

The Effect of Technology-Infused Homework Practices on Homework Completion Rates

by E. Gerard Filosa

Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Education

July 2014

Graduate Programs in Education
Goucher College

Table of Contents

List of Tables	i
Abstract	ii
I. Introduction	1
Overview	1
Statement of Problem	3
Hypothesis	3
Operational Definitions	3
II. Review of the Literature	4
The Importance of Homework	4
Changing View of Homework	8
Homework Completion	10
Technology Infused Homework Practices	13
Summary	15
III. Methods	16
Design	16
Participants	17
Instrument	17
Procedure	19
IV. Results	20
V. Discussion	21
Implications	21
Theoretical Consequences	21

Threats to Validity	22
Connections to Previous Studies/Existing Literature	23
Implications for Future Research	24
Conclusions	25
References	26

List of Tables

1. Mean and Standard Deviations of Pre-Test and Post-Test Scores for Each Group	20
---	----

Abstract

The purpose of this study is to determine the impact of homework practices (worksheets/paper & pen) on students' poor homework habits in standard level Chemistry classes. The measurement tool was the students' homework completion rates. The study involved a quasi-experimental design in which a control group received traditional homework assignments and the experimental group received the online homework assignments. The study spanned two units from the Baltimore County Public Schools (BCPS) Honors/Standard Chemistry Curriculum and lasted approximately seven weeks. The null hypothesis was supported. The results show that online homework practices did not lead to an increase in homework completion rates. Future research is recommended examining the impact technology-infused homework practices has on homework completion and performance among high school students.

CHAPTER I

INTRODUCTION

Overview

Today's students have greater access to technology than previous generations. They have grown up using computers as a part of their daily lives. Technology is used for everything from social interactions to research and it should play an integral role in the education of students. Today's school-aged children already spend so much time in front of a computer, why not have them use it to accomplish their school work, specifically their homework? Access to computers and the internet is so prevalent today that it is rare to have a student that does not have easy access to a computer and the internet. As the needs of students change over time, it is important for educational practices to change and adapt in order to meet the ever-changing needs of the students.

Reviewing the research, there is a connection (albeit a weak connection) between homework performance and student achievement. Homework, when used properly, can be an effective teaching tool. The research suggests that one strategy to help improve homework completion rates is to use different media for the completion of assignments. Utilizing the computer for homework assignments offers several potential benefits to students and teachers (Salend, 2004).

This study will examine how homework practices can affect homework completion rates in a high school chemistry class. Specifically, traditional homework practices (worksheets/pen & paper) will be compared to online homework practices to see if the type of assignment is a cause of poor homework habits in standard-level classes. The students for this study will be chosen using a convenience sampling from three standard-level chemistry classes

the researcher teaches. The research will be a quasi-experimental study because it compares two groups but there is no randomization in the groups.

Homework has been a concern in education for many years. There are groups of educators that do not see any value in homework, while there are others that view it as an integral part of effective educational practices. Homework avoidance is not a new phenomenon, either. There are several different factors for homework avoidance among students. This research will look to see if the type of assignment, traditional versus online, is a contributing factor toward homework avoidance.

This research focus was chosen because technology is becoming more and more pervasive in the classroom. Local, state, and national education reforms stress the need for students to become 21st century learners and to be competitive on a global stage. Today's students have a greater access to portable technology and the internet than students before them. Most students have access to some form of computer or internet enabled device that can be used to help enhance their educational experience. Educators can take advantage of the students' access to technology to meet the ever-changing needs of the students they teach. School districts across the country are looking toward technology to enhance the educational experience of the students in their school.

Baltimore County Public Schools (BCPS) has taken a progressive approach to technology integration into educational practices. They permit the use of personal devices when used to accompany instruction. Recently, BCPS has made a very bold technology-based initiative: every student will be issued a personal computer to help make them 21st century students. It is for these reasons that it is important to see if technology-enhanced homework practices have an impact on homework completion.

Statement of Problem

The purpose of this study is to determine the impact of traditional homework practices (worksheets/paper & pen) on students' poor homework habits in standard level classes.

