# Misconceptions of Digital Natives and the Implementation of Information and Communication Technologies

by

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Field Project

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**Abstract**

The following documentation details a field project conducted at Fox Valley Lutheran High School. The project focused on the misconception that digital natives are correctly equipped for technology use in a high school setting. The study looks at the role of technology in the personal lives of digital natives compared to the use of informational and communication technologies found in the school setting. The study focused on first-year students at Fox Valley Lutheran and the computer skills they possessed as they entered high school.

As a 1 to 1 school, Fox Valley Lutheran is committed to providing the technology needs of students in the 21st century. Technology is a prevalent part of our students' lives, and there is a high demand for computer skills in future careers. The goal of the project was to help eliminate any incorrect assumptions that digital natives are adequately equipped in computer skills. This data will help shape the future curricular goals of Fox Valley Lutheran and drive progress toward better technology implementation and instruction.

## Table of Contents

# List of Figures

# Chapter I: Introduction

## Identify the issue

Each year at Fox Valley Lutheran School (FVL), students are handed a laptop for their use while they attend high school. They are walked through the basics of passwords and logins, given a short presentation on care for the device, and told where they need to go for troubleshooting problems. They are then released from the session and have a working machine in their possession. From this point, the struggle begins as teachers note that the students, although in possession of a functional up to date computer, struggle as they attempt to use it efficiently.

The students could be called digital natives because they have been born into a society equipped with computers and the internet (Helsper & Eynon, 2011). Schools see the potential in using technology and work hard to fund and implement it in the classroom. Access to technology is not a guarantee that students will end up being computer literate to the extent that they know how to use technology productively for learning (Zogheib, 2015). Many advantages come with putting technology into the hands of students, including enhancing their learning experience and preparing them for the use of technology in future career possibilities (Hsu, 2016). However, there seems to be a disconnect between a student's ability to use a computer when compared to a student's knowledge of a phone or tablet. Laptops are given to students with the assumption that they know how to utilize the device correctly and that teachers will be implementing the use of the machines regularly (Zogheib, 2015). How computer literate are students as they enter high school? What can FVL do to help all students achieve a level of computer literacy expected of its students? This project looked to answer those questions and provide evidence of a need for stronger computer literacy training and instruction in information and communication technologies.

**Importance of the project**

The FVL School System is undergoing a curriculum review and is addressing the Technology and Computer Science area in 2020-2021. As part of the initiative to better implement technology into FVL classrooms, this project was designed to provide data to understand the degree to which FVL feeder schools are currently preparing students in the area of information and communication technologies and computer literacy. The project results will help bridge the gap between students who are receiving computer literacy training in grade school compared to those who are not. As students complete a basic computer course at FVL, they will gain additional knowledge and skills needed in future FVL courses.

It is a goal of FVL to support student learning so that by the time they graduate, they are ready for the next step of their careers, whether it is going on to college or directly into a vocation. As students prepare for future jobs, students need to leave high school with a set of technology skills that includes: information literacy, typing, productivity software proficiency, email communication, social networking, internet safety, and computer upkeep (Reece, 2009). Full participation in society demands competence in digital media, specifically the ability to produce, collaborate, share, and critique media using current and emerging technologies (Gleason & Gillern, 2018).

**Project purpose**

The goals of the project were to help eliminate any incorrect assumptions that digital natives are adequately equipped in computer skills and to build the needed skills for technology implementation in high school courses. The plan to accomplish this included a basic computer course created for incoming first-year students to cover basic computing skills that are necessary for high school. Through this course, FVL would have a better understanding of where students struggle and provide a learning experience to get them to a place where teachers can then focus on using technology to enhance learning, instead of technology to perform a task.

The long term goal would be to take the data found through this project and communicate it to the grade schools that feed FVL. Over time, the teaching of the skills would transfer to the grade school levels along with lessons and ideas of implementation. This progression would allow students who are entering FVL to have a stronger base for using computers and also give resources to teachers at FVL and the federation schools for the implementation of computers in the classroom.

# Chapter II: Literature Review

## Digital Natives Computer Knowledge

There is an assumption that digital natives are tech-savvy because they have grown up with information and communication technology (ICT) (Wang, Hsu, Campbell, Coster, & Longhurst, 2014). This assumption has led educators to place computers into the hands of their students with the second assumption that students will be able to use ICT properly. While digital natives have familiarity with technology, they may still have misunderstandings with the use of technology (Neumann, 2016).

The reported technologies used inside of the school are often limited. School-aged students seem to have less technology experience inside of school than outside of school; their use of technology outside of school was also limited and driven by entertainment and personal interests (Wang et al., 2014). Helpser and Eynon (2010) also concluded that while the proportion of young people (age 14-34) who use the internet and new technologies is higher than the older population, there are differences in how and why young people use these technologies and how effectively they use them. Clark, Logan, Luckin, Mee, and Oliver (2009) performed a study that showed that teen use of ICT was limited. However, they did recognize the potential educational benefits these tools could bring to their academic study and had a desire to use these tools to support their learning. Teachers and students alike have found that when technology is appropriately implemented in the classroom, student motivation rises, and students are more engaged with the learning task (Wang et al., 2014).

## Implementation of ICT

ICT is not a clear cut subject like history or math; it has not secured a domain in the school curriculum (Capuk, 2015). However, education in elementary and high schools must include education in the field of information and communication technology to enable students to understand the basics of the technology, to build the foundations for its productive use in life and learning, and to open the way for competitiveness in the labor market (Dimic & Rogic, 2015). The content of ICT is a broad array of information and communication technologies that include the operation of computer hardware and software, web 2.0 tools, the internet, cell phones, cameras, and other components. The International Society for Technology in Education (ISTE) created six foundational standards for students grade four through twelve. The first foundational standards for students, "basic operations and concept," requires students to demonstrate a sound understanding of the nature and operation of technology systems and be proficient in the use of technology (ISTE, 2019).

While there is not much debate about what topics belong in ICT, there is more debate about how implementation should occur. The Committee of Advisors on Science and the Panel on Educational Technology suggest that teachers should teach with educational technology, not just teach about educational technology (Cupak, 2015). Research conducted by Helsper and Eynon (2010) showed that the integration of ICT's is likely to lead to more digital learning opportunities that would likely be ignored if the technology was used in a broader sense.

