

# Narrowing the Digital Divide at a Tuition-Free Catholic Middle School

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## Abstract

Guadalupe Regional Middle School (GRMS) is a tuition free Catholic school committed to serving families living in poverty who desire a Catholic education but cannot afford one. GRMS is an institution founded on the objective of closing the achievement gap facing low-income students.

Unfortunately, the digital divide is widening this gap. In order to attempt to narrow this gap, the school must have a technological infrastructure that is financially sustainable in a school of this model. This action research project used a mixed method research design to examine faculty ( $n = 7$ ) confidence and frustration levels in regards to technology use for school purposes and student ( $n = 75$ ) access and use of technology when off campus in order to begin development of a technological infrastructure that will serve the needs of the school's student population. Results indicated that while faculty are mostly confident in using technology, the district firewall, lack of funding, and time to plan are major barriers to implementing technology into the curriculum. Results also indicated that while the majority of students have access to some form of technology while off campus, use of that technology is limited to social networking.

## Introduction

B.Y.O.D, Glogs, Wikis, and flipping the classroom are current topics frequently being discussed in educational technology. Heralded as exciting and idyllic for engaging student collaboration and developing critical thinking skills, teachers nationwide are being urged to integrate these methods into their classrooms. Unfortunately, the benefits of this surge of educational technology (i.e., edtech) are not as widespread as hoped. According to a 2013 survey of over 2,000 K-12 teachers conducted by the Pew Research Center's Internet & American Life Project, access to technology such as broadband internet (outside of school) is greatly limited for low-income students. This group of students is largely dependent on only the technological resources available at school. Equally discouraging, the same survey revealed that while only 15% of teachers at high-income level schools feel their school's technological resources are less than adequate, that number rises to 39% among teachers of low-income students. Sadly, it would seem based on these statistics that low-income students not only experience limited access to edtech resources at home, but also at school. This digital divide does nothing to help narrow the educational achievement gap that continues to grow between the children of low-income families and those in a higher income bracket (Attewell, 2001). A large reason for this gap is that high-income parents can provide their children with the resources necessary for academic achievement (Rothstein, 2004).

Guadalupe Regional Middle School (GRMS) is a tuition-free Catholic school committed to serving families living in poverty who desire a Catholic education but cannot afford one. GRMS is an institution founded

on the objective of closing the opportunity and achievement gaps facing low-income students. It does so via institutional support to prevent and address a lack of student confidence and under-preparedness, which is common among low-income students as they move into high school, college, and the workforce. The eleven-year-old school is located only blocks from the Texas/Mexico border in Brownsville, Texas. The school currently serves a 100% Latino student population from economically disadvantaged families. It does so solely through private donations. The school receives no public financing of any kind, even though the operating budgets exceeds \$600,000 annually. This money must be fund-raised continually to maintain school programs. This is often a challenge in the economically depressed Rio Grande Valley. When adequate funds are not able to be raised, non-core programming is often downsized in favor of core academic programs such as math and literacy skills. Funding for technology, especially for expensive hardware and infrastructure, frequently falls into the category of the non-core programming that is negatively impacted by lack of school resources.

Part of the school's mission to break the cycle of poverty includes an experiential academic program that strives to address students' lack of exposure to resources and cultural experiences that many of their middle class counterparts may have. More than a few of the school's pupils have never been outside of Texas or even outside of the lower Rio Grande Valley, rarely being exposed to educational/development programs as compared to their middle-class counterparts. In addition to experiential learning, students receive an education in technology that includes access to technology equipment that further develops them as 21st Century learners.

As the school's technology teacher, I am tasked with ensuring that my students have access to reliable equipment and current software programs. Regrettably, much like

the teachers of low-income schools that were surveyed by the Pew Research Center, our school's current technological offerings are less than efficient. An increasingly slow internet speed and a problematic firewall filter are just two among a longer list of frustrations that students and faculty commonly experience while utilizing the current technology infrastructure. In my 5 years at the school, I have consoled more than a few students who have encountered problematic issues when using the school's technological resources. Due to frustration with hardware and software components, most of the faculty is understandably hesitant when it comes to integrating technology into their lesson plans as well. This is a serious problem for our students. If they are not exposed to current technology at school, they will continue to suffer from the digital divide. They will be at a severe disadvantage as they continue their academic and professional careers. Closing the gap is a vital part of GRMS's mission; therefore it is crucial that our students are provided with the same tools and resources as their middle-class counterparts.

