

HOMEWORK VS. ASSESSMENT: CORRELATION ANALYSIS OF AVERAGES

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ABSTRACT

This study was an analysis of homework average and assessment average. This study group consisted of 29 students enrolled in Algebra 1 during the 2007-2008 school year. The data for this study was collected from a student information system used by North Harrison R-III in 2007-2008 school year. The homework scores were calculated using the overall homework points earned by each student divided by the overall homework points available. These scores were then compiled to create an average per quarter. The same process was used to create the assessment average for each quarter. The raw data was then compiled to create the overall averages for the entire year. There is a significant relationship between higher homework averages and higher assessment averages. All students received the same instructions and assessments. This study recommends that school districts create a homework policy for all students. This has proven to result in increased assessment scores throughout the high school career. The study also shows that more research is needed to identify factors affecting the third quarter scores in a way that creates a much weaker correlation.

INTRODUCTION

This study examines the correlation between homework averages and assessment averages. The study group consisted of 29 students enrolled in Algebra 1 at North Harrison R-III during the 2007-2008 school year. The data analysis was completed using a correlation test.

Background, Issues and Concerns

There have been several studies done finding a correlation between homework average and assessment average. The issue lies in the satisfactory completion of homework. Students consistently failing to complete the daily homework for Algebra 1 has caused loss of time and learning in the classroom. The lack of homework completion lead to time spent reviewing material rather than covering new material due to a lack of understanding from not practicing concepts. Studies have proven if daily homework is completed, students would be better prepared and able to move at a more rigorous pace. (Keith, 1982) These practices also have proven to increase assessment averages. (Trautwein & Ludtke, 2007)

Practice under Investigation

The practice under investigation is the need for a homework policy within the North Harrison R-III School District. The current practice lacks accountability and consistency throughout the district.

Policy to be Informed by Study

The results of this study will be used to inform the school district about homework policies that best lead to desired student achievement.

Conceptual Underpinning

Everyone has had a battle of homework, whether as a student, parent, or educator. Cooper (2008a) found that a comparison across five studies, the average student who did homework had a higher test score than the students not doing homework. While this may seem common sense, educators still fight the homework battle on a daily basis. While there is always the argument of how much, how often, the need for homework is still prevalent. Cooper's study also gave the "rule of ten" for homework. That is, ten minutes of homework for each grade level. This would mean a ninth grader would have approximately ninety minutes of homework. Cooper also noted the homework needs to be meaningful, not just busy work taking time away from family or extracurricular activities. (Cooper, 2008b)

Statement of the Problem

Due to the lack of information as to how homework average correlates to assessment average, no school policy is in place at North Harrison R-III. This creates the problem of inconsistency in expectations throughout the district, in regards to homework.

Purpose of the Study

Homework policies are put into place by the teacher as far as how much, how often. However, districts also put homework policies into place in respect to late and missing assignments. North Harrison R-III school district does not have a homework policy. Based upon the results of this research and previous studies, homework policies need to be put in place in high schools. If homework policies are not in place, one cannot expect to see the higher assessment averages. The purpose of the study is to

create the information needed for the district to create a homework policy that reflects that will lead to best practices for student achievement.

Research Question

RQ1: Is there a significant correlation between homework averages and assessment averages?

Null Hypothesis

Ho1: There is no significant correlation between homework averages and assessment averages.

Anticipated Benefits of the Study

This study will prove the necessity of homework at the high school level. The homework policy can be developed based on the knowledge of a correlation between homework averages and assessment averages. Benefits of the study include greater consistency and accountability for homework policies throughout the district. These practices will then lead to greater student achievement.

Definition of Terms

Homework. Any work requiring completion outside of the regular classroom time.

Assessment. Tests given at the end of each chapter consisting of questions relating to the concepts covered within that particular chapter.

Summary

As educators battle the latest trend of less is more in regards to homework, educators must justify the need for homework at the high school level. As educators are to prepare students for a post-secondary setting, most of which contain work outside of the classroom setting. As shown in this correlation study, homework

averages have a direct relationship to assessment averages. If educators wish for our students to succeed, they must learn the value of homework.