In 2012, Murphy, Sharma, and Rosso (2012) conducted research that focused on office applications like a word processor, spreadsheet, and presentation software. The research showed that students preferred simulation software that takes a direct approach to learning, but also indicated that students were not wholly prepared to apply the skills they learned. Research conducted by Zogheib (2014) showed that students taking a course that focuses on the necessary skills, which is then followed by courses that integrate technology, builds a level of confidence that helps the learner be more productive with the skills of ICT.

A teacher’s knowledge about using technology to facilitate student learning and a teacher's level of tech skills or lack of them have been identified as factors to classroom technology integration (Wang et al., 2014). While various methods of introducing the use of technology into the classroom can lead to some degree of success, any successful implementation appears to have more to do with the teacher than the instructional strategy chosen (Wang et al., 2014). Research by Atif and Chou (2018) highlighted the transformative role of educators in leading students to develop the relevant competencies needed to become knowledgeable digital citizens.

The good news is that as people spend time with computers, there is a positive correlation with their attitudes toward working with computers. Hence there is a need for well-designed training (Mor, Laks, & Hershkovitz, 2016). Application of best practices of technology into the appropriate learning environment will prepare 21st-century learners to become more successful (Neumann, 2016).

# Chapter III: Design

## Introduction:

The goals of the project were to help eliminate any incorrect assumptions that digital natives are adequately equipped in computer skills and to build the needed skills for technology implementation in high school courses. The plan to accomplish this included a basic computer course created for incoming first-year students to cover basic computing skills that are necessary for high school. Through this course, FVL would have a better understanding of where students struggle and provide a learning experience to get them to a place where teachers can then focus on using technology to enhance learning, instead of technology to perform a task.

## Procedures

An online Computer Basics course was constructed to evaluate the current state of a student's ICT skills. The course ran on the FVL Moodle server and served as a branch to educate students in an online environment. The course was initially designed to run during the summer months so that students could pace themselves through the course without the added weight of other course work during the fall. This plan did not take off, and a new plan was implemented (see Appendix A).

Freshmen teachers were contacted, and the Language Arts department volunteered some of their sections to run the Computer Basics course as a supplement to the Language Arts curriculum. The course ran from the beginning of the school year till the end of the 1st quarter mid-term, a time frame of 4 weeks that aligned with the original plan of the course. The course was still voluntary, and 60 of the 120 potential students chose to participate in the course. Students had to complete a 20-hour training course during four weeks that evaluated them on various skills that fit into the definition of ICT. Students began with an orientation on using

Moodle and then took the pre-course assessment as a measure of their current knowledge (see Appendix B for sample questions). A short survey was taken to gain some demographic data from students and to gain information about their current level of computer knowledge (see Appendix C for survey questions). The course continued with a progression through six major units which included: 1. powering on and computer components, 2. operating systems and file management, 3. email and the cloud, 4. word processing and computer troubleshooting, 5. spreadsheets programs and internet searching, 6. presentation software and digital citizenship. Each unit was comprised of two or three lessons per unit (see Appendix D for sample unit). The unit was concluded with a unit quiz to help reinforce the concepts. Unit 3 through 6 also included a task for the students to complete, including document creation and using email to send a message and share documentation. The course was self-paced, though a course timeline was available to help students gauge progress in the course. Weekly reminders were sent via email or spoken by the classroom teacher to encourage students to continue working on the course and explained how their progress could be aligning with the course timeline. At the end of the four weeks, students completed the post-course assessment, and they took a survey to reflect on the course (see Appendix E for survey questions).

**Pre-course Assessment and Survey Results**

The pre-course assessment was a compilation of 54 questions that focused on the following concepts: power on a computer, computer components, operating systems, file management, email, the cloud, word processing, computer troubleshooting, spreadsheets programs, internet searching, presentation software, and digital citizenship. The average score for the pre-course assessment was 62% (see Figure 1).

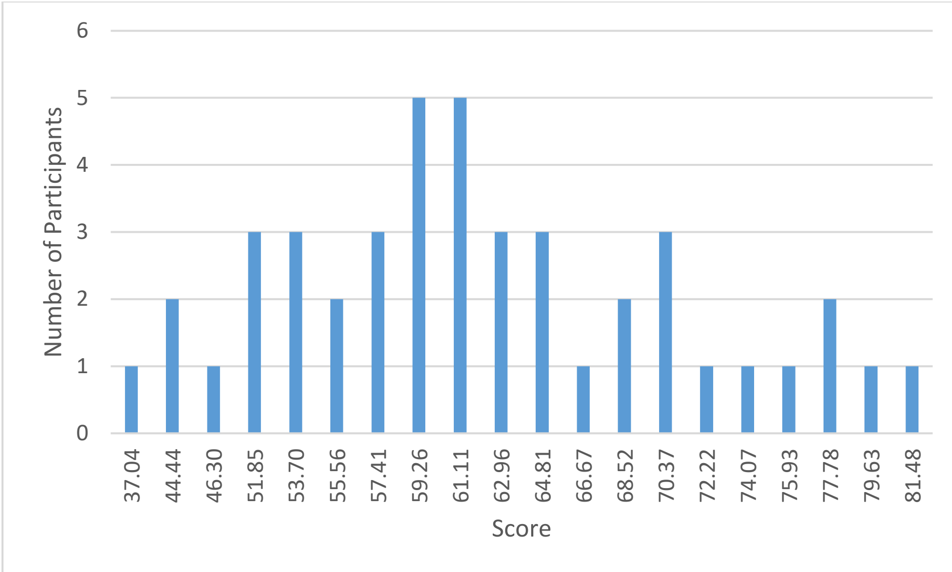


*Figure 1:* Pre-course assessment results

The average scores for the different categories broke down into the following means (see Figure 2). Participants scored the best in presentation and digital citizenship, with an average of 73% and the lowest in spreadsheets and internet searching with 48%.

