MASTER'S PROJECT

A STUDY OF TEACHER AND ADMINISTRATOR PERCEPTIONS OF THE
ACADEMIC BENEFITS OF PAPERLESS SCHOOLS AND CLASSROOMS

By:

Daniel Eckel

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Approved by:

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Course Instructor

_____
Official Advisor

_____
Director of Graduate Education

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Chapter 1

Introduction

Statement of the Problem or Research Question

Many educators face a new generation of students, who grew up in a world surrounded by increasingly mobile technology, information readily available, and unprecedented global connectivity. Even the youngest educators should be able to recall the transition from limited internet access to full immersion. However the children of today do not know of such a world. Many schools want to keep up with the incoming generations, and forgo traditional methods, and much of this begins by implementing *paperless* policies. "In recent years, many schools are moving towards a "paperless classroom" policy, in which teachers and students use computers (or other devices such as tablet PCs) as an alternative to notebooks and textbooks to exchange information and assignments electronically both in and out of class" (Shonfeld and Meishar-Tal, 2017). Unfortunately, there is little data easily accessed on how many schools throughout the world actually employ this policy. Simple internet searches, and even long hours of research through academic databases yield little up-to-date information. This is surprising considering the concern the world has with educating the incoming generations by reaching them where they are. Given the fact that there is not as much readily available information on paperless schools or classrooms, this study will continue filling the void, by seeking to unveil the perceptions both current teachers and administrators have towards the idea of paperless schools and classrooms. Do most teachers and administrators want to go paperless? What are some misconceptions concerning going paperless? What is the biggest academic fear teachers and administrators think that prevents a school from eventually going paperless and embracing technological change?

What are the largest possible academic barriers facing schools and classrooms that seek to implement paperless policies.

Statement of Purpose

In this action research project, the purpose is to contribute to the limited research concerning paperless schools and classrooms by exploring the perceptions held by current teachers and administrators regarding the academic impact of paperless policies.

Ever since the idea of going paperless has come about, particularly since the use of the term *paperless* (Businessweek, 1975), different studies in different fields have been conducted. The amount of research done for paperless education is particularly limited, perhaps because compared to the history of paper, our modern technology is quite current. This study seeks to perpetuate the discussion within the education community by compiling and synthesizing responses to specific questions pertaining to teacher and administrator perceptions as well as add to the body of existing knowledge about paperless schools and classrooms. This study will seek to gather and synthesize responses from teachers and administrators operating within the framework of traditional school settings, as well as more progressive and possibly paperless settings.

Definition of Important Terms

Blended Learning: Blended Learning is the use of traditional and progressive methods of learning with the idea that this better suits the needs of current students. This mode of learning utilizes digital technology, particularly the use of online learning, as well as face to face instruction.

BYOD Policy: *Bring Your Own Device* (BYOD) is a policy many school districts use due to various factors (financial for example). This policy allows students to bring their own

electronic devices to school rather than having the school provide such tools, and adapts the digital content for these devices so that the students have ease of access.

Digital Natives: Individuals who have had digital access since a very young age, and are proficient in the use of such digital tools. These individuals have been surrounded by mobile devices and internet connectivity their entire lives.

E-learning: E-Learning is the term used to refer to education that happens through digital means. Such digital means are internet sites, programs, mobile apps, software programs, virtual classrooms, face-to-face instruction through a digital medium, or any other digital method of communication utilized for the sake of education.

Flipped Classroom: An instructional method where the students learn the material outside of the classroom, often through digital means, rather than in the typical brick and mortar setting. Students then come to school with questions and tasks to complement their home learning. The teacher can thus aid them in content they are unable to understand on their own in the traditional building setting.

Kinesthetic Learners: Students who learn through action and movement rather than through visuals or hearing. These students typically improve through action based activities rather than activities that don't require the use of the hands.

Paperless Classroom: A classroom that uses a very limited amount of paper, or no paper at all, but rather utilizes current available technological solutions to effectively aid students in their academic progress. This is usually the result of one of three factors or a mixture of said factors: financial factors, perceived academic factors, and environmental factors.

Paperless School: A school that uses a very limited amount of paper, or no paper at all, but rather utilizes current available technological solutions. This is usually the result of one of three factors or a mixture of said factors: financial factors, perceived academic factors, and

environmental factors. This policy does not just affect students and teachers, but can also affect administration. Some courses can be exempt from this policy. For example, art class might need to employ the use of paper for projects.

Progressive Education: Progressive education is typically driven by the student. The teacher is a guide rather than an authority figure. The student is given more choice in the curriculum. The utilization of new instructional strategies such as blended learning, flipped classrooms, and e-learning is common.

Traditional Education: Teacher driven education in a brick and mortar building, employing the use of pen and paper, as well as printed materials. Typically, the format is teacher centered, and students have little choice in what subjects they will take. Experimentation on how education is achieved is considered anathema. There is a lot of emphasis on memorization and facts.

General Hypothesis

This study hypothesized that the majority of teachers and administrators surveyed would agree that paperless policies have greater academic benefits than detriments but age and teaching experience would be an important factor to this hypothesis.   The main academic benefits survey participants would point to would address maintaining student attention with engaging digital activities, ease of access towards research materials, and having more opportunities to develop their technological skills. The main barriers or detriments they would identify would be losing the ability to write, getting easily distracted with unrelated material, and possible delays due to time needed towards technological instruction. Finally, this study predicted that the majority of teachers and administrators would want to teach in a school that employs such policies or continue teaching in such a school.

Chapter 2

Review of the Literature

Introduction

This literature review will be summarizing and analyzing various sources that touch upon two important points relevant to this project. First, it is necessary to show how paperless classrooms academically benefit teachers, and students. Second it is necessary to review studies and research about the possible barriers or detriments. This literature review will be comprised of literature that has tested a wide range of individuals from different ages, cultural backgrounds, and perspectives.

Summary and Analyses of Sources

Flamm (2013) examined the benefits of having students electronically submit their work. This study was a self-reflection from many years of teaching college students, and from this self-reflection, Flamm was able to form conclusions that have practical applications for the education community. This study also provided further information concerning the benefits of going paperless in the classroom.

As mentioned, the author of the study utilized personal experience to share the benefits of having students electronically submit their work, and from this personal experience, the author was able to form both direct and indirect benefits. The direct benefits are allowing the educator to become a better grader by improving the quality of comments, giving students the ability to rewrite their work, and thus improve their writing, facilitate student peer review, and easily having all student assignments on hand for an indefinite time. The indirect benefits are less plagiarism, flexible deadlines with assignments, and although the author didn't conduct specific scientific research about medical benefits, personal health improved during this time, and the hypothesis is that within paperless classrooms, there are less opportunities to transmit germs.

The author used personal experience coupled with concrete points to relay this information. However, the author did not use any other data, or offer concrete numbers when giving each point, and thus this work could be labeled subjective. Flamm's short study is relevant to this research project because it offers a few points that directly benefit the student academically. In the future, researchers might want to study benefits separately, and offer a larger data range, in order to make this study more objective.

Whisler (2010) studied the perceptions of students with regards to the implementation of a paperless classroom. The original purpose of this instrumental case study was to assist with cost reduction efforts. However, the study allowed for extended research on the impact "going green" has within a classroom. The study involved 88 undergraduate students enrolled into four courses taught by the same professor. Twenty-three students participated in the survey. The professor also offered observations concerning "going green". Anonymous surveys were used as well as participant observations from the professor. Whisler found that the students benefitted from going paperless because they had instant access and instant feedback through the use of various technologies rather than paper. However, the average student scores on assignments and tests when compared to other years remained the same. Furthermore, the amount of effort required for the professor to grade the papers digitally gave the professor enough reason to continue using some paper the following semester.

