Is STEM Experience Related to Student Grades in Food and Agricultural Chemistry?

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AGR 300: Food and Ag Chemistry

- Typically taken during junior year
- Tailored to meet needs of Agriculture majors
  - Emphasizes applied organic chemistry and biochemistry
III

Objective

• Evaluate relationship between prior academic preparation and student performance in AGR 300

• Hypothesis
  • Students with more STEM experience will earn better grades
Methods

VARIABLES

• Age
• Credit Hours
• Pre Test Scores
• GPA
• ACT
• Amount of STEM classes
III

Methods

DATA ANALYSIS

• Analysis of Variance

• Correlation

• Stepwise Regression
Results

STUDENT BACKGROUNDS

Age

Credit hours completed

- 18-22: 58
- 23-27: 9
- 28-33: 8
- 34-39: 97

- 40-100: 79
- 101-150: 4
- 151-200: 1
- 200+: 88
Average Student Grade

FOOD AND AGRICULTURE CHEMISTRY

N=172; 4 semesters represented
Results

PRE/POST TEST SCORES
Results

GPA

N=172; 4 semesters
Results

ACT SCORES
Results

PRIOR STEM COURSES

Math

Number of Students

Number of Classes

Science

Number of Students

Number of Classes
## Regression Analysis

**MODEL $R^2$ 0.40**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Partial $R^2$</th>
<th>$F$ value</th>
<th>$Pr&gt;F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>0.35</td>
<td>50.41</td>
<td>&lt;0.0001</td>
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<tr>
<td>Pre test</td>
<td>0.05</td>
<td>7.35</td>
<td>0.0080</td>
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</tbody>
</table>

Grade = $-1.222 + 0.22 \times $GPA $- 0.097 + 0.04 \times $Pretestscore $+ 7.448$
Student Grade and GPA

[Box plot showing GPA distribution by grade (A, B, C, D, F).]
Student Grade and Pretest Score
Conclusions

• Number of STEM courses had little effect

• Student GPA prior to course was best predictor

• Grit is more important that ability?
Future Research

- Consider ‘highest’ STEM course and grades
- Measure grit

https://www.psychologytoday.com/us/blog/unmapped-country/201708/grit-grittier