

The Relationship Between Technology and Procrastination In High School Students

AP Research

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Introduction

The ability to stay on task and complete work quickly and with quality is a valuable trait in a professional environment, not to mention in an educational setting. Today, it can seem that procrastination, the irrational delay of a task with the intent to complete it, is more present than ever and becomes an increasingly detrimental behavior in our society. While procrastination does affect a large amount of people around the world, and there is still a wealth of literature on the subject to go along with it, though there is less available information on the behaviour than one may expect.

One of these areas where research is lacking is in the relationship between technology in procrastination. Despite the seemingly large part that technology plays in modern procrastination perceived by popular culture, there is little existing research and much of what does exist is outdated with the continued development of technology. Yet another one of the areas that is underrepresented is in American High Schools. Research pertaining to foreign high schools, or equivalent, exist however aren't entirely comparable. This is due to the difference in cultures and schooling systems present in those countries. Furthermore, there is research regarding procrastination in university settings within the United States. Although this research is closer to the target setting in location, the difference in age does not guarantee similar results despite not being far off.

The object of this paper is to determine the role that technology plays in American High School Student's Academic Procrastination. In other words, this paper will look into how significantly phones and other devices impact student efficiency, and evaluate the correlations between devices and procrastination. Overall, the results from this paper will add to the current

literature, as well as help develop a better understanding of the implications to the academic efforts in teens as they prepare to move on to college, where they will likely bring their habits with them.

Literature Review

In a paper written by Joseph Ferrari, a professor specializing in procrastination research at dePaul University, titled “Procrastination” he explains essentially everything needed to know for an above-average understanding of the topic of procrastination. In the article, Ferrari presents a statistic that estimates 70-75% of college students actively participate in a form of procrastination known as “Academic Procrastination” (Ferrari, 2017, p.1). In which, students procrastinate studying, assignments, or about anything that falls under the blanket term “academic.” Academic Procrastination is found to often be one of the most severe forms of procrastination and it follows the notion that those conducting white-collar type jobs tend to be the greatest procrastinators. In a different gathering of information done by Eric Jaffe, he states that students who were procrastinators “reported higher cumulative amounts of stress and illness” (Jaffe, 2013). In other words, Academic Procrastination is not just a nuisance and an obstacle to completing work, but can actually cause harm with those afflicted in the form of severe stress. Likely experienced by most, failing to allow oneself enough time to complete their assignment results in an immense pressure causing this stress.

A different paper led by Alison Flett, a researcher from Carleton University, conducted a study which suggests that cognitive traits common in procrastinators, are common in those with depression. For example, it was found that cognitive “risk factors” such as high levels of

“ruminative brooding and procrastination-related automatic thoughts,” as well as low levels of protective factors such as “mindfulness and self-compassion” were found to be “related to a high level of procrastination and depression” (Flett, et al., 2016, p.169). In other words, these findings can imply that those with chronic procrastination could be more vulnerable to depression due to the sharing of these cognitive traits. Another aspect procrastination can be detrimental to is physical health. According to research done by Dr. Fuschia Sirois, a researcher at the University of Sheffield, “procrastination as a behavioral style [] may increase vulnerability for negative health outcomes” (Sirois, 2013, p.122). In a study of university students, it was found that procrastination related to treatment delay and fewer wellness behaviors, resulting in a decreased overall health. This presents a point that is more viable for drawing attention to the health drawbacks of procrastination due to the stigma surrounding mental health in today’s society. Although, the research is mostly outdated as mobile phones and other technology were not widespread during this time.

Despite the almost universal understanding that procrastination is self-destructive behavior, as well as the presence of lesser known mental health drawbacks, there is still a large prevalence, specifically within schools. There are many reasons as to why procrastination is so prevalent. According to Mohsen Haghbin, a researcher from Carleton University, a fear of failure was found to have “increased the likelihood of problematic delay on academic and everyday-life tasks” in those who were affected by it (Haghbin et al., 2012, p.249). Going further, this fear of failure was found to be present in students with both a high and low level of competence. The students with low competence were directly affected by the relationship between the fear of failure and procrastination. Furthermore, those with high levels of competence and fear of failure

resulted in a unsatisfied need for autonomy. This ended in an increased chance of delay in academic and everyday tasks for some students. The concept of student competence is in other words a student's self control, and is recurring theme throughout various studies on procrastination, though it goes by many names.