### **Purpose Statement**

The purpose of my action research is to gain insight into teacher confidence with technology integration into class curriculum, possible barriers to teacher use of technology, and student access to and use of technology while off campus in order to begin to develop within my school, and within its budget, a technological infrastructure that is more efficient than our current infrastructure. Doing so will result in less frustration within our school community and an increase in teacher and student digital confidence.

### **Research Questions**

The research questions addressed in this action research project include:

1. What are teachers' current level of technology use and their comfortability level with technology?

2. What frustrations do teachers experience when utilizing our school's current technological resources?
3. What are teachers' needs regarding technology (i.e., hardware, software, professional development)?
4. What technology resources do students have available at home?
5. What are students using technology for while off campus?

### Literature Review

As stated on the EdTechActionNetwork website, "Technology is a powerful tool that gives students access to vast amounts of information—and helps students acquire the learning skills they need to transform this information into useful knowledge" (<http://www.edtechactionnetwork.org/why-technology-in-schools>, 2013). Because of its pivotal role in helping students to cultivate essential learning skills, such as those needed in our 21<sup>st</sup> Century society, it is most imperative that all students have access to this tool. Unfortunately it has become evident that not "all" students have equal access to reliable and current technology.

The following literature review addresses three themes to further illustrate the importance of the need for all students (regardless of socio-economic status) to not only have access to, but also to acquire the skills necessary for adequately utilizing technology: Why is the integration of technology into school curriculum so important?, How does the "digital divide" impact student success?, and "What are some reasons for teacher hesitation toward technology integration?"

**Why is integration of technology into school curriculum so important?** The incorporation of technology into school curriculum is not a novel concept. Prior to classroom computers, teachers were urged to utilize overhead projectors or wheel in the media cart with accompanying TV/VCR combination. Instead of lecturing to a

biology class on the nocturnal venturing of the bat, teachers could engage the students with actual footage of a bat flying through the night. No matter the type of technology, the inclusion of it as an educational resource has most often had the same goal: to provide the teacher with another option to differentiate their instruction and engage the student. In today's 21<sup>st</sup> century society, technology has become an integral component of information dissemination. Teachers today are having to face the reality that students have access to technologies outside of the classroom that permit them to accomplish tasks in a manner that makes more sense to them (Brooks-Young, 2007). In order to become active participants in the global economy, students must be knowledgeable in the navigation and use of current technologies to consume, produce, and effectively evaluate digital information (Edutopia, 2008). Described as the "new, essential literacy for the 21st century" (Phelps & Graham, 2013, p. 8), to be literate in information and communication technology (ICT) is a critical precursor to student success.

**How does the "digital divide" impact student success?** As previously mentioned, ICT literacy is an essential skill that today's students must have as they enter the competitive arenas of higher education and the work force. Unfortunately for one group of the population, limited access inhibits attainment of the skill. According to Mossberger, Tolbert, and Stansbury, the "digital divide" refers to the "disparities in information technology based on demographic factors such as race, ethnicity, income, education, and gender" (2003, p. xi). Lack of access to computers and high-speed internet at home usually mean that for this group of students, their only technology interaction is at school. Coincidentally, the digital divide affects the same group of students already faced with the achievement gap. The achievement gap refers to the disturbing discrepancy in academic performance between students of high-income families and those of low-

income families. Closing and/or narrowing this gap has been at the forefront of educational reform. While laws such as No Child Left Behind were passed in hopes of encouraging progress toward narrowing this gap (Abernathy, 2007), developments in 21st century technology have unfortunately resulted in an occurrence that some believe is widening the gap. When asked if today's digital technologies are narrowing or widening the achievement gap between the most and least academically successful students, 56% of 2,462 teachers surveyed said technology is actually widening the gap. Only 18% percent of the same group of teachers believed that their students had access to reliable technology outside of school (Purcell, Heaps, Buchanan, & Friedrich, 2013).

