Homework vs. Quizzes

Which Evaluation Method is Better?

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4/17/2012
Table of Contents

Introduction .................................................................................................................................................. 2
Literature Review .......................................................................................................................................... 2
Testing Procedures ....................................................................................................................................... 4
Data Analysis ................................................................................................................................................. 5

Table 1: MA104 Data ............................................................................................................................ 5
Table 2: MA205 Data ............................................................................................................................ 5
MA104 Results .......................................................................................................................................... 5
MA205 Results .......................................................................................................................................... 6
Figure 1: Course Data.................................................................................................................................. 6

Is there a correlation between HW grades and WPR grades? Or quiz grades and WPR grades? .......... 7

Conclusion and Recommendations .............................................................................................................. 8
Bibliography .................................................................................................................................................. 8
Appendix A—Cadet Comments for MA104 and MA205 .............................................................................. 1
**Introduction**

In a student’s educational career, he or she will be evaluated by numerous problem sets called homework, in addition to being quizzed and tested on course material. The questions that have crossed many instructors’ minds are “which method of evaluation, graded homework or quizzes, will improve a student’s overall performance in the course?” or “what mixture of quizzes and homework works best?” Many studies have been done on whether homework is beneficial to a curriculum. Many other studies show that when homework is graded, students will perform better on quizzes. However, an experiment has not been done to determine which evaluation method (graded homework or quizzes) is better. When administering quizzes, valuable class time is used while the students take the quiz. Homework assignments allow students to complete the assignments at their own pace and accurately learn the course concepts. This paper will discuss this question and see which evaluation method has more of an impact on overall performance on course wide exams.

**Literature Review**

Quizzes and homework are widely used to facilitate the learning of assigned material; however, the level of significance and the importance of what role homework and quizzes play in the application of learning assigned material has not been compared. The usefulness of homework assigned points and quizzes together have been compared. Ryan and Hemmes demonstrated the usefulness of graded homework versus non-graded homework and compared each to quiz performance results. Each homework assignment and quiz corresponded to a textbook chapter. Ryan and Hemmes state, “Points were available for homework submission under this condition; points were not available under the no-points condition. The group-mean percentage of homework
assignments submitted and quiz grades were higher for all chapters under the point’s condition than in non points condition (Hemmes, 2005).” They demonstrated that when homework assignments are assigned a point value, students will perform better on graded events such as quizzes because they will spend time on their homework and ensure the accuracy of their answers. Harris and Sherman also concluded that when homework is assigned and accurately completed their grades are better associated with academic performance (Sherman, 1974).

The usefulness of just homework has been compared to overall course performance, but not individual course wide assessments. William Anderson looks at how homework may improve a student’s overall grade in a specific subject. Anderson evaluated two sections, each containing 29 students, of an eighth grade math course. One group would be assigned homework and the other no homework. Teacher comments also stated, “Pupils had a better sense of direction when they came to class and exhibited the ability to work with much less teacher directions than the non-home study group. The non-home study group, on the other hand, had varying levels of achievement in the three subjects, English, mathematics, and social studies, tending in a few instances to be very high and in others very low (Anderson, 1946).” The conclusions that came out of this study were very clear. The group assigned homework performed better than the non-homework section (Anderson, 1946).

Our experiment will look at the effectiveness of assigning just homework, or just quizzes, or a mixture of both. The effectiveness of each will be compared and discussed.
Testing Procedures

During the Spring 2011 semester data was collected from six MA104 (Differential Calculus) sections. During the Fall 2011 semester data was collected from six MA205 (Integral Calculus and Introduction to Differential Equations) sections. Each course was broken into three blocks of approximately one month each. During each block the homework and quiz grades were collected, as well as the grades on the block end exams (Written Partial Reviews or WPR). These scores were then averaged and compared. For each section and each block, it was noted what type of assignments were given. The three options were: 1) a mixture of quizzes and homework, 2) quizzes only, and 3) homework only. Both quizzes and homework were designed to evaluate student’s understanding of published course objectives. These objectives were the base of the WPR questions. The courses covered the same material in each section, but since two instructors taught the sections, some sections were given a different option for a particular block than others. For example, one instructor gave only homework during Block I, while the other gave a mixture of homework and quizzes.

Both courses were sectioned by ability, so within each section the students had similar mathematical abilities. The sections were composed of non-math majors. The WPRs were identical for each section; however, the format of the homework and quizzes differed by instructor. WPRs are graded in mass, using the same rubric. Homework and quizzes were graded by individual instructors. Lastly, the homework and quizzes were administered weekly.
Data Analysis

The following information was gathered following the end of each semester.

From the data above in Table 1 and Table 2, it is very clear that the homework only option did not achieve the best results. A mixture of both homework and quizzes appears to have the greatest effect on WPR performance overall.

### MA104 Results

In MA104, as seen in Figure 1, the sections which were given quizzes only had comparable WPR results (76.1%) to those sections which were given homework only (73.1%). The sections which were given a mixture of homework and quizzes scored the highest on the WPR (81.3%). In end of course surveys, the results for keeping the numbers of quizzes and homework were mixed. Some students wanted more quizzes, and appreciated the opportunity to test themselves prior to the WPR, while others wanted more homework, and appreciated the time to learn the material and
apply it at their own pace. Some students wanted more free time, and so they wanted less of everything.