A study done by Timothy Pychyl and Gordon Flett titled "Procrastination and Self-Regulatory Failure: An Introduction to the Special Issue" discusses how procrastination is the result of a deficit in self-regulation. By looking at, and discussing "the complex array of motivational, affective, cognitive, and behavioral factors that operate in chronic procrastination" (Pychyl, 2012, p.203). In exploring these ideas, he is able to illustrate the concept of negative self-views and its association with the lack of self control and its role in procrastination through the use of various case studies.

In another study by Ji Won You from the Department of Early Childhood Education, in Gachon University in Korea, he looks at data collected from e-learning courses from 569 college students. He found that "absence and late submission of assignments were negatively significant in predicting course achievement" (You, 2014, p.64). In other words, procrastination exhibited in students was not significant to predict whether a student succeeds or not, meaning procrastination did not limit one's academic ability. This suggests once more that procrastination is more strongly concerned with Self Control than other factors. Thomas D. Connor, a Psychologist from the University of Manchester, in his paper about maintaining self control while having opposing motivation, describes Self-Control is "the ability to master motivation that is contrary to one's better judgement," or in other words control one's motivations (Connor, 2013, p.783). In his paper, he explains what a lack of motivation has to do with Self-Control.

From this, a person's self control can be tied into procrastination, in which students are not motivated to complete their work, as per technology.

One of the few, relevant studies regarding technology and procrastination was lead by Shuai-lei Lian from the Key Laboratory of Adolescent Cyberpsychology and Behavior in Wuhan China in order to find a connection between social media and procrastination (Lian et al., 2015). They surveyed 1,085 Chinese Undergraduate students and found that Social Network Site addiction and irrational procrastination were positively correlated, and negatively with effortful control, another name for self-control. In short, Social Media addiction often leads to decreased motivation and procrastination, though these effects are not felt to the same degree by all individuals. This is due to the amount of Effortful Control a person exhibits over their physiological and emotional behavior. Similar to before, those with low control have a greater tendency to exhibit more procrastination than those with high control. While the paper does confirm a connection between procrastination and social media specifically, it lacks explanation of whether social media is a direct cause of the procrastination as there is only explanation to why the degree of procrastination is different between social network site addicts.

Question

The original goal of my research was to develop a method for students to follow that aids in reducing procrastinatory behavior. As I continued to gather information regarding the topic, it became increasingly clear that procrastination is not as simple as common knowledge may lead many to believe. In communication with Dr. Tim Pynchyl at Carleton University, I shifted the focus of my research from a broad "guide" down to the topic of technology and procrastination.

In this area exists the gap of research regarding modern technology which is so currently sought after. For example, many parents want to know what role technology plays in their children's procrastination.

To address this gap, I posed the question "To what extent modern technology influences the level of procrastination present within High School aged teens." From this, details describing what types of technology are strongest connected to procrastination, and the extent of procrastination that can be associated with technology.

In order to do this however, other questions must be asked in order to reach an overall. The great majority of students surveyed in procrastination studies consist of college-aged adults, with very few related to actual high school students. This is in large part to the paperwork and legal steps that are needed in order to distribute a survey to minors, in which most researchers would rather avoid. Therefore, to address this gap, I ask "What is the overall state of procrastination within High Schoolers", and "What levels of technology use do High School Students typically exhibit?"

Hypothesis

In response to the first question, I hypothesize that although tightly intertwined technology is not a cause of procrastination, and that those susceptible to such behavior do so out of a lack of self control. In other words, both those with high levels of procrastination and those with low levels will still use technology. Though not equally as much due to the increased self control of non-procrastinators. Still, there will be significant technology use on both sides. The

observations made while attending a Suburban High School led me to reach this conclusion about my hypothesis on the teenager's relation with procrastination and technology.

Furthermore, in the second question made to uncover the amount of procrastination present in High School aged teens as a whole, I expect an above average level of procrastination. As far as the Procrastination measure is concerned, this would mean an average score for all the students surveyed, would be at a score of about "Often," or a score of 3. I am led to believe this is the case due to a combination of observation, as well as the fact AP students are not likely be severe procrastinators, as they care enough about their GPA that they will end up completing the large majority of assignments while still being procrastinators. Continuing, technology use among students will vary, this being due once more to the self-control a student exhibits. However, technology use overall will be significant enough to play a strong role in student's procrastination.

