

**Technology's Impact on Online Learning and Academic Performance**  
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science  
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree  
Bachelor of Science, School of Engineering

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Spring, 2021

Department of Computer Science

## **Sociotechnical Synthesis**

A one-page summary of the overall thesis, including the technical and STS parts. If the two are related (even just remotely), provide an integrated narrative to connect them. If they are completely irrelevant, please add “the technical and STS theses are not related” at the end of the section”.

As technology continues to advance year after year, its presence and sophistication is has become increasingly abundant in the education sector. Contemporarily, nearly every aspect of a student’s university education utilizes some form of technology. Likewise, the novel Coronavirus pandemic has further emphasized the ubiquitous and vital nature of technology in education. Due to its ubiquitous and vital nature, technology has also had the greatest impact on the success of a student’s education in an online learning format. With useful and frictionless hardware and software, students can continue to learn without the need for a physical classroom setting and in-person interactions. However, this does not necessarily mean that the education will be the same. In my STS Research, the idea of how technology can be best utilized in an online learning format to allow students to best thrive academically is explored. Questions such as, “Where and how can universities integrate and leverage technology in educating their student in order to allow the students to thrive academically?” are asked and the research hopes to answer it. Likewise, my technical research involves creating a web-based application which facilitates several processes in the course CS2150 at UVA such as Teaching Assistant office hours, support requests, logistics, and far more. In short, the technical portion of my STS Thesis is an application of such a utilization of technology explored in my research. The idea behind the web application is create simple and frictionless technological resources that allows students to interact with the course staff and ultimately succeed academically. In summary, there are countless parallels between the research and the technical portions of my thesis, and it would be fair to say that the technical portion of the thesis is an application-based extension of my research.

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A Research Paper submitted to the Department of Engineering and Society

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Bachelor of Science, School of Engineering

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On my honor as a University Student, I have neither given nor received  
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Daniel Mizrahi

Approved \_\_\_\_\_ Date \_\_\_\_\_  
Aaron Bloomfield, Department of Computer Science

# **Technology's Impact on Online Learning and Academic Performance**

## **Introduction**

In light of the ongoing Coronavirus pandemic, universities across the United States have made the shift to online learning in order to continue to deliver an education to students despite the omnipresent health and safety risks. With this in mind, the question begs to be asked; is it even possible to replicate a traditional style of a college education in online learning format with respect to learning and academic performance? This question encompasses countless factors of education such as the means of delivering education, opportunities to collaborate between students and professors, delivery format of assignments and exams, and many more. Some obstacles that students now face in an online format of learning include a lack of engagement and motivation, disconnect from course staff and resources, fewer opportunities for collaboration with other students, and countless other factors. However, the one factor facilitating this transition and the single reason an online college education is even possible, is technology. Because technology is the single most influential factor on the success of an online education, it is also the factor that should be investigated the most in order to figure out whether or not an online education can mimic the successes of a traditional education. Contemporarily, data on online education suggests that it does not match the successes of traditional means of education. However, this does not mean that an online education does not have utility or is invaluable. For the most part, as the single option allowing college students education to persist, an online college education should and is being investigated to figure out what these shortcomings are and how they can be overcome. Therefore, as the single most influential and catalytic facet of online learning, technology is also the area which stands to gain the most from research. Studying and understanding the impact that technology has in an online learning environment will also uncover the ways that technology can be leveraged and utilized in order to overcome the present shortcomings of an online education.

## **Literature Review**

Chen, Lambert, and college analyzes the integration of web-based learning technologies in students' online education and the impact it has on their education and learning as measured by engagement, academic performance, as well as several other metrics. "the results of this study point to a positive relationship between Web-based learning technology use and student

engagement and desirable learning outcomes. Not only do students who utilize the Web and Internet technologies in their learning tend to score higher in the traditional student engagement measures (e.g. level of academic challenge, active and collaborative learning, student-faculty interaction, and supportive campus environment), they also are more likely to make use of deep approaches of learning like higher order thinking, reflective learning, and integrative learning in their study and they reported higher gains in general education, practical competence, and personal and social development.”<sup>(2)</sup> Additionally, the number of web-based technologies involved in a student’s online learning experience was investigated to see if more was better from a technology standpoint. It was discovered that a “...positive correlation is persisting even as new technologies are being introduced and students are entering college with increasingly sophisticated uses for and expectations of technology in their lives and on campus.”<sup>(2)</sup> This leads to the idea that, in the aggregate, if there is a need for a certain technology which can reduce the friction in a process found in traditional learning that is more difficult in online learning, the utilization of technology will likely have a positive impact on the facilitation of this process. Likewise, one final major consideration that this paper makes is with regard to equity. Chen argues that, “No one would deny that computers and the Internet technology have offered educational opportunities to many people who would otherwise be excluded from the traditional higher education system. Now the goal should be not just providing the educational opportunities but the highest educational quality for all students.” In each new utilization of technology, the maximal outcome for students’ learning is also the one which allows the most number to students to succeed and not just a subset who have the luxury to utilize the best technologies.