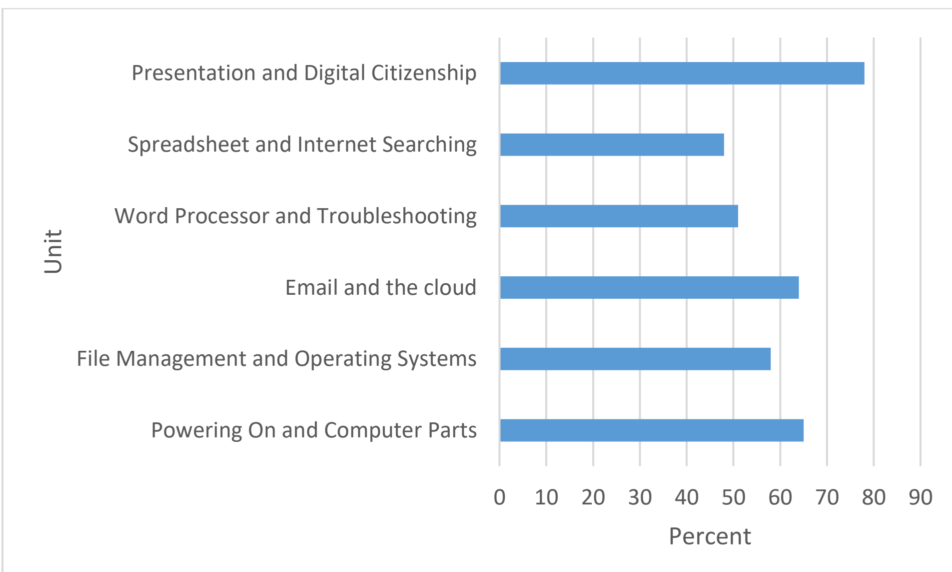


*Figure 2:* Pre-course assessment results by unit

This data compared to students' prior use of computers, as reported in the pre-course survey. The demographic of students that participated in the course became a comparable figure as to the average enrollment found at FVL. Seventy-six percent of students who participated came from the FVL schools, and the other 24% came from other Christian schools, international schools, or other public/private schools.

The pre-course survey looked at the use of computers in students' previous education. It focused on how much time was spent on computer instruction and application within the classroom (see Figure 3).

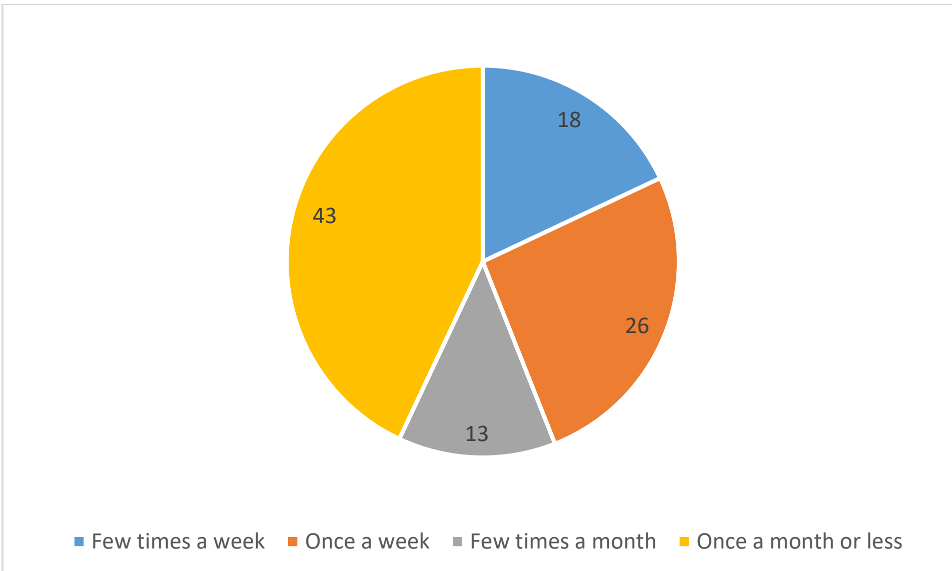


*Figure 3:* Technology course frequency

The survey data showed that 63% of students had a technology class. The frequency of instruction varied greatly, with 43% indicating once a month or less compared to 26%, indicating once a week. Other students said their instruction came as an application within a class, which points to the application of technology tied into the subject matter. Sixty-six percent of students said they had lessons that involved technology outside of a technology course. While many students were receiving some computer training, the extent of that training varied from school to school.

Figure 4 shows how often students were using a computer for classwork varied greatly, as 55% of students had regular access to a computer and were completing multiple assignments a week with the device. On the contrary, 32% of students were using a computer one time or less a week for classwork.

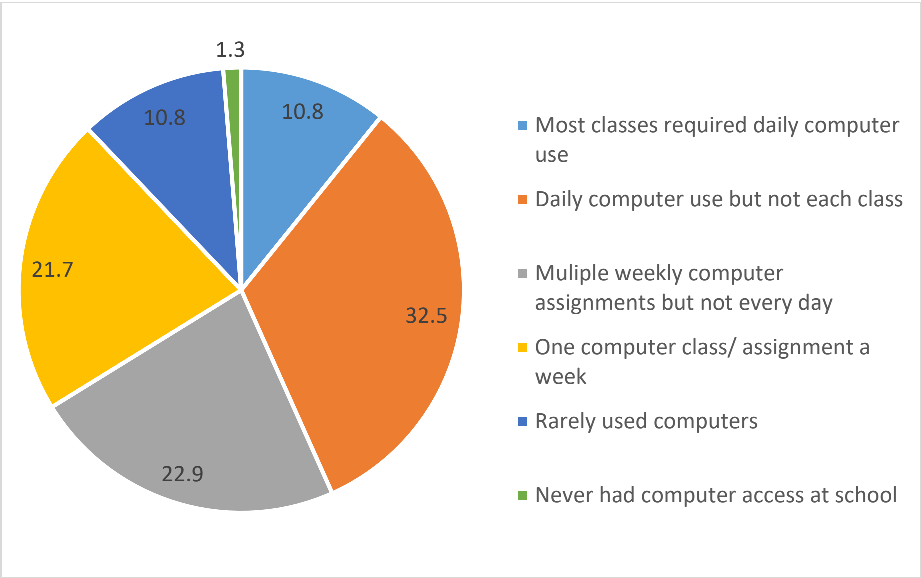


*Figure 4:* Computer use in classes

The field project focused on three main pieces of software: a word processing program, a spreadsheet program, and presentation software. The pre-course survey inquired about the different types of computer applications used in school, and the survey data provide a positive outlook concerning those three types of applications. The data showed that 85% of students had used a word processor, 61% had used spreadsheet software, and 86% had used presentation software. Other applications, such as video software (23%), Web 2.0 apps (33%), and tablet/iPad instruction (7%), all made an appearance in the classrooms but at a much lower percentage.

The last two questions of the survey looked at troubleshooting as a general concept. The first question asked if students could troubleshoot a minor issue such as a computer freezing or not being able to connect to Wi-Fi. Sixty percent of students said yes to being able to do minor troubleshooting. When it came to significant troubleshooting, students were more unsure as 65% answered maybe, and only 22% answered yes. An example of a significant issue included cleaning up a virus or malware.

