

Factors Affecting Student Success in Small Collage-Classroom Settings

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ABSTRACT

Teacher qualifications are reported to be one of the most important factors affecting learning, yet improving teacher qualifications is difficult, time consuming and sometimes impossible in the short term. Knowledge of other factors that have limited effects on student learning and success may be more valuable if these factors are more easily manipulated. In this study, factors affecting student success were studied in small classroom settings in undergraduate Biology classes. A strong correlation between the sitting position of the student in the classroom and student success was demonstrated in the study. In addition, there was a strong correlation between good note taking skills and student success. Sitting position is a factor that can easily be manipulated and can be of help especially for failing students. Instruction of good note taking skills during K-12 education and strategies that will determine and support the students that need improvement in this particular skill early on in college will promote the academic success of students in STEM areas in higher education.

INTRODUCTION

The objective of this study is to determine factors that affect student success and are easily manipulated in order to improve student success. In an undergraduate small classroom setting, different factors were studied for their effect on student success. The sitting position of the student in the classroom is a factor that is easily manipulated. Good note taking skills is a factor that can be improved with specific targeting and strategy development in earlier education. Class attendance is also a factor that can be improved. In this study, these factors were studied for their effect on student success in undergraduate Biology classes.

METHODS

Students

Undergraduate students majoring in biology taking either of the Cell Biology (Biol 3480), Human Anatomy and Physiology II (Biol 2452) and Histology (Biol 3490) courses were observed in this study. Students were not directed to seat in any particular way. Most students were observed to find their seat at the beginning of the course and keep it throughout the semester. Students were encouraged to take notes. Their seating zones and note-taking skills are recorded towards the end of the semester. The students were informed that these recordings would not have any influence on their grades. Students were not given any information about the study until the study is completed. Note-taking skills are graded based on the following formula and the rubric a week before the corresponding exam. Note-taking skills grade = content + organization + neatness (fig. 1). Classroom sitting positions are assigned a score based on students' closeness the screen and the instructor's desk (fig. 2).

Examinations

Examinations were administered as usual independent from this study. Examinations were consisted of mostly multiple choice, matching and true/false test questions. In Histology (Biol 3490), visual examinations were

given asking the students to identify cells, tissues, organs or structures from the images projected on the screen. Students were closely supervised during the examination time for integrity.

Statistical Analysis

For analysis, students' grades, attendances, seating zones and note-taking skills were copied without the names of the students. Data consisted of grade versus sitting zone, grade versus note-taking skills, or grade versus unexcused absences without any names associated. To determine the significance of the association, simple linear regression analysis was performed using Microsoft Excel 2010 software and R^2 values were calculated. For some analysis, student T test was performed using Microsoft Excel 2010 software and p values were calculated. p values less than 0.05 was accepted to be statistically significant. Error bars on the graphs indicate standard deviations and were calculated using Microsoft Excel 2010 software.

RESULTS

The effect of classroom sitting zone on student success

This study was conducted in regular small size classrooms in the Department of Biology at the University of Arkansas at Pine Bluff serving the mostly minority populations in the Arkansas delta region. Typical classrooms can accommodate up to 36 students (fig 1). In these classrooms, sitting zones are defined based on the closeness of the student to the center of instruction or, in other words, the desk of the instructor and the screen (fig. 2). Students usually choose their seats in the first class and tend to keep the same seat throughout the semester. Students were not aware of the study and they were not instructed in any way about their choice of seats. Their seating preference was simply observed and recorded.

Student success was determined in supervised in-class examinations consisting of multiple choice, matching or true/false test questions. When the grades students made were graphed in reference to their in-class sitting zones, it was obvious that student success directly correlated with the closeness to the center of instruction ($R^2 = 0.8848$) (fig. 3). Students who sat closer to the center of instruction performed better in the examinations. The graph presented is representative of three studies from different classes with similar results.

Student success was also determined in visual examinations consisting of questions involving identification of cells, tissues or structures in histological pictures. The correlation of student success with the closeness to the center of instruction was especially prominent in the learning of the visual material ($R^2 = 0.9475$) (fig. 4). The results were confirmed with two other similar studies.

The effect of good note-taking on student success

Student notebooks or binders were evaluated for content, organization and neatness prior to examinations. Although students were advised to take good notes throughout the semester, they were informed that their grading based on the quality of their notes would not be used for the calculation of their final grades in the class. Based on content, organization and neatness of the notes taken, students' note-taking skills were graded on a scale of 0-10 (table 1). Students were then assessed in supervised in-class examinations and received a grade 0-100. Student success as determined by the grades made in examination was graphed in reference to their note-taking skills. Student success directly correlated with good note-taking skills ($R^2 = 0.8066$) (fig. 5). Two repeated studies yielded similar results (data not shown).