**MA205 Results**

In MA205, as seen in Figure 1, the sections which were given only homework had higher grades on the WPR (73.4%) than the MA205 sections which were given only quizzes (62.9%). However, when both homework and quizzes were administered, the WPR grades were higher than those of quizzes only as well (69.5%). In end of course surveys, some students expressed appreciation for the graded homework. They appreciated the ability to practice problems that would be similar to WPR questions and the extra time they had to learn the material. There were some students, however, that did not appreciate the homework assignments. Most of these negative comments reflected a desire for less of a time requirement outside of class.

![Course Data](image)

*Figure 1: Course Data*
After looking at both classes, assignment of homework problems has a positive effect on WPR performance. However, so do quizzes. In considering differing abilities and learning styles in students, a good approach may be to assign both homework and quizzes.

Is there a correlation between HW grades and WPR grades? Or quiz grades and WPR grades?

No significant correlation was found between higher homework grades and higher WPR grades. Neither was correlation significant between quiz grades and WPR grades, although there was a higher correlation between quiz grades and WPR grades than between homework grades and WPR grades, but it was still not statistically significant. This statistic, however, does not directly address whether homework improves WPR performance or not. By comparing sections with homework and those without, the difference in WPR performance can be perceived. One thing that this experiment failed to look at was if students learn from their mistakes that they make on either a homework assignment or a quiz. Individuals may learn concepts on quizzes and homework after getting them wrong by reworking the problems. When they rework the problems, they increase their knowledge on the objectives, and then earn a higher score on the WPR.
Conclusion and Recommendations

After performing our analysis, the following conclusions can be made:

1) A mixture of both homework and quizzes has the greatest effect on WPR performance overall.
2) The homework only option or the quiz only option did not achieve the best results.

Recommendations for future research on this topic include:

1) Consider different mixes of homework and quizzes.
2) Consider a larger sample of differing abilities.
3) Consider different courses. Apply this concept to other math courses and other subjects to see if this concept is applicable across the spectrum of courses.
4) Survey students on which method they prefer.
5) Look at the complexity, length, and frequency of homework assignments.
6) Look at the complexity, length, and frequency of quizzes.
7) Look at the point value assigned to both quizzes and homework and how it affects performance.

This topic has many different layers that can be evaluated.
Bibliography


Appendix A—Cadet Comments for MA104 and MA205

MA104 Comments

C1. If you could make one improvement to the math program, what would it be and why?
There were 12 responses.

1. Make the homework mandatory. This would cause some complaints, but in all I think that it would help in the long run, especially for those who have trouble getting it right the first time. There could be a section for people who got grades lower than a B- in the first semester, and they would have to be the ones to do mandatory homework problems for the extra points and practice.
2. Less HW assignments. I don’t really gain anything from them.
3. Going over the homework more in class.
4. Keep the same amount of graded homeworks and projects because it seemed just the right amount.
5. The amount of quizzes
6. The quiz and WPR were good
7. Take the mathematica program, find a deep hole, throw it in there, fill it with concrete, and never let it out again.
8. More homework assignments.
9. If I could make one improvement to the math program, I would lessen the number of grade homeworks we had so that we had more time for our other classes because it seemed to me every time we had a math lab/graded homework, we also had a ton of other stuff going on.

10. C3. If you could keep one aspect of the math program the same, what would it be and why?
11. number of graded homeworks and projects
12. The amount of WPRs and quizzes were placed at the right times so that the materials were learned.
13. The many quizzes to keep up on our toes
14. the number of graded homeworks, and the material.
15. The number of quizzes because it helped us remember what we learned by testing us on it more recently.

16. E1. How would you improve this course?
17. More guidance on PSLs and more graded homework.
18. more small 30 point quizzes handed back early to learn from mistakes once gone over.
19. E2. What was the best thing about this course?
20. Doing projects and graded homeworks that will apply in the real world and understanding that we may have to solve problems like them one day in the military.
21. Quizzes and corrections
22.
23. E3. What was the worst thing about this course?
24. So many tests besides the WPR's
25. MA205 Feedback Fall 2011
26. too much homework.

27. **C2. If you could make one improvement to the math program, what would it be and why?**
28. I would make more weekly graded events such as weekly homework problems, with material that may appear on the WPR's.
29. make the wpr questions like the homework problems, because we are told to study them but when we get to the test the questions are in a different format and it is sometimes hard to understand

30. More points based off effort. Example being more homeworks and projects.

31. **E1. How would you improve this course?**
32. **C3. If you could keep one aspect of the math program the same, what would it be and why?**
33. The graded homeworks, because it was graded, students worked hard and usually together to learn and score well.

34. **E2. What was the best thing about this course?**
35. the graded hw opportunities
36. **more minor quizzes before WPR's**
37. I would definitely keep the graded homeworks, however make them shorter so cadets can more efficiently use their time.
38. Give more practice problems that are similar to what we can expect to see on the WPR.

39. **E3. What was the worst thing about this course?**
40. **Remove the nearly weekly homework assignments**
41. The number of available problems to work.
42. The projects and the graded homeworks, which helped out our grades a lot.
43. **Homework assignments instead of quizzes allowed me to really learn the information.**
44. **board problems and homework graded quizzes**
45. The graded homeworks each week.
46. **The worst thing about the course was the amount of home study problems assigned. While they were a great review for the course material alot of the homework took so long that I wasn't able to focus my attention on other classes.**
47. **Almost weekly homework assignments were more of a chore than a learning opportunity at one point during the semester.**