Mario Guerrero and colleges analyzed the influence office hours had on students’ academic performance. “For eight political science courses over four years, we record the number of times students visit office hours and their course grades (N = 406). Our findings indicate that office-hour visits are positively correlated with academic performance.”<sup>(3)</sup> With this in mind, the access to office hours could play a vital role in students’ academic performance. Traditionally, student would meet in person at a designated location at a designated time and get help from a teaching assistant. Now that this is no longer feasible, proper access to office hours as facilitated through technology is vital. In order for students to be able to adequately access office hours in an online learning environment technology must attempt to replicate these previous in person interactions. This includes a proper platform for communication such as Zoom or Discord, a queueing system

to organize TA help, and other technologies to mimic in-person explanations. Knowing that office hours allow students to succeed academically, means that technology's ability to mimic traditional office hours in the closest sense will be an indicator for whether or not students will be able to succeed in an online learning setting.

In Haythornthwaite's "Facilitating Collaboration in Online Learning", the author explores how collaboration between relationships amongst students as well as with teachers change when the learning environment changes from in-person to online learning. Furthermore, the paper concludes, "...with a brief summary and some key concepts for facilitating collaborative activity." (Haythornthwaite, 2006) The idea of building a software tool such as Satori is basically to foster more collaboration between students and teaching assistants during office hours, among other functionalities. Therefore, Haythornthwaite's paper will likely guide a great many ideas into how more collaboration can be fostered in an online learning environment.

In Leong, the author, "investigates the relationships between social presence, cognitive absorption, interest, and student satisfaction in online learning." (Leong, 2011) This study will be instrumental in uncovering some of other factor involved in students' success in online learning. "The study concludes that while social presence is related to student satisfaction, its impact is not direct but rather mediated by cognitive absorption." (Leong, 2011)

In Wallace, the author looks at how the relationships between students and teachers affect the students' learning experience. Furthermore, "the literature provides insights into social aspects of online teaching and learning such as the development of community, the social roles of teachers and students, and the creation of online presence." (Wallace, 2003) Such a study could be vital to linking the technology aspect of online leaning to the social aspect of learning and what students lose when there is a lack of physical interaction.

Finally, in Xu & Jagger, the authors "estimate[s] the impact of online versus face-to-face course delivery on student course performance." (Xu & Jaggars, 2013) An analysis of both two- and four-year colleges found that "robust negative estimates for online learning in terms of both course persistence and course grade, contradicting the notion that there is no significant difference between online and face-to-face student outcomes." This paper will be vital in gathering quantifiable metrics on students' academic performance in the two settings as well as demographic information on the students involved in the study.

## **STS Framework and Research Method**

In Buchanan's "Wicked Problems in Design Thinking", the author investigates the idea of wicked problems and their relation to multifaceted problems, such as the one being investigated in this STS Prospectus. The problem of how online learning affects students' academic performance is inherently a wicked problem and thus having additional research material that can be used to assess this problem will be quite valuable. It is of the utmost importance that the social and cultural aspects of a problem like the aforementioned be investigated.

Much like Winner's paper, in Pinch, T., & Bijker's "How the Sociology of Science and the Sociology of Technology Might Benefit Each Other", the authors uncover the relationship between facts and artifacts. Seeing as my research topic has several physical and non-physical technologies artifacts that contribute to the facilitation of online learning, a paper of this nature will be instrumental in understanding how the artifacts contribute to the problem and what aspects of them or their utilization can be changed in order to mitigate the problems of online learning.