The author's research found in the literary review offered a summary that began with some of the first actual paperless classrooms, thus supporting claims towards academic benefits. However, the research in this actual study lacked a large sampling size of students, and thus the results cannot be generalized.

Ferguson (2016) researched the perception of 676 middle school students from grades 6, 7, and 8 concerning the use of iPads in a 1:1 iPad initiative and a paperless curriculum through

the use of a survey. Upon conclusion of this research the author found that the 6th and 7th graders were more positive than the 8th graders. The research found that there was a steep learning curve, so those who were using these technological tools longer had a more positive outcome. The study also showed that although more students answered the survey questions more positively, comments concerning a paperless curriculum were more negative. Many comments were concerned with iPads not working, or the internet going down. In addition, students mentioned eyes and head hurting after prolonged use. The author also talked about how many of the students' perceptions possibly correlated with the way the teachers implemented the technology within the classroom.

The research had a sampling size of over 500 students, which gives some validity to the study. The study compared genders, three grade levels, and different ethnicities which brought about some interesting points. However, the study involved one school with predominantly white students which portrays opinions based off mainly one race. Furthermore, this research was done with one survey rather than a series of surveys to see if perceptions changed throughout the year. Future researchers might want to involve more schools from different districts and even countries to see if perceptions differ.

Gibson (2015) researched the materiality and phenomenology of paperwork, and how our cyber-culture is meshed with paper. The author used two previously done researches. The first study involved looking up images from Flickr tagged with words related to studying. The second study used the self-directed photographic method. A total of 76 photos from 16 participants with the average age of 20 years old were taken. This study showed that when people are in the act of studying, researching, and teaching paper is nearly always present. The author went on to point out the importance of having this material connection with something tangible and also how

"going paperless" is not necessarily environmentally friendly. This is due to the fact that e-waste critically affects many places with its toxins, and electronics short life-span.

This article provided more research on the importance of having tangible items when studying and how our body reacts positively with such spatial relations. However, the data given was based off previous research, and not updated through the researchers' own findings. Furthermore, research based off subjects averaging 20 years old presents many questions due to the fact that these test subjects are not all digital natives but rather digital immigrants. This article provides an important point to a barrier that can directly affect many learners. Paper is such an important although mundane part of our lives, transitioning from paper to paperless can be a very challenging, and possibly detrimental process.

Pederson (2004) followed a teacher and the teacher's pupils for a week, using observations, field notes, spontaneous interviews, and formal interviews to reach certain conclusions concerning project work in a paperless school. The ages of the students were between 16-19. Much of the case study involved observation, especially on how the students had to do project work using the internet. The environment was truly a paperless school, as all students had laptops, and paper use was limited apart from occasional use and the books found in the library. Grades, presentations, and reports were stored on the intranet. Pederson observed that although the methodology followed at the school was Project Based Learning, technology seemed to cause the students to engage in more individual work. Although the students had groups for their projects, they often did not sit together or communicate face to face. Rather the students communicated through the internet or emails. The author observed a few negative or unbeneficial outcomes. Some students spent much of class time over technological problems rather than content. Many students arrived late to class or did not even show up to school.

Rather they worked from home. Many pupils expressed how this method was boring, and plagiarism was commonplace in many of the reports.

Pederson's article narrated how a paperless school might function through the personal experiences of the students rather than stale data. This perception provides a lot of insight on barriers that can be found in a paperless school. Unfortunately, measures could have been put in place to give some weight to the interviews, and perceptions expressed. This would have added more validity to the case study. Furthermore, this study happened over the period of a week, in one classroom. More time and possibly different classroom observations might alter the findings. Finally, this case study took place at the dawn of implementing paperless school studies, and thus the new generation holds different perceptions. Pederson's case study is relevant to this research project because the study shows how the implementation of paperless policies can be a challenging process, especially when strictly applying this policy to one method of teaching, particularly that of Project Based Learning. There can be many barriers that need to be overcome.

Myrberg and Wiberg (2015) were able to synthesize many studies concerning the difference between reading from the screen and reading using traditional paper. The researchers focused on more current articles, as articles more than a decade ago were based off older technology. Through this study the authors were able to dispel three main concerns with regard reading from a tablet or e-reader: the danger of electronic screens on the eyes, and brain, the myth that it is more difficult to read from e-readers, and finally the idea that people learn less when they use current technology to read rather than paper. Ultimately, the conclusion was that the problem is the current attitude and preference towards reading on digital platforms, and that this attitude will take time to change.

The authors were able to analyze and synthesize six different studies to provide a decent summary concerning the equivalency of paper reading and digital reading. The article however

is already slightly outdated because when they discussed some drawbacks of e-reading, a lot of the concern was on spatial and navigational elements that provide ease of reading. Currently, many of these problems have been solved or at least improved upon in the last few years. The study is relevant to this current project because it provides alleviation from the idea that using paper for reading is more beneficial than digital technology, which is certainly a barrier some teachers or administrators might bring up. Whereas, the actual fact is that use of paper is a matter of attitude or preference. Personal preference is the barrier.

Meyer (2008) laid out the groundwork for paperless classrooms through the actual implementation of an Electronic Portfolio System. The author first implemented the Electronic Portfolio System in her own course, and then as a coordinator of the Electronic Portfolio system for over 5000 students and 400 faculty. This study and implementation took over four years, as the implementation happened in different phases, ultimately leading to many courses becoming completely paperless. Throughout this process, Meyer was able to survey the students and staff and noticed a trend. There was initial concern when the process began for each phase but as the semesters fell underway, most individuals preferred the electronic portfolio over paper because it was cost effective, and time efficient. Meyer also pointed out to the fact that having the courses completely digital left a better paper trail, as well as improved the teacher-programs which lagged behind the technology use being utilized in many public schools.

This article shared the implementation of an electronic portfolio, and although the points written throughout the article were very practical in nature, it is these practicalities that add validity to the academic benefits of a paperless classroom. Furthermore, this implementation happened over a period of four years. Unfortunately, Meyer did not include a lot of actual data concerning the findings, and this takes away from the validity of the paperless classroom benefits. The studies informal style can also detract from the study. This research points to the fact that

although the initial pushback of paperless classrooms is strong, when the process is underway, most students and teachers find the use of current technology more efficient, and beneficial than maintaining the traditional use of paper in the classroom.

Shishkovskaya et al. (2015) studied numerous research about the integration of "paperless" technology in the study of English. When discussing the methodology of a "paperless classroom" the authors highlight the fact that such a method allows flexibility, and adaptability of lessons, allowing for more student independence. This methodology also allows for teaching individualization with up-to-date information. This research looked at different digital platforms that enabled the possibility of a "paperless" classroom. As well, the authors suggested the use of electronic textbooks, and interactive software that allow for a level of learning far above that of a linear paper textbook.   This study also concluded that "paperless" education technology offers the teacher more freedom with new training techniques which will increase student motivation for language learning. The authors noted that "paperless" education technology is merely a tool that contributes to the efficiency and enhancement of the educational process.

Shishkovskaya et al. were able to summarize different ideas and research with regards foreign language learning, and state numerous benefits that "paperless" classrooms force upon the students and teacher. This short paper did not offer specific examples of data, but rather quoted numerous research papers that supported its claims. This paper is about academic benefits with "paperless" classrooms, and surely falls in-line with the research being done in this very project. Ultimately, paper is very linear, whereas digital media can be interactive, and enhance the learner with many more resources, otherwise unavailable. Future research might want to examine the current online foreign language businesses and study the perceptions of both students and teachers using this medium for purely online classes.

