

2014

# Remediation Research in USU 1360 Intelligent Life in the Universe

Tony Triplett

Jared Butler

Follow this and additional works at: [http://digitalcommons.usu.edu/phys\\_stures](http://digitalcommons.usu.edu/phys_stures)

 Part of the [Education Commons](#), and the [Physics Commons](#)

---

## Recommended Citation

Triplett, Tony and Butler, Jared, "Remediation Research in USU 1360 Intelligent Life in the Universe" (2014). *Physics Student Research*. Paper 13.

[http://digitalcommons.usu.edu/phys\\_stures/13](http://digitalcommons.usu.edu/phys_stures/13)

This Poster is brought to you for free and open access by the Physics Student Research at DigitalCommons@USU. It has been accepted for inclusion in Physics Student Research by an authorized administrator of DigitalCommons@USU. For more information, please contact [dylan.burns@usu.edu](mailto:dylan.burns@usu.edu).



# Remediation Research in USU 1360 Intelligent Life in the Universe

Tonya Triplett and Jared Butler

Department of Physics, Utah State University, Logan Utah

## ABSTRACT

Some students struggle more than others during their college years and if not identified and given the help they need many drop out, resulting in less money for the university and lack of direction and education for the student. Students were identified as “at-risk” after failing their first exam in a general science course and were given an extra assignment to make up some points. The assignment was given to help students learn structured study skills in order to prepare for the following examination. The work turned in by these students was analyzed and critiqued for quality and effort. As a result, on average, the students that took completed the assignment significantly increased their future exam scores. However, the quality and effort they put into their assignment had no statistically significant impact on their future improvement in the course.

## INTRODUCTION

A General Education Physics course is a crossover of one of the hardest subject matters with some of the least prepared lower classmen on campus. It is a daily balance of providing thought-inducing material without relying on the depth of background that even an introductory physics course assumes. Utah State University admits students with a broad spectrum of preparation and abilities. While the vast majority of these students are ready for college work, the lowest level students provide a significant challenge. These students face a limited course choice, and are often placed in General Education courses that, while the lowest level the University teaches, are still above their current skill set. Low performing students tend to avoid seeking assistance from faculty, resulting in chronic failure and lack of personal responsibility.<sup>1</sup> Historically, these students have failed courses, been placed on academic probation, and ultimately dropped out.

Students in USU 1360 IPS: Intelligent Life in the Universe, are identified at the end of week 4 of the 16 week semester. At this time, the first exam is given. Scores range from 30% to 100%, but with a notably large fraction (about 30%) of the course performing at C- level and below. Distant history would argue that this is the expected outcome, but grade inflation comparisons make this value alarming. Students with very low scores generally dropped the class in the past, but if they were not prepared for this course, what possible course would be available? In an effort to help these low-performing students, remediation programs are frequently designed to meet the most pressing needs. Remediation research performed by K.A. Winston found that increased instruction through workshops for failing students “made no difference to short- or long-term pass rates.”<sup>2</sup> So, early on, the assumption that “more teaching” could help these students “catch up” was discarded, as the realization that the problem was not in course content, but in student study skills. If students could learn and use structured study skills, they would be capable of working at a university level. This could then increase grades and decrease the drop rate for the course (and possibly for the University as well.)

## MATERIALS AND METHODS

### Selecting Students for Remediation:

In order to identify “at risk” students, following the first exam, all students scoring 72% and below were identified as being at-risk and are selected for remediation. (The test has 50 questions, so only even scores exist.) Each student was sent an e-mail inviting them to do an extra study assignment to make up some of the points missed on the exam.

### The Remediation Assignment:

To “make up” a point, students were required to write test questions based on the learning objectives for the upcoming exam. These questions were to be multiple choice and designed to look like a question they would see on an exam. By studying this way, students were required to think about answers to questions they would likely see, focus on key learning concepts, and spend time in class material in order to complete the assignment.

### Evaluating Student Assignments:

Upon completion of the assignment, students turned in their work unaware that their assignment would be analyzed and assessed. During the semester, this work was reviewed for quality of work and effort on the part of the student to follow directions and write questions directed toward specified learning objectives.