Hypothesis

Technology-infused homework assignments will not have a significantly higher rate of completion than traditional homework assignments.

Operational Definitions

The *type of homework assignment (traditional vs. technology infused)* is the independent variable. *Traditional homework* assignments will consist of problems assigned from the textbook or other teacher-created worksheets. *Online homework* will be the same in content as the traditional assignments but will be completed using Quia, an online educational website that allows teachers to create assignments, review games, quizzes, and other assessments. Quia is a subscription based service that allows teachers to craft their own assignments and automatically grade the assignments and track student progress. The online assignments will also allow students to access video, animations, and other multimedia to assist students when completing the assignments.

Student homework completion rate is the dependent variable. Homework completion is defined as completing at least 75% of the homework assignment; anything less will be considered an incomplete homework assignment

CHAPTER II

REVIEW OF THE LITERATURE

Historically, homework has often been considered an integral part of education.

Homework is viewed as a tool for teachers to enhance student learning outside the classroom. There has been a considerable amount of research conducted studying the relationship between homework and student achievement. The research shows a moderate to weak connection between the two at the middle and secondary levels and no connection between the two at the elementary level (Ramdass & Zimmerman, 2011). This tenuous connection between student achievement and homework has led many to question the role homework has in the modern American education system. With the increased scrutiny on homework, it is important to examine exactly what role it plays in the education system and effective homework practices to best benefit today's students.

This literature review will first examine the role homework plays and its importance as a part of the educational process in American schools. In the second section, the changing attitudes toward homework will be discussed, starting with the reaction to the launch of *Sputnik I* and continuing to the present day. Homework completion and effective homework practices will be examined in the third section. In the final section, the strategies for infusing technology to aid and enhance homework practices will be discussed.

The Importance of Homework

The definition of homework may vary from source to source, but, in general, homework is any task assigned by the teacher to be completed outside of classroom instructional time (Ramdass & Zimmerman, 2011). In fact, homework can be any of the following activities: pre-reading for a future lesson, reading text of the day's lesson, practicing skills taught in class,

extending and applying basic skills to new areas, studying for quizzes or tests, or any other activity that pertains to what is being taught in the classroom (Romano, 2012). All of these activities are capable of helping students learn and retain the information presented in class.

Proponents of assigning homework argue that homework does help student achievement and research does show that there is moderate to weak gains in academic achievement for middle and high school students. This tends to be the main motivating factor for assigning homework. Another benefit to assigning homework is the promotion of self-regulation for students. Some of these processes include goal-setting, time management, maintaining attention, and self-efficacy (Ramdass & Zimmerman, 2011). Critics of homework argue that it does not improve study skills or enhance student achievement (Kralovec & Buell, as cited in Ramdass et al., 2011). Improved academic performance is important when it comes to evaluating the learning/performance of the student. This can help open doors to students at all educational levels. It may make opportunities available that would not be available if they did not have good grades. Some argue that a more important benefit of the practice of assigning homework is the promotion of self-regulation. This is a very important set of skills that not only help the students while they are still in school, but they can also help the students as they transition to the professional world.

A key component to the efficacy of homework is the type of homework assigned. An important aspect of this is whether or not the homework assigned by the teacher is relevant to what is happening in the classroom. A trap teachers have to avoid is the notion that they must give their students homework. Conventional practices in education suggest students have 30 minutes of homework per class each night. It is important that the homework assigned by a teacher has a specific purpose. It is also helpful for teachers to communicate the purpose of the

assignment to the students so that they see that the assignment is meaningful (Romano, 2012). Homework should be used to extend, build upon, and reinforce the learning that takes place in the classroom. When used for these purposes, homework has the potential to aid student achievement.

When assigning homework, it is important to consider several factors when constructing the assignment. In a survey of high school students, one complaint the students had toward homework was that often there were very high expectations tied to the assignment (Salee & Rigler, 2008). These high stakes assignments had the potential to significantly impact their grades. Another interesting fact learned from the student responses was that they felt they had to do a lot of the learning on their own outside the classroom.

