

Grasping Physics: Traditional or Studio

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Purpose of Research

Physics has one of the worst DFW rates at AASU. The AASU physics faculty are attempting to address this and the overall learning in the introductory physics courses. There were discussions about aspects of the courses that may be leading to student failure and what could be changed without lowering the standards of the courses.



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Goals

- To improve retention rate (DFW rate) in introductory physics
- To improve learning of fundamental concepts



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Problems To Be Addressed

- Poor connection between lab and lecture
- Not efficient use of time in lab
- Not enough time in lecture
- Minimal feedback between professor and student



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First Step to Change

A literature review to see what other institutions are doing lead to the concept of studio physics courses.^{1,2} The studio style course blends lab and lecture together. Traditional physics courses have a one hour lecture and three hour lab that may not be taught by the same person.



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Steps to Implementation

- Teach PHYSICS 1111 (trig based) traditionally in Fall 2006
- Visit Northern Kentucky University to observe their studio physics classes
- Teach PHYSICS 1111 using studio method in Spring 2006
- Give each class the FMCE for assessment



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The Data

Traditional Physics

- 46 students
- 41.3% DFW
- FMCE gain = 0.10
- A's = 10.9%
- B's = 30.4%
- C's = 17.4%
- D's = 13%

Studio Physics

- 25 students
- 28% DFW
- FMCE gain = 0.13
- A's = 16%
- B's = 20%
- C's = 36%
- D's = 8%



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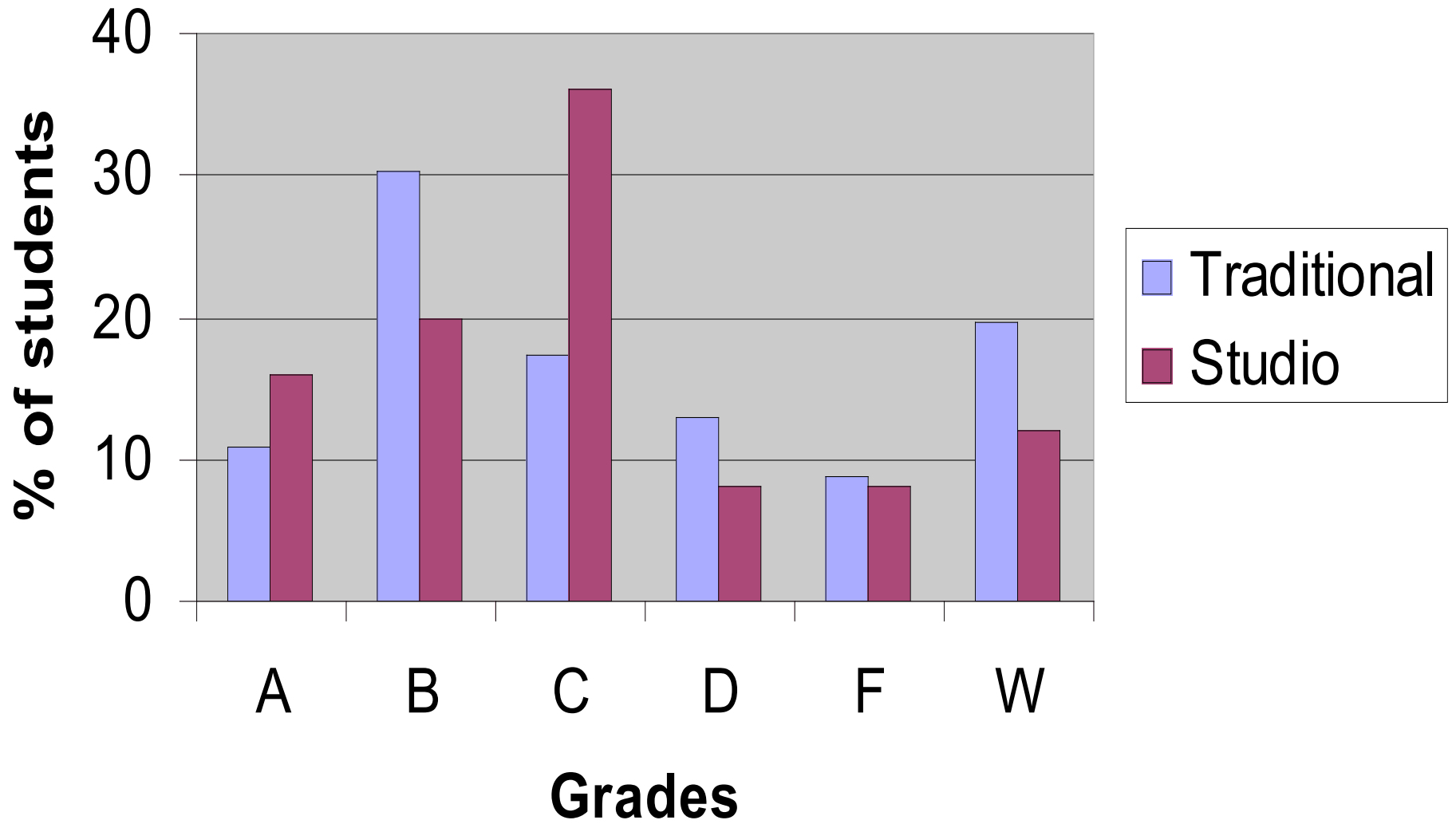
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Grade Distribution



Discussion of Results

The data shows a 13.4% improvement in the DFW rate. Therefore, the retention rate improved. The A's and C's went up, whereas the B's and D's went down. From our analysis, the upper B's were able to move to A's and the D's were able to move to C's. There were no low F's in the studio physics course, unlike the traditional course.



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Advantages of Studio Physics

(according to instructor)

- Immediate feedback in class
- Efficient use of time, no rushing
- Professor gets a better idea of where the students are in class before the exam and can work through the areas of difficulty



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Advantages of studio physics (according to students)

- Immediate feedback in class
- Immediate reinforcement of concepts with lab activities
- No long labs
- Working with classmates helps a lot
- Connection is made between lab and lecture



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Observations from HS Teacher

- The students were actively engaged through out the entire 2 hours.
- Ms Mullenax was able to monitor and give individual attention to every student.
- I talked to several students and they all preferred this class format verses the traditional college lecture/lab format
- All the students felt they understood each physics concept being presented in this format.
- The class was fun and engaging.
- The students answered and asked good questions.
- The two hours went by very quickly.
- The final worksheet reinforced the concepts discussed and utilized in the lab session.



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Disadvantages of Studio Physics

According to students

- Must attend class

According to faculty

- Will cost the university more \$ since studio method classes are smaller



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Conclusion

- Using studio method, the retention rates improved and student learning improved.
- Future work will continue on improving the AASU Physics courses
- PHYS 1111 is being taught using studio this fall



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Thank You

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- Northern Kentucky University



References

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