

[DOI: 10.20472/TEC.2015.001.001](https://doi.org/10.20472/TEC.2015.001.001)

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HOMEWORK COMPLETION: PERCEPTIONS AND COMPARISONS OF 6TH-12TH GRADE STUDENTS USING TRADITIONAL AND DIGITAL SUBMISSION

Abstract:

As technology becomes more prevalent throughout society, schools must adapt to effectively utilize technology in support of classroom instruction and assessment. This study focused on a comparison of three forms of technology that may be used in public middle and high schools for digital submission of student work. Student usage of Moodle, Gaggle, and Google Drive at one middle school and one high school in central Illinois was monitored. Researchers sought to answer how the rate of homework completion was affected by use of digital versus traditional submission of assignments as well as gain insight to teacher and student perceptions of the technology. In the course of this study, researchers identified a significant decrease in student return rates of homework when digital submission was utilized instead of traditional submission. This decrease was observed across all grade levels. Teacher and student perceptions of the technology were mixed, indicating a divide in both use and preference for or against digital submission.

Keywords:

Homework Completion; Traditional vs. Digital Homework Submission; Teachers' & Students' perceptions; Middle and High School

JEL Classification: I29, O39, I21

Introduction

Since the release of the National Educational Technology Standards in June 1998, school districts and educators have been under increasing pressure to utilize rapidly-changing technology effectively in the classroom. Students growing up in a digital age with a wide variety of exposure to digital mediums have varying levels of competency with technology, as do educators. Teachers must seek to meet students where they are with technology, build upon existing skills, and prepare students for a very interconnected global society (Hernández-Juhán, 2012). The impact of technology as a whole on the educational practice is staggering. Many traditional school staples, such as homework, are shifting to embrace the use of technology. Homework is frequently employed to develop self-regulatory behaviors (Bembenutty & Zimmerman, 2003), enable students to practice and internalize skill sets, and provide educators with a formative assessment on key concepts (Boston, 2002). The question of how best to utilize technology in support of homework remains an open concept.

Research Problem

Due to the nearly constant evolution of technology, it is imperative that its impact on education be continually evaluated. Schools with limited budgetary resources must be able to evaluate the strengths and weaknesses of various technologies when determining how to best meet the needs of their students. Likewise homework is considered an integral part of the educational process (Halcrow & Dunnigan, 2012), and its methodologies must be monitored for success and impact. However as of yet, there is a limited body of research focusing on the impact of technology on students' homework completion rates. Specifically a gap exists in regards to the impact of digital submission options for homework as compared to the more traditional method of paper submission for students in grades six through twelve.

Purpose Statement

The purpose of this study is to compare the completion rates of homework assignments for students grades six through twelve in two public schools in central Illinois. Student homework completion rates will be monitored in a wide variety of subject areas across the grade levels. The traditional method of paper submission will be compared to digital submission options such as a Course Management System (CMS), Gaggles digital storage interface, and Google Drive's sharing and storage capabilities. Additionally a survey will be administered to teachers and students in both schools. The survey will focus on teacher and student familiarity with and perceptions of the digital submission options, as well as personal preferences between the two options.

Research Questions

The following questions were developed to guide the study:

1. How the rate of homework completion is affected by the use of digital submission

- versus traditional paper turn-in in 6-12th grade classrooms?
2. What is the teacher perception of effectiveness on submission rate of digital versus paper submission of homework?
 3. What is the students' perception of digital versus paper submission of homework?

Significance of the Study

This study holds significance for students who are experiencing an education utilizing technology to varying degrees. The growing adoption of college and career readiness standards which demand students master the efficient use of technology will continue to profoundly shape the lives and experiences of students in the public school system. Teachers and school administrators will also find significance in this study for future curricular decisions. As budgetary constraints continue, cost-effective technological adoptions that best improve student learning are key decisions facing administrators and school boards. Likewise the continued adoption and implementation of the Common Core State Standards for teachers and administrators to consider how best to integrate technology into the classroom learning environment.

Review of Literature

Historical views of homework

Homework has been a part of our schooling for many years. Homework can be defined as educational work assigned outside of the normal class period to increase the practice of the skills taught in the academic setting (Cooper, 2001). Throughout the latter part of the 20th century, trends have swayed positively and negatively towards homework and its place in American schooling (Cooper, 2001). School board members have long struggled with this question as they strive to implement policies that will support student learning. Parents worry that their children have too little homework or too much—and teachers get criticized for both. Regardless of the beliefs of teachers, parents, students, and administrators, the homework assignment remains a tool in educational system. With more pressure to have success on high stake tests, schools are assigning homework to give students more opportunities to practice work.