Rossomondo and Lord (2017) proposed the idea that paper-based textbooks are nearly obsolete by exploring different aspects of a "paperless classroom". First the researchers pointed to numerous studies that showed how many Spanish teachers were using paper textbooks, thus basing their course on the layout of the textbook rather than objectives relevant to the students' needs. Then the authors studied how the teaching materials in today's world are drastically different than before, allowing the learner to delve deeper into the language through all the available technological resources. The focus of these materials must be towards a textual context. Given current technology, the learning must now be visible to the learners. Printed text and printed pictures offer very limited possibilities. Finally, the digital delivery must be reworked from the ground up rather than the mere uploading of printed texts. Rossomondo and Lord pointed out that digital natives need the material to have a digital transformation so as to create a better learning environment for this current world.

The authors laid out three simple points on what sort of materials are necessary for the "paperless" classroom. This study adds more thought towards the discussion about materials used in the "paperless" classroom. The authors clearly came from a certain teaching method framework, particularly that of backward design, and many educators might not fully agree with this method, or use other successful methods for teaching. The study highlights the fact that digital natives view educational resources much differently than digital immigrants, and this brings about one "paperless" benefit. Paperless lessons fit the needs of the student, rather than the preferences of the teacher. Future research might want to investigate the different forms of digital medium out there that differ from e-books that aid all learners in learning.

Clarke and Abbott (2016) conducted a case study on four and five year olds from a Northern Ireland School concerning the impact of education technology, particularly the use of Ipads. Given the fact that these pupils were very young, they used group interviews, as well as

teacher and class assistant interviews. The vast majority of the study was positive, as the pupils for the most part were able to clearly state their literary, and numerical achievements, as well as captivated interest. The teachers and class assistants noted improved pupil communication, listening and fine motor skills. As well, they mentioned the ability to differentiate learning, and the structure that the approved apps gave to the students.

This case study is one of the few current case studies dealing with young students, given the ethical challenges with interviewing and studying young children. The use of the "circle time" interview rather than one-on-one interviews was unique but according to research, offered the young children something familiar to them, and thus allowed them to share answers that otherwise might not be their true opinion. The challenge is the fact that this is one of the few studies on younger learners, and thus there isn't a lot of data to back up the researchers results apart from the case study itself. Although this work itself is directly related to the implementation of technology, it is relevant to the current research project because it deals with the effects one of the main tools has on students in a "paperless" classroom. The teachers and their class assistants all had positive perceptions concerning the use of this technology.

Levin and Schrum (2013) studied the creative use of technology in eight secondary districts in the United States. The conclusion of the study showed that using technology cannot be the goal but rather learning centered goals for work and life in the 21st century. These eight districts had two common points. First the districts relied on project-based learning. Second the school leadership was completely behind the use of technology. The schools researched found increases in standardized test scores, and high college acceptance rates. The schools followed three strategies to integrate technology successfully. First, the schools established a vision and culture while implementing 1:1 computing environments. Second, the technology was used

constantly for formative assessments. Finally, the schools established partnerships, such as with the business community.

The article provided evidence that at least eight districts found success integrating new technology into the classroom. The article also clarified the role of technology as a tool fit for digital natives and not a goal. The article gave a few examples with statistics and data but unfortunately did not offer many specific points. As well, the article briefly mentioned that the results came through case study research but did not go into much detail. Thus, the process for providing the information was not mentioned. The article is relevant to the current research project because it shows how paperless schools can offer good results. Although the article did not specifically mention that the schools were wholly paperless, the amount of technology used implies at least a limit on the amount of paper. Finally, the article provides one important point. Going paperless and using technology cannot be the single vision or goal of the school. Learning goals always need to take precedence.

Kupetz (2008) transitioned from a traditional style course to going almost completely paperless during the course being taught. Throughout the process the author found three tangible benefits of a paperless classroom. The students are encouraged to think of digital benefits, students and faculty use less resources, and finally professors have greater flexibility by electronically bundling together cases in a course, no need for printed textbooks, and can pick and choose the digital content desired without purchasing entire texts or products. The author then shared the perceptions of some professors, and their reluctance to go paperless due to a lack of tech familiarity. Kupetz pointed to the fact that students already know these tools and thus the professors need to be readying the students on how to use the technology in the real world. One challenge that surfaced was cheating during tests which at the time this article was written lacked

fool-proof solutions. The author finally advocated for the idea that going paperless in the classroom goes beyond the classroom.

This article portrays an earlier sample on what it is like transitioning from paper to paperless within a course and the benefits and challenges that immediately surface. The author spoke from personal experience but did not provide much data to back up claims concerning fellow teacher perceptions. Kupetz's article is relevant to this current research project because of the mentioned benefits and challenges of going paperless. Furthermore, this study happened during a transitional period, which is still common today. Future researchers may want to see how the perceptions are now concerning paperless classrooms, particularly focusing on teachers and professors who underwent the transitional process.

Hadlock et al. (2013) write about how going paperless benefited Bentley University's promotion and tenure application process by saving time and generating higher information quality of information. The authors explained how a paper application typically filled at least one large three-ring binder, and as the process moved along, eventually seven copies with confidential information were made. The university explored different technology options to streamline the process, and eventually decided upon Blackboard. The two issues that arose were confidentiality and attitudes towards technology. Due to various processes the university showed that the files were actually safer under this new system than as printed documents. Concerning attitudes, either individuals wanted the binders, or for the university to use technology according to their personal preference. Eventually the Blackboard system was implemented. This paperless system has provided a system that is easier to evaluate and the process has become more streamlined.

The article went step by step through the process of how the university implemented a paperless application system for professors and showed how common software can be used for

such a daunting task. The authors briefly explained how a survey taken after the program was put in place. They could have included the data of that survey. Hadlock et al. bring up two important points that are related to this research project. First, paperless systems offer the benefit of efficiency. When students can learn with ease and teachers have access readily made available, both at school and at home, that information provides excellent starting points for student achievement. Second, paperless systems provide stored information that can be given at a moment's notice yet maintain confidentiality. Students need to create portfolios for the future and having all that information on a database is a lot easier to obtain than if it were all stored in binders. Future researchers could study the process of going paperless for teachers that work in elementary and secondary schools and see if Blackboard could apply to them as well.

Scherer (2014) wrote an article for Time concerning the use of technology in the classroom, and although this article is not necessarily academic, it explores many concerns he found through listening to parents of a teacher's sixth-grade classroom. Scherer's interview with the teacher reveals the fact that going paperless is not a goal but a result. The teacher's students prefer using technology rather than reading books and using paper and pens. The teacher controls everything from a smartphone. The parent's concern is the current disconnect between child and parent as parents often cannot help the child with homework. Furthermore, one parent pointed out how there was no cursive. The author also wrote about how there is a lot of friction between schools and parents concerning technology, especially technology in the hands of younger students. Other points brought up are where technology is used, to prevent health problems. The benefit mentioned is how technology meets the current needs of today's children and maintaining interest will promote learning.

Although this article is not from an academic journal, it reveals one real concern that has not been studied in depth. The concern is the loss of handwriting. This author was writing for a

general audience, and thus did not include a lot of data directly related to the interactions involved. As well, this article asked more questions than actually offering a solution or data to back up a premise. It also portrays many peoples' current perceptions concerning educational technology perceptions and going paperless. This article is very relevant to the research project on hand as it brings up many concerns that are part of the hypothesis. Future research could be done on the importance of handwriting, and the effects technology has on handwriting.