Questions written by students were ranked on a scale of 1 – 3. A level 1 question showed invested time by the student to create, effort to emphasize a learning objective, and consistency in the quality of work. A level 3 question showed little effort and disregard for teacher instruction. Each question was ranked and the student’s question scores were averaged to give a final overall score.

Examples: (spelling and grammar consistent with what was submitted)

#### LEVEL 1 QUESTION

Which rock is structurally formed by pressure and heat?

- A: Sedimentary
- B: Metamorphic
- C: Igneous

#### LEVEL 3 QUESTION

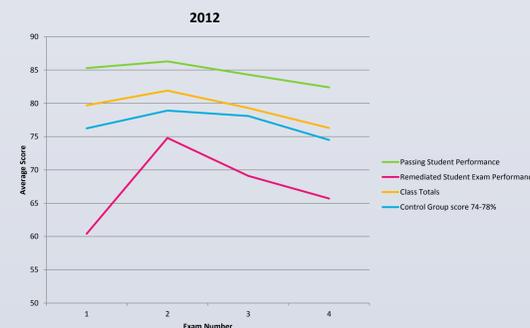
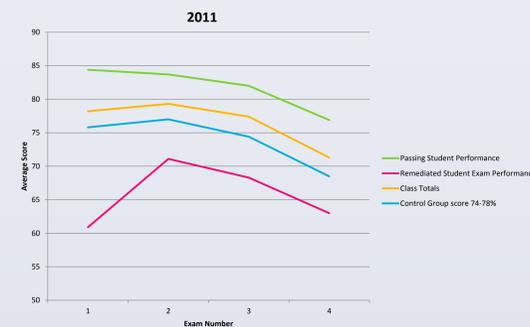
How are humans related to Apes?

- A: Humans evolved from apes
- B: Humans are apes
- C: Humans and apes are distance cousins
- D: Apes are our rulers
- E: My grandmother is an ape

As the semester closed, student scores were able to be plotted. The difference in exam scores between exam 1 and exam 2 were found for each student in the class. They were grouped into remediation students, non – compliant students, and students who had passed the first exam. The change in exam score was also plotted against the final averaged score of each remediation student.

## RESULTS

It was found that compliant students had an average increase in their second examination score of  $13 \pm 8.3$  points. This data, as is shown graphically, has been taken for 3 years and has had similar results. The class as a whole tends to steadily decrease in performance as the semester continues, while compliant remediation students see a large spike in their test scores after the second exam. As can be seen in 2011 and 2012, the “control group”, or non-compliant students who ranged in score from 70 – 74, followed the same trend as the rest of the class.



After graphing question quality vs. improvement from exam 1 to exam 2, the correlation between the two yielded an  $R^2$  value of 0.0004.



## CONCLUSION

After 3 years of taking data, it is apparent that remediated students see a significant improvement on exam 2. It would be expected that students would all follow the same trend of increase or decrease due to the material and circumstances surrounding particular exams. However, the only monitored change made to persuade any different preparation by the student was the study assignment sent to those who had failed the first exam. As such, it is seen that on average, participating in the remediation assignment had a statistically significant increase in examination score.

After graphing question quality vs. improvement from exam 1 to exam 2, it can clearly be seen that there is absolutely no correlation between effort on the remediation assignment to follow instructions and performing better on the second exam. With an  $R^2$  value of 0.0004, no meaningful argument can be made in order to support the claim that actually trying to do well on the remediation assignment would increase future examination scores. Initially this was seen as a flaw or an incongruence, but upon further analysis, it appears that putting effort into the assignment is of negligible importance as compared to simply doing the assignment. It would appear that by doing the remediation assignment, regardless of effort, led to an average increase in exam score.

This one-class effort to retain students is a model of effective retention efforts at the lowest level. It identifies students early and addresses underlying issues prior to allowing them to lead to course failure. While clearly not ideal in every course offered, there are parts of the overall structure that would fit most courses. It appears that the e-mail, sent in a timely fashion, has a predictable positive outcome. In addition, long-term tracking of students involved in this course could be implemented to see what impact it has on graduation rates.

## REFERENCES

1. J. Cleland, R. Arnold, & A. Chesser. Med. Teach. **27** (6), 504 (2005).
2. K. A. Winston, C.P.M. van der Vleuten, and A.J.J.A. Scherpbier. Med. Teach. **36** (1), 25 (2014).