Roles of homework in education

Epstein (1988) provided several reasons why students are assigned homework. However, the most common reason teachers assign homework is to help students' master basic concepts. Homework can have positive impacts on student achievement and provide many other educational benefits for students. It can assist students with developing good study habits and help students recognize that learning can occur beyond school. Homework can foster responsible character traits and independent, lifelong learning (Xu, 2010). Homework can also give parents an opportunity to see what's going on in school, serving as a vital link between schools and families. According to Xu (2010), there are several benefits to homework. The repetitive nature of some homework and feedback from

teachers helps students to retain facts and master the basic skills they need to proceed to the next level within a learning objective. Findings by Dillard-Eggers, Wooten, Childs, and Coker (2008) confirm that online homework “increases student performance and that students believe that using online homework is an effective method of study.” (Abstract). Homework also improves the depth of the curriculum. There may not be enough time within the school day to do additional activities; homework can accomplish what could not be done during the school day. Homework can also accomplish the ultimate goal of the educational system which is to create lifelong learners.

Many researchers argue on whether homework can raise the academic achievement in the student. However, researchers do claim that homework helps students develop responsibility and life skills and the ability to manage tasks and learning to cope with difficulties and distractions (Corno and Xu 2004). While many researchers take either a positive or a negative stance on homework, Cooper (2001) takes a more balanced approach, stating, "Research on the effects of homework suggests that it is beneficial as long as teachers use their knowledge of developmental levels to guide policies and expectations" (34).

Therefore, homework should be a useful time for learning test preparation skills. According to Cooper (1989), homework assignments should not be taken for a grade. Too often teachers view homework as an opportunity to test. This action misleads students to do homework out of fear of being punished. Students should learn the intrinsic motivation in doing homework. Cooper continues to encourage teachers to collect homework, check it for completeness, and give feedback. This procedure shows that the teacher takes homework seriously and that it is purposeful. The major purpose should be to identify individual students' learning problems.

Movement of Technology in Education

Findings by Goldberg, Russell, & Cook (2003) and Hsu & Wang (2011) show that the use of technology such as Web 2.0 tools for homework increases student motivation. The movement of technology in education is rapid; it is no longer a single Commodore 64 used for simple game play and word processing in one high school library. The movement and integration of technology has become not only part of the everyday classroom, but in some cases it is the entire classroom. Technology has made multiple implications on current learning, teaching, and curriculum from web 2.0 tools, mobile learning, to full online schools. We have moved from hardback textbooks to online interactive ones, from closed circuit television to Youtube, Skype, and virtual web tours. The “average American eight to eighteen report[s] more than six hours of daily media use.” (Roberts & Foehner, 2008, p. 30) and as this time continues to increase, education will continue to be affected.

Formats Used for Digital Submission

Digital submission as a concept varies greatly between schools, and frequently between teachers in the same school. For this study, the concept of digital submission will be defined broadly to encompass any technological method that enables students to submit work in a virtual format. A broad approach to this definition proved necessary, as the concept of

digital submission for student work remains a relatively new phenomenon below the collegiate level. Currently the market contains a wide range of programs with varying capabilities. For the purposes of this study, the platforms of Moodle, Gagggle, and Google Drive will be examined as they relate to the concept of digital submission of student work.

Moodle/Course Management System (CMS)

Moodle is an open-source Course Management System (CMS), also known as a Learning Management System (LMS) or Virtual Learning Environment (VLE) (About Moodle). Typically software is proprietary in nature, meaning the source code that designs and runs the software is under copyright and may not be edited by users. In contrast, Moodle utilizes an open-source philosophy which allows users to both view and edit the source code as needed to better meet the needs of the consumer. This enables users to customize their platform to best meet the needs expressed in each location (Pfaffman, 2008). Though Moodle admits truly accurate statistics are challenging to obtain due to the voluntary nature of their registration process, they are able to track downloads to provide a raw estimate of users. As such, they claim more than seventy-eight million enrollments of individuals in a Moodle course, serving over two hundred countries. Also identified are at least 1.3 million teacher users (Moodle Statistics).

By allowing schools to bypass the financial expense of purchasing software from a vendor, Moodle presents a public education-friendly dynamic. Schools may download Moodle software and install it on their own web servers for use as the district or building sees fit. Customization options include activity modules that allow student-to-student and student-to-teacher collaboration. Presentation modules allow teachers to deliver content and assess student learning. Several modules also enable file and folder attachment for sharing with other students, or for student submission of work. Few restrictions on usage exist beyond maintaining the open-source nature of the site (About Moodle). Continual news updates provide documentation of ongoing development, easily accessible for schools and teachers as well as demonstrating again the open, “free to all” image presented by the company (Moodle News).