Kalonde (2017) investigated high school teachers' and students' use of iPads, barriers to iPad use and the relationship between types and frequency of iPad use in rural school environments. A mixed methods case study was used, with observations happening over 3 weeks. The author also did interviews. The school in this study was a semi-rural farming community with about 1050 students attending high school. Nine out of 47 high school teachers met the criteria and were observed. Out of nine classes surveyed, 3 classrooms did not use iPads at all, and 6 classrooms used them at least for the observation.   Some barriers were found with regard frequent iPad use. These were student attitudes and preferences followed by teacher attitudes and preferences. Finally, there were various infrastructural problems. Teachers often did not plan lessons to adequately use the technology. Overall, teachers and students were not using the iPads as much as one would expect.

This research offered some unexpected barriers. The author specifically mentions that in the literature review, student attitudes and preferences were not a mentioned barrier, implying that there is not a lot of research concerning student preferences. This research focuses on rural students from the US from one specific school. More research must be done concerning other rural schools to be able to give a definitive answer concerning technology use in classrooms, particularly the use of iPads. The case study relates to this research study, because in order to achieve a truly paperless classroom, another technology needs to take its place. Currently, iPads

and other similar tablets offer possibly the closest equivalent to paper use. Yet, preference is playing an important role into paperless technology implementation.

Wang (2010) researched a framework to provide the state of the art online classroom using various classroom management and class collaboration software. The author also surveyed students who used these different programs and most of the students were satisfied with the software being used to run their courses.

This paper offered a specific method with certain programs for running a paperless classroom and most of the students were very satisfied with the program. However, the research showed numerous software that seemed to require some training. Advocates for traditional classrooms could still maintain the fact that paper is more intuitive and just easier to use. This research relates to the current project because indirectly it offers another barrier to paperless classrooms. The processes for creating a paperless classroom seem too complex and difficult, whereas paper is more intuitive. Future research needs to be focused on how to make paperless classrooms easier to maintain and more intuitive than using paper.

Hesser and Schwartz (2013) replaced paper with iPads for a chemistry laboratory course at the University of New Haven in an effort to observe the effects of iPad integration in such a course. Twenty students participated in this course, and each student was issued an iPad and were given a list of apps necessary for the course. Hesser and Schwartz found that instructors needed to use a considerable amount of effort in designing the course. Furthermore, although the students were technologically competent, the sole use of the iPad required a steep learning curve. Many students complained about various nuances that seemed to slow the workflow down. However, a survey was given after ten weeks into the first semester and it revealed that the general attitude was actually quite positive towards this paperless approach because students felt

it prepared them for the real world. The tools and organization possibilities outweighed the challenges.

This case study and survey reveals an important fact, which is the realization that paperless technology is slowly replacing paper, and millennials as well as digital natives desire this technology use, even if it is challenging at first. The case study did not hide the challenges such as a steep learning curve, or the initial high workload given to instructors, yet it showed these barriers are easily outweighed by the many benefits. This research was done in a chemistry course at one university, and the amount of paper typically used in such a course consists of lab reports and notes from lectures, whereas other subjects possibly require more writing, or at least that is the impression one might have. Thus, more current case studies that look into other subjects would be quite beneficial for further study. The paperless chemistry course case study reveals various academic benefits which are aligned with the main hypothesis of this research project.

Dundar and Akcayir (2012) studied the reading performance, speed, and comprehension of twenty fifth graders randomly divided into two groups. One group read from electronic PC tablet displays and the other group read printed text. Data was collected through interviews and reading performance tests. The reading performance tests revealed no significant differences between digital and printed text reading scores. The students interviewed found the use of the iPad very ergonomic and mentioned how carrying one iPad with all the texts on it would be better than carrying many books from place to place. In conclusion, using tablets eliminates the need to carry many books from place to place, offers the reader many reading tools like zooming in and out, and does not cause the reader to read slower, or understand the text any less.

This qualitative and quantitative study reviewed literature that both opposes and supports the use of e-books, yet through the tests and surveys, it offered a more up-to-date diagnoses on

the reality of digital reading. Due to LCD technology and slim tablets, many studies have become outdated, and reading through electronic devices has become less of a strain. This study supports this claim. The sample size was very small. Ten students used an iPad, and ten students read from paper. In order to further the claims that this study found, a larger sample size spanning different countries would be necessary. The findings are relevant to this current research project because such findings, although small, offer some quantitative data supporting the use of e-books and dismantling the notion that such digital tools affect reading speed and comprehension.

Block and Jesness (2012) studied the impact of iPad integration on learning activities as well as teacher and student perceptions of one-to-one learning with iPads in the classroom. The case study pilot project took place within four 9th grade geography classrooms comprised of approximately 120 students total. 30 iPads for classroom use were given to each class, and both the four geography teachers as well as four social studies teachers took part in the project. Data was collected through the teacher focus group, student focus group and classroom observation. During this pilot project, the researchers concluded from the observations and focus groups that the students had more active engagement, increased time for projects, improved information literacy and digital citizenship. The teachers benefited as well. The case study showed that iPads allowed for more student-centered activities and the ability to access updated information. The barriers the case study pilot project found were that students were more easily distracted and teachers needed more time for training as well as the lack of teacher-oriented apps.

This case study has a larger sample size compared with other studies, and again reveals the many benefits of a paperless classroom through the use of iPads. The barrier of student distraction directly relates to the barrier mentioned in this research project and thus supports the claim that teachers might have reservations with implementing iPads within the classroom and

getting rid of paper. This study focused on one grade level within a pilot program and thus perceptions might differ with a classroom that has implemented such tools for a year or more. A case study similar to this one that focuses on schools that have been using iPads for more than a year might be beneficial for exploring these points more deeply.

Wong (2006) compared how internet enabled college level courses enhance the experience of both students and teacher. During this study, Wong compared traditional classroom setups with hybrid classrooms. The researcher used comparative analysis, basing the study off running a hybrid classroom for three years, as well as three decades of teaching at the college level. Furthermore, numerous articles and studies were noted to give this research more validity. Some benefits Wong found with hybrid classrooms were improvement in course delivery, increased availability of course resources, improvement in utilizing teaching tools, and reduction in support costs.

Wong's research took place over ten years ago, yet given the fact that technology tools are more advanced today, and the benefits Wong noted in his study, the benefits still relate to this current day and age. Wong based the research off personal experience which is rather subjective and limited in scope. The author's study on comparing hybrid classrooms and traditional classrooms relates to this current research project because hybrid classrooms rely in a large part on paperless environments. Technology that replaces paper offers a wide range of added benefits that weren't present before. Current research on comparing traditional classrooms with hybrid classrooms may note some benefits that weren't previously noted.

Kuriakose and Luwes (2016) studied the student perceptions on the use of paperless technology in assessments. They focused on the use of clickers. The purpose of this study was to find the pros and cons of taking assessments using clicker technology through the perceptions of the students using such technology. Sixty-six freshmen electrical engineering students

actively participated in the research, by using clickers for formative and summative assessments throughout their second semester, and doing a survey using clickers. This survey mainly used questions involving the Likert Scale. From the responses, most students found the clickers user-friendly. Most students preferred using the clickers for formative assessments but only 53% preferred using them for summative assessments. Although the results show that most students have positive perceptions, there are still considerable reservations towards this specific paperless technology.