### **What are some reasons for teacher hesitation toward technology integration?**

For the integration of technology to be effective, it needs to be embraced by the teachers in the classroom. Through grants and other initiatives, there have been more than a few instances in which small rural communities are equipped with technologies in the form of computers and/or internet in order to provide access to technology. Unfortunately, not long after it was observed that simply having physical access to technology does not necessarily guarantee the cultivation of any type of information and communication literacy. This was the case with the "Hole-in-the-Wall" experiment. The experiment, which occurred in the poorest areas of New Delhi, consisted of booths equipped with a computer, monitor, and a joystick. Part of the concept of this project was that the village children would learn through their own experiences, so there was no instruction of any form provided. Children did flock to the booths, but after some time it was noted that they mostly played games and used the drawing programs (Warschauer, 2003). Without proper training, the computer simply becomes a typewriter or an overpriced game console. Mossberger et al. argued that, "If some

individuals cannot use computer technology, then all the access in the world will do no good" (2003, p. 39).

Educational technology is an integral factor in student success and because teachers are responsible for its implementation, it is important to understand what frustrations they may experience when implementing it (Tatum & Morote, 2007). It has also been noted that the digital divide might actually widen more if educational institutions cannot maintain a teaching force that is prepared to effectively incorporate technology in a manner that supports student learning (Lawless & Pellegrino, 2007). Larry Cuban has discussed several reasons for teacher frustration and resulting hesitation at implementing technology into their classrooms. Examples of reasons for teacher frustration are confusion over the term "Computer Literate" (no longer does the term mean an individual is a computer programmer or able to write code, but a software user), not having enough time to devote to the planning and researching of tech heavy lesson plans, pressure to meet standards, unreliable hardware, and not feeling part of the decision making process involved in choosing tech hardware and software (Tatum & Morote, 2007).

### **Method**

The purpose of this action research is to gain insight into teachers' current level of technology use and their comfortability level with technology, current frustrations that teachers experience when utilizing school's current technological resources, teachers' needs regarding technology (i.e., hardware, software, professional development), student access to and use of technology while off campus. The ultimate goal is to begin to develop within my school, and within its budget, a technological infrastructure that is more efficient than our current infrastructure. Three original survey instruments were administered in this study.

**Participants.** Participants ( $N = 82$ ) were 75 current students (45 female, 30 male) and 7 current teachers (4 female, 3 male). Teacher participants ranged in years of experience, from between 1-5 years to 16 and more years.

**Instruments.** There were three different original survey instruments used in this study. Each is outlined separately below.

**Teacher comfort survey.** The first survey was used to assess teacher comfortability and capability levels in regards to using technology (see Table 1). The survey instrument consisted of 15 statements and a corresponding 4-point Likert scale ranging from *Not confident* (1) to *Super confident, I can show you how to do it* (4). Participants were asked to rate their level of confidence in completing certain technology focused tasks such as “Guiding a student in creating a PowerPoint presentation” and “Accessing a shared document in Google Drive.”

**Teacher survey of perceptions of barriers to technology use.** A second survey instrument was used to identify potential barriers to teachers’ use of school computers and/or internet (see Table 2). The survey instrument consisted of 13 statements and a corresponding 4-point Likert scale ranging from *Not a Barrier* (1) to *Great Barrier* (4). Participants were asked to rate each statement; example items included: “Lack of time in schedule for students to use computers in class” and “District firewall.”

**Student survey measuring access to technology.** A third survey instrument was to gauge student access to technology when not on school grounds. The instrument consisted of three separate sections. The first section consisted of 10 items meant to solicit information from participants regarding specific forms of available technology, such as do they use a desktop or a handheld device, do they have access to the internet, and specific programs

they may use. The second and third sections were identical in content but were device specific. The sections each consisted of 10 statements and a corresponding 5-point Likert scale ranging from *Not often* (1) to *Very often* (5). Participants were asked to rate their frequency in completing specific technology focused tasks such as “Type a document” and “Communicate through email.”

**Design and Procedure.** This action research project employed three cross-sectional surveys. Student participants completed a survey specific to their population. Teacher participants completed two survey instruments.

The student participants completed the survey during their technology class on school grounds. Students were provided a link to the Google Forms created survey on October 3<sup>rd</sup> and 4<sup>th</sup> of 2013 and completed it anonymously. Teacher participants were emailed a link to the survey via Google Drive on October 16<sup>th</sup> and were asked to complete it within a two week period, also anonymously.

## Findings

The purpose of this action research project was to examine teachers’ confidence level with technology, areas of frustration regarding our school’s current infrastructure, and to gain insight into students’ access to and use of technology when off campus.