A number of hidden costs with Moodle must be considered. Although Moodle itself is free to download, the company is careful to state “consider it free like a ‘free puppy’ that needs care and attention to grow, not free like a ‘free beer’...” (About Moodle FAQ: Cost, para. 1). Schools that wish to host Moodle from their own servers must consider the additional costs of such activity, including hardware upgrades, server traffic, and the costs of individuals who are trained to build and maintain such systems. Costs to districts will naturally increase with larger numbers of teachers and students using the system. Moodle does offer to host and maintain the software on their servers, but costs are not clearly defined for schools. While Moodle points out larger districts “will naturally cost more to host and maintain than a small community,” exact numbers are not provided (About Moodle FAQ: Cost, para. 3). This necessitates schools plan wisely before investing serious time and energy with Moodle.

Gaggle

Created in 1999, Gaggle evolved from primarily an e-mail and communication-focused company into a system that today provides a wide range of products geared towards public schools. Gaggle markets its products around student safety on the internet: “Our focus is and always has been on student safety, so educators can have the confidence to allow learners to take advantage of current technological tools for communication, collaboration, and productivity” (Gaggle About Us). Based in Bloomington, Illinois, Gaggle has grown remarkably and currently offers resources such as digital lockers, discussion boards, blogs, assignment drop boxes, and instant messaging. (Gaggle About Us).

An advantage for schools using Gaggle is the focus on student safety. Beyond internet filters and word recognition software, a wide range of safety features monitor student use and work. The Human Monitoring Service comprised of Gaggle employees review flagged content, contacting school districts when safety concerns occur. These could include threats of violence or suicide, or bullying issues. Anti-pornography scanners review all images, including embedded content as well as attachments and links, flagging and blocking anything deemed questionable. Teachers or administrators are notified of questionable content and must review and accept flagged materials before they can be viewed by students (Gaggle Advantages). Gaggle also promotes itself as CIPA compliant. Passed into law in 2000, the Children’s Internet Protection Act (CIPA) mandates that schools and other public institutions filter the internet with the intent of protecting minor students from potentially harmful or obscene content (Menuey, 2009).

While offering many features similar to Moodle, Gaggle states directly “Gaggle is not a Learning Management System” (Gaggle Overview, para. 1). Gaggle instead promotes itself as supporting blended learning. While definitions vary, blended learning tends to encompass any program where a combination of online instructional delivery and face-to-face classroom instruction is utilized to better meet student needs (Singleton, 2013). Schools must be aware that by choosing Gaggle, the defined structure and organization of a LMS will be lost. Additionally pricing with Gaggle may prove challenging for schools. Gaggle does not offer free trials for teachers or districts to evaluate the service. Schools can apply for a free trial invitation, but no guarantee exists that an invitation will be issued to schools in a timely fashion (Gaggle FAQs). Gaggle also does not directly state costs on their site. This prevents schools from quickly determining whether Gaggle is a feasible option in terms of monetary costs, and forces deeper evaluation into a system that may not even financially be an option.

Google Drive

A component of the popular search engine Google, the Google Drive service revolves around file storage. Google’s mission statement reads “Google’s mission is to organize the world’s information and make it universally accessible and useful” (About Google). Offering dozens of services and products, Google provides a wide range of capabilities useful for school districts. Programs may be individually selected by schools, or a combination of programs such as e-mail, drive storage, and video may be selected in a bundled fashion. Specific to the Google Drive service is the ability to store and access files from any

computer or internet-capable device (Overview of Google Drive).

An advantage for schools using Google Drive is the ease of access for students. Google Drive is accessible from any internet-capable device. Students simply log in to retrieve stored files, images, or other digital media. Individual accounts are free and provide fifteen gigabytes of storage (Overview of Google Drive). Within the Drive, students can create and edit documents, spreadsheets, forms, and presentations. Other types of files can easily be stored, even if Google does not support the program using that file extension. Students can share files and folders with other students or teachers, allowing for collaboration and digital submission of work. The ability to share folders allows teachers to potentially deliver large amounts of content material to students quickly, rather than piece by piece (Dawson, 2009).

A downfall with Google is the lack of integration of services designed with a public school system in mind. While Google offers a plethora of services, it is not a LMS designed for classroom use. Teachers must organize materials without the benefit of the structure and organization offered by a LMS. Furthermore, the price to use Google as a district platform may prove challenging. To purchase a domain-specific set of e-mail addresses and drive storage, Google charges \$5 per user per month or \$50 per user per year. With the inclusion of extra security, archiving of emails and documents, and audit logs of user activity, the price increases to \$10 per user per month, with no yearly discount. Although discounts are offered for non-profit organizations, potential customers are encouraged to call a sales representative to discuss eligibility and specific pricing (Google Apps for Business). Though helpful to districts that Google directly places pricing information in an easily-accessible location, the costs associated with enrolling all students in a district on Google may prove a barrier to public schools.