Methods

Data was collected through a survey distributed to students in a suburban high school in Southern California. The survey was specifically given to students from AP classes in all grade levels offered at the school (9-12th). This was done to look for a possible development of maturity or self control as one ages through adolescent years, as well as to gather a rounded dataset that displays the "High School Student" group as a whole. Furthermore, students from AP classes were specifically surveyed to insure that those surveyed were affected by true procrastination. To explain, procrastination can be defined as "The intentional yet irrational postponement of a course of action despite knowing that this delay has negative effects" (Ferrari,

2017, p.1.). In other words, in order to procrastinate, one must first have the intention to complete a task, yet are unable to bring themselves to start doing it. To explain, if one never had the intention to complete an assignment, that would not be considered procrastination. Therefore, by surveying only students in AP classes, the goal is to eliminate those who never had the intention from the data pool of real procrastinators. This is not to say those who are not in AP classes don't procrastinate, only that those in AP classes have a higher likelihood to be true procrastinators.

The structure of the survey is in two parts. One part is to test the extent of one's academic procrastination through a procrastination measure developed by Mohsen Haghbin and Dr. Timothy Pychyl titled the Multifaceted Measure of Academic Procrastination. Specifically, a modified version of the "PBS" portion of the measure was used as it was geared specifically towards Academic Procrastination. Some questions which were similar to others were dropped from the end survey in order to cut the length. For example, question 9, "When I receive academic tasks, I plan to work on them ahead of time, but I needlessly delay starting them," is very similar to question 1, "When academic tasks are assigned, I tell myself that I will not start them late, but I end up delaying them without a good reason." While in the original measure there is a purpose for the similarity, in the case of my survey it was decided that question 9, as well as others weren't entirely necessary for the end product of the survey.

The second part of the survey was self designed in order to target electronic device use overall, but specified towards procrastinatory behavior. Although, the questions asked are by no means a measure for technology use where data from multiple questions may be combined. For instance, one question asks "How long on average are you able to stay on task until you become

distracted by a device?” In response, students were given the option to estimate their average length of focus in increments of 10. This as well as others were used in order to gather data regarding technology use overall in the students.

To gather data to answer the question, the results from both parts of these surveys will be compared. For instance, those that score high procrastination behavior will have their technology use compared to those with low procrastination behavior. By comparing data, it will be possible to find whether or not technology greatly influences procrastination or not. To explain, if it is found that there is support that students with high technology use are high procrastinators and that those with low technology use are low procrastinators, it would confirm that technology does play a role in causing procrastination itself. Whereas if there was no correlation between procrastination and technology, it might suggest that procrastination might not be a consequence of technology, but that technology is a consequence of procrastination, stemming from one's ability of self control.

