

The contextual sensitivity of graphical skills in the domain of physics and biology

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Introduction
 As science expands its reach, it makes the ability to read, understand, and communicate with graphical information an increasingly important skill. This project aims to explore the contextual sensitivity of graphical skills in the domain of physics and biology.

Research Question

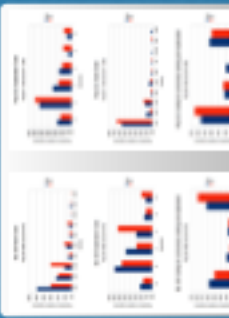
How do students' graphical skills vary across different contexts (physics vs. biology) and across different levels of graphical complexity (e.g., line graphs vs. scatter plots)?

Theoretical Framework

Many researchers believe the presence of graphical information affects the way we process information. This project is designed to explore the relationship between graphical skills and contextual factors.

Methodology

This project was conducted in two interdisciplinary science classes: General Biology 1 (BIO 101) and General Physics 1 (PHYS 201). The data was collected through a series of graphical tasks designed to assess students' skills in reading and interpreting graphical information.



Logistic Regression

Model: $\ln(\frac{p}{1-p}) = \beta_0 + \beta_1 X + \beta_2 Y + \beta_3 XY$
 where p is the probability of success, X is the subject (Physics/Biology), and Y is the graphical complexity level.

Parameter	Estimate	SE	z	p-value
Intercept	0.91	1.87	0.48	0.63
Subject (Physics)	-0.20	0.94	-0.21	0.86
Complexity (Level 5)	-1.05	0.43	-2.42	0.02

β_3 represents the interaction effect between subject and complexity level.



Context Analysis

3 > 2 > 1
 This analysis compares the performance of students across different levels of graphical complexity (1, 2, 3) for both subjects.

Complexity Level	Physics Mean	Biology Mean
Level 1	5.2	4.8
Level 2	6.1	5.5
Level 3	7.0	6.2

These results indicate that students generally perform better on more complex graphical tasks, particularly in the physics context.