A major complaint of students regarding their homework is the amount of time it consumes. Assuming students receive 30 minutes of homework per class, this gives them three and a half to four hours of homework each night. The American educational system also “encourages” students to be involved in after-school sports, clubs, or other activities. Many students have after-school jobs. All of these activities leave very little down time for students each night. In a survey, 49% percent of students said they committed two to three hours a day to after-school activities; 62% devote at least four hours a week to after-school activities. All this adds up and has an impact on the students. This is just another reason to assign meaningful homework assignments.

When it comes to constructing and assigning homework activities, it is very important to make sure it is meaningful and has a purpose. Vatterott (2010) says there are five hallmarks to good homework: purpose, efficiency, ownership, competence, and aesthetic appeal. One often overlooked hallmark is efficiency. Try to get the “most bang for the buck.” Tasks that take an

inordinate amount of time or that show no evidence of relationship to learning run the risk of being viewed as busy work. For those tasks that may require a lot of time to complete, why not set aside time in class to get started on the assignment (Salee & Rigler, 2008)? Not only does this not overburden students, it also communicates the importance of the task through the devotion of class time toward accomplishing the assignment.

Another hallmark mentioned that is often overlooked is competence. Homework that students cannot do without help is not good homework (Vatterott, 2010). This only discourages students. In the survey performed by Salee & Rigler (2008), they found that 57% of students turned to outside sources for homework assistance. Instead, teachers should try differentiating tasks for different levels of students within the class. One can even go as far as not penalizing students that display competency in class for not completing homework (Romano, 2013). If the purpose of the assignment is skill reinforcement, it is not necessary for those that display mastery to have to complete additional tasks.

Another effective homework strategy, that also promotes self-regulation, is allowing the students to assess their own homework activities. Posting answer keys online can be an effective way for the students to self-assess their work. This not only allows students to recognize where their weakness may exist, but it also saves time in class; less time has to be devoted to homework review. Additionally the teacher may be able to better use this time to address students' problems completing the assignment (Romano, 2013).

Changing View of Homework

In order to understand the role homework plays in today's classrooms it is important to examine past practices. The watershed moment that transformed the American education system's view toward homework is the aftermath of the launch of *Sputnik I* in 1957 (Vatterott, 2009). Prior to 1957, there was a strong anti-homework sentiment. Homework was almost never assigned to elementary school students and it was only assigned in small amounts in the secondary schools (Gill & Schlossman, as cited by Vatterott, 2009). After the launch of *Sputnik I*, homework was viewed as a way to accelerate the acquisition of knowledge. During the Vietnam War era, the views toward homework changed again. There was not only a movement to abolish homework, but it was recommended that children be allowed time to play and socialize. Homework was generally recommended to be limited to one hour a night (Wildman, as cited by Vatterott, 2009).

The pendulum swung again with the report *A Nation at Risk* (U.S. Department of Education, 1983). This report blamed the economic troubles of the late 1970s and early 1980s on the American education system. This pro-homework sentiment has continued to build into the 2000s. The *No Child Left Behind Act of 2001* (NCLB) (2002) set accountability standards for schools and school systems. Homework was viewed as a tool for meeting those standards established by NCLB. The pro-homework sentiment continued to build until it finally reached a tipping point. Students, of all grades, were becoming so overburdened with homework that people began to question the value of the homework they were assigned. This backlash against the pro-homework sentiment is where the American education system is today. There is a lot of research concerning the efficacy of homework, its effect on student performance, and what practices are best for homework.

Today, there is an ongoing debate between the pro-homework and anti-homework supporters. Vatterott (2009) states that there are several forces driving this debate: technology and media, the new mass hysteria, and the balance movement. Media and technology have helped to foster the current debate. Never before have so many people had a voice in this debate. The internet and social media outlets have brought this debate into everyone's home. More and more people, from scholars, to educators, to parents, and students are lending their voice to the debate through the many media outlets available to them. All of this media attention has fueled mass hysteria among parents.

There is a fear that is pervasive that parents must do all they can to get their children into the best colleges. This has led to a dramatic increase in enrollment in programs like Advanced Placement (AP) and International Baccalaureate (IB). Students are being encouraged to take higher level and more rigorous classes. With these classes also comes more homework; either greater amounts of homework or additional time spent on homework because they lack the skills needed for the higher-level classes.