Preference of Digital Submission

William Bossert envisions technology in the future of education being a great equalizer by making museums and libraries more accessible “digitally encoded copies of their possessions and simple means of network access, there need be no rich or poor schools” (Nickerson, 2009). According to a study by Smolira (2008), undergraduate students in college finance classes prefer online homework submission to traditional methods. It is likely this preference would transfer to younger students as well due to the fact that they have grown up with nearly unlimited access to technology and continue to gain comfort with and preference to web-based education (Peng, 2004).

Methodology

Research Design

The study utilized a causal-comparative methodology to examine data on homework submission rates from two schools in central Illinois, comparing traditional and digital submission formats. The middle grades from one grade school and one high school were used in the study, employing multiple classes at each building with all classes having the option of both submission formats. Additionally, an online Google form was used to conduct a quantitative survey to measure teacher and student preference, familiarity, and

perception of digital versus traditional submission formats.

Research Setting and Participants

According to the Illinois Interactive Report Card (IIRC) the central Illinois high school has a total student enrollment of 1,695 with 27.4% reported as low income, 0.1% limited English proficiency, and 14.5% having an IEP. Additionally the central Illinois grade school has a total school enrollment of 894 with an enrollment for grades 6-8 of 301 with 18.8% low income and 14% having an IEP.

Classes selected to participate in the study were a convenience sampling chosen based on usage of digital versus traditional homework submission methods. At the high school, this consisted of seven social studies classes (grades 9-12) with approximately 150 students involved. At the middle school, this consisted of five sixth grade social studies classes of approximately 100 students, and one seventh grade language class with an enrollment of nineteen students. Data was gathered throughout the school year, tabulating only the rates of submission for student homework.

The survey was given to all staff members electronically, using an online form to automatically tabulate results. Taking place during the school year. Students also used an online form to complete their survey.

Data Collection Procedures

Researchers tabulated data for homework submission rates using an Excel spreadsheet to track digital versus traditional submission rates for students in selected classes. Only rate of submission was tracked; data was limited to students who turn assignments in by the due date. This occurred only for homework assigned and collected during the school year from August to February.

Survey distribution for both students and staff utilized an online Google form. Staff received the form through an email link with an explanation for the purpose of the survey. All teachers received the survey, regardless of their class' participation in the research study. Teacher participants were asked to complete the survey within a seven day window of receipt of the email. A reminder was sent via email prior to the close of the survey window. Student participants received access to the survey in a designated class period, with the survey available to students for a limited window.

Instrumentation

An Excel table was used to track homework submission rates. The chart consists of the week of submission, number of students receiving the assignment, number of students completing the assignment on time, and format of submission (traditional versus digital).

The student survey consisted of eight questions, two demographic asking for gender and grade level, and two multiple selection questions asking which digital submission system students are familiar with and in which classes they generally receive homework. The next

two questions were multiple choice questions asking about frequency of homework and number of classes that allow for online submission of homework. The final questions utilized a five point and four point Likert scale, ranging from *strongly agree* to *strongly disagree* for the first question to gauge participants' opinions and perception of required time for online submission of assignments, and the final question, ranging from *very much prefer paper* to *very much prefer online* to gauge participants' opinions and perception of digital work submission.

The teacher survey consisted of seven questions in total; the first of which was a checkbox question asking for courses instructed and the second a demographic question asking gender. Remaining questions utilized a multiple selection question asking which digital submission system teachers are familiar with, a multiple choice question asking how often homework is assigned as well as a multiple choice question asking if teachers provide the option of online submission of homework *always*, *sometimes*, *never*, or *not yet*. The sixth question utilized a four point Likert scale ranging from *strongly agree* to *strongly disagree* to gauge participants' opinions and perception of rate of completion between the two submission formats; and the final question asked teachers to check any listed factors which prevent them from allowing digital submission of work.

Ethical Considerations

Student confidentiality was ensured, as no names only grade levels were associated with data collection for the homework submission rates. Researchers solely examined rates of submission. The only identifiers used were class and grade level; no student identifiers were used. Survey participants were informed that their participation is strictly voluntary and anonymous. Survey responses were only viewed by members of the research team. No hard copies were printed, for either survey or the Excel documents. Digital data was kept on password-protected computers within the school's protected network. All digital data will be deleted at the conclusion of the study.

Limitations

Data validity may be impacted due to use of a convenience sample for both surveys and homework submission rates. Participating classes were chosen due to convenience and use of both traditional and digital submission; the sample size may not be large enough to thoroughly represent student preferences and usage. Survey data may be compromised due to the number of responses returned. The limited time frame combined with the pace of the school year could impact teacher return rates. Student return rate will be limited by the number of students surveyed; absences and the decision to opt out may decrease the number of responses available for study. Student (and teacher) interest in the survey may also influence the accuracy of results.