### Teacher Comfort Survey Results

The items with the highest mean score of 3.57 were using the internet for general searching and to research lessons, indicating that overall teachers at GRMS feel confident in using the internet as a research tool. However, while 57% of faculty feel confident in using the internet to conduct research for general ( $M = 3.57$ ,  $SD = 0.53$ ) and professional purposes such as researching lessons ( $M = 3.57$ ,  $SD = 0.53$ ), only 14% ( $M = 2.29$ ,  $SD = 0.95$ ) feel super

confident in using the internet to participate in education based communities and/or forums. The item with the lowest mean score of 2.17 was uploading to YouTube, indicating that the teachers are mostly evenly split in their confidence level in this area. The survey (see Table 1) revealed that 57% of our faculty feels very confident in sending and receiving email ( $M = 3.43$ ,  $SD = 0.79$ ) and working with the Microsoft program PowerPoint ( $M = 1.57$ ,  $SD = 0.79$ ). Only 29% of faculty are super confident in their ability to work with Google Drive (creating documents, accessing shared documents, and editing shared documents). While most teachers identified at least one area in which they were not confident in their technology use, there was not one area that was identified consistently.

### **Teachers' Perceptions of Barriers**

The item with the highest mean score of 3.43 was the district firewall, indicating that this item was consistently rated as being a significant barrier to teacher use of technology (see Table 2). The item with the lowest mean score of 1.57 was lack of administrative support, indicating that this item typically is not a barrier to technology use for this group of teachers. The majority of teachers (57%) indicated that lack of release time for teachers to learn/practice/plan ways to use computers or the internet, lack of available funding, and the district firewall as major barriers in their use of technology in school. Forty-three percent of teachers indicated that lack of computer availability was also a major barrier in the integration of technology into their curriculum. Lack of administrative support ( $M = 1.57$ ,  $SD = 0.79$ ) was not a significant concern, with 57% indicating that the item was not a barrier.

### **Survey of Student Access to Technology**

The results of the students' technology access at home survey (see Figure 1) revealed that 87% of our student population do have access to either a desktop or laptop computer at home. Eighty-three percent

have access to the internet at home, and 48% identified their connection as a high speed cable modem. When asked to rate the frequency with which each student uses either a desktop/laptop computer and/or a hand held device to perform various tasks, 51% of students surveyed listed Social networking as something they use the specified devices for *very often*.

Approximately only 17% ranked social networking as something they used their device for *not very often*. Table 3 and 4 indicate that creating a spreadsheet ( $M = 1.46$ , and  $M = 1.30$ , Tables 3 and 4 respectively) and Creating a presentation ( $M = 2.13$  and  $M = 1.56$ , Tables 3 and 4 respectively) were both items with some of the lowest mean scores of each survey. The highest mean score on Table 3, using a desktop computer/laptop for research, was 3.62. The highest mean score on Table 4, using a hand held device for social networking, was 4.23.

### **Discussion and Extension**

The purpose of this action research project was to examine teachers' confidence level with technology, areas of frustration regarding our school's current infrastructure, and to gain insight into students' access to and use of technology when off campus. Three different original survey instruments were administered in this study. The primary analysis of data revealed a couple of trends. The teacher comfortability survey did not identify any one particular technological area and/or task that faculty were not confident in. The possible barriers to teachers' use of technology survey indicated that administrative support was not a barrier to their use of technology at school. The survey revealed that the major culprits of teacher frustration would be the district firewall, lack of funding, and not having ample time in their schedule for prep. The data from the student survey revealed that most of our students do have access to technology at home.

### **Discussion of Major Findings**

Fifty-seven percent of faculty rated the district firewall as being a great barrier in their implementation of technology into the curriculum. District firewalls and filters are often installed to protect students from inappropriate web content; unfortunately the manner in which the filter operates often prevents students from using the internet to its fullest potential. Students have encountered difficulties when researching topics such as the Holocaust and breast cancer. Terms such as “breast” will trigger the website filters and block student access from the site (Glencoe/McGraw-Hill, 2004). The firewall also makes it virtually impossible to allow students to collaborate in “real-time” via interactive cloud based computing programs such as Google Drive.