The effect of attendance on student success

The attendance records are kept as usual through the semester and graphed against the overall grades student make in the course at the end of the semester. It was observed that students who made better attendance to classes made better grades. Students with less than two unexcused absences had higher overall average in the class than those who had two or more unexcused absences. Two different classes are shown here (fig. 6). Although the class averages may be very different from class to class, the same pattern was observed and the difference between the averages of the students with less than two absences and students with two or more absences was statistically different in all the classes studied.

CONCLUSIONS

There are many factors influencing the student success from the teacher qualifications to the physical conditions of the teaching environment. Many of these factors cannot be improved easily. Identification of easily manipulated factors even with slight impact on student success may result in notable improvement in student learning and success when used appropriately.

In this study, we were able to demonstrate the effect of two factors that have strong correlation with student success and at the same time are easy to change or improve. Students who sat close to the center of instruction performed better in the examinations. This effect was especially prominent in the learning of the visual material. Classroom sitting zones can be easily adjusted especially for failing students. The experience from a few instances of failing students who were instructed to sit near the center of instruction suggested benefit from this intervention, however, the number of these cases were too few to produce a statistically significant result. Also, it is difficult to discern the role of sitting near the center of instruction from the effect of increased attention on the student.

The other factor that has strong correlation with student success and at the same time is easy to change or improve was note-taking skills. Students who took better notes performed better in the examinations. Good note-taking is a skill that can be learned and improved with targeted instruction. Improvement of good note-taking skills requires identification of the students who need improvement in this particular skill and early intervention to prevent the failure of these students in the college. Student motivation is also important in good note-taking.

These findings in small classroom settings in the field of Biology are applicable to other STEM areas. Instruction of good note-taking skills during K-12 education and strategies to inspire students to sit in the front and participate in the classroom activities will promote the academic success of students in STEM areas in higher education.



Figure 1. A typical classroom in Biology Department at UAPB.

4	4	4	4	4	4
4	4	4	4	4	4
4	3	3	3	3	4
3	2	2	2	2	3
2	1	1	1	1	2
2	1	1	1	1	2

Figure 2. Classroom sitting zones

	0	1	2	3	4	5	6
Content of notes taken	none	very few	few	barely sufficient	good	satisfactory	excellent

	0	1	2
organization of the notes taken	unorganized loose pages	somewhat organized loose pages or different notebooks or different sections in a notebook	well organized pages or notes confined to a single notebook
	0	1	2
neatness of the notes taken	very messy	fairly legible	neat and legible

Table 1. Grading of student classroom notes.