**Observations from the 4-week course**

The 4-week period in which students worked through the course reveals many different strategies of how to complete the course. The course was outlined for the students as one lesson would take 10 to 15 minutes. The basic structure repeated over the four weeks would have allowed them to complete all 18 lessons with minimum time constraints. Since the course was self-directed, students took many different approaches to complete the work. The typical student started by trying to complete a lesson a day, but soon their regular school work would trump their work for the course. Much of the work transferred to the weekends, and students would complete an entire unit or more a day. This pacing allowed some students to finish in two weeks, some in three, and others using the full four weeks.

While the initial 60 students took the pre-course assessment, the number who completed every aspect of the course changed dramatically. Students were reminded each week to continue working on the course. The Language Arts teacher even added an incentive of extra credit. By the end of the four weeks, the percent of students who did all the course work was down to only 23%; this included all the unit quizzes and the unit activities. Seventy-two percent of the students did go through all the materials found on the Moodle course site and were able to take the 6 unit quizzes, while 28% of the students completed less than half of the course (See Figure #5).

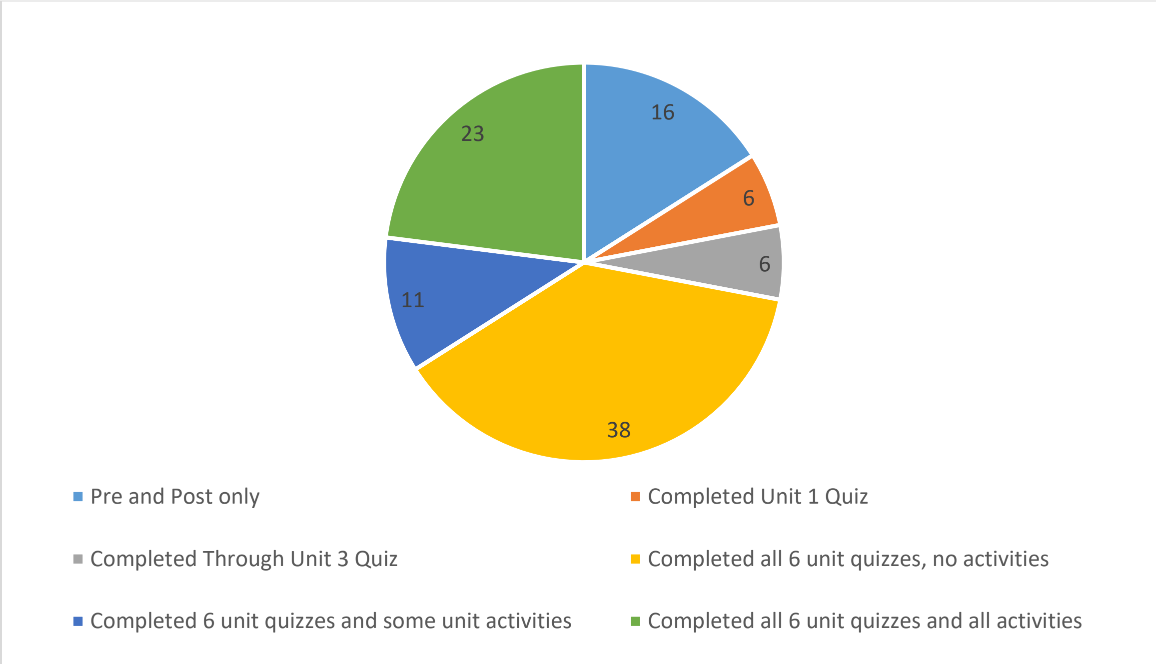


*Figure 5:* Course completion percentages

**Post-Course Assessment Results**

The post-course assessment was a mirror of the pre-course assessment. It focused on the six major units of the course. The questions found in the post-course assessment were not only found in the pre-course assessment but also became the basis for the individual unit quizzes. As students took the post-course assessment, they had had exposure to the content of the Computer Basics course along with other computer directions they may have received from their classroom teachers in other subjects.

The results of the post-assessment showed a mixed description of student progress. The overall scores showed a slight increase in overall scores. Though there were more outlier scores where students scored far below what they did in the pre-course assessment, the overall mean score for the pre-course assessment was 62%, and the overall mean score for the post-course assessment was 71% (see Figure 6).

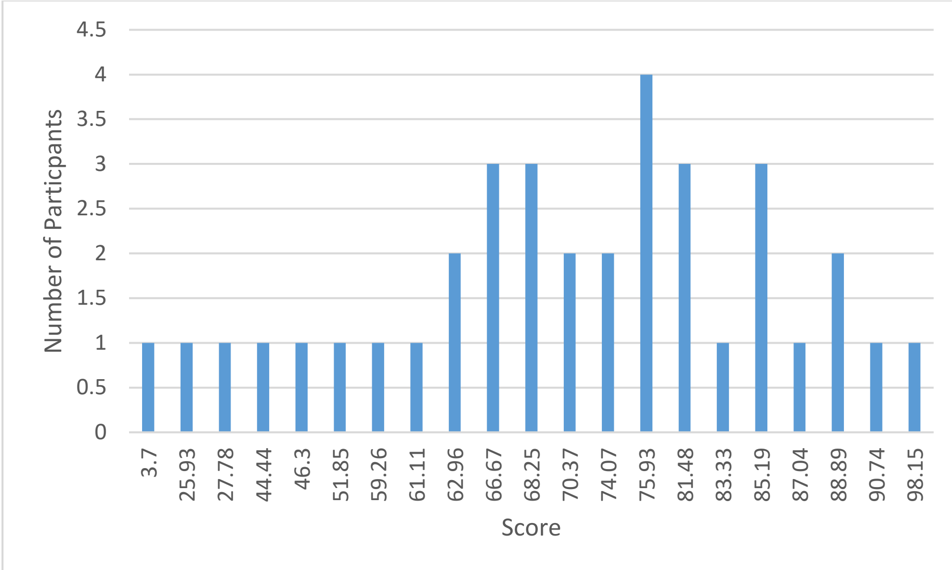


*Figure 6:* Post-course assessment results

The breakdown of the post-course assessment by unit (see Figure 7) showed similar results as student scores were slightly higher compared to the pre-course assessment. The most significant gains appeared in the word processing and troubleshooting unit with an increase of 15% and the spreadsheet and internet searching unit with an increase of 6%.