In order to adopt Pinch & Bijker's Social Construction of Technology framework in the research of how online learning impacts students' academic performance in comparison to traditional means of education prior to Coronavirus, the several facets of relevant social groups (RSG's) must be investigated. Firstly, the relevant social groups (RSG) must be identified. With regard to online learning, the parties involved are the students, the universities, and the companies that create the technology to make online learning possible. Students are currently in a position where they are required to undertake online learning in an effort to continue their higher-level education in spite of the adversity caused by Coronavirus. These students are a member of a single social group which consists of men and women between the ages of 18-24 and are comprised of likely every race and nationality. Universities are a more complicated RSG seeing as they are both public and private entities that are controlled by older men and women of majority ages between 35-70. Likewise, technology companies are vastly complicated private entities that all share the same set of ideas with respect to online learning, which is to simply create the most in-demand tools and resources that the public can leverage in return for their own profits.

Once the RSG's have been identified, now one can assess the interpretational flexibility among them. Students, for starters, perceive technology as the facilitator which allows them to continue their education and mimics many of the missing facets of traditional education which includes lectures from professors, interactions with other students, taking exams, and much more.

Moreover, universities interpret technology as these days as the means of delivering the service they need to deliver to students. Now that all many physical educational facilities around the country are closed, online learning and the software and hardware tools are the only things keeping education from failing. Finally, the social group of technological corporations are addressing the problem of online learning by adapting their software tools and collaborating with universities so that students have the most access to these resources. Otherwise, the tools involved in online learning already existed to a large extent in the private sector and thus there wasn't any major innovation necessary for its integration into the education sector.

Another important question to answer, is how different RSG's negotiate/conflict on the use of the aforementioned technologies. Currently, universities are still adapted to these sudden changes to education and thus they are currently in a trial-and-error phase in a sense. At the University of Virginia for instance, several classes in the Computer Science Department have been experimenting with different software tools and resources to see which ones the students will be able to use to their advantage. For instance, which is better for communication between students during office hours, Slack, Zoom, or Discord. These types of conflicts are created from a lack of experience during these times and are resolved based on feedback from the students that is then taken into consideration by the universities. The best outcome for the universities is ultimately the best outcome for students. Finding the software tools that are most easily adoptable and utilized by the student will ultimately be best for the universities, seeing as it is the universities goal to have their students learn and perform academically.

Finally, with regard to the closure mechanism to settle the debate and to curtail the interpretational flexibility, as mentioned before, this mechanism is simply trial and error between the universities and their faculty and the students. As previously mentioned, students taking courses have many forms of dialogue with their instructors and the university staff providing the course. Thus, if a certain resource is not the most advantageous for the students, within reason it is in the instructors best interest to transition to another tool. For instance, in a class I am a teaching assistant for, CS-2150, collab was not the optimal resource for creating and taking exams. Thus, the instructors of the course decided to transition to another software tool, Gradescope. This new software tool provided far greater functionality and less friction to use on the students' end, hence it was chosen to be used during this most recent semester. Therefore, with regard to conflict and



compromise, the burden of providing possible solutions to the problem falls on the universities who should ultimately settle on a single one largely based on sentiment from the students.

The research methods that I chose were interviews as well as an analysis of quantitative research papers on online learning and affiliated topics. The reason for this decision was so that my research could capture both the quantitative and qualitative aspects to online learning. In terms of quantitative metrics, established research on the matter would be the most applicable in quantity and quality over anything that I could obtain myself. Likewise, the qualitative aspect of technology's influence on online learning could be captured in the form of interviews conducted with university students both at the University of Virginia and other prestigious universities. These interviews would prove to be very beneficial in providing first-hand accounts of how technology has influenced the online learning experience and thoughts on possible improvements.

These interviews were meant to garner the qualitative sentiments students had on their online learning experiences. This choice was made because it is difficult to find recent accounts of students experiences with online learning given that the pandemic is quite recent. Likewise, this method trumps gathering quantitative metrics because it would be incredibly tough to gain enough response on a survey, for instance, in order for the results to be statistically significant. In total, eight university students were surveyed about their experience with online learning, their utilization of technology, and how technology has influenced their recent semesters academic performance as well as ability to learn. These students ranged from numerous universities including University of Virginia, Yale, Brown, and Cal-Tech. In terms of background, the students interviewed were mostly engineers or students studying hard science such as mathematics, data science, and similar fields. Each student was asked a list of questions and then their qualitative responses were transcribed for further analysis.

Although the existing data in the study of online learning has a vast number of quantitative metrics, what lacks in the field, and what my research attempt to find, is contemporary qualitative sentiments by university students on the influence of technology in online learning. With this information, ultimately, the question of how to best utilize technology to allow students to thrive academically can be answered.

