## Students with Lower GPA's Participate Differently in Class From Those with High GPA's <br> (Knowing This, What Should We Do?)

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## DRIVING QUESTION

Student grades are often strongly related to a student's prior success as measured by incoming GPA. Is this because these students lack cognitive ability or is it due to undeveloped study skills? Kuh et al. (2008) have argued that student learning is linked to student engagement. Are lower GPA students less engaged?

## STUDY DESIGN

Student participation was measured using the Echo360 Active Learning Platform (see Figure 1) which measures:

1. Attendance,
2. Number of questions answered in class,
3. Number of questions correct in class,
4. Volume of notes taken,
5. Number of notes taken, and
6. Number of questions asked.

During the first weeks of AOSS 102 (winter 2015) student participation was measured and the data was matched with data obtained from the University's Data Warehouse that includes each student's incoming grade point average (GPA). These data were then matched with each student's score from the first hourly exam.


Figure 1. Student view of the Active Learning Platform in which they can take notes, answer instructor questions, ask
questions, bookmark slides and indicate confusion. All actions by the student are also automatically linked to the captured lecture.

## 1. EXAM SCORES VS. GPA

In this course the student's first exam scores were related to their incoming GPA (Figure 2). This relationship is consistent with results found elsewhere (McKay, Miller, \& Tritz, 2012).


Figure 2. Scatter plot of AOSS 102 scores on exam 1 in winter 2015 versus the incoming GPA of each student ( $r^{2}=0.20$ ).

This outcome is disheartening as it infers that learning is controlled by the inherent cognitive ability of the student and less what can be done in class to promote student success.

## 2. EXAM SCORES VS. PARTICIPATION

The data from the Active Learning Platform were used to identify relationships between levels of student participation and exam scores. Figure 3 shows

- Attendance, often the only recorded measure of participation, was unrelated to exam scores.
- The number of lecture captures viewed was weakly related to exam scores.
The number of times notes were taken was strongly related to exam scores.
The number of slides the students viewed during class was strongly related to exam scores.


Figure 3. Relationship of attendance, lecture capture views, number of notes taken and number of slides viewed to exam 1 scores.

## 3. PARTICIPATION VS. GPA

Data from the Active Learning Platform was stratified by the incoming GPA of each student to see if there were systemic differences in participation patterns at different levels of incoming GPA. The results, shown in Figure 4, illustrate that between the beginning of the semster and the first exam:

1. The level of attendance between four bins of GPA was not dissimilar.
2. The level of lecture capture views increased from 2 minutes on average for GPA $<2.5$ to 44 minutes on average for GPA > 3.5.
3. The number of notes taken increased by a factor of more than four between GPA < 2.5 and GPA > 3.5.
4. The number of slides actively viewed during class roughly doubled from GPA $<2.5$ to GPA $>3.5$.
Hence those students with low GPA are not participating at the same level as students with high GPA.
These results suggest that the relationship between grades and GPA identifies in Figure 1 is probably due to a combination of issues beyond cognitive ability and definitely includes differences in the motivation and/or study skills of students.


Figure 4. Relationships between how students participate in class and their incoming GPA.

## 4. WHAT SHOULD WE DO?

Hypothesizing that the relationship between GPA and grades can be explained by differences in student partifcipation begs the question ...now what? In AOSS 102 an intervention has begun where each student was presented with these results in a survey and asked to describe the relationships and nonexistent, weak or strong. Students were asked if they were happy with their exam 1 grade and, if not, what they planned to do differently when preparing for the second exam. The students' pattern of participation is being monitored to see to what degree this intervention leads to changed engagement and if those changes affect exam scores.

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    Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J., \& Gonyea, R. M. (2008). Unmasking the Effects of Student Engagement on First-Year College Grades and Persistence. The Journal of Higher Education, 79(5), 540. McKay, T., Miller, K., \& Tritz, J. (2012). What to do the Actionable Intellegence E2Coach as an Intervention Engine. Paper presented at the Learning Analytics and Knowledge 2012, Vancouver, Canada. http://sitemake umich.edu/ecoach/files/lak_2012_submission.pdf