Validity may also be impacted as the survey seeks to measure participants' familiarity and perception of digital versus traditional submission methods. If the participants selected have limited familiarity with the digital formats selected or limited opportunity to utilize those formats, results may be skewed to over or under represent usage in the typical classroom.

Data will be collected from only two schools in central Illinois, limiting the external validity. Only one grade school and one high school will participate, further limiting the generalization of response data.

Data Analysis Procedures

Quantitative data from homework submission rates were analyzed with basic comparison methods, examining submission numbers for both digital and traditional methods and comparing to the total numbers of students receiving each assignment. Mean averages per assignment for each method were compared for trends based on age, subject area, and school. This data was then compared to the survey data for correlation between factors. Survey data was also analyzed for mean response and standard deviation on the Likert-style questions. Researchers sought to identify trends in data, both between submission formats as well as between schools and grade levels.

Results

In seeking to answer research question one regarding how the rate of homework completion is affected by the use of digital submission versus traditional paper turn-in in 6-12th grade classrooms, submission rates in twelve different courses at varying grade levels were compared. As seen in Appendix A, the data showed section one of 6th grade geography submission rates dropped by almost 15% when digital submission instead of paper submission was used. Section two saw a decrease of almost 9.5%, section three a drop of 16.74%, and sections four and five recorded 10.83% and 20% decreases, respectively. The results from the seventh grade language class showed a similar decline in submission with just over 12% decrease. Likewise, the ninth grade regional world studies courses submission rates declined by 9% and 4% respectively, and section one of tenth grade U.S. history saw a 16% decrease. The highest decline was seen in section two of tenth grade U.S. history with a 35.36% drop in submission rate. The submission rates for the two eleventh and twelfth grade classes, psychology and sociology, each reported just under a 7% drop in submission rates. In comparing rates, digital submission attempts that included unattached work or incorrectly attached work were included in reported digital rates similar to the practice of accepting work submitted on paper that is only partially complete. Overall, submission rates show a 13.55% decrease between paper and digital submission.

In order to answer the second research question, what is the teacher perception of effectiveness on submission rate of digital versus paper submission of homework, researchers calculated means and standard deviations. Of the approximately 140 teachers asked to participate in this study, 64 completed the online survey. Out of those responding, 30% were males and 70% were females. Also 19% had two or more areas of disciplines, 17% were Math teachers, 14% were in the English department, and 13% were Science teachers. The rest of the departments represented 8% or less of total responses. Table 1 gives a mean of 2.41 for how often teachers reported assigning homework per week, with a standard deviation of 1.13. Also, the data showed that the highest mean of assigned homework per week among departments is 1.00 with standard deviation of 0.00 for Math, and the lowest mean of assigned homework per week was 4.00 with a standard deviation

of 0.00 for Business. Finally, the question addressing teacher perception of online submission being more effective than traditional submission reported a mean of 2.46 with a standard deviation of 0.88. The highest mean was Health and Driver's Education teachers with a response of 3.50 with a standard deviation of 0.71, and Instructional Special Education reported the lowest at 1.80 with a standard deviation of 0.84.

Table 1: Results of teacher survey

Teacher's Subject Area		Frequency teacher assigns homework	Teacher provides option for online submission	Teacher perception of effectiveness of online submission
Math	Mean	1.00	3.27	2.09
N = 11	Std. Dev.	0.00	0.47	0.94
Social Studies	Mean	2.50	3.00	3.17
N = 6	Std. Dev.	0.84	0.89	0.41
Science	Mean	2.38	2.38	2.25
N = 8	Std. Dev.	0.92	0.92	1.04
English-Language Arts-Literature	Mean	2.11	2.44	2.56
N = 9	Std. Dev.	0.60	0.88	0.73
Foreign Language	Mean	2.67	2.67	3.00
N = 3	Std. Dev.	0.58	1.15	0.00
Business	Mean	4.00	2.00	2.00
N = 1	Std. Dev.	0.00	0.00	0.00
Arts-Fine Arts-FCS	Mean	3.50	2.25	2.75
N = 4	Std. Dev.	0.58	0.50	0.50
Health-PE-Drivers Ed	Mean	4.00	2.50	3.50
N = 2	Std. Dev.	0.00	0.71	0.71
Ag-Technology	Mean	3.00	2.00	2.50
N = 2	Std. Dev.	1.41	0.00	0.71
Instructional Special Education	Mean	3.60	2.60	1.80
N = 5	Std. Dev.	0.89	0.55	0.84
Multi-Disciplines	Mean	2.50	2.92	2.42
N = 12	Std. Dev.	1.24	1.00	1.00
Total	Mean	2.41	2.71	2.46
N = 63	Std. Dev.	1.13	0.83	0.88