The balance movement is counter to the new mass hysteria. This movement seeks to slow things down and seeks balance in children's lives. This movement is concerned about the immediate and long term effects of homework dominating a student's time outside of school.

Throughout the history of the American educational system, the homework debate has swung back and forth. The current debate concerning homework is unique because there is a diversity of attitudes toward the value of homework (Vatterott, 2009). Teachers and schools tend to be caught in the middle of this debate. Until research can clearly support one side of the debate, educators will have to walk a tightrope to appease both sides. It is important to give meaningful and relevant homework, but educators also have to be mindful of the many factors

competing for our students' free time. Educators have to carefully construct activities that will foster learning, but also be a meaningful use of a student's time.

Homework Completion

Homework assignments are generally considered part of a student's schooling. These assignments are intended to help students prepare for future classes, review skills learned in class, study for quizzes and tests, etc. Teachers expect that students will complete these assignments and students are given a grade for their performance on their homework assignments. Whether students are given a completion grade or the assignments are collected and graded for accuracy, students' performance on these activities directly impacts their overall grade for the class. There are competing schools of thought on how to assess homework. One school of thought believes that simply checking for completion devalues the assignment in the eyes of the students. If students know the assignment will not be graded, they will only put minimal effort into the assignment and not reap the intended benefits of the assignment (Romano, 2013). On the other hand, others argue that grading homework assignments for accuracy creates a high stakes situation which may place too much emphasis on the assignment (Salee & Rigler, 2008). The proper way to assess homework most likely lies somewhere in the middle of these two competing schools of thought.

Students are not likely to recognize the teacher's motivation for assigning particular work. There are students that view time outside the classroom as their time and are not likely to work on schoolwork outside the classroom setting. These students that are avoiding homework are not reaping the benefits of these assignments. It is important to try and identify the causes as to why the students are not completing their homework. Two of the most common reasons for homework avoidance among students are the lack of time and the lack of purpose. Today's high

school students face increasing pressure to make themselves more marketable and unique to the colleges to which they are applying. Students are encouraged to participate in a wide array of clubs, sports, and other school activities. They are encouraged to perform community service, and some students have jobs. When homework is added to the picture, students have very little time to socialize. One of the top causes of homework avoidance, according to surveyed students, is that they simply do not have enough time (Hinchey, 1996). All of their school-related responsibilities leave very little time for students to unwind and socialize. Sometimes homework is not done to allow the students time to themselves or with friends or family. Another reason students give for homework avoidance is a lack of purpose. When teachers do not check, collect, or even mention the previous night's homework in class, students do not see its importance. When teachers do not care about the assignment, it is very likely students will take the same attitude. Another potential source of the perceived lack of purpose is the teacher's homework practices (Bryan & Burstein, 2004). If teachers are not assigning appropriate assignments with clear expectations and purpose, students are more likely not to complete the assignment.

In order to improve homework completion, a few areas must be examined: the amount of work given, the connection of the assignment to the class, and teachers' homework practices. The area teachers have the most control over is their homework practices. Teachers are willing to consider methods that are feasible, cost-effective, and valuable (Bryan & Burstein, 2004). One strategy is to make the homework more meaningful; this includes assigning only what is important to foster student learning and retention of information. Another strategy teachers can adopt to help increase completion rates is to have the homework make real-life connections (Bryan & Sullivan-Burstein, 1998). Making real-life connections may be easier in the elementary grades than in middle and high school, but teachers can craft assignments in which

the connection to the classroom learning is clear.

Some other strategies for increasing homework compliance among secondary students are the use of cooperative study teams, student planners, teacher feedback, and student feedback (Bryan & Burstein, 2004). Cooperative study teams increase homework completion through group work. The students have a support group that can help in the event of struggles with the work. A student's responsibility to the other group members can be a strong motivating factor for completing homework assignments.