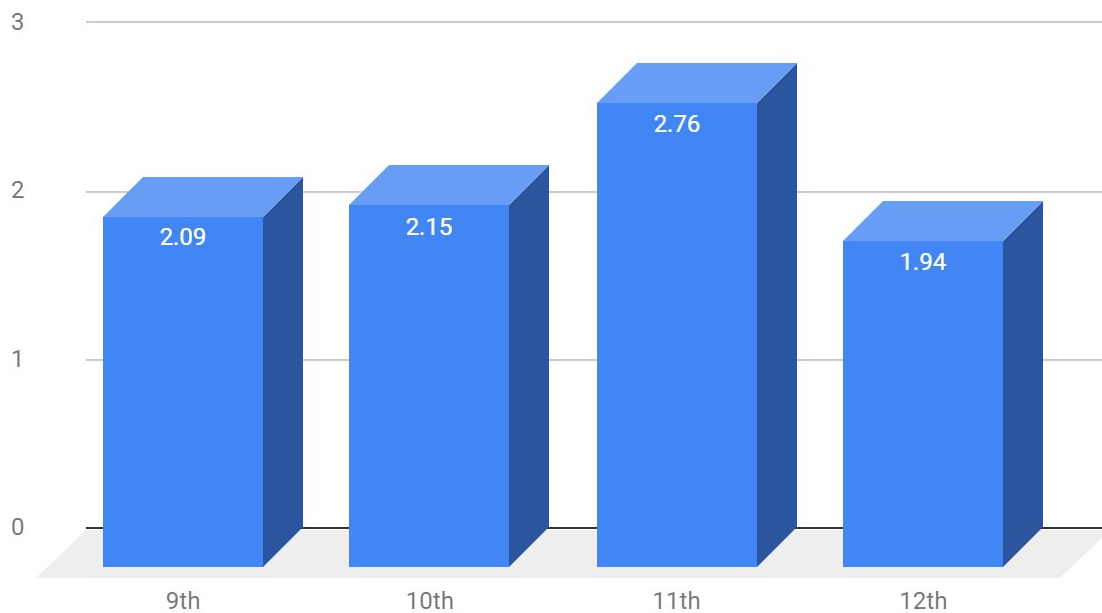
Findings and Analysis

Questions made to measure procrastination were designed with answers “Never, Almost Never, Occasionally, Often, Very Often, and Always.” For the purpose of analysis, these scores will receive a number 0-5. Answers of “Never” will receive a score of 0, “Almost Never” a 1, “Occasionally” a 2, “Often” a 3, “Very Often” a 4, and “Always” a 5. The average score will be taken to measure a group's overall procrastination, or for a specific question. These scores will then be taken, and then compared to answers in the second part of the test related to technology use to find whether or not there is correlation between certain trends. Furthermore, scores can be

picked out based on individual questions or groups to see how they compare to the whole. For instance, choosing a data set based on comparing grade levels.

In an overall view of all 103 students surveyed, the average score for all questions related to procrastination was 2.65, meaning on a general note that High Schoolers as a whole were about balanced as on a spectrum of high, and low levels of procrastination, with a slight inclination to procrastinate less than often. This suggests that AP students in general have a sufficient amount of self control which enables them to limit their procrastination.

Average Across Grade Levels



In order to go deeper into analyzing the average of all students, this is broken up into grade levels 9 through 10 in order to find whether maturity and self control grows as one ages and progresses through High School. For 9th graders the average score was a 2.09, 10th graders

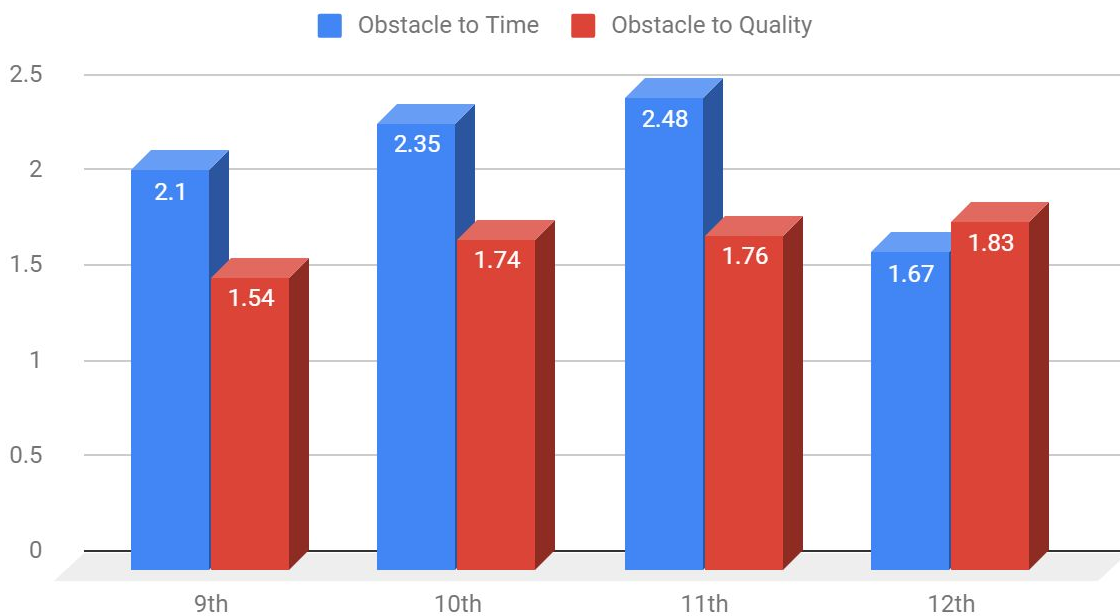
was a 2.15, 11th graders had the highest score of 2.76, and 1.94 for the 12th graders. One limitation in this is the variance in age of those in grade levels. For instance an 11th grader may only be a few months older than 10th grader, yet they are rounded into the grade level they are currently enrolled in. Still, as shown by the scores, there is little difference between the grade levels, although there is the outlier of those in 11th grade. If taken at face value, this would suggest that there is a circumstance present within the 11th grade that causes a decrease in one's self control. This could possibly be a decrease in amount of priority placed on education, however this is unlikely due to student's concern with college applications and keeping up one's grade point average. Then again, this could simply be a variation in the scores brought on by the sample size. Ultimately, this disproves the idea that growing maturity with age increases one's self control when looking at the age range of about 14-18.