Literature suggests that approximately 19% of families with incomes below \$15,000, own computers (Attewell, 2001). Based on the surveys, 87% of our families do own a computer. However, children of low-income families tend to use their computers for non-academic tasks, such as playing games (Attewell, 2001). As seen in Table 4, while 36% and 51% of the student population use their tech devices to play games and for social networking (Facebook, Twitter), less than 15% use their devices for word processing or creating presentations. These percentages suggest that while our students do have access to technology, they are not using it to develop important 21<sup>st</sup> century skills and are mainly using it for consumption of entertainment and social media. While most of our students have access to computers and internet at home, it would appear that they are not using their resources to their fullest potential. Typically, students in low socio-economic populations may not have educated familial support at home. Most of this population’s middle class counterparts do have that support at home, which automatically places them at an advantage to our students (Attewell, 2001).

### **Application of Findings**

This action research project has revealed that 87% (see Figure 1) of the student population at Guadalupe Regional Middle School do have access to either a laptop or personal computer at their homes. While the majority of the student population may have access to technology off campus, students are primarily using technology for social networking and playing online games. While the digital divide refers to the lack of access to tech hardware (i.e., computers and tablets) it also pertains to the lack of access to the knowledge and skills required to be literate in information technology. While this population of students may have access to technology at home, they likely do not have access to any form of instructional support. It would be advisable to conduct another round of action research to gain further insight into the current level of students’ digital literacy. In conjunction with this second round of action research, it would be wise to survey both our students as well as students in more affluent socio-economic populations. Surveying the two populations may help to identify if any correlation exists between socio-economic class and digital literacy among adolescent children.

Maintaining an efficient technology infrastructure at Guadalupe Regional Middle School is an important component in preparing students for life in the 21<sup>st</sup> century, but it is merely the vehicle that students will use to navigate through the digital world. Based on this action research study, establishing a curriculum in Digital Literacy at Guadalupe Regional Middle School along with opportunities for professional development will be necessary components to the future technology infrastructure.

### **Dissemination**

The results and final research report of this AR project will be shared with the principal, the president, and the faculty of Guadalupe Regional Middle School.

### Limitations

Several study limitations were present in the surveys used in this action research. First, in the survey instrument “Barriers to Teacher Use of Technology” I believe the item, “Lack of funding” was vague. When analyzing the data, I realized that I did not allow for specification of a type of resource that was unavailable due to lack of funding. The item was listed as a “great barrier,” but I am still uncertain whether teachers felt they were lacking in software programs, hardware, or a combination of these two areas. Second, some of the questions in the student access survey were not specific enough. One example is the question regarding the use of desktop computers/laptops and handheld devices in conducting online research. The results show that students do in fact use the internet for research, but what they do not show is what kind of research is being conducted. In retrospect, this item should have been more specific in regards to the type of research that was being conducted. The survey did not require students to specify whether they were researching colleges and/or geographic locations or the latest teen heartthrob. Third, another issue that I encountered was an item also located on the student access survey. After having responded to the question, “If your family has a computer at home, what type is it?” the participant is asked, “How long have you been using a computer at home?” The second question does not allow participants who do not have a computer at home to answer “n/a” or “do not have a computer.” Most participants answered the question very generally and just based it on how long they have had been using computers regardless of location. I made the decision to eliminate this question’s responses from the study data.

### Future Directions

This action research study has been an extremely educational and eye-opening process. In embarking on this study, my initial goal was to establish a strong case for the importance of having a solid

technological infrastructure on a campus such as ours (operating on a very tight budget). Upon analyzing my data I was somewhat shocked to learn that most of our students do have access to technology off campus in their homes. This left me confused and trying to fully comprehend the digital divide. What I discovered is that the issue of the “digital divide” is much more complicated than just the simple possession of technological devices. Students of economically disadvantaged families are also severely lacking in the educational support system at home. These students are fully versed in tweeting and updating their statuses’ in Facebook, but do they know how to access an online library database or distinguish between a reputable online source and a bogus one? Sadly, research says they do not. This could potentially be a severe handicap for the students that I work with. This situation needs to be addressed so that students will be sufficiently versed in 21<sup>st</sup> century digital literacy skills and not be at a disadvantage when competing for scholarships and jobs with their middle class counterparts. I would like to continue my research in this area and develop a curriculum in digital literacy geared specifically to this part of the population.