Student planners are another proven way to positively impact homework completion. Although not mentioned earlier, a student's organizational skills can impact homework completion. This is not necessarily a cause for homework avoidance; rather, it is a cause of homework incompleteness. Teacher feedback can be a very strong motivating factor for completing homework assignments. If a teacher does not grade a homework assignment, there is very little motivation for the students to complete the assignment. More importantly, grading the assignment provides even more motivation for students to complete the assignment (Romano, 2013). An interesting strategy is having the students provide feedback about the assignment to the teacher. In their study, Bryan & Sullivan-Burstein (2004) found that soliciting feedback from the students about the difficulty of an assignment led to greater completion rates. This practice is also helpful for teachers so they can compare their assessment of the assignment to the views of students. This can help teachers craft more meaningful and appropriate homework assignments.

Another strategy to help improve homework completion rates is to use different media for the completion of these assignments. Students live in an increasingly digital world. Computers, tablets, and smart phones are finding their way into the classroom. Teachers need to harness this infusion of technology to their benefit. Today's students are spending more time in

front of an internet connected device. Utilizing the internet for homework assignments offers several potential benefits: facilitation of collaborative work, access to multimedia resources, and offering immediate feedback (Salend, 2004).

Technology Infused Homework Practices

Technology infused homework practices are commonplace at colleges and universities, but they are not so common at the secondary and elementary levels. The latest education reform, Race to the Top (RTTT), stresses that students become competitive in a global community. Part of this reform requires students to become proficient using digital communication tools. Recently, there has been a great push to have elementary and secondary students use technology as part of their education. It is about time that elementary and secondary students reap the benefits of a technology infused education that college students have enjoyed for the past 10-15 years. One way to accomplish this is to use the internet and web-based programs for homework assignments. Research has found that replacing quizzes with online homework assignments has significantly improved student performance in college chemistry classes (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011). This study also found that 90% of students self-reported that they were completing all of their online homework.

Web-based assignments are not bringing about new and revolutionary homework practices, rather they are facilitating the implementation of already recognized effective homework practices. Bryan & Burstein (2004) said that some strategies for increasing homework compliance among secondary students are the use of cooperative study teams, student planners, teacher feedback, and student feedback. There are a number of web-based services that can facilitate these strategies.

Online homework assignments have a lot of potential as a learning tool. One of the

greatest potential benefits is the opportunity for instant feedback. Teachers can use a variety of services that will grade homework assignments and provide students instant feedback when they complete the assignment. This instant feedback deals with the complaint from students that their homework is not meaningful, because the teacher does not check or grade the assignment. The feedback gives students the opportunity to recognize their mistakes and try to learn from those mistakes. In the study performed by Richards-Babb et al., (2011), 60.2% of students surveyed indicated that they looked over the graded homework to learn from their mistakes.

Another interesting finding the study performed by Richards-Babb et al., (2011) was that 63.0% of students said their main motivation for doing homework was because it was being graded (Richards-Babb et al., 2011). Giving credit for work completed is a very strong motivating factor for students. If the homework is being graded by the web-based service then the teacher should record the grade they earn on the assignment. This strategy will have the students view the assignment as being meaningful.

Online homework can help foster collaborative work environments between students. Many researchers agree that true technology integration in the schools relies on creating student-centered learning experiences (Hammonds, Matherson, Wilson, & Wright, 2013). Web-based assignments and activities can be conducive to online collaboration. Web-based services like EdLine, Engrade, PBworks, and Edmodo are just a few of the web-based services that provide opportunities for students to work in collaborative groups to complete homework assignments.

The use of a class website can be used as a form of student planner. Posting homework and other assignments can eliminate the need for a paper and pencil student planner. A teacher can use a calendar to show when assignments are due and when tests and quizzes will take place. Another way teachers can utilize class web sites is to post assignments and handouts for the

students to download and link to online activities. Most importantly, class websites can help increase the communication between parents and teachers. Posting what is happening in the class for the parents to see can help make them take an active role in their child's education.

All of these strategies are not unique to web-based assignments, but the web-based services can help make it easier for teachers to implement effective homework strategies.

