How to Forecast Exam Scores Based on Student Behaviors in Class

Perry Samson
University of Michigan
Step-by-Step

Share Slides

Pose Questions

Answer Questions

Monitor Progress

Research

Class Capture
1. Capture Class

Blah, blah, blah...
2. Share Slides

- Powerpoint
- App
- Web

- Upload a file
- Import from your library
- Create a new presentation

Add a presentation

Reading Weather Maps
3. Pose Questions

“Formative assessment refers to assessment that is specifically intended to generate feedback on performance to improve and accelerate learning.”


“In higher education, formative assessment and feedback should be used to empower students as self-regulated learners.”

What conditions will make the atmosphere less stable

B. Heating of the surface, cooling aloft

Correct Answer

- the difference in temperature will make it unstable
- the heating of the surface causes the atmosphere to be less stable
- The atmosphere is unstable when the point is below the dry adiabatic rate line. It is unstable when as altitude increases, temp decreases or does not increase
- heating to decrease stability
- To have it unstable, you need to have a warmer parcel that wants to rise.
- The heating surface will cause the air to float and make the atmosphere unstable.
- Rising air is warmer than the environment causing it to be unstable
- increase the difference
What part of this image does NOT make sense to you and why?

RESULTS

Why are there no hurricanes along the equator? Is that significant?
4. Answer Questions

Any questions?
Q. When I have questions in class, I am comfortable asking them verbally.
Q. When I have questions in class, I am comfortable asking them verbally.

Number of students 158

Number of questions asked 413

Average number of questions/student 2.7
QUESTIONS?
5. Monitor Progress
Providing live streaming **INCREASES** participation
Creating an Ecosystem

Learning Analytics Database

- Activity Answers
- Notes
- Attendance
- Bookmarks
- Lecture Capture
- Questions Posed
- Confusion
Creating an Ecosystem

- Activity Answers
- Questions Posed
- Confusion
- LMS
- Attendance
- SIS
- University db
- Other Vendors
- Vendors

Perry Samson
@pjsamson
Attendance

Relationship of Attendance vs. Grades

Average Exam Grade vs. Number of Times Attended Class:

- <20 times attended: Average Exam Grade
- 20-25 times attended: Average Exam Grade
- >25 times attended: Average Exam Grade
AttendanceBehaviors as a function of exam scores

Attendance

<table>
<thead>
<tr>
<th>PERCENT OF ATTENDANCE</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Class</td>
<td>Remote</td>
</tr>
<tr>
<td>&lt;70</td>
<td>27%</td>
</tr>
<tr>
<td>70-80</td>
<td>26%</td>
</tr>
<tr>
<td>80-90</td>
<td>47%</td>
</tr>
<tr>
<td>&gt;90</td>
<td>65%</td>
</tr>
</tbody>
</table>

AVERAGE EXAM GRADE

@pjsamson
Note-Taking

Relationship of Note Taking vs. Grades

Average Exam Grade vs. Total Words Typed in Notes

- 0-100: 75
- 101-1000: 77
- 1001-2000: 78
- 2001-5000: 85
- >5000: 86

Perry Samson
@pjsamson
Review

Relationship of Exam Grades vs. Getting Gradable Activities Correct

<table>
<thead>
<tr>
<th>Average Exam Grade</th>
<th>Percent of Questions Answered Correctly</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%-30%</td>
<td>68</td>
</tr>
<tr>
<td>30%-40%</td>
<td>75</td>
</tr>
<tr>
<td>40%-50%</td>
<td>82</td>
</tr>
<tr>
<td>50%-60%</td>
<td>82</td>
</tr>
<tr>
<td>&gt;60%</td>
<td>93</td>
</tr>
</tbody>
</table>
Background

Previous Success vs. Grades
Successful Students Behave Differently

- Minutes of Lecture Capture Viewed per Class
  - <2.5: 1
  - 2.5-3.0: 13
  - 3.0-3.5: 18
  - >3.5: 22

Incoming Grade Point Average
Successful Students Behave Differently

![Bar chart showing the average number of notes taken based on incoming grade point average.](chart.png)
Successful Students Behave Differently

Student participation varies with prior level of success.
### Extreme Weather - 001 (Fall 2016)

**Student Activity Details**

<table>
<thead>
<tr>
<th>Date</th>
<th>Lesson Name</th>
<th>Question</th>
<th>Question Detail</th>
<th>Answer</th>
<th>Correct</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 19, 2016</td>
<td>Uneven Heating</td>
<td>List two conditions that can lead to excessive heat deaths.</td>
<td>TYPE: ShortAnswer</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>September 19, 2016</td>
<td>Uneven Heating</td>
<td>What spot on this image of infrared radiation does not make sense? Why?</td>
<td>IMAGE: <a href="https://cgb.utsa.edu/teach/phy5314/PHY5314.pdf">link</a></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>September 20, 2016</td>
<td>Atmospheric Moisture</td>
<td>Assume it’s 30Â°C in New Mexico and 20% RH and there’s a snowstorm in Michigan at 0Â°C. What air has more moisture in it and how did you decide this?</td>
<td>TYPE: ImageAnnotation</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>September 20, 2016</td>
<td>Atmospheric Moisture</td>
<td>If the temperature outside is 20Â°C and the dew point is 15Â°C what is the relative humidity?</td>
<td>TYPE: MultipleChoice</td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>September 20, 2016</td>
<td>Atmospheric Moisture</td>
<td>If there is 20 mb of moisture in the air at what temperature would the air be saturated?</td>
<td>TYPE: RangeAnswer</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>September 20, 2016</td>
<td>Atmospheric Moisture</td>
<td>If the temperature outside is 24Â°C how much moisture can the atmosphere hold?</td>
<td>TYPE: RangeAnswer</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Activity</td>
<td>Corrected Percent</td>
<td>Slide Deck View Count</td>
<td>Slide View</td>
<td>Activities Participation Percent</td>
<td>files</td>
<td>Slide Note</td>
</tr>
<tr>
<td>----------</td>
<td>------------------</td>
<td>-----------------------</td>
<td>------------</td>
<td>----------------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
</tbody>
</table>

**Relative Contribution of both Echo360 & Canvas Activities to Explaining Variation in Grades**
Predicting Grades in Week 2

CLIMATE 102: W2017

<table>
<thead>
<tr>
<th>Predicted</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail</td>
<td>Fail</td>
</tr>
<tr>
<td>Pass</td>
<td>Fail</td>
</tr>
<tr>
<td>Pass</td>
<td>Pass</td>
</tr>
<tr>
<td>Pass</td>
<td>Pass</td>
</tr>
</tbody>
</table>

Accuracy = 80%
QUESTIONS?