To answer research question three, what is students' perception of digital versus paper submission of homework, researchers analyzed student survey results. These showed a

preference toward paper submission, with 54.5% of respondents preferring this submission format. Only 19% of students strongly favored digital submission. Also, it was noted that 56% of students did not feel a strong preference toward either submission format. Low levels of familiarity with digital submission were indicated with nearly 65% of students identifying a lack of opportunity for digital submission in more than two of their courses. Additionally although students indicated a preference toward paper submission, survey results showed that 36% of student respondents felt that digital submission required less time than paper compared to 30% who felt paper submission required less time (Appendix B).

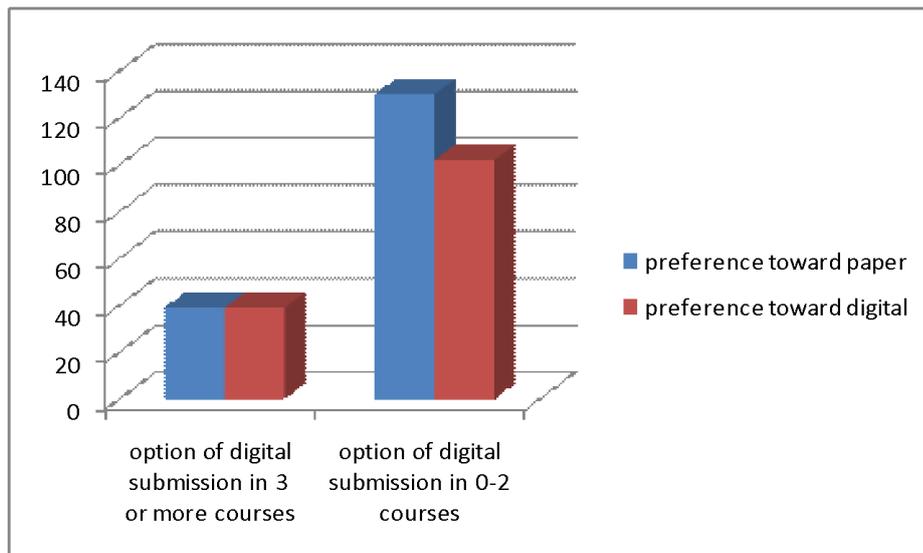
Discussion

Student survey results seem to support the overall drop in submission rates showing a preference across age groups (Table 2) to favor paper slightly with 54.5%, compared to a 45.9% digital preference. This is contrary to Smolira's (2008) study in which digital submission formats were favored over traditional. One possible variable impacting results may have been the teacher presenting digital submission as an optional format as opposed to a mandatory one, contributing to the significant declines in digital submission rates. Reliable access to technology outside the school setting also could be a variable impacting student submission rates. This study did not take into account barriers such as power outages, internet access, or socio-economic levels of students, all of which may potentially have held a negative impact on student submission rates.

Table 2: Submission rates across grade levels

	Preference very paper		Preference paper		Preference Digital		Preference very digital	
Sixth	18	84	24	84	20	84	22	84
Seventh	10	43	18	43	8	43	7	43
Eighth	25	82	17	82	23	82	17	82
Ninth	13	58	21	58	17	58	7	58
Tenth	6	21	5	21	8	21	2	21
Eleventh	2	16	7	16	4	16	3	16
Twelfth	3	6	0	6	2	6	1	6
Total	77	310	92	310	82	310	59	310
Percentage	24.84%		29.68%		26.45%		19.03%	
Sum	54.52%				45.48%			

Yet, as the option for students of digital submission increases (Fig. 1), the preference toward digital submission also increases, from 44% to 50%. A lack of familiarity with the surveyed systems may have contributed to the preference toward paper, as students had no more than three years maximum exposure to any one system. This leads to an assumption similar to Peng (2004) that as time passes and digital submission becomes more widely used, student preference toward this submission format will continue to increase as well.

Figure 1: Option for digital submission compared to preference for digital submission

Our second research question addressing the teacher perception of the effectiveness on submission rate of digital versus paper submission of homework was asked of approximately 140 teachers, with 64 respondents. Prior to surveying teachers, the research theory was that teachers would highly prefer traditional to digital submission of homework assignments. Yet according to our survey results, the mean score of the teacher perception was 2.46 which indicated the teachers were close to neutral about their preference toward the format for submission of homework. This neutrality is similar to findings by Kemp (2014) where there is concern that technology is advancing only for those with access while distancing those who cannot participate. If teachers have a desire to experiment with online submission and a willingness to try, it is believed their preference toward online submission would no longer remaining neutral and would shift away from traditional/paper means.