Summary

Research shows that there is a moderate to weak connection between homework and student achievement at the secondary level (Ramdass & Zimmerman, 2011). Homework should be considered an integral part of an effective education and it is important to recognize how to effectively use homework as a teaching tool. Web-based homework assignments are not meant to revolutionize homework practices within schools. Rather, they can help teachers to put effective homework strategies into practice.

CHAPTER III

METHODS

The purpose of this study is to determine the impact of traditional homework practices (worksheets/paper & pen) on students' poor homework habits in standard level classes.

Design

This study is based on a quasi-experimental design. There were two sampling groups, the control group and the treatment group, but the sampling groups were not chosen at random. The control group was given traditional homework assignments while the control group was given online homework assignments. This study employed convenience sampling. Students were able to choose in which group they would participate.

The control group was given handouts for their homework assignments to complete and turn in the next day. The handouts typically contained practice problems to help reinforce the concepts the students learned in class. For the purpose of this study, students were only graded on completion of the assignment even though the researcher allowed the students to check their work by displaying the answer key.

The treatment group was required to complete their homework assignments via Quia.com, a service that allows teachers to post assignments and quizzes for students to complete online. The online assignments had the same content as the traditional homework assignments, but they also contained videos, animation, and other media to assist the students. The information presented in the multimedia component of the assignment was similar to information that could be found in the textbook for the class. Students received credit for homework completion if they answered at least 75% of the questions and submitted their work by the next class. Student completion was recorded by services provided by Quia.com, but it also provided

students with instant feedback once they submitted their assignments.

This study spanned two units that last approximately seven weeks in total during the 2nd half of the third marking period. In total, there were 23 assignments the students were assigned over the course of this study.

Participants

The research participants were students from the researcher's three standard-level chemistry classes. Convenience sampling was used and the students were allowed to select which group, control or treatment, they would be in for this study.

The control group consisted of twenty-six students. These students either elected to be in the control group or did not select a group and were assigned to the control group. Of the twenty-six students, fourteen were female (53.8%) and twelve were male (46.2%). Sixteen students were African-American (61.5%), eight were Caucasian (30.8%), and two were Hispanic (2.2%).

The experimental group consisted of eighteen students. These students elected to participate in the experimental group at the beginning of the study. Of the eighteen students, eight were female (44.4%) and ten were male (55.6%). Twelve students were African-American (66.7%), four were Caucasian (22.2%), two were Hispanic (11.1%), and one was Asian (5.6%).

Instrument

Homework assignments were the basis for comparison in this study. Homework was checked for completion the day following assignment. A student received credit for completion as long as they completed 75% of the assignment. This shows that the student made an honest effort to complete the assignment. Students received a score of incomplete if they completed less than 75% of the assignment. There was no test or other assessment used for this study

therefore validity and reliability information regarding the instrument is not available.

Procedure

The research began during the third marking period with the start of the gas laws unit from the BCPS Chemistry curriculum, March, 2014. The research study spanned two units, gas laws and solutions/acids & bases. The study was concluded in April, 2014 with the completion of the solutions/acids & bases unit.

A week before the study was to begin students were asked which group, control or treatment, they wished to join. The details and expectations regarding the two groups were explained to the students. Students that did not choose a group were assigned to the control group. This group received the same type of homework assignments they had been receiving previously during this class.

Throughout the course of this study, all students were assigned homework on a regular basis. Students in the control group received traditional homework assignments. Students in the treatment group were given assignments to complete online via Quia.com. The online assignments were the same in content as the traditional assignments with the exception that the online assignments were to be completed via Quia.com.

The next class after each homework assignment was given to the students, it was checked for completion. Records were kept noting each student's homework completion. At the end of the study, the results were compiled and the homework completion rate for each student was calculated by comparing the number of completed assignments to the total number of assignments.

CHAPTER IV

RESULTS

The purpose of this study was to determine the impact of homework practices (worksheets/paper & pen) on students' poor homework habits in standard level Chemistry classes.

A dependent *t*-test was run to see if there was any significant difference between groups' pre-test and post-test scores. The pre-test scores were the students' homework completion rates prior to participation in the action research project. Post-test scores were the students' homework completion rates during their participation in the action research project.