## Data Analysis

### Interview Questions

1. Do you find it more difficult to learn in online classes vs in-person classes?
2. What technologies have you been using (hardware and software) that you didn't previously utilize, and which do you find most useful?
3. How do you think/how has the transition to online learning impacted your academic performance (positive impact/negative impact/neutral impact)?
4. What do you think your university could have done/could be doing differently with respect to utilizing technologies to improve learning?
5. How do you think you would manage if you did not have your own personal laptop?
6. How would you rate your motivation (on a scale 1-10, 10 being the highest) to do work and succeed learning online versus previously?
  - i. Previous Motivation-
  - ii. Current Motivation-
7. How often do you find yourself collaborating and working with other students when compared to before the pandemic?
  - b. Follow Up- Why did your motivation go up/down/stay the same?
8. If you could change something about your online learning experience, what would it be?
9. Do you TA a course?
  - i. Has online learning made your job as a TA harder/easier/the same?
  - ii. How have technologies affected the way you TA?

Firstly, as seen above is the comprehensive list of all questions the student interviewed were asked. As previously mentioned, these questions were meant to gain some insight into their experience with online learning, their utilization of technology, and how technology has influenced their recent semesters academic performance as well as ability to learn. To start the students were asked some probing questions such as questions 1-3. These questions were mostly used to get the students to reflect a bit on their online learning experience. Across the board, the students found it far more difficult to learn in online classes as opposed to in-person classes. The large sentiment among those interviewed was that they both felt very disconnected from their classes as well as were in an environment in which distractions were far more prevalent than when being in a classroom. Several students quoted the terms, "less engaging", "distracting", "harder to pay attention", and "more hectic". All of these perspectives led to the conclusion that there were many students who were struggling to thrive in an online learning environment when they had otherwise been very successful.

Secondly, the students interviewed were then asked about their utilization of technology. On this point there was a range of responses. Some students felt there were too few technologies being used, and others felt there were too many. In both cases, the abundance or lack thereof

technology became an added layer of friction to an already difficult learning environment and conditions. One student was quoted suggesting that, "Limiting the number of different software tools used across the board would make life a lot easier. If the university had a select number of tools, it would make learning a lot easier. Learning so many different software tools can be difficult and confusing at times." This point was reinforced by several other students who simply wanted ease of use, but functionality at the same time.

Finally, on the matter of collaboration, the students had staggering responses. Collaboration is a vital part of the education process. Students learn the most when they collaborate with their peers, go to teaching assistants for help, and communicate with professors and other course staff. However, all of these aforementioned collaborative efforts are drastically decreased in an online learning environment. One student surveyed cited the fact that, as a teaching assistant for a computer science class, office hour attendance has decreased significantly. This finding becomes increasingly alarming when considering the previously discussed paper by Guerrero and colleges which analyzed the influence office hours had on students' academic performance. Diminishing the collaborative aspect to education will be directly correlated with decreased academic performance and the ability of the students to learn the course material.

The overwhelming sentiment garnered from these interviews with university students was that while academic performance remained relatively the same, as measured by the student's semester course grades and relative gauge on the current semester, actual learning dramatically decreased. The majority of students cited the disconnect they felt during lectures through tools such as Zoom as well as the lack of motivation to pay attention and participate. In addition, many of the interviewed students mentioned how technology was also one of the greatest hurdles to overcome in the respect that it created many distractions to learning during class time. Moreover, another consensus among the students was the lack of consistency among the technologies used between courses. Too many tools made learning and adapting to them far more difficult and added more friction to the transition process. Some are just a few of the many criticisms of online learning, yet, what are the take-aways.

Although online, the lectures need to be more engaging. Recordings and asynchronous classes proved to be very detrimental to learning. Rather, zoom lectures were said to be far more engaging when conducted synchronously, with technological features such as break-out-rooms where students had an opportunity to engage with one another. Secondly, given this lack of peer-

to-peer communication, teaching assistant (TA) office hours (OH) were valuable now more than ever. Given that attendance at TA OH was directly correlated to academic success and students interviewed said they attended these OH less often, technologies that make these resources more accessible will only elevate the student's learning and academic performance. <sup>(3)</sup> Finally, every single student interviewed mentioned that if not for their personal laptop which was relatively new, they would not be able to succeed let alone participate in online learning. The computer plays such a vital role in online learning that it is crucial that every university student must have one in order to make online learning a possibility.

