my null hypothesis which would have been that FAs did not increase teacher clarity, responsiveness, or student outcomes.

R: Student growth increased through eight different FAs that were aligned with the student outcomes. Over the course of this period, students were scored on a 1-4 proficiency-based scale to analyze student growth, clarity and teacher responsiveness.