REVIEW OF LITERATURE

Much research has been done relating to homework and assessments since the beginning of the education system. Many believe homework is not necessary and simply takes away from the child's time to play and spend time with family. (Skinner, 2004) As Americans, our dream is to produce intelligent, well-rounded children. This is not possible without the free time students need outside of school. At the same time, it is not possible without homework.

The homework battle has been going on since the first teacher sent home extra work. There is always someone who is not able to do their homework for one of the thousands of reasons every teacher has heard. In a poll conducted by the Associated Press in January 2006, 57% of parents felt their child was assigned the appropriate amount of homework. Out of the remaining parents, 23% felt there was too little homework, and 19% believed there was too much. (Cooper, 2008a) This shows we are pleasing the majority. However, there is a very vocal minority when it comes to children. This is the group we will forever attempt to keep at bay.

While this battle will rage on, the studies continue to support homework. The key to homework is effectiveness and appropriateness. Teachers need to assign meaningful homework that is a reasonable length. ("Focus on effectiveness", 2005) Homework should serve one of four purposes;

- a. memorization of basic rules, algorithms, or laws so the skill becomes rote
- b. increase skill speed to improve application in more complex problem solving
- c. deepening understanding of a concept
- d. preparation for the following day's learning ("Focus on effectiveness", 2005)

Applying this to an Algebra 1 classroom only makes sense. How many people could solve an extensive math problem the first time? It takes time, and practice. This is something that cannot be done without homework. Cooper (2008b) reiterates this by saying studies analyzing homework for practice and preparation consistently favor assigning homework for these purposes, and have a larger impact on delayed measurement of achievement.

Richard Walker, an educational psychologist at Sydney University, states data shows that in countries where more time is spent on homework, students score lower on a standardized test call the Program for International Student Assessment, or PISA. At the same time, Walker says, an hour or two per week usually does not impact test scores either way. However, inundating children with hours of homework is detrimental. (Wolchover, 2012) This idea is also supported by several studies that have been done in the United States. In another article by Harris Cooper, the Ten Minute Rule should be applied. This is Ten Minute Rule is simply multiplying the student's grade level by ten to determine how much time on homework is suitable. For example, a ninth grade would be able to complete ninety minutes of homework. (Cooper, 2001) Using this rule can produce great improvements on assessment averages, as well as, overall grade point averages. It was found that junior high students who do homework can expect to see a 10 percentile-point advantage and high school students doing homework can see a 19 percentile-point advantage. (Skinner, 2004)

Marzano (2001) states "the more homework students do, the better their achievement" in his book Classroom Instruction that Work. (p.63) Many believe there are underlying reasons for homework. Brian Gill, a senior social scientist at the Rand

Corporation, gives three of these reasons within his research. Gill states it extends the classroom work with additional time on task, develops habits of independent study, and is a form of communication between the school and parents. (Wilde, 2010)

While all this is important, the findings that students agree seemed even more interesting. Dominick Recckio completed a survey within his Central New York high school and found that students in the top 10% academically do all their homework, plus extra studying on a regular basis. There are always a few expectations, but these tend to be the auditory learners, who can hear it once and retain the information. During Recckio's survey, he also found the middle of the road and at risk students do not do their homework. Most believing it is not worth the time it takes since it is only a small percentage of the grade. (Recckio, 2012)

Recckio's findings are supported by a publication from National Council of Teachers of Mathematics in 2008. Cooper writes, "With only rare exceptions, the relationship between the amount of homework students do and their achievement was found to be positive." (Cooper, 2008 p.2) According to Trautwein and Ludtke, "effort on homework has a profound impact on student achievement" in an article from the Journal of Educational Psychology. (Trautwein & Ludtke, 2007 p.432) Timothy Keith also notes that study time contributed significantly to student grades. It is second only to that of intellectual ability. (Keith, 1982)

Regardless of the time it may take, homework has proven to be the most effective learning tool to date. If we are to produce knowledgeable, efficient citizens, we must teach the importance of homework.