Although the researchers conducted research with active participants that were not randomly chosen, the data shows strong evidence that can possibly be inferred on a larger population. Most current students are ready for paperless technology with regards formative assessments, but not summative assessments. The study also included irrelevant data not directly related to student perceptions which did not add to the research. Kuriakose and Luwes' research is similar to this research project because the conclusions bring up a possible barrier that relates to the attitudes teachers and administrators hold. Although more than half of the individuals preferred using clickers for summative assessments, the other individuals did not, which might imply they prefer the more personal paper and pencil method traditionally given. The research also brings up a possible academic benefit. Many students preferred clickers for formative assessments which means that the general perceptions of the population are shifting towards paperless technology. Future researchers may want to study other forms of paperless assessments to see this study's results point to a much broader perception over all forms of paperless assessments or if this study's results are limited to clicker technology.

Singer and Alexander (2017) examined how print and digital mediums affect text comprehension by systematically researching numerous studies that date back to 1992, and then continuing until arriving to current research. The searches used reliable and valid databases, and

were limited to peer-reviewed publications since 1992. Various criterion focusing on empirical data were used to determine which articles would be reviewed in this study, thus reducing the pool of 878 publications down to 36. The goal of this study was to understand the consequences readers have when reading from digital materials on high stakes assessments. Although there have been numerous studies on reading comprehension, this specific study found that most studies failed to define reading or digital reading. As well, most studies focused on one sort of comprehension. Many studies employed methods that had limited reliability or validity. Furthermore, digital text, and printed text seem to affect comprehension in different ways, and thus one shouldn't necessarily be chosen over the other, and employing one over the other requires considerable understanding and thought.

This study focused on numerous studies and was able to synthesize the findings through systematic processes. The researchers were also able to conclude that a trend was taking place, where other researchers were looking at the newest digital mediums rather than using studies based off older digital mediums. Definitions of reading and digital reading, comprehension, understanding assessments, and trends were covered in this study. This study is highly relevant to the research project because the study points to the very mediums that may or may not replace paper and synthesize many works both offering academic benefits or barriers. The conclusions of this extensive literature review dismiss the possibility that all assessments should be handled in a paperless environment. Further work is necessary to analyze and synthesize the numerous studies concerning education in digital environments.

Mueller and Oppenheimer (2016) studied the use of technology and note-taking in the classroom, boardroom, hospital room, and courtroom. Although they focused on four areas, this literature review will focus on the authors' study of note-taking in the classroom. Note-taking technology in the classroom has been changing rapidly. Most university students have a laptop,

but with regard note-taking, the data at different universities varies significantly. Although using a laptop seems more efficient, Mueller and Oppenheimer cited research that pointed towards more benefits with the use of pen and paper in the classroom setting. Handwritten notes correlated with better learning outcomes. The researchers also noted the distraction potential of laptops. The study also explored the use of tablets, and how the benefits of tablets for notetaking can be equivalent to using paper and pen. The research focused on the fact that notes are taken for different reasons, depending on the purpose. The technology being developed needs to consider the cognitive processes of the brain rather than merely focusing on efficiency or ease when considering note-taking in the classroom.

This study offered brief clear points on technology for classroom-notetaking, and the researchers were able to synthesize numerous studies to form the conclusion that pen and paper, or similar technologies that enable natural writing rather than typing are better than typing notes in class. This study also focused on three other note-taking instances which require note-taking for different purposes, rather than focusing on one note-taking instance, and exploring those instances more deeply. Mueller and Oppenheimer challenge this hypothesis by offering extensive research on the damages of laptop notetaking in a classroom setting, and this study reiterates the importance of using technology as a tool and not as the purpose or end. However, this study also points to the possibility of replacing paper with tablets. Further studies on such a replacement need to be undertaken so as to effectively educate digital natives, yet not cause detriment towards their education.

Shonfeld and Meishar-Tal (2017) researched the benefits and obstacles found in a paperless school through the perceptions of teachers. This qualitative study interviewed twelve teachers teaching in a paperless school. The conclusion of this study shows that paperless classrooms prepare students for the future, makes their learning more effective, and empowers

the students. Furthermore, paperless classrooms enabled the teachers to present learning experiences in innovative ways that interested the students. Concerning challenges, this study showed some teachers feared that this technology may affect students' reading and writing abilities. Technology offered numerous distractions, information overload, technological problems, disorganized information, and underdeveloped skills such as reading, writing, and social skills.

This study factors in the idea that education is preparing students for the future, where a plethora of paperless environments exist. Technology is a way of life for nearly all modern individuals. For those that embrace such learning theories concerned with preparing individuals for future jobs, and experiences, this study provides numerous academic benefits. However, for the classical theorists following a more platonic line of thought, this study points to problems that can be solved with paper and pen. Furthermore, this research involved 12 teachers from one specific country, and thus more perceptions need to be gathered in order to provide more accurate data. This study discusses academic challenges and benefits directly related to the research project on hand, as well as teacher perceptions.

Luterbach and Brown (2011) researched the skills necessary for education in the 21st Century. The goal of this research was to gain consensus through a year-long Delphi study that involved six highly qualified educational technologists. The consensus came to the conclusion that students need six 21st century skills: being literate, possessing ICT skills, solving problems independently, possessing social skills, being ethical, and possessing systemic thinking skills. The panel also discussed the necessity for teachers to possess sufficient ICT knowledge and to leverage the students' ICT knowledge to achieve higher order thinking abilities.

This study consisted of highly qualified experts with years of experience, and thus the research concerning the six skills and the emphasis on ICT knowledge need to be taken seriously.

This study forms a basis for many courses that discuss the 21st century education skills students need for today. Advocates of more traditional approaches could say that this study is based off the idea that processes and skills are more important than actual knowledge, but it is common knowledge the world has left the industrial era and has entered the information age. This study is relevant to the current research project because this research provides the reasoning behind paperless classroom, as well as the roots for all the academic benefits to be found within a paperless classroom. Going paperless cannot be done for its own sake, but so as to address the development of these 21st century skills.

Conclusion of Literature Review

The amount of literature that directly relates to paperless classrooms is limited. However, several studies that address reading, writing, and presenting content digitally rather than on printed text have been conducted. Various themes have arisen throughout this literature review. First of all, going paperless is not a goal in and of itself, but rather a reason for addressing a problem or an issue. Second, going paperless provides numerous academic benefits such as efficiency, increased engagement, and greater information access. Third, going paperless has a lot of barriers as well. Typically, the transition involves a lot of extra work, there is a steep learning curve utilizing new technology, and this effort requires the full cooperation of all stakeholders. Furthermore, studies have suggested possible benefits with comprehension when reading from printed texts, and pen and paper note-taking. Ultimately, the perceptions gathered from several studies showed that most teachers, and students find using digital tools that replace paper more beneficial than harmful. However, paper might always hold some sort of place in the classroom, even the classroom of a paperless school.

Chapter 3

Methodology and Procedures

Type of Design

The design of this research is action based, and it is investigative in nature. This research project is non-experimental and the tool to arrive to the results of this research will be a survey.

Participants

Units of analysis: This research aimed at discovering various teacher and administrator perceptions on the academic benefits or barriers of paperless classrooms and schools. Thus, the participants of this research were teachers and administrators.

Geographic extent: The teachers and administrators who participated in this research were from elementary schools, secondary schools, and institutes of higher education. The majority of the participants in this study were from a bilingual K-12 school in Beijing, China. However, participants were also be from both rural and cosmopolitan areas of the US and Mexico. This will give the study a broader range of perceptions.