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Table 1

*Teacher Comfort with Technology Use**Mean, Standard Deviation, Response Count, and Frequency for Survey Questions*

Item	<i>M</i>	<i>SD</i>	Not Confident (1)	(2)	(3)	Super Confident (4)
Sending and receiving email	3.43	0.79	0 (0%)	1 (14%)	2 (29%)	4 (57%)
Attaching files to emails	3.29	1.11	1 (14%)	0 (0%)	2 (29%)	4 (57%)
Using PowerPoint	3.43	0.79	0 (0%)	1 (14%)	2 (29%)	4 (57%)
Guiding students to create PowerPoint presentations	3.33	1.11	1 (14%)	0 (0%)	1 (14%)	4 (57%)
Use internet for general searching	3.57	0.53	0 (0%)	0 (0%)	3 (43%)	4 (57%)
Trouble-shooting hardware issues	2.71	0.95	0 (0%)	4 (57%)	1 (14%)	2 (29%)
Downloading files from internet	3.00	0.82	0 (0%)	2 (29%)	3 (43%)	2 (29%)
Uploading files to internet	3.00	1.00	0 (0%)	3 (43%)	1 (14%)	3 (43%)
Use internet to research lessons	3.57	0.53	0 (0%)	0 (0%)	3 (43%)	4 (57%)
Participate in online education communities	2.29	0.95	1 (14%)	4 (57%)	1 (14%)	1 (14%)
Creating a document in Google Drive	2.43	1.27	2 (29%)	2 (29%)	1 (14%)	2 (29%)
Accessing a shared document in Google Drive	2.71	0.95	0 (0%)	4 (57%)	1 (14%)	2 (29%)
Editing a shared document in Google Drive	2.43	1.13	1 (14%)	4 (57%)	0 (0%)	2 (29%)
Uploading to YouTube	2.17	1.07	2 (29%)	2 (29%)	1 (14%)	1 (14%)
Creating a multimedia presentation	2.33	0.94	1 (14%)	3 (43%)	1 (14%)	1 (14%)

Table 2

*Barriers to Teacher Use of Technology**Mean, Standard Deviation, Response Count, and Frequency for Survey Questions*

Item	<i>M</i>	<i>SD</i>	Not a barrier (1)	(2)	(3)	Great barrier (4)
Not enough computers	3.00	1.15	1 (14%)	1 (14%)	2 (29%)	3 (43%)
Outdated, incompatible, or unreliable computers	2.43	1.13	1 (14%)	4 (57%)	0 (0%)	2 (29%)
Internet access not reliable	3.00	0.82	0 (0%)	2 (29%)	3 (43%)	2 (29%)
Lack of good instructional software	2.29	1.38	3 (43%)	1 (14%)	1 (14%)	2 (29%)
Inadequate training opportunities	2.43	1.51	3 (43%)	1 (14%)	0 (0%)	3 (43%)
Lack of release time for teachers to learn/practice/plan ways to use computers or the internet	3.14	1.07	0 (0%)	3 (43%)	0 (0%)	4 (57%)
Lack of administrative support	1.57	0.79	4 (57%)	2 (29%)	1 (14%)	0 (0%)
Lack of support regarding ways to integrate technology into the curriculum	2.14	1.21	3 (43%)	1 (14%)	2 (29%)	1 (14%)
Lack of technical support or advice	2.00	0.82	2 (29%)	3 (43%)	2 (29%)	0 (0%)
Lack of time in schedule for students to use computers in class	2.86	1.07	1 (14%)	1 (14%)	3 (43%)	2 (29%)
Lack of funding	3.29	0.95	0 (0%)	2 (29%)	1 (14%)	4 (57%)
Concern about student access to inappropriate materials	3.00	0.82	0 (0%)	2 (29%)	3 (43%)	2 (29%)
District firewall	3.43	0.53	0 (0%)	0 (0%)	3 (43%)	4 (57%)

Table 3

*Using Desktop Computer/Laptop**Mean, Standard Deviation, Response Count, and Frequency for Survey Questions*