In light of all this information, there are however, numerous changes that could be made to online learning in order to overcome some of the aforementioned obstacles. Engagement was a big area where students felt their online learning experience was not thriving. Thus, incorporating tools such as Satori to promote collaborative interactions in office hours and with course staff will likely have a great impact in improving students' online learning experience and academic performance. Additionally, consolidating the software tool set to a select number of powerful yet capable application will reduce friction, decrease learning time to use each application, and allow students to manage the software tools without becoming overwhelmed. Additionally, making the lectures themselves more engaging, but giving students the opportunity to participate in lecture, see each other with cameras on (for instance), and having the lectures themselves held synchronously will also drastically improve motivation for and engagement in lectures. Finally, creating a centralized location where students can organize and have access to all the resources involved in the course cannot be understated. It can be very easy for a student to get lost during these hectic times, and thus making the online learning experience as informative, simple, and coordinated as possible will be of great utility to the student. These are just some of the many changes that could be made in order to improve students' online learning experience. With a larger sample size and more data gathers, greater insight could be garnered which allows universities to continue to improve and leverage technology so that their students have the best chance of succeeding academically and learning.

## Conclusion

The most prevalent factor that will determine the success of the education sector during Coronavirus will undoubtedly be how successful academic institutions are at leveraging technology in order to deliver the same caliber education as prior to the pandemic. Technological innovations have had a profound impact on education and how students learn. As evident by previous discussion, technology can be utilized to the students' advantage in the form of seamless collaboration with other students and professors as well as greater access to resources such as office hours. However, technology can equally be a hinderance as seen by numerous interviews where students found online lectures to be both disconnecting, as well as the unhindered access to the internet to be a sometimes-unavoidable distraction. Thus, the question therein lies, how can technology be leveraged to maximize the learning potential for students and what best practices can academic institutions implement to facilitate this transition to online learning. As previously explained, some examples of such utilization include ample access to collaboration resources such as course materials as well as professor and teaching assistant office hours as well as more technologies across the board involved in the online learning experience. <sup>(2)</sup> In summary, it is known that technology has a profound impact on online learning and the students' ability to learn and perform academically. In light of this, is incumbent upon academic institutions to ensure that they are utilizing technology to the full potential and in the right ways students that maximizes their ability to learn, engage, and perform academically.

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**Satori: Open-source course management system**  
(Technical Report)

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On my honor as a University Student, I have neither given nor received  
unauthorized aid on this assignment as defined by the Honor Guidelines  
for Thesis-Related Assignments

X       Daniel Mizrahi

## **STS Prospectus**

### **Introduction**

Contemporarily, the world is facing a period of great adversity in light of the Coronavirus pandemic. Quickly upon the arrival of Coronavirus, many governments around the world understood the severity of the pandemic and thus implemented strict measures and protocols to mitigate infections and consequently fatalities. Domestically in the United States, for a period of time it seemed as if all of society came to a sudden halt in order to thwart Coronavirus from spreading and to preserve the health of the masses. One notable essential institution facing a multitude of obstacles from the pandemic is education. The number of unanswered questions regarding how the education sector will respond to these circumstances is seemingly endless and the number of proposed solutions to these challenges is equally as vast. In this day and age technology has become omnipresent in education and has largely facilitated this transition as well as answered many of these questions. Modern day advancement in the personal computers have enabled essentially all students to have access to boundless resources and knowledge than ever before. Advanced software tools such as Microsoft and Google Suite, Zoom, and countless other tools have effortlessly empowered student to connect and collaborate with each other. The education sector has been able to leverage modern technologies in an attempt to continue to educate students. Nevertheless, the question still lingers as to how to best utilize technology to emulate the same in-person education that students are accustomed to and if this is even possible.

### **Research Question**

The topic of online learning is a multifaceted problem with several crucial underlying questions. Firstly, how has the transition to online learning impacted students? The impact of online learning must first be investigated in order to assess the current status of education. Are all students at a detriment or are there some students that are thriving? Establishing a baseline of educational related statistics and general sentiment towards online learning will help assess the current situation. Once this baseline has been established, then, additional questions can be asked such as, why students are or aren't thriving while leaning online. Finding an underlying cause to these issues will help uproot the source of the problem, if there is one. Finally, once the source of the problem has been identified, the question can be asked; what academic institutions can do to



mitigate these obstacles while an online education persists. Are there technologies that exist that universities and schools are underutilizing/overutilizing? Are there best practices when delivering an online education that universities are ignoring or are simply unknowledgeable about? The answers to these questions and the solution to the problem of online learning is not a question of right or wrong, but rather better versus worse. An investigation into how the transition to online learning has impacted students' ability to learn will yield important answers that will inevitably guide the policies and best practices that academic institutions could implement in order to better mitigate the impact of online learning on education.