Time of membership: Teachers and administrators were required to have at least one year of experience teaching in an elementary school, secondary school, or a center of higher learning. They also had to be working as a full-time teacher or administrator at the time of the survey.

Sampling technique: The technique used was convenience sampling. Teachers and participants who fit the required categories were asked to participate through direct contact, email, or Facebook.

Ethics: This was a minimal risk study that notified the participants of the purpose of the study, and required their consent. The survey participants are all anonymous. As well the names

of the schools were the participants worked are also anonymous. Some questions asked for age, and years of experience.   Some survey questions asked participants technological proficiency and their willingness to work in a paperless environment. Even if participants agreed to participate, they were not be required to send their survey answers.

Apparatus

The apparatus of this research project was that of a semi-structured survey. The survey was delivered through two methods, depending on the availability of the participants: a link sent through email, or a link sent through a social media tool. The survey consisted of 2 multiple choice questions, 4 Likert Scale questions, and 4 short answer questions, and 1 open-ended question (Appendix A). The questions covered the age of the individual, how many years the individual taught, technology proficiency, daily use of technology, perceptions of academic benefits, perceptions of academic barriers, and the willingness to work or continue working in a paperless environment. The survey was created by Google Forms, and participants were asked to access the survey through a link. A permission letter was directly given to the principal where participants worked (Appendix B). A consent form about the content of the questions and ethical considerations was sent to participants who met the given research requirements (Appendix C). The survey was reviewed for reliability and validity by Franciscan Professor Dr. George Ash, Franciscan Professor Dr. Mark Furda, and Legion of Christ College of Humanities Dean of Studies Rev. Andreas Kramarz. The researcher edited the survey according to the suggestions given by these qualified judges.

Procedure

Eligible administrators and teachers from a particular school in Beijing, China were contacted. Permission was be sought from this particular school and granted. Each participant was given a consent

form and the survey was made available for an extended period of time, allowing for participants to fill it out at their own pace. Once the given period of time was over, the researcher analyzed and interpreted the collected data. Once completed, the results of the research project will be made available to all participants upon request.

Internal Validity: This study took into account six characteristics of internal validity: An operational definition of all terms was provided. Three expert judges ensured reliability and validity of the questions found in the survey. A careful description of the population was provided. An operational and rejectable hypothesis was given. Error controls were used and a careful and extensive literature review was stated.

External Validity: This research project studied a sample of the Teacher and Administrator population based on availability. There is limited external validity.

Data Analysis

As found in the survey given, this study hypothesized that the majority of teachers and administrators would agree that paperless policies have greater academic benefits than barriers. However, age and teaching experience would an important factor. Furthermore, the main academic benefits that would be mentioned will address maintaining student attention, ease of access towards research materials, and having more opportunities to develop technological skills. The detriments that would be mentioned are losing the ability to write, getting easily distracted with the technology, and possible delays due to technology instruction. Finally, most teachers would want to work in a paperless school.

Chapter 4

Results

This chapter contains the results of this action research project which surveyed the perceptions of teachers and administrators concerning the academic benefits of paperless schools and classrooms. This research project's survey (Appendix A) was sent out through numerous communication channels and remained open during a one-month period, allowing participants to access the questions during previously said period.

Twenty-nine participants answered the survey. However, some of the participants did not answer every question given on the survey, which is reflected in the data. All participants were full time teachers or administrators at the time of the survey. All questions from the survey and the data gathered has been included except for the data concerning the urban location of schools where participants worked.

The survey did not differentiate between teachers and administrators, so concerning reading the following data contained in the tables, the term teacher is used for both teachers and administrators. Finally, the data has been written in percentages in order to highlight the differences between the different answers.

Table 1

Gender

Answer Choices	%Responses
Male	82.1%
Female	17.9%

Table 2

Age

Answer Choices	%Responses
25-29 years old	18.0%
30-34 years old	43.2%
35-39 years old	17.9%
40-44 years old	0.0%
45-49 years old	25.2%
Over 50 years old	3.6%
Did not respond	3.6%

Table 3

Years of Teaching Experience

Answer Choices	%Responses
1-5 years	39.6%
6-10 years	36.0%
11-15 years	7.2%
21-25 years	10.8%
26-30 years	3.6%
More than 30 years	3.6%

Table 4

Country of school where participants worked at the time of the survey

Country	%Responses
China	82.8%
Mexico	3.6%
USA	14.4%

Table 5

Whether paperless classrooms and schools have more academic benefits than barriers

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
18.0%	25.2%	39.6%	14.4%	3.6%

Table 6

Teachers' perception of the three main academic benefits of paperless schools and classrooms

Perceived Benefit	%Percentage
Efficiency	16.7%
Ease of information access	16.7%
Better classroom engagement	4.7%
Greater opportunities for group learning	2.3%
Greater opportunities to develop technological skills	22.6%
Close the learning gap	1.2%
Better possibilities with differentiated learning	3.6%
Student work can be stored more easily and readily accessed	26.2%
More thorough comments on writing assignments	1.2%
Better opportunities for blended learning	3.6%
Others – Teachers wrote a benefit not on this list – Less Paper Waste	1.2%

Table 7

Teachers' perception of the three main academic barriers of paperless schools and classrooms

Perceived Barriers	%Percentage
Increased distraction	10.8%
Technological interruptions	27.0%
Detriment towards reading comprehension	2.4%
Loss of writing ability	22.9%
More chance of plagiarism	9.6%
Loss of social skills	2.4%
Giving too much screen time	9.6%
Wasted time due to steep learning curve	2.4%
Increased Teaching Workload	1.2%
Classroom discipline issues caused by technology use	8.4%
Others – Teachers wrote a barrier not on this list	2.4%

Others: Here are the teacher's comments

Some students may not have access at home

Burden to schools budget

Table 8

Whether participants would want to work or continue working in a paperless school

Absolutely Not	Only if I had no other choice	Indifferent	Interested	Absolutely
10.7%	21.4%	42.9%	17.9%	7.1%

Table 9

Teachers' frequency of technology use in the classroom

Answer Choices	%Responses
Avoid as much as possible	3.6%
Once in a while – but don't intentionally integrate it into my lesson plans	7.1%
Occasionally integrate technology use into my lesson plans	32.1%
Integrate technology use into my lesson plans on a weekly basis	25.0%
Integrate technology use into my lesson plans on a daily basis	32.1%

Table 10

Teachers' Technological Proficiency

Beginner	3.6%
Basic Proficiency	10.7%
Intermediate	21.4%
Above Average	50.0%
Expert	14.3%

Teachers were able to make free comments at the end of the survey. Below are the comments

quoted verbatim.

Participant 1: It's hard to be open to this simply because it is not what most teachers were raised/taught with. I would need to be shown the positive outcome of this notion while considering the negative implications as well in order to embrace such an idea.

Participant 2: We only have a few pieces of technology in the classroom. I'd love to be a 1:1 school but for now we use what we have.

Participant 3: I believe the greatest challenge for paperless schools is to provide students opportunities that will enable them to develop the basic social-interactive abilities.

Participant 4: Unless it is a science class technology has almost no place in education. I use paper only lessons and require students to write by hand. It forces them to remember things, get ready for college, and reduces distraction. My kids cannot control themselves to not look on social media or text others when I am not looking. We assume maturity from students that are not mature. On that same vein adults are sometimes less mature and less trustworthy than kids when it comes to improper phone and laptop use. Cheating skyrockets with laptops in the classroom. Not to mention ADD students are hopelessly distracted. Boo paperless school...boo.