The results showed no significant differences for the control group, $t(25) = .168$, $p > .05$, or the experimental group, $t(17) = 1.232$, $p > .05$. These results support the null hypothesis that technology-infused homework practices would not have a significantly higher rate of completion than traditional homework assignments (see Table 1). These results will be further discussed in Chapter V.

Table 1.

Mean and Standard Deviations of Pre-Test and Post-Test Scores for Each Group

Group	Pre-Test	Post-Test
Control	81.91 (14.63)	81.46 (18.23)
Experimental	87.68 (10.46)	83.8 (16.91)

CHAPTER V

DISCUSSION

This study was conducted to investigate the original hypothesis that technology-infused homework assignments would not have a statistically higher completion rate than traditional homework assignments, and this was supported by the results. The mean homework completion rate for the experimental group decreased compared to their pre-treatment homework completion rate. The decrease in homework completion rate, albeit not a statistically significant decrease, will be discussed further in this chapter.

Implications

The findings of this study suggest that there is no significant connection between the type of assignment and homework completion rate. The experimental group did not show a statistically significant change in homework completion rates among students in a Standard-level Chemistry class. These findings do not suggest that one type of assignment, pen/paper or online, is better than the other. Rather, it suggests that the type of assignment does not play a role in whether or not a student will do their homework. This is important as technology and the Internet are playing an ever increasing role in education. The findings suggest that transitioning a greater amount of student work to online activities will not have a statistically significant negative impact on the completion of educational tasks. This is important as more and more school systems deploy technology-based initiatives, like Baltimore County Public Schools's (BCPS) Students and Teachers Accessing Tomorrow (STAT) program, in order to make students 21st century learners.

Theoretical Consequences

One potential theoretical consequence to this study would be to assume that online

assignments are not an effective educational tool since they did not result in an increase in homework completion rate among the students in the experimental group. While this study did find that online homework assignments did not have a significant impact on homework completion rates, it would be wrong to totally discount the use of online assignments in educational practices. This notion flies directly in the face of current educational trends. The latest federal educational program, Race to the Top (RTTT), calls for schools to make the students 21st century learners. In order to become 21st century learners, students need to use technology and develop skills that will allow them to be competitive on a global stage.

Another consequence of the findings of this study is that the media of the assignment, pen/paper versus online, does not have a significant impact on completion rates. A positive spin on the findings is that the media of the assignment does not affect completion rates. This may help alleviate concerns teachers may have as they transition from traditional teaching methods to newer “21st century” teaching methods. These findings also show that simply assigning online assignments will not increase homework completion rates. Other strategies need to be employed in order to increase homework completion rates among students.

Threats to Validity

Even though the null hypothesis was supported, there were threats to validity that may have affected the results. An external threat to validity was the sample size of each group. This study only had 44 participants; there were 18 students in the experimental group and 26 students in the control group. Another external threat was the sampling method used for assigning the students to their respective groups. Because of potential issues with technology and online access, students were allowed to select which group they would be a part of, control or experimental. The sampling method led to another potential external threat, reactive

arrangements. The students volunteered to be a part of the experimental group. It is possible that since they volunteered, they would be more motivated to complete their homework than if students had been randomly assigned to groups. An environmental factor that is a threat to the validity was the timing of this study. The study took place during a portion of the third marking period. Beginning the treatment this late into the school year may have had an influence on the results.

Connections to Previous Studies/Existing Literature

Connections can be made between this study and a study that examined how online homework assignments improved performance in college chemistry classes (Richards-Babb, Drelick, Henry, & Robertson-Honecker, 2011). The study performed by Richards-Babb et al., found that replacing in class quizzes with online homework statistically improved student performance. The study also found that 90% of students self-reported that they were completing the online homework assignments. While data is not available on homework completion rates prior to the treatment, the study does conclude that online homework assignments had a positive impact on student performance. This correlation may be due to the fact that the homework assignments were graded and students could view the results of their assignments and use the results as a learning tool. Bryan & Burstein (2004) said that some strategies for increasing homework completion rates among secondary students are the use of cooperative study teams, student planners, teacher feedback, and student feedback.