Conclusions

Student data demonstrates a slight overall preference for traditional methods of homework submission as well as a low degree of familiarity with digital submission formats. Although student responses were divided in preferences between submission formats, homework return rates clearly indicated a decline in student performance when digital submission is utilized. Researchers observed this decline in performance across all grade levels to a varying extent; while dropping in intensity at higher education levels, a decrease was still present even at the most mature grade levels. A significant lack of availability of digital submission was consistently present across all grade levels, indicating that overwhelmingly students are not expected to submit assignments digitally. This coincided with the low number of teachers who reported via the teacher survey offering digital submission means in their classes. This negatively impacts students as they in general are unfamiliar with digital submission formats and not forced to learn to utilize any of the surveyed systems consistently in their classes.

Students and teachers overall appear divided on the effectiveness and ease of use of

digital submission formats. Survey results for both students and teachers lacked an overwhelming response option for any of the questions, indicating no distinct preferences. This indicates currently both students and teachers hover in a vague middle ground where, while individuals may have strong preferences, as a group neither digital nor paper submission methods hold a compelling mandate. As such, while submission rate data indicates students do not innately benefit from digital submission options, survey data indicates as a whole both teachers and students currently remain ambivalent to the concept of digital submission.

Implications and Recommendations

Further research into the topic of digital submission options is needed in several areas. One key component not found in this study is the impact of digital submission over a student's school career. Most students in this study had utilized digital submission for less than a calendar year with a maximum of three calendar years. Student and teacher lack of familiarity with options, formats, and functionalities therefore potentially created a barrier to student success. Future studies are necessary to track student progress over time to eliminate the lack of familiarity as a hindrance. Likewise future studies may focus specifically on the impact of teacher familiarity with digital submission. Greater familiarity and usage by teachers would most likely lead to increased usage of immediate feedback to students, resulting in greater student learning as found by Vatterott (2011). A larger sample size of students and teachers at all grade levels would also be beneficial, as the sample size of students in this study in some cases was limited. Although overall providing a wide range of age groups to survey and collect submission data from, the total number of students involved in the study was relatively low. Future studies would do well to involve more total students, or focus specifically at either middle or high school students rather than secondary students overall.

This study also holds important implications for teachers and school districts considering moving to a greater use of digital submission with student work. Time for both teachers and students to become familiar with any digital submission format appears key, as does continued exposure to and utilization of the format. Districts seeking to embrace a digital submission platform should do so with enough support and structure to allow teachers time to convert materials to fully utilize any chosen platform. This thereby increases the likelihood that teachers will adopt and regularly use the platform. In turn, this increases the likelihood that students will encounter multiple classes that require digital submission and as such become familiar with the process. Future studies into the impact on students of multiple classes utilizing digital submission formats would also be valuable. This study indicated a slight increase in student preference for digital submission when exposure to the format increased; replicating the study with a larger sample size of students utilizing digital submission in multiple classes could confirm this trend and offer important information to districts seeking to move in this direction.

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Appendix A: Submission Rates**Table 2: Grade Six Geography Submission Rates**

<u>Section One</u>	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	Wk8	%
Paper									
Submitted	18	18	19	16	16	11	19	19	89.47%
assigned	19	19	19	19	19	19	19	19	
Digital									
Submitted	10	10	17	12	14	15	17	13	74.48%
assigned	19	13	18	19	19	19	19	19	
<u>Section Two</u>									
Paper									
Submitted	17	13	16	16	17	15	18	19	86.18%
assigned	19	19	19	19	19	19	19	19	
Digital									
Submitted	11	10	17	16	16	13	17	19	76.71%
assigned	19	13	19	19	19	19	19	12	
<u>Section Three</u>									
Paper									
Submitted	22	22	24	23	23	18	24	24	93.75%
assigned	24	24	24	24	24	24	24	24	
Digital									
Submitted	15	18	18	18	20	19	18	18	77.01%
assigned	24	22	23	22	24	24	24	24	
<u>Section Four</u>									
Paper									
Submitted	11	13	13	15	12	12	15	15	88.33%
assigned	15	15	15	15	15	15	15	15	
Digital									
Submitted	8	5	11	12	13	12	15	10	77.48%
assigned	15	6	15	15	15	15	15	15	
<u>Section Five</u>									
Paper									
Submitted	17	19	19	19	18	10	18	19	91.45%
assigned	19	19	19	19	19	19	19	19	
Digital									
Submitted	9	11	14	15	13	16	18	14	71.43%
assigned	19	15	20	20	20	20	20	20	

Appendix A: Submission Rates – Continued**Table 3: Seventh Grade Language Arts Submission Rates**