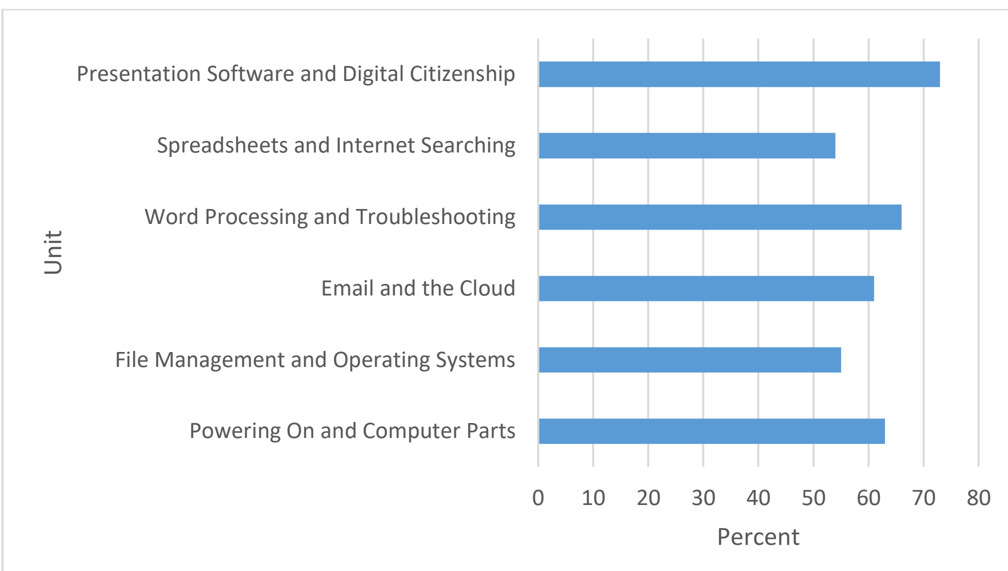


*Figure 7:* Post-course assessment percentages by unit

In a comparison between the participants that completed the course and those who only partially completed the course, the following data was collected (see Figure 8). Participants that did not complete every unit in the course started with an average of 62% correct on the pre-course assessment. By the end of the course, their post-course scores averaged 66% correct, a 4% increase over four weeks. Most participants in this category only saw a 2% increase, while a few outliers were able to increase by 10%. These outliers were students that completed about half of the course but not the entire course.

In contrast, the participants that completed the entire course had a pre-course assessment average of 61% and a post-course assessment average of 73%. When taking a closer look at individual scores, many participants scored 20-30% higher on the post-course assessment. The overall data may be skewed as some participants completed the test in less than 2 minutes, and the average test time was 15-20 minutes.

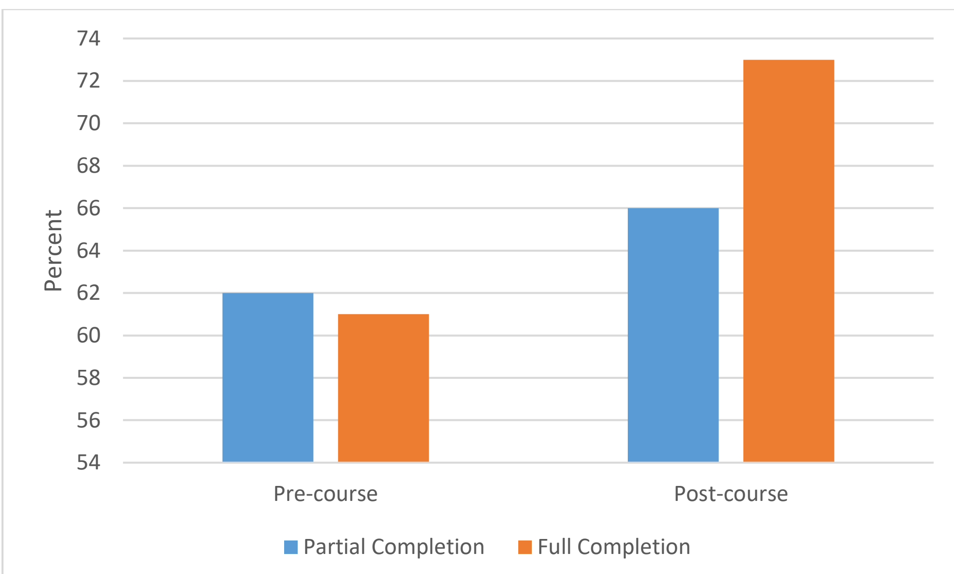


*Figure 8:* Comparison of course assessment percentages in participants

**Post-course Survey Results**

The Post-course survey (see Appendix E) served as feedback for the course. The first part of the survey focused on what was beneficial. The second part of the survey looked for opinions about requirements and improvements. In terms of how beneficial students found the course, 75% of students rated the course 3 out of 5 or higher. The course was then broken down by subject matter, and participants selected the following areas of the course as the most beneficial (see Figure 9).

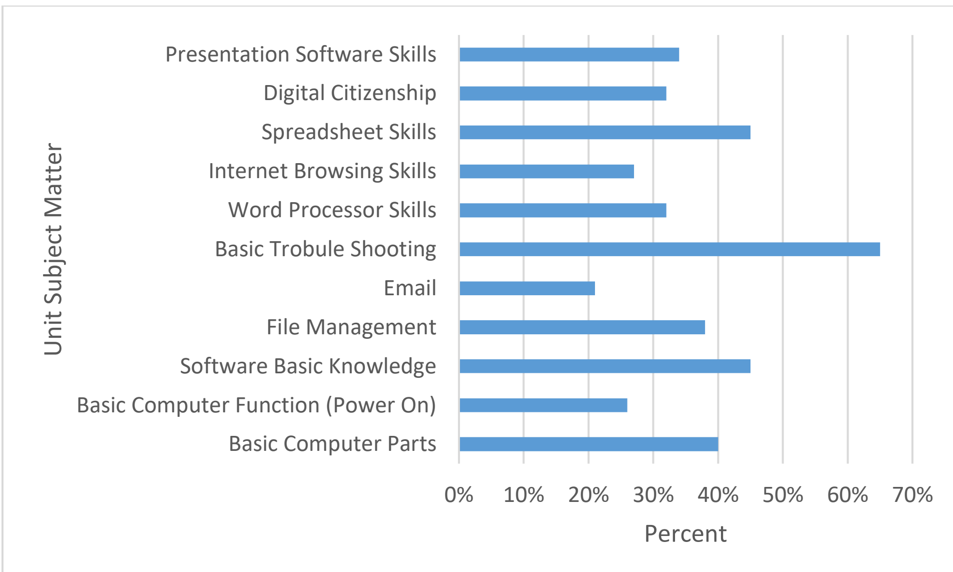


*Figure 9:* Most beneficial subject matter

The top area selected was basic troubleshooting with 65% of the participants; next was software basics knowledge, which tied with spreadsheet skills at 45% of participants.