RESEARCH METHODS

Research Design

The research for this study was done using the records of twenty nine students enrolled in Algebra 1 at North Harrison R-III during the 2007-2008 school year. The homework averages are a simple mean of each student's total points earned vs total points possible. The assessment averages are a simple mean of each student's total points earned vs total points possible. The averages were calculated for each quarter, as well as, a cumulative average using the entire year. These averages were compared using a correlation test to determine the significance of homework averages upon assessment averages. The homework averages were used as the independent variable, making the assessment averages the dependent variable.

Study Group Description

The study group chosen consisted of twenty nine students enrolled in Algebra 1 at North Harrison R-III in 2007-2008 school year. All the students received the same instructional methods and assessments throughout their course work.

Data Collection and Instrumentation

The data for this study was collected using records from North Harrison R-III Student Information System. The homework averages and assessment averages were found using an Excel spreadsheet. A standard correlation test within Excel was used to analyze the data for significance.

Statistical Analysis Methods

The data was analyzed for significance based on the p-value of the correlation test. The alpha level was set a 0.25 before beginning the test. The mean, correlation value, p-value, and practicality were all examined during the analysis of the data.

FINDINGS

The research design used for this study was based upon a simple correlation test. There are two variables within the study. Homework averages serves as the independent variable. Assessment averages serves as the dependent variable. There were five correlations run on this data. These five tests represent quarters 1,2,3, and 4, and an overall average for the year. The p-value determined significance based on an alpha level of 0.25. All five tests proved to be significant using the correlation of averages.

The data for homework averages and assessment averages was broken down by school year quarter and then presented cumulatively for the year. As presented in Table 1 below, the findings show a student's homework average to be a significant and practical way to predict their assessment average. This particular quarter was a moderately strong correlation at 0.566249 with a p-value of 0.00172802 based on an alpha of 0.25. This causes researchers to reject the null hypothesis of no relationship between homework averages and assessment averages. Researchers generally state a practicality of over 10% is useful. Quarter one showed a practicality of 31%. This is not the strongest quarter for the significance, but still supports the research question of a relationship between homework averages and assessment averages. The homework average for quarter 1 is 0.827, while the assessment average was slightly lower at 0.848.

Table 1

Summary Correlation Study Homework Average v Assessment Average for Quarter 1

	N	Mean	r	R ²	p-value
Homework Average	29	0.827			
Assessment Average	29	0.848	0.556249	31%	0.00172802

Note significance = or < .25

Table 2 analyzes the homework averages and assessment averages for quarter 2 of the 2007-2008 school year among the same twenty-nine students. Again, there is a moderately strong correlation between the averages. Quarter two has the best correlation value of 0.63791. This provided a p-value of 0.000197102 with an alpha of 0.25, which rejects the null hypothesis, and a practicality of 41%. Quarter two homework average is 0.825 with an assessment average of 0.808. Again, the test found homework averages to be both significant and practical in predicting assessment averages.

Table 2

Summary Correlation Study Homework Average v Assessment Average for Quarter 2

	N	Mean	r	R ²	p-value
Homework Average	29	0.825			
Assessment Average	29	0.808	0.63791	41%	0.000197102

Note significance = or < .25

Quarter 3, represented in Table 3, is the weakest of the five correlations. While the homework average, 0.733, and assessment average, 0.712, are still close in value, their correlation was only 0.23101, which is fairly weak. This provided a much lower correlation and a p-value of 0.227935 with an alpha of 0.25 which still rejects the null

hypothesis. There is also only a 5% practicality, making it impractical for prediction.

This quarter rejects the null hypothesis of homework averages have no relationship to assessment averages. This quarter does lead to some concern with the greater difference in significance in comparison to the other four tests.