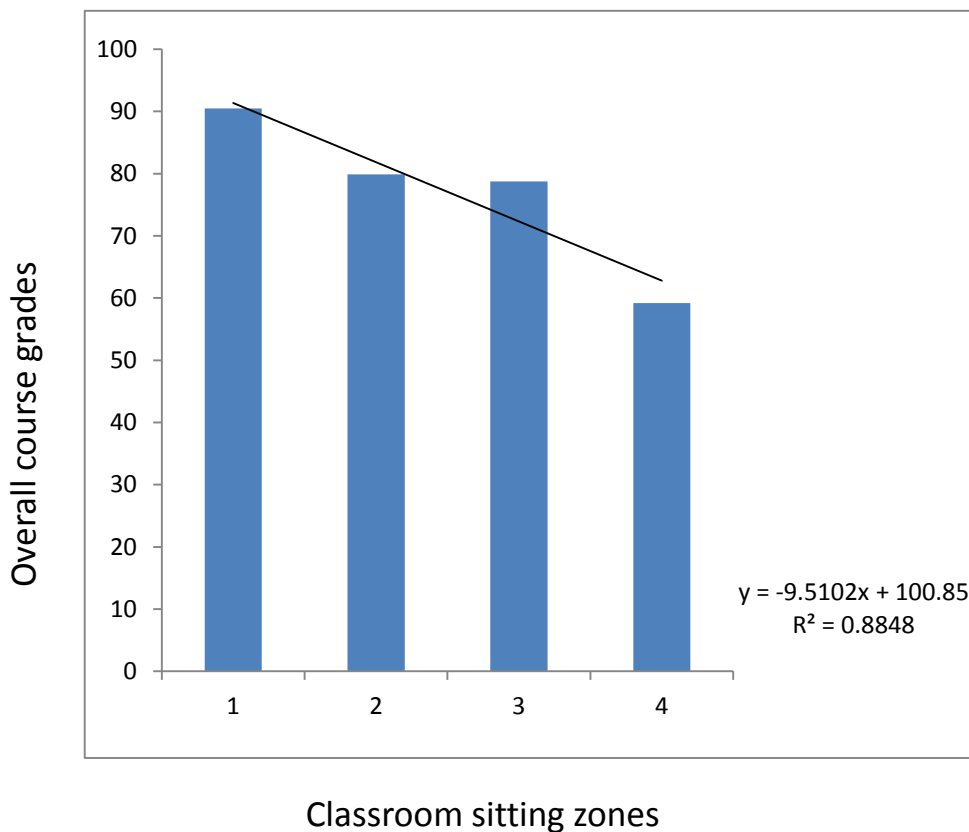


Figure 3. Overall course grades in reference to the sitting zones.

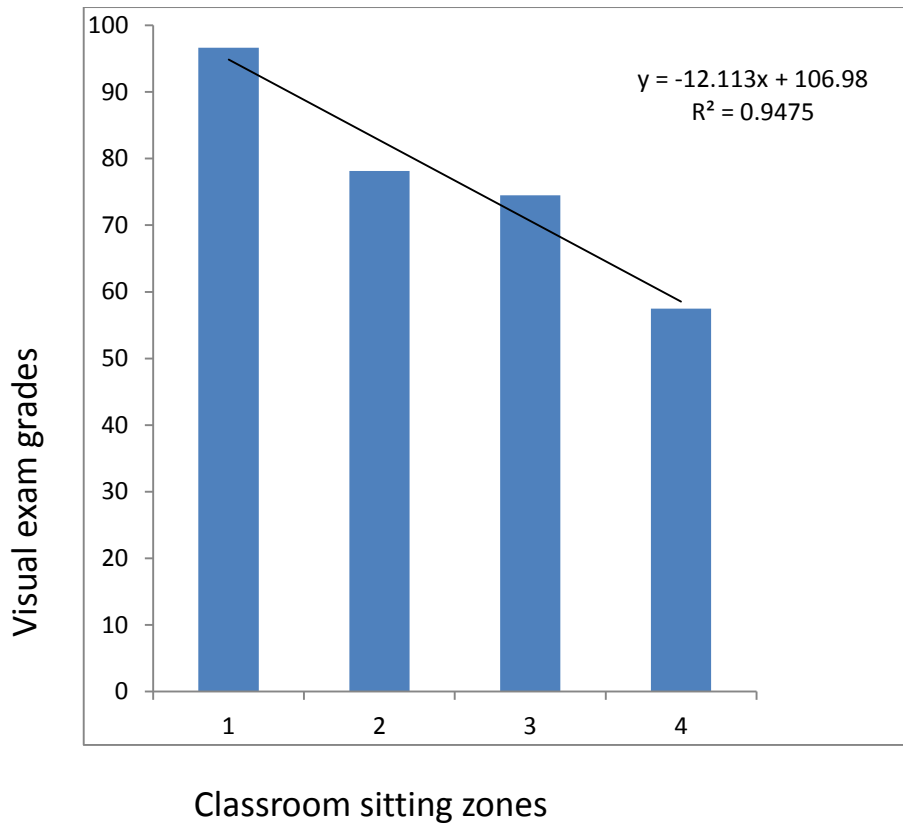


Figure 4. Visual exam grades in reference to classroom sitting zones.