One strategy that is supported by the study performed by Richards-Babb et al., (2011) is the use of teacher feedback. The researchers reported that 63.0% of students said their main motivation for doing homework was because it was being graded (Richards-Babb et al., 2011). Giving credit for work completed is a very strong motivating factor for students; it helps the

students view the assignment as meaningful and therefore as something that needs to be completed.

This study is similar in that it attempted to examine the effect technology-based practices had on student performance. However, it did not attempt to replicate the results of the study performed by Richards-Babb et al., (2011); rather it sought to identify another factor that might influence homework completion rates among secondary students.

Implications for Future Research

While this study found there was no significant relationship between online homework practices and completion rates, further research should be performed on this topic. The timing of this study may have influenced the results; the study took place in the third marking period. By this point in the school year, students' homework practices may be more rigid and less apt to change. Starting a study like this at the beginning of the school year may yield different results.

This study's lack of a significant relationship between the use of online homework practices and homework completion rates should not discourage future research on the topic of online homework assignments. On the contrary it raises additional questions regarding the use of online assignments. Will graded feedback on homework assignments result in increased completion rates? Online services like Quia.com, EdLine, and Engrade all have the ability to grade online homework assignments instantaneously; teacher graded homework rarely receives such prompt feedback to the students. Will online homework assignments increase student performance on unit tests? With the prompt feedback online homework can offer, will this help the students learn from the mistakes they make in their homework assignments? As the use of technology in the classroom becomes more and more prevalent, these are questions that should be explored.

Conclusions

This study's original intent was to explore whether or not technology-infused practices might influence homework completion rates in a Standard-level class. While this study supported the null hypothesis, it helped to provide some insight into why students do not do their homework. Homework avoidance was not related to the type of assignment, pen/paper versus online, rather it is related to some other causes that need to be identified through further investigation.

This study showed that the type of assignment does not influence homework completion rates. As teachers and schools employ more and more technology-based educational practices in order to "create 21st century learners," educators should embrace new technology-based educational practices. While they may or may not lead to increased student performance, it will help students develop skills they will need in order to be more competitive on a global stage.

References

- Bryan, T., & Burstein, K. (2004). Improving homework completion and academic performance: Lessons from special education. *Theory into Practice*, 43(3), 213-219.
- Bryan, T., & Sullivan-Burstein, K. (1998). Teacher-selected strategies for improving homework completion. *Remedial and Special Education*, 19(5), 263-75.
- Hammonds, L., Matherson, L. H., Wilson, E. K., & Wright, V. H. (2013). Gateway tools: Five tools to allow teachers to overcome barriers to technology integration. *Delta Kappa Gamma Bulletin*, 80(1), 36-40.
- Hinchey, P. (1996). Why kids say they don't do homework. *Clearing House*, 69(4), 242.
- Mendicino, M., Razzaq, L., & Heffernan, N. T. (2009). A comparison of traditional homework to computer-supported homework. *Journal of Research on Technology in Education*, 41(3), 331-359.
- Ramdass, D., & Zimmerman, B. J. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics*, 22(2), 194-218.
- Richards-Babb, M., Drelick, J., Henry, Z., & Robertson-Honecker, J. (2011). Online homework, help or hindrance? What students think and how they perform. *Journal of College Science Teaching*, 40(4), 81-93.
- Romano, M. (2013). Defining your homework stance (Part 1). *Science Teacher*, 79(11), 11.
- Romano, M. (2013). Defining your homework stance (Part 2). *Science Teacher*, 80(1), 14.
- Salend, S. (2004). Using the internet to improve homework communication and completion. *Teaching Exceptional Children*, 36(3), 64-73.
- Vatterott, C. (2010). Five Hallmarks of Good Homework. *Educational Leadership*, 68(1), 10-15.

Comment [T1]: Capitalize the first word after a colon in the title

Vatterott, C. (2009). *Rethinking homework: Best practices that support diverse needs*.
Alexandria, VA: Association for Supervision and Curriculum Development.