Participant 5: Never limit your resources. Paper can be a valuable resource in the classroom. However, paperless methods are also equally valuable. I would prefer access to be able to use both.

Participant 6: Google Classroom is a great resource. If we continue to have reliable VPN, and get one-to-one devices, I'd love to use it again.

Participant 7: I have found that a good integration of both paper and paperless leads to excellence in the class, especially in time-management and streamlining of lessons. Having some paper being involved in class gives me something to actually hold onto and gaze at when it comes to grading, as well as a daily reminder to me that grades are needing to be done. It also increases accountability in students when they actually have to give something to the teacher rather than just copying off of the Internet [a major problem in China] and sending it to me via email or group chat.

Participant 8: I think that is important that students learn writing skills, if not just for the benefits of being able to fill out a form in later life. I support the idea of paperless classrooms if the technology is being used correctly, and without issues that may stifle lessons. Technology, and especially internet access, can be very restrictive in China; which would make me hesitant about trying to implement paperless lessons in a Chinese school.

Participant 9: Despite the setbacks, a paperless classroom (with most "papered" items available on PDF or word-processor) has more benefits only if everyone is equally able to access the information outside of the classroom. One drawback that I am witnessing is parents who cannot access PDFs of textbooks or reading materials at home through their computer system because it is on the school server (which is not accessible after a certain hour). In a perfect system, schools would keep their server up 24/7/365 to allow students access to textbooks and other media needed for success.

Participant 10: For higher learning, perhaps it would be best, but it's important to develop tactile analog skills early on, so that such skills are not lost on the way to the future.

Participant 11: Due to technology being used on a daily basis now and just thinking of how my current students whom are 10 years will use technology in the future makes me believe that paperless schools, will just be the norm within the next decade. I think schools today should consider lightening down on their paper use as it is easier to slowly change into this kind of institute, rather making it a snap decision later on. I believe tests via the computer, and electronic portfolios are a start, and later, providing IPADs for students with textbooks downloaded inside them as the next step.

Chapter 5

Discussion

<u>Conclusions</u>

Explanation of results: This research aimed at discovering various teacher and administrator perceptions on the academic benefits or barriers of paperless classrooms and schools. This research brought about both expected and unexpected results. The data collected failed to support the hypothesis that most teachers would have a positive view about the academic benefits of paperless schools or classrooms. Table 5 in Chapter 4 fails to support the hypothesis due to the neutral and negative responses towards the perception of more academic benefits than barriers in a paperless classroom or school. Collectively 43.2% of the participants gave negative responses, whereas 18.0% of the participants gave positive responses. The rest of the teachers gave neutral responses. Furthermore, when looking at each survey separately, the data showed that age was not a factor in such perceptions as both younger and older teachers agreed, disagreed, or were neutral. In fact, the largest group for disagreeing were teachers in their 30s. The older teachers had a more neutral or positive response. Furthermore, experience did not seem to effect the perceptions of teachers.

The results concerning the benefits of paperless classrooms or schools were not entirely consistent with the hypothesis either. Table 6 shows that 26.2% of the participants perceived student work being stored more easily and readily accessible as the main benefit. Furthermore, 22.6% of the participants saw greater opportunities to develop technological skills as a main benefit. This is the only benefit that aligns with part of the hypothesis. Finally, efficiency was the third main benefit. Only 4.7% of the teachers saw better classroom engagement as a main benefit. Only 16.7% of the teachers saw ease of access as a main benefit.

The participants' perceptions on main academic barriers were more aligned with the hypothesis. Table 7 shows 27.0% of the participants perceived technological interruptions as the main academic barrier. Furthermore, 22.9% of the participants selected the loss of writing ability as a main academic barrier. These first two chosen barriers correspond with this research's hypothesis. The only barrier that does not correspond is the possibility for increased distraction which was chosen by 10.8% of the participants.

Table 10 pointed towards an unexpected result in the research. It seemed to not matter if a teacher or administrator was technologically proficient. Many teachers who were technologically proficient disagreed about the academic benefits of paperless classrooms and schools. More understandably was the fact that teachers who were not technologically proficient also saw little academic benefit concerning paperless schools and classrooms.

Although the majority of the teachers and adminstrators who participated were working in China, the few teachers who were teaching in the USA either had neutral or negative perceptions with the academic benefits of paperless schools. This is surprising because the infrastructural challenges and internet restrictions in China are more than those found in the USA.

Another interesting point of discussion are the comments that different participants wrote. One participant pointed out that perhaps paperless schools are better for higher learning, but for younger learners, tactile analog skills are important to develop. This points to the idea that technology doesn't include such skills. Does this perception need to be corrected? Another teacher mentioned how there are many great resources when going paperless but many times it is because of infrastructural problems, challenges arise. Access to both materials – paper being a valuable resource – was mentioned. Limited available technology, and equal student access to technology was another concern. One teacher pointed to the present, where most students were technologically proficient at a young age, and thus paperless schools might just be the norm. It is

better to slowly implement such practices now rather than have to implement something of such a large scale within a short timeframe. One comment that seemed quite shocking in this day and age expressed the idea that technology had no place in education except in a science class because children lack self-control. Other teachers voiced their concerns of knowing how to implement technology properly in the classroom as quite a challenge, and thus this would take time and effort.

References to previous research: The results of this research are consistent with the research done by Flamm (2013) concerning the benefit of having student documentation easily stored and accessed. Furthermore, Meyer (2008) supports this perception discovered in this research. Meyer pointed out that having courses completely digital actually led to a better paper trail. The perception that students will lose the ability to write is consistent with the study of Gibson (2015) who pointed out the importance of having this material connection with something tangible such as paper. The perception that paperless classrooms would have too many technological interruptions is in line with the case study done by Pederson (2004). Students often became entrenched with technological problems which distracted them from the task at hand. One interesting point to be discussed is the perceptions found in this project compared with the perceptions found in other projects. Clarke and Abbot (2016) found that the teachers they researched had positive perceptions when they were actually using the technology in a paperless scenario.

Implications

Teachers and administrators need to be able to teach students and provide students with the most appropriate tools and teaching methods possible. They also need to communicate in a language the students understand. Students in this digital age speak through technology, use

technology to communicate, and spend hours in front of digital interfaces. The students are using tools that can be used for educational purposes and in fact are already being used in some places. Paperless classrooms and schools are using such powerful tools and teaching students how to use these tools effectively as well. The data collected in this research study reveals mainly negative or disinterested perceptions from teachers and administrators. It reveals partial interest in utilizing the tools that students currently use. The literature analysis from this study shows that if utilized correctly, paperless tools have numerous benefits.

Teachers and administrators avoid technology because they do not want to deal with technological interruptions and maybe they do not like change. Teachers and administrators avoid technology because they think that using other tools besides paper will cause a loss in writing. Teachers and administrators avoid technology because they perceive increased distraction. These are legitimate fears but these fears can be solved through proper training, new technology that allows for digital handwriting, and appropriate measures to aid students in focusing on the tasks at hand.

This study implies that teachers are mainly using methods and tools that predate the tools that students are capable of using. While a few teachers are on board with paperless schools and classrooms, most teachers are indifferent, and many teachers are plainly against such a concept. It is therefore imperative for administrators and teachers to focus their professional development in using education technology effectively. This will alleviate many negative attitudes, and fears, as well as help teachers much more effectively teach their digital native students. There are numerous online programs that can aid teachers and administrators towards this goal. Using distance learning for professional development will both teach them the skills necessary, and give them a firsthand experience of the power of education technology.