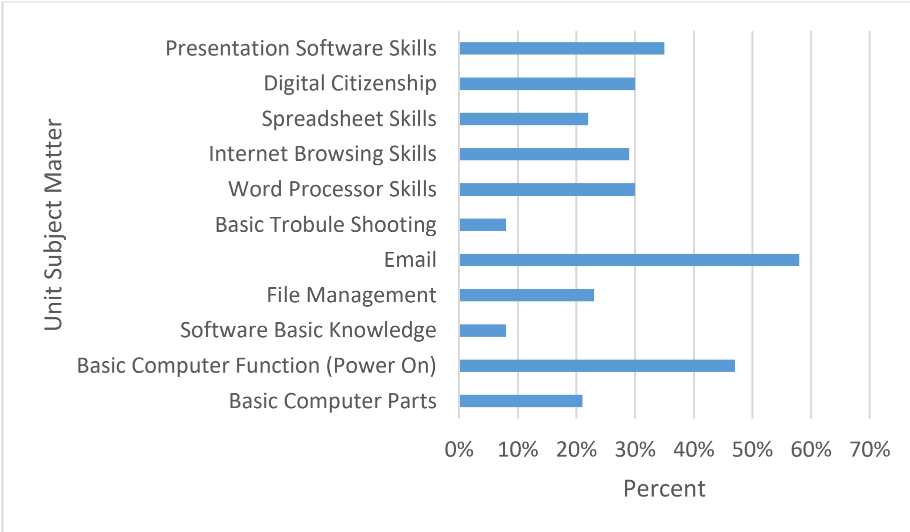


*Figure 10:* Least beneficial subject matter

The lowest areas of the course (see figure 10) included the email section, in which 58% of participants did not find it beneficial, power on and off a computer came next with 47% of participants. The final areas that students did not find beneficial were much closer, but the two that stood out were presentation software and basic computer parts, both near 35%.

One of the goals of the course was not to add a large amount of work for participants. The course was designed to take 10-20 hours of work (see Figure 11).

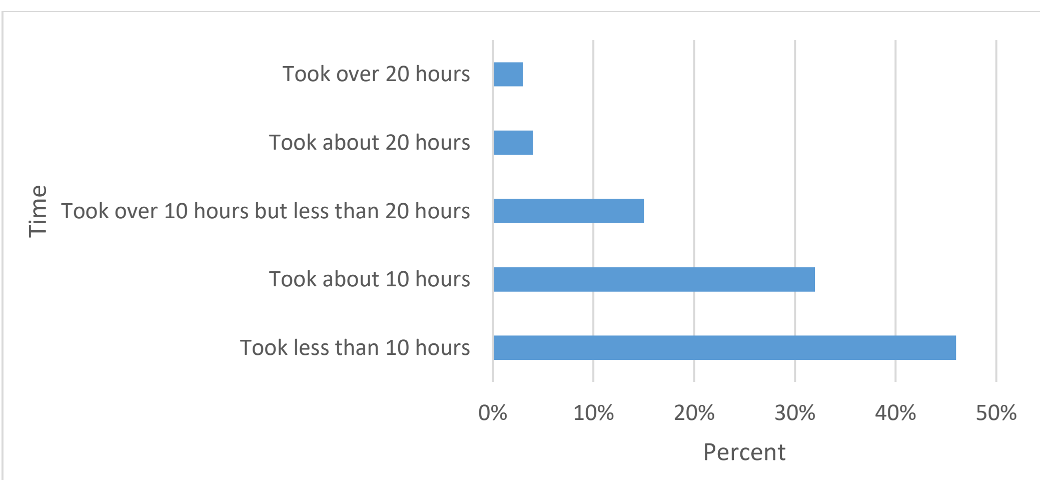


*Figure 11:* Time spent on course

In the post-course survey, 97% of participants responded that the course took 20 hours or less. 75% of participants were able to finish the course in 10 hours or less though this statistic is a bit higher than the percentage of students that completed the course.

The final thoughts of the survey looked for recommendations for future implementations. Students were asked that if the course was required, how should it be run. The options included a summer course before school starts, four weeks as a part of study hall, four weeks as an independent online study, or other. Student's opinions split into the following categories: 17% for the summer course, 21% for a study hall course, 54% as an independent study, and 8% begging that the course not be made a requirement. Final thoughts by participants included a desire for more engaging lessons, more options for assignment variation, more time, the desire for more advanced units, and many thank yous for the knowledge gained.

# Chapter IV: Reflective Essay

## Introduction

The goals of the project were to help eliminate any incorrect assumptions that digital natives are adequately equipped in computer skills and to build the needed skills for technology implementation in high school courses. FVL's approach has followed the trend that students are getting the necessary training on computers from their grade school education. This trend, combined with students' immersion in technology as a regular part of their lives, led FVL to drop in a required technology course. This field project developed a new Computer Basics course to discover if a change needed to be made in the school's thinking concerning how capable students are with the technology placed in their hands.

## Conclusion

The pre-course survey and assessment pointed to a stronger need for technology training for students entering high school. The pre-course assessment scores showed that there are areas where students lack knowledge about technology. With an average score of 62% in the pre-course assessment, the Computer Basics course started to reveal that the knowledge that students possess about their phones or how they use the internet is not the same skill set as what is desired for educational purposes, such as word processing and spreadsheet skills. The breakdown of each unit showed that the performance in areas like spreadsheets and troubleshooting resulted in lower percentages compared to word processing and presentation skills. Foundational items like how computers work and how to use the internet fell within the midrange of the previous extremes. The pre-course assessment also showed that students know foundational ideas of digital citizenship. This concept would align with the usage of many technology skills found with phones and social media.