The Second part of the survey regards Technology use and although some use numerical values, the scoring system for these questions is is not uniform across all questions. Therefore, questions will be looked at individually, and compared to the scores of the procrastination section in order to find if there is any correlation between procrastination and the habit's of one's technology use. Not every every question will be analyzed for correlation if it is found unnecessary to do so, however they may be included in the analyzations of other questions answers to help explain them.

Two questions under the technology use category use the same scale as the procrastination section and function as a hybrid of the sections in a way. These questions ask separately to what extent do distractions resulting from how often technology affects completing your work on time, and the quality of it. For the first question investigating completing work on

time, an overall score of 2.26 while the question asking how often the quality is affected is at a score of 1.71. This suggests that technological distractions more commonly affect the pace at which one works and have less effect with the overall quality of the work. The question did not inquire about if it actually prevents turning in work on time, only if it is an obstacle, to which the average is 13% over occasionally. On the other hand, the quality of work is affected 25% less than a score of occasionally. In other words, the majority of students feel that although technological distractions are obstacles to overall completing their work, their ability to conduct quality work is less affected. This means for the most part their work is of the same quality as if they weren't distracted.

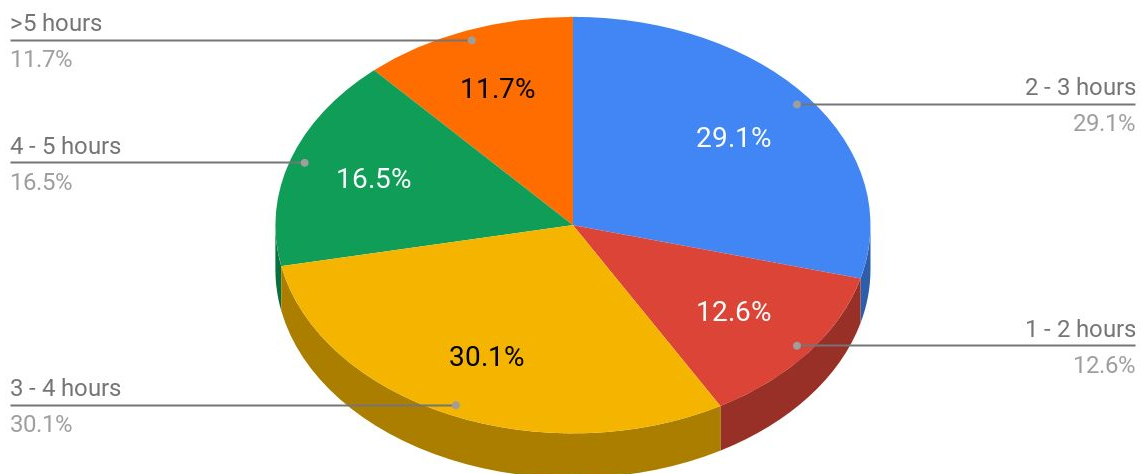
Distractions by Technology



These questions can be compared to grade level to see if proneness to technological distractions has more relation than was found with the basic procrastination survey. For the questions related to time and quality, the scores for 9th graders are 2.09 and 1.54 respectively.