<u>Section One</u>	Wk1	Wk2	Wk3	Wk4	Wk5	Wk6	Wk7	%
Paper								
Submitted	15	17	16	18	18	16	17	87.97%
assigned	19	19	19	19	19	19	19	
Digital								
Submitted	15	17	12	10	15	15	13	75.00%
assigned	19	19	18	18	18	18	18	

Table 4: Ninth Grade Regional World Studies Submission Rates

<u>Section One</u>	W1	W2	W3	W4	W5	W6	W7	%
Paper								
Submitted	23	22	41	19	23	20	21	76.82%
assigned	28	28	56	26	28	26	28	
Digital								
Submitted	22	16	14	15	19	20	24	67.71%
assigned	28	28	26	26	28	28	28	
<u>Section Two</u>	W1	W2	W3	W4	W5	W6	W7	
Paper								
Submitted	18	13	30	19	15	15	17	78.40%
assigned	21	21	41	20	18	21	20	
Digital								
Submitted	12	12	14	16	20	15	15	74.29%
assigned	19	20	21	21	21	20	18	

Table 5: Tenth Grade U.S. History Submission Rates

<u>Section One</u>	W1	W2	W3	W4	W5	W6	W7	%
Paper								
Submitted	18	20	16	18	14	16	18	83.33%
assigned	21	21	22	19	20	19	22	
Digital								
Submitted	14	14	16	12	13	17	15	67.33%
assigned	23	21	22	20	21	22	21	
<u>Section Two</u>								
Paper								
Submitted	27	27	17	25	22	25	24	80.29%
assigned	31	31	27	30	28	29	32	
Digital								
Submitted	14	12	11	14	14	13	15	44.93%
assigned	30	28	29	30	32	29	29	

Appendix A: Submission Rates**Table 6: Eleventh and Twelfth Grade Psychology Submission Rates**

<u>Section One</u>	W1	W2	W3	W4	W5	W6	W7	%
Paper								
Submitted	84	80	77	79	72	73	72	89.50%
assigned	87	87	85	84	86	85	86	
Digital								
Submitted	75	70	72	74	68	71	73	82.59%
assigned	87	87	87	87	87	87	87	

Table 7: Eleventh and Twelfth Grade Sociology Submission Rates

<u>Section One</u>	W1	W2	W3	W4	W5	W6	W7	
Paper								
Submitted	22	24	21	24	21	23	23	86.81%
assigned	26	27	24	27	26	25	27	
Digital								
Submitted	22	20	21	21	23	23	21	79.89%
assigned	27	27	27	27	27	27	27	

Appendix B: Student Perceptions

Figure 2: Familiarity with digital submission

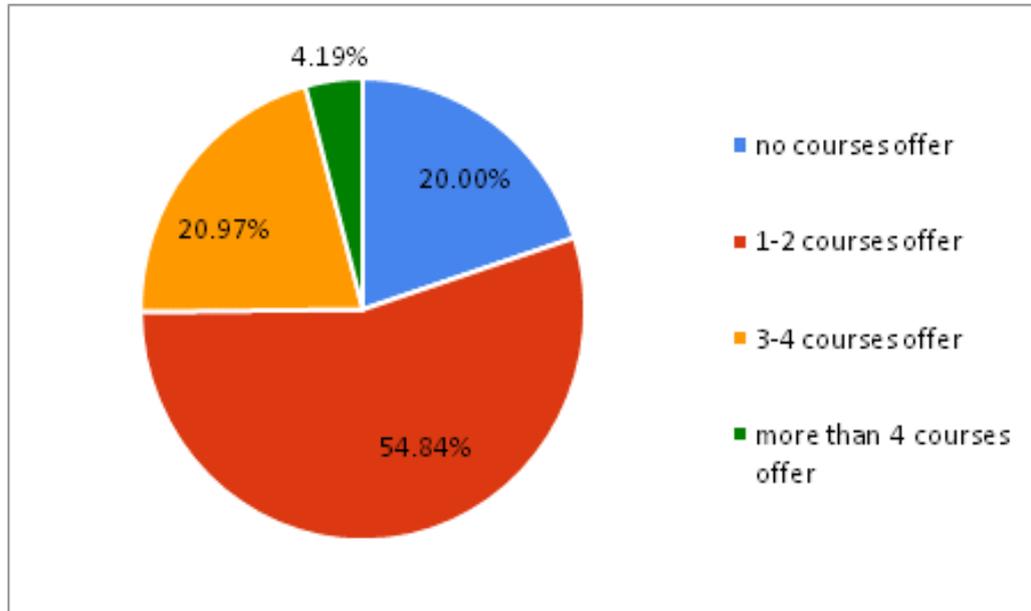


Figure 3: Time required for submission by format