All of the questions found in the pre-course assessment related to the time students were spending with technology at school before attending FVL. The pre-course survey results showed that 50% of students only had training on computers once a week or less. This same percentage showed that students only had tasks to complete with computers about once a week. This data leads to the question; how are students learning these fundamental computer skills? Most students had some exposure to computers in the classroom. The instruction that students are receiving before attending FVL is of high quality, and students are retaining knowledge as students did not fail the pre-course assessment. If it is not coming from their schools, then where are students getting their technology education? Is there direct instruction from family, or are students forced into self-learning and using instructions found on the internet to learn best practices of the technology that they are being asked to use?

The research on ICT shows that the assumptions about student knowledge regarding technology use in a professional or classroom setting need refinement. While many students have an awareness of the available technologies, their skill set is embedded in personal computer use, not in the use of technology as a platform for education and professional skills. Students' previous education has started to guide them in a direction to help improve those skills but is inconsistent between which students have reached mastery of these different areas of technology. While true mastery of each aspect of computers may not come until a piece of software is utilized in a workplace, the mastery of the necessary skills and basic functionality of a computer does show a hole in understanding. This hole needs filling with better foundational learning in earlier grade levels and then supported in the high school years as students start their search for future professions.

A more substantial amount of time with technology training is a clear need for students. This training is an area that can be supplied by schools but starts a debate about how to implement technology training. Would a course like the Computer Basics course suffice to prepare students for technology use as they enter high school? Or does a more dynamic approach need to be implemented at the grade level where teachers learn how to fully integrate technology into the core courses so that technology skills are not just being taught in connection to the software but also in line with the curricular standards for each course? Another possibility is reestablishing a computer application course in the high school that is required for students to complete as a requirement for graduation. This concept also falls into the debate about technology integration and how technology is implemented in high school courses.

When it came to the 4-week Computer Basics course, many different observations pointed to weaknesses of the course and how to best implement the course. The nature of an optional course had many students choosing not to work on the course content. The Language Arts classes that used the Computer Basics course had 120 students. From that group of 120, only 60 agreed to participate in the study, though that number dropped even more when it came to doing the course work. The course started with the possibility of a large sample population; the actual sample population became a much smaller number. The smaller sample points to students who are motivated to learn. This motivation allowed them to work through the course and provide data that could help shape the future of technology integration and instruction not only at FVL but also for the schools of the FVL federation.

In the post-course survey, students commented that time was a significant factor in completing the course. Since the Computer Basics course was in addition to the Language Arts course and the regular school load, many students did not feel they had sufficient time in the day to accomplish all tasks. The course was designed only to take 15-20 minutes a day; however, many students concluded that 15-20 minutes each day was too much extra work.

Another limitation of the course was the instructional technique. As the course was set up as a self-paced course online course, students had a fast introduction to online learning. While the instructor of the course had the foundation in teaching online, implementing an online course to test how well students understand technology became another test of student understanding of how technology can work. The results showed that participants did well with the course, though some did not enjoy the format of the instruction.

The post-course assessment put the validity of the course to the test. The data reflected that the course did have an 8% increase in the knowledge gained about computers and technology use. The initial data showed that there was a need for more technical instruction. The instruction in some areas did not create an increase in student performance. Areas like word processors, the internet, and presentation software stayed the same. These are areas that many participants were familiar with and had scored well on them in the pre-course assessment. Areas like spreadsheet software and troubleshooting were two areas that grew significantly, and participants found them beneficial as they grew in their computer knowledge. As FVL and the FVL schools' federation make plans for the future, they will need to find a balance between the different pieces of software so that students can have a good understanding of the different technologies that they will be asked to use.

Overall the course was well-received by participants. The time constraint put into play by the operation of the course as an adjunct to the Language Arts course became a significant hindrance to the participants. However, the course taught many different aspects of technology that had been missed in earlier education or became a good refresher on essential content as students now have the responsibility of managing a computer. The 1 to 1 program requires students to help maintain the functionality of their computers. They need to know how to connect the Wi-Fi, the network to be able to manage their files on the device, and the cloud. As issues arise with their computers, the basics of troubleshooting become more important as the tech help does not follow them home. As the 1 to 1 program runs within the school, there are many opportunities and requirements to be on a computer. This regular activity on the computer can lead to many questions that cannot be answered if the previous skills about computers are unknown. The Basic Computer course provided many of those fundamental skills that have made the transition from their previous education to a 1 to 1 program at FVL more successful.

**Recommendations**

The technology presence at FVL is not about to diminish. This study has started to point to different areas that technology knowledge needs to increase. With the success of students in mind, it is time to better establish technology training not only in high school but also in the FVL federation schools. This process is not an overnight change but rather a healthy transition that uses the information gained from this course to help direct future implementation of technology in classrooms. The process will need to start with a foundation of expectation that the high school has for students entering FVL. This baseline of standards can help shape instruction and computer use within schools at each level of learning. The instruction at each level will need to take shape in a variety of forms so that teachers can find the right balance between teaching the lessons of math, reading, science, and history, along with the fundamental skills of computer use. Technology integration within the curriculum will allow for not only the learning skills but also practical applications of those skills as students move further along in their educational journey.

As part of educating students, there will also be a need to educate the teachers on how to best implement these different technology areas into their curriculums. By bringing teachers on board and educating them in great instructional strategies for implementing technology skills, the students will become the principal beneficiaries of this increase in technology implementation. Much of this education will need to find a foothold in the lower levels of education to start a learning pathway. As students enter high school, the necessary computer skills desired can be present, and high school teachers can raise the bar and build on that knowledge. As students search for professions that interest them, their high school education will support the technical skills required in future careers.

As a plan is built and the transition is created, there is still a present need to help students who are not getting this fundamental technology education. The establishment of an introductory course on technology skills could benefit students as they enter high school. The idea of an open-ended, self-pace course appealed to many students. FVL leadership will be able to sit down and discuss the implementation of a course like the Computer Basics course so that students entering high school will have that foundational understanding of computers.

Two clear options stand out to help students gain this knowledge. The first option is to offer a course in the summer. Students will be able to use the online format of the course to complete the prerequisite established for necessary technology skills. The time constraints during the summer can be less demanding than the beginning of the school year. However, this would require participants to have the technology available to complete the course. The second option would be a course developed for the first part of the school year. This course would have to balance the current course load of students. The implementation of this required course would help ensure that students have a baseline education in the desired technical skills.