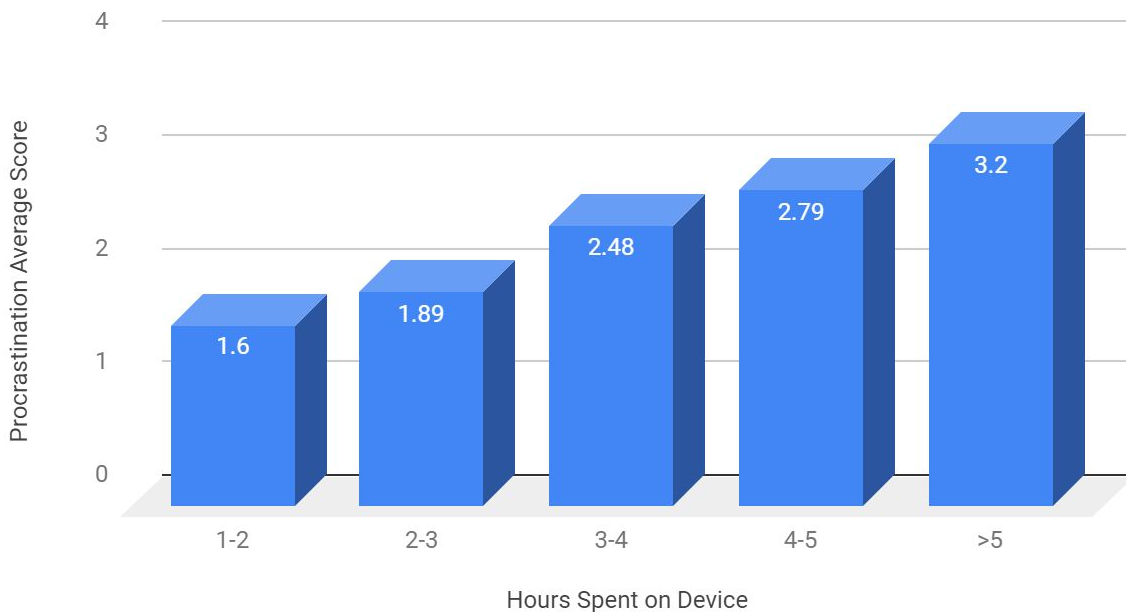
10th graders submitted scores of 2.35 and 1.74, 11th graders scores of 2.47 and 1.76, and finally 12th graders with scores of 1.67 and 1.83. This follows the trend of overall procrastination scores compared to grade level mentioned earlier in the analysis. This suggests that the pattern of procrastination and technological distractions in High School are related and start relatively low when starting High School, and grows until the 12th grade where it falls lower to where it started. In the case of technology affecting focus, the score grew from 9-11th grade and fell in the 12th grade for a net change of -21.5%. However, in the case of quality of work, the rate of it being affected grew 18.8%. This would suggest that as students came into 12th grade, they would place more priority on their work, and would complete it quickly and on time. However the susceptibility to do quality work unaffected by distractions still exists and grows, despite the priority given to the work being higher.

Time Spent using Technology Overall



Moving on to the other questions regarding technology use, we can compare the overall technology use of Teens, and their procrastination levels. Students were asked to estimate what the overall daily technology for any device use is. As shown, The Majority, about 30.1% of people use devices between 3-4 hours, with those between 2-3 hours coming in at 29.1%. This comes out to be about 59.2% of Students surveyed estimate they spend between 2-4 hours actively using a technological device.