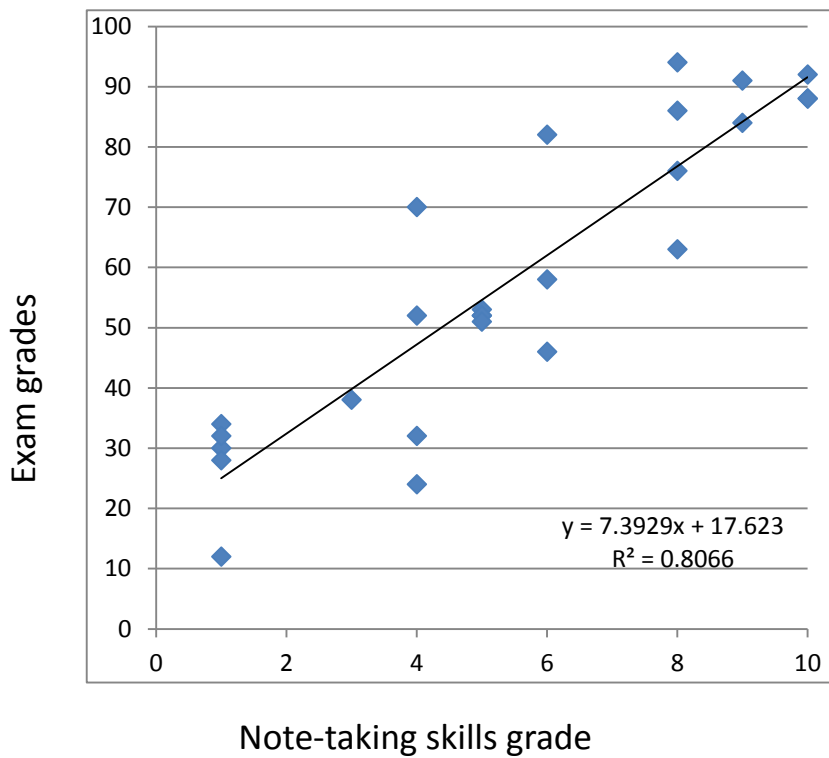


Figure 5. Exam grades correlation with note-taking skills.

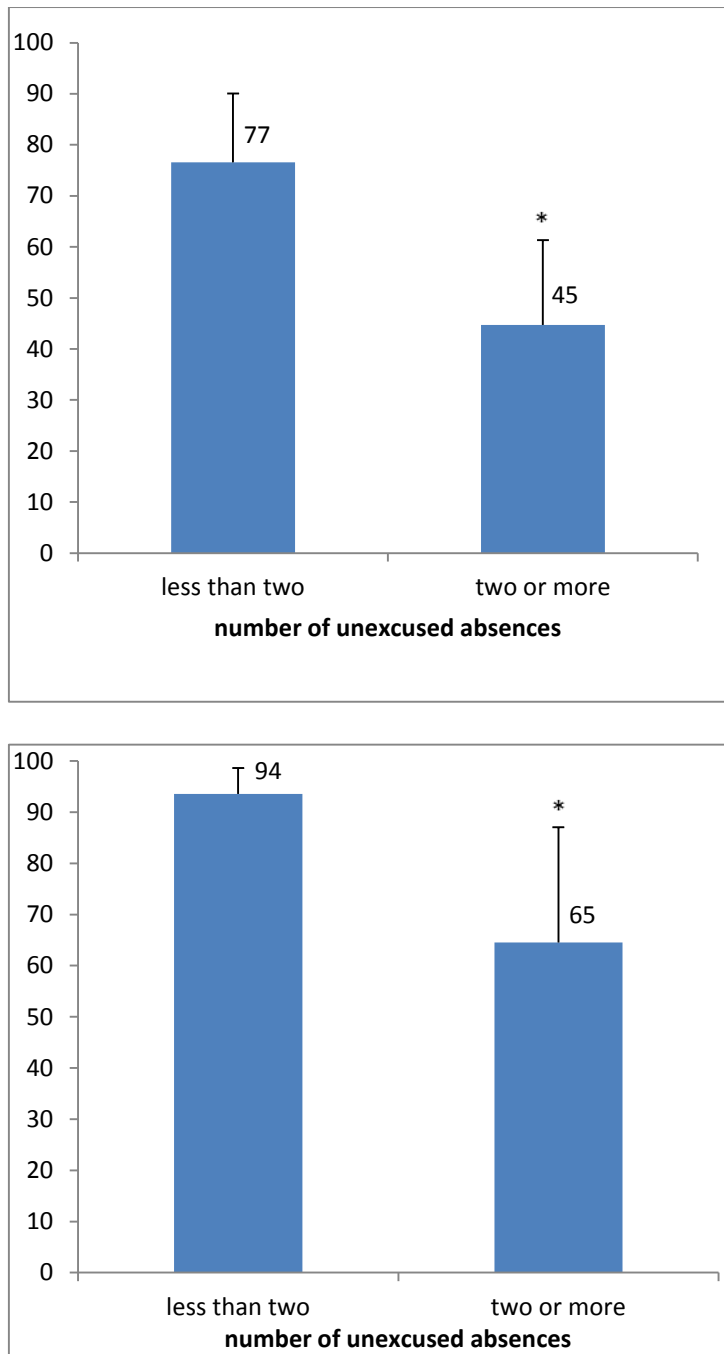


Figure 6. Overall course grades correlation with class attendance in two different classes. Error bars on the graphs indicate standard deviations and the values indicate averages in the corresponding group. * indicates statistical significance in student T test of $p=0.009$ for the first graph and $p=0.044$ for the second.