While schools can establish different sets of technology requirements for students and work to help prepare them for future professions, the reality is that students do know areas of technology, and many are very good at it. As education continues to teach the skills that promote proficiency and professionalism with technology, it will also be necessary to have students utilize the computer skills that they already possess to enhance their education. This practice will create avenues for students to express themselves and share the knowledge gained in a way that is familiar and fun for them. By moving beyond professional skills of a word processor, spreadsheets, and presentation software, students can help shape the future of technology integration and help lead the way for a great balance between the misconception about digital natives and the reality of technological skills.

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## Appendix A: Sample Letter

Dear Families of (Name of School)

For the past three years, Fox Valley Lutheran has moved to a 1:1 computer program. This program was initiated by the constant changes in technology and the advancements in classrooms that use current technology. As this transition to 1:1 computing was done in high school, many of the federation grade schools are making similar moves to get computers into the hands of their students. As the 2019-2020 school year approaches, the FVL schools are performing a study on how this transition is meeting the needs of students. As more devices are placed in the hands of students, there is a need to ensure that students are receiving the skills necessary to utilize the technology correctly and professionally.

FVL is looking for your help. FVL will run a trial course that covers necessary computer skills. This course will cover topics like computer components, using email and the internet, productivity software such as word processors and spreadsheets, digital citizenship, and more. The data collected from this course will help shape the future technology education of students at FVL and the FVL schools. FVL is looking for students that will be entering 9th grade in the 2019-2020 school year. If you would like to learn additional information about this program or have a 9th-grade student that would be willing to participate in this study, please contact Mr. Fischer at tfischer@fvlhs.org.

# Appendix B: Sample Assessment Questions

The main hardware parts of a computer include the case, monitor, keyboard and mouse. The mouse and keyboard fit into which category of hardware parts?

Select one:

- a. Output
- b. Input
- c. Processor
- d. Memory/Storage

Which list best describes the ports found on a computer?

Select one:

- a. Coaxial, Composite, S Video, HDMI
- b. XLR/TRS, RCA, SDI, A/V
- c. VGA, USB, Audio, Ethernet
- d. RGB, HDMI, USB, Component

Which computer Peripherals would be considered outputs?

Select one:

- a. microphone and webcam
- b. scanner and RAM
- c. speakers and printers
- d. microphone and mouse

## Appendix C: Pre-Course Survey Questions

1. Which school did you attend before Fox Valley Lutheran?
2. Does your school offer a 1:1 computer program?
3. How often does your teacher provide an opportunity for you to use technology in class?
4. Does your school offer a computer applications course?
5. How often did you have a computer/ technology course?
6. Did your teacher have lessons that teach different computer applications outside of a technology class?
7. What computer application did you regularly use for school?
8. Do you know how to troubleshoot (fix) your computer if it has a minor problem? (Examples: computer freezes, pop up window won't close, Can't connect to Wi-Fi)
9. If your computer had a problem, could you tell the difference between a major problem and a minor problem? Example: Your computer is running slow because you downloaded a virus (Major problem) compared to your computer is running slow because your computer memory is low. (Minor problem)

# Appendix D: Example of Unit

## Unit 1 Introduction

It was probably the worst prediction in history. Back in the 1940s, Thomas Watson, boss of the giant IBM Corporation, reputedly forecast that the world would need no more than "about five computers." Six decades later and the global population of computers has now risen to something like one billion machines!

To be fair to Watson, computers have changed enormously in that time. In the 1940s, they were giant scientific and military behemoths commissioned by the government at a cost of millions of dollars apiece; today, most computers are not even recognizable as such: they are embedded in everything from microwave ovens to cellphones and digital radios. What makes computers flexible enough to work in all these different appliances? How come they are so phenomenally useful? And how exactly do they work? Let's take a closer look! (Chris Woodford, www.ExplainthatStuff.com)

## Objectives:

In this lesson you will learn about the key parts of a computer. You will also look at how to power on and off a computer and the benefits of doings so properly.

## Lesson 1.1

**1.1** A ***computer*** is a machine or device that performs processes, calculations and operations based on instructions provided by a software or hardware program. It is designed to execute applications and provides a variety of solutions by combining integrated hardware and software components.

This Unit will focus more on the hardware aspects of a computer where future units will look at software.

When it comes to hardware in a computer, the pieces of a computer can be broken into four main categories:

- **Input**: Your keyboard and mouse are just input units—ways of getting information into your computer that it can process. If you use a microphone and voice recognition software, that's another form of input.
- **Memory/storage**: Your computer probably stores all your documents and files on a hard drive. But smaller, computer-based devices like digital cameras and cellphones use other kinds of storage such as flash memory cards.
- **Processing**: Your computer's processor is a microchip buried deep inside. It works amazingly hard and gets incredibly hot in the process. That's why your computer has a little fan blowing away—to stop its brain from overheating!
- **Output**: Your computer probably has an LCD screen capable of displaying high-resolution graphics, and probably also stereo speakers. You may have a printer on your desk to make a more permanent form of output.

## Your Task

**Your task** is to look into deeper detail about computer hardware. Use the website below to cover the topic. You need to view / read the information found in the Hardware Basics section. The parts to explore are number **#3-7**. The information found in these short guides will be a part of the Unit Quiz.

Basic Computer Skills Hardware

## Lesson 1.2

**1.2** Turning on a Computer

*"Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains."* Steve Jobs

Powering on a computer is an essential part of being able to use it. However, this simple function is the key to avoiding many problems with the operation of a computer.

Watch this Video and learn more about Powering on a computer and many of the different options for shutting a computer down.

Here is a quick review of the difference between Sleep, Hibernate and Shutdown.

Link to Power on and Shutdown Presentation

## Lesson 1.3

**1.3** You have come to the end of Unit 1. There are two steps left in this Unit.

Step 1: Take the Unit 1 Quiz (link to Quiz). After passing the quiz you will be able to move onto the next unit.

Step 2: Leave feedback (Link to feedback) for the course. The feedback will help to improve the course and lead to a better learning experience.

## Appendix E:  Post-Course Survey

1. After completing the course, how beneficial did you find the information in the course? (Rate 1 to 5)
2. Which parts of the course did you find most beneficial? (List of all topics)
3. Which parts of the course did you find least beneficial? (List of all topics)
4. The course was supposed to take about 10 hours of work but no more than 20 hours of work. Check the amount of time needed for this course.
5. Do you feel that four weeks gave you enough time to complete this course?
6. If this course would become a requirement for all freshmen, which option would you suggest for implementation?  (Summer Session, four weeks as a part of study hall, four-week independent study in the fall)
7. If you could change one thing about this course, what would you change?