Table 3

Summary Correlation Study Homework Average v Assessment Average for Quarter 3

	N	Mean	r	R ²	p-value
Homework Average	29	0.733			
Assessment Average	29	0.712	0.23101	5%	0.227935

Note significance = or < .25

Quarter 4 has the lowest values of the four significant correlations. Table 4 shows there is a close range between the homework average of 0.705 and assessment average of 0.700. This is a moderate correlation at 0.4747 and a p-value of 0.0092693 based on an alpha of 0.25. This test rejects the null hypothesis of no relationship between homework averages and assessment averages.

Table 4

Summary Correlation Study Homework Average v Assessment Average for Quarter 4

	N	Mean	r	R ²	p-value
Homework Average	29	0.705			
Assessment Average	29	0.700	0.4747	23%	0.0092693

Note significance = or < .25

The last correlation used to determine if there is a significant correlation between homework averages and assessment averages was an overall correlation. This was done using the entire set of data in a single correlation test. Table 5 shows there is a significant correlation at 0.525507 with a p-value 1.38788E-9 and an alpha of 0.25.

Once again, the null hypothesis is rejected. This test shows there is a practicality of 28%, making it both significant and practical for the prediction of assessment averages based on homework averages.

Table 5
Summary Correlation Study Overall Homework Average v Assessment Average

	N	Mean	r	R ²	p-value
Homework Average	116	0.772			
Assessment Average	116	0.767	0.525507	28%	1.38788E-9

Note significance = or < .25

Based on the findings from the five correlations, there is a significant relationship between homework averages and assessment averages. This simply means, your homework average should be closely related to your assessment average. If you were to look at the homework average, you could predict the assessment average for the same student. The only time this may be questionable is during quarter 3. Though the mean for both homework average and assessment average were still very close, the overall data was scattered in a way that made it a weaker correlation in comparison to the other four tests.

All five correlation tests proved that there is a significant relationship between homework averages and assessment averages. The only quarter that did not show a strong correlation was quarter 3. This makes it possible to say that a student's homework average can predict their assessment average.

CONCLUSIONS and RECOMMENDATIONS

This research study answered the research question regarding a significant relationship between homework averages and assessment averages. These findings are also supported by the research of Harris Cooper, Robert Marzano, and several other researchers.

The findings of this research study showed that all five correlations showed a significant and practical relationship between homework averages and assessment averages. Quarter 3 of the study data lends itself a much weaker correlation between homework averages and assessment averages, although there is still a small difference between the two averages. This data was taken from a sample of twenty-nine students all enrolled in Algebra 1 at North Harrison R-III during the 2007-2008 school year.

The conclusions and implications of this study would lend to the idea that homework is an essential part of any learning situation that involves an assessment at a later time. The homework average can serve a predictor of the assessment average for the individual. There are exceptions to this, as with any situation, mostly due to auditory learners. The idea of practice makes perfect still holds solid for the argument of homework. There is still the quandary of the third quarter data. Why is this data the only set that did not follow the same trend? Overall, the conclusion to support homework and create homework policies is found to be best practice.

Teachers should assign a reasonable amount of meaningful homework to keep students engaged in the learning process. Without the extra practice and application of processes we cannot expect mastery at a later date. This means that districts should have a homework policy in place to emphasize and support the assignments given. The

amount of weight homework bears on the grades and whether or not to accept late homework are all things to consider when writing such policies.

Based on the findings of this study, further research on the reason for the third quarter difference needs to be done. It would also be beneficial to research appropriate weighting of homework in a homework policy, along with the amount of homework assigned.

In conclusion, all five correlations showed homework averages to be both significant and practical predictors of assessment averages. Researchers have supported this idea throughout many studies evaluating the effects of homework and assessment scores. This indicates that schools should have a homework policy in place to support teachers implementing homework as part of their teaching practice. No one has ever won the Super Bowl without some rigorous practice. How can we expect students to be successful academically without the same type of practice? Homework is the answer to helping students achieve success. We must find ways to make it important to them, if they wish to succeed.

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