This research study has shown that age, gender, and even teaching experience are not factors with regards negative perceptions. An ability to use technology may be a factor but even technological proficient teachers had negative perceptions. The other possibility that was not explored in this study is the fact that educators most often resist change and hold onto traditional methods because it is more comfortable than meeting the current needs of students. It is common in any organization to resist change and this could be the possibility here. The problem is this resistance to change and adapting to the current needs of students will cause detriment to their education, and create learning gaps that will take years to remedy. This means that administration cannot remain neutral but must enroll in change leadership programs so they can help their teachers effectively make the change towards the use of more technology. It is imperative to begin this now because the educational systems throughout the world are still in the early stages of paperless models. Thus these changes can happen in small stages rather than all at once.

This study makes it more pressing for educators to seek training with paperless schools, realize their perceptions can be changed when they have a better understanding of the educational technology potential, and the detriment to students this avoidance can possibly cause.

Recommendations

This study only had 28 participants so future studies need responses from more participants. As well, the majority of teachers and administrators who participated in this research project were teaching in one particular location. It is important to have data from numerous locations that represent the educational diversity and challenges found throughout the world. Furthermore, the data portrays unequal proportions of data from different age ranges, teaching experiences, and gender. Future studies should study the perceptions of these different groups equally so as to have more balanced data, and thus increases validity.

Digital natives make up the main portion of students in the education system, and this data clearly shows that there is still a negative perception towards the very technology they rely on concerning educational purposes. There is very little research on perceptions concerning paperless schools. There is some research on benefits and barriers, but concerning attitudes, there is much wanting. This small amount of literature affected this study, because it was challenging to find studies related in some manner. The studies were either outdated, or contained information that focused on a very particular problem. More studies need to be done about paperless schools and classrooms so as to increase the amount of data, and improve our understanding about paperless classrooms and schools.

This research project asked some very general questions about the barriers and benefits. Future studies need to focus on specific barriers and benefits to discover if these are actually real barriers or benefits. Practical solutions for these barriers, such as technological interruptions, losing the ability to write, and increased distractions need to be explored, as these are certainly not insurmountable barriers. Given the pace of digital use in the world, it is imperative that educators know how to overcome such obstacles. Researchers need to find out if these perceived preconceptions concerning paperless classrooms and schools is based off of data, or purely conjectures that teachers have due to another reason. Finally, researchers can conduct more studies to see if it is possible to pinpoint the particular reason why teachers and adminstrators have differing perceptions concerning paperless classrooms and schools.

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Appendices

SURVEY FOR TEACHER AND ADMINISTRATOR PERCEPTIONS OF THE BENEFITS OF PAPERLESS SCHOOLS

This survey is for a study into the perceptions of the academic benefits and barriers of paperless schools and classrooms. Please respond accurately and honestly. All answers will remain anonymous

1. **Gender**

   Mark only one oval.

   ◯ Female

   ◯ Male

   ◯ Prefer not to say

   ◯ Other: _____

2. **Age**

   _____

3. **How many years of teaching experience do you have?**

   _____

4. **What country is your school located in?**

   _____

5. **Is your school in a**

   Mark only one oval.

   ◯ city

   ◯ suburb

   ◯ rural area

6. **From a scale of 1 to 5, do you agree that paperless schools / classrooms have more academic benefits than barriers?**

   Check all that apply.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Please pick one	☐	☐	☐	☐	☐

7. **What are three main academic benefits of paperless schools / classrooms?** *Check only three.*

Please check three benefits

efficiency	☐
ease of information access	☐
better classroom engagement	☐
greater opportunities for group learning	☐
greater opportunities to develop technological skills	☐
closing learning gaps	☐
better possibilities with differentiated learning	☐
more thorough comments on writing assignments from the teacher	☐
student work can be stored more easily and readily accessed	☐
better opportunities for blended learning	☐
Other...(if checked fill the section below)	☐

8. **other learning benefit (only fill out if you checked the "other" box above)**

_____

_____

_____

_____

_____

9. **What are three main academic barriers or problems you think paperless schools / classrooms cause?**
Check only three.

Please check three barriers

increased distraction	☐
technological interruptions	☐
detriment towards reading comprehension	☐
losing the ability to write	☐
more chances of plagiarism	☐
loss of social skills	☐
giving too much "screen" time	☐
wasted time due to steep learning curve	☐
increased teaching workload	☐
classroom discipline issues caused by technology use	☐
other (if checked fill the section below)	☐

10. **other learning barrier (only fill if you checked the "other" box above)**

_____

_____

_____

_____

_____

11. **If given the opportunity, would you want to work at a completely paperless school (or do you want to continue working at a paperless school)?**

	absolutely not	only if I had no other choice	indifferent	interested	very interested
Please check one	☐	☐	☐	☐	☐

12. **How often do you use technology for teaching?**

	Avoid as much as possible	Once in a while - but don't intentionally integrate it into my lesson plan	Occasionally integrate it into my lesson plans	Integrate technology use in my lesson plans on a weekly basis	Integrate technology use in my lesson plans on a daily basis
Please check one	☐	☐	☐	☐	☐

13. **How technologically proficient are you?**

	Beginner	Basic proficiency	intermediate	above average	expert
Please check one	☐	☐	☐	☐	☐

14. **Comments about paperless schools / classrooms you would like to share**

_____

_____

_____

_____

_____

Appendix B

Dear Principal/Superintendent,

    I am currently researching teacher and administrator perceptions about the impact of paperless policies in classrooms and schools. I am doing this research for my master's degree project at Franciscan University. My advisor is Dr. George Ash and my class instructor is Dr. Mark Furda. I am seeking your approval to conduct a survey portion of my project by asking teachers and administrators from your school a questionnaire. The questionnaire consists of 14 open and closed ended questions pertaining to teachers and administrators' perception of paperless policies in classrooms and schools. The questionnaire will take approximately 15 minutes to complete. I will ensure that the answers to this questionnaire remain completely confidential. If you have any questions about this research project, please feel free to contact me by writing to my email: deckel320@yahoo.com. I currently live in Beijing, China, and thus contacting me by phone is difficult. However, we can arrange a skype time if necessary. Your cooperation is greatly appreciated. Your prompt response is appreciated. This form can be mailed back to 5 Betty Rd, Enfield, CT 06082 and I will be promptly notified when it arrives. Again thank you for your cooperation.

Sincerely,

Daniel J Eckel

Appendix C

Consent Form for Teacher Survey

Dear Participant,

    This survey questionnaire is part of my master's degree project at Franciscan University. My advisor at Franciscan University is Dr. George Ash and my class instructor is Dr. Mark Furda. Through this research project, I am studying teacher and administrator perceptions on the academic impacts of paperless policies in classrooms and schools. You have been chosen to take part in my survey because you have been a teacher or administrator for at least one year in an elementary school, secondary school, or in higher education. I assure you that any answers you give to this survey will remain completely confidential and your name will not be connected to this study in any way, per the American Psychological Association (2002) ethical guidelines. If you wish, you do not have to participate in this survey. On the questionnaire, please indicate the answer which best describes your perception of the question asked. Please answer each question honestly. This questionnaire can be returned to me via email: deckel320@yahoo.com or mailed to the following address: 5 Betty Rd, Enfield CT, 06082. Return of the questionnaire indicates your consent to participate. Your prompt response is appreciated. Upon completion of my master's project, I will make the results available and you can see the results by contacting me via email (deckel320@yahoo.com). I appreciate your help with my project. Thank you.

<div align="right">

Sincerely,

Daniel J Eckel

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