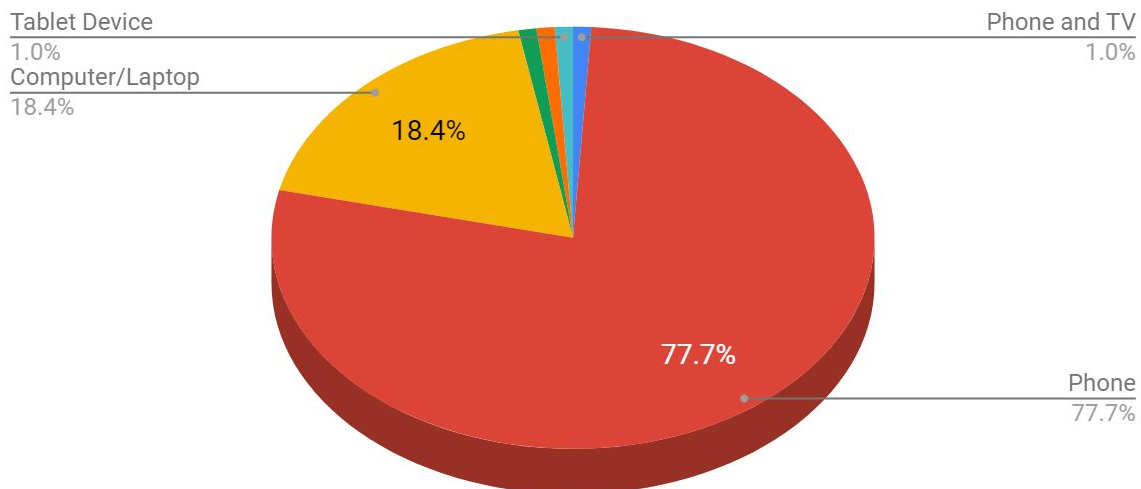
Hours Vs Technology



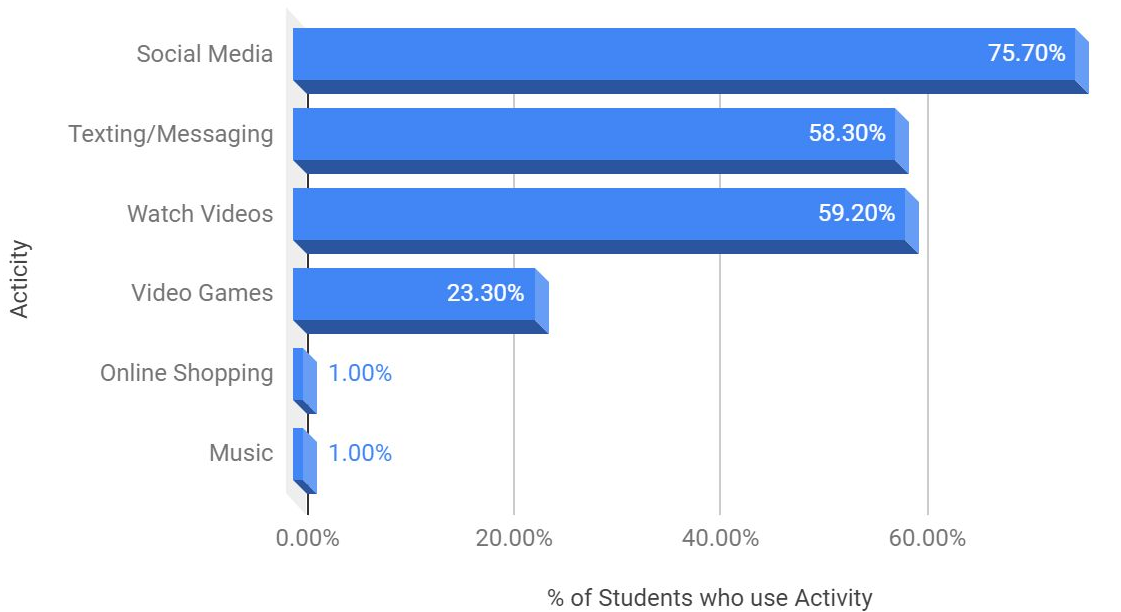
When comparing the time spent on a device versus the procrastination scores, it is found that the scores are positively correlated. In other words, as the amount of time spent using a device each day increases, the amount of procrastination a student exhibits increases. In fact, when moving across scale from 1-2 hours to greater than 5 hours, the average value for the

procrastination scale doubles from 1.6 to 3.2. This correlation between technology use and procrastination is in line with Shuai-lei Lian's findings of increased social media addiction is correlational with procrastination. My findings further this discovery by expanding Lian's findings from just social media, to encompassing all technological devices. Furthermore, despite the change in demographic the results still stand. In other words, My targeted sample differs from Lian's in that instead of Chinese Undergraduate students, I surveyed American High School students. The consistent results regardless of this change suggest that High School students may be similar to Undergraduate students, which would open the ability to use studies of college students to make inferences about the High School setting. However, this may be influenced by differences in culture, since this assumption is based on data from studies in different countries. Further study on the procrastination between culture is needed to be certain.

Most Popular Devices to Procrastinate with