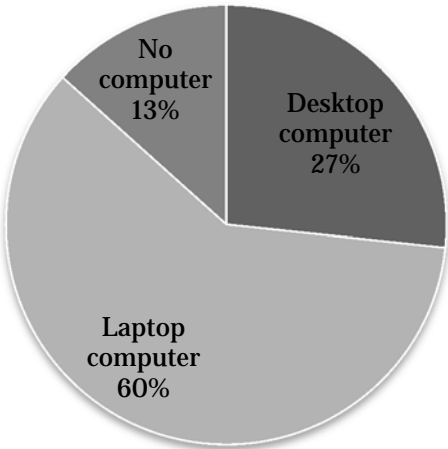
<i>Item</i>	<i>M</i>	<i>SD</i>	Not very often (1)	(2)	(3)	(4)	Very often (5)
Type a document	2.39	1.45	26 (43%)	7 (11%)	14 (23%)	6 (9%)	8 (13%)
Create a spreadsheet	1.30	0.74	51 (83%)	4 (6%)	4 (6%)	2 (3%)	(0%)
Create a presentation	1.56	0.98	41 (67%)	11 (18%)	6 (10%)	1 (1%)	2 (3%)
Create a multimedia project	2.25	1.56	33 (54%)	5 (8%)	7 (11%)	7 (11%)	9 (15%)
Research on the internet	3.62	1.37	7 (11%)	5 (8%)	15 (25%)	11 (18%)	23 (38%)
Communicate through email	2.11	1.48	32 (52%)	12 (20%)	4 (7%)	4 (7%)	9 (15%)
Social networking	3.49	1.68	12 (20%)	10 (16%)	6 (10%)	2 (3%)	31 (51%)
Video chat	2.70	1.73	25 (41%)	8 (13%)	6 (10%)	4 (7%)	18 (30%)
Edit pictures	2.85	1.70	23 (38%)	5 (8%)	9 (15%)	6 (10%)	18 (30%)
Play online games	3.11	1.63	16 (26%)	8 (13%)	11 (18%)	5 (8%)	21 (34%)

Table 4

*Using Hand Held Device**Mean, Standard Deviation, Response Count, and Frequency for Survey Questions*

<i>Item</i>	<i>M</i>	<i>SD</i>	Not very often (1)	(2)	(3)	(4)	Very often (5)
Type a document	1.90	1.37	36 (59%)	12 (20%)	3 (4%)	3 (4%)	7 (11%)
Create a spreadsheet	1.46	0.96	46 (75%)	7 (11%)	5 (8%)	1 (1%)	2 (3%)
Create a presentation	2.13	1.37	28 (46%)	15 (25%)	7 (11%)	4 (7%)	7 (11%)
Create a multimedia project	2.20	1.34	27 (44%)	11 (18%)	13 (21%)	4 (7%)	6 (10%)
Research on the internet	3.98	1.32	6 (10%)	3 (4%)	8 (13%)	13 (21%)	31 (51%)
Communicate through email	2.70	1.62	23 (38%)	8 (13%)	7 (11%)	10 (16%)	13 (21%)
Social networking	4.23	1.45	9 (15%)	10 (16%)	6 (10%)	2 (3%)	31 (51%)
Video chat	3.15	1.72	19 (31%)	6 (10%)	5 (8%)	9 (15%)	22 (36%)
Edit pictures	2.23	1.54	32 (52%)	7 (11%)	8 (13%)	4 (7%)	10 (16%)
Play online games	3.02	1.74	20 (33%)	8 (13%)	6 (10%)	5 (8%)	22 (36%)

**Computer Access at Home**



**Internet Access at Home**

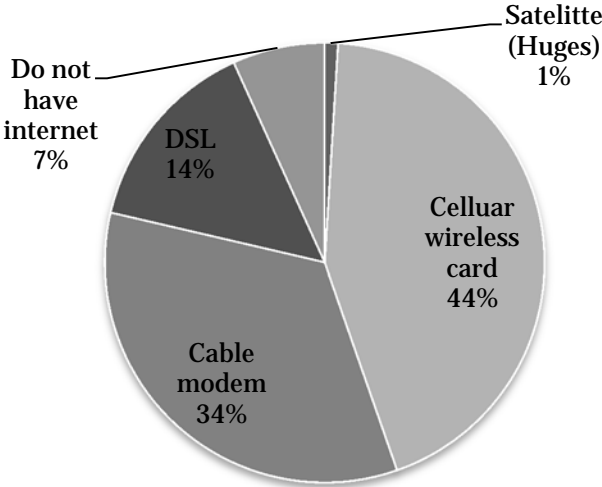


Figure 1. Student access to computers and/or laptops and internet at home