### **Literature Review**

1. (Xu & Jaggars, 2013)
2. (Leong, 2011)
3. (Chen & Lambert & Guidry, 2010)
4. (Wallace, 2003)
5. (Buchanan, 1992)
6. (Winner, 2020)
7. (Pinch & Bijker 1984)
8. (Termeer & Dewulf & Biesbroek, 2019)
9. (Haythornthwaite, 2006)
10. (Guerrero & Rod, 2013)

### **STS Framework and Method**

Document Analysis will be the sole research method that I intend to use in order to research about how the transition to online learning impacts students' academic performance and what academic institutions can do to improve students' academic performance with regard to technology. These aforementioned documents will be the ones cited in the references section of the prospectus and these documents alone, along with personal experience that related to my technical work pertaining to the prospectus will be comprehensive in coming to a conclusion on this research question.

Some examples of quantitative data sources that will be measured include academic performance of students during traditional means of learning vs online learning. Additional quantitative metrics that can and will be investigated will be how students perform in classes that utilize technologies vs. those which don't or underutilize technology when compared to similar

circumstances. Likewise, additional qualitative metrics that could be looked into is social-science studies which investigate the sentiment of students who are currently enrolled in online learning vs. traditional means. Finally, other qualitative metrics that are of relevance is students' sentiments on integrating technology into learning versus circumstances without technology.

Since the vast majority of the data involved in my research will be based on quantitative metrics in the form of academic performance, it will be difficult to introduce much bias. Comparing the relative academic performance of students in online learning environments versus traditional learning environments and students that are and aren't utilizing technology in these environments, is a simple and effective way to gather comparable numeric data that will lead to some conclusions about which scenario allows students to thrive academically.

## **Timeline**

I plan to complete my research project in a timely and scheduled manner. This means beginning by creating a detailed schedule to follow in terms of when to create surveys for data collection, when to re-read and extract data points from cited articles, when to interview students, and much more. In the coming weeks I plan to begin preparing my data collection phase of the research project which entails both extracting data from cited reputable sources as well as my own data in the form of interviews with current university students about their experiences with online learning and how technology has either assisted or thwarted their online academic success thus far. I have chosen interviews rather than surveys for several reasons. Firstly, the goal of my data collection is to garner qualitative sentiment of students at my university about their experience with online learning and how technology has influenced this experience. This approach juxtaposes doing surveys and getting quantitative metrics on the sentiment. This decision was made mostly because I do not think I could get a significant response back on the surveys for my data to be relevant as well as these metrics can be found in the existing literature on the topic. Once the interviews are complete within the coming month or so, I will aggregate the data and try and find commonalities among the students responses. Once this stage of the data collection and aggregation is complete, I will move on to collecting the quantitative metrics from the literature I cited in my proposal. Finally, I will have all the necessary pieces in order to write the entire paper with about two months of the semester in time to do so. I believe that this plan, along with the Professor's guidance and incremental assignments, will assist me to finish the paper in a timely

and thorough manner. In summary, the first month of the semester will be dedicated to preparing, scheduling, and partaking in interviews as well as quantitative data collection from cited resources. Then the following two months of the semester will be allocated to writing and polishing the final paper.

## **Conclusion**

The most prevalent factor that will determine the success of the education sector during Coronavirus will undoubtedly be how successful academic institutions are at leveraging technology in order to deliver the same caliber education as prior to the pandemic. Technological innovations, including the aforementioned, have had a profound impact on education and how students learn. However, is it possible that a complete immersion in an online education could be more of a hinderance than an advantage when compared to traditional means of education? This is the question that is so crucial to answer. It is incumbent upon academic institutions to ensure that they are delivering an education to students that maximizes their ability to learn. This responsibility entails utilizing technology to assist learning whenever advantageous, providing students any resources necessary, accommodating students with learning disabilities, and more. Thus, the question therein lies, how can technology be leveraged to maximize the learning potential for students and what best practices can academic institutions implement to facilitate this transition to online learning. The solutions to these problems will not only benefit students in schools and universities in the short term by empowering them to learn optimally, but also, they will give the education sector a better insight into how to leverage technology to help students learn. Knowing what factors contribute to academic success and knowing how to best adapt to a given circumstance such as Coronavirus will yield the best outcomes for all students and make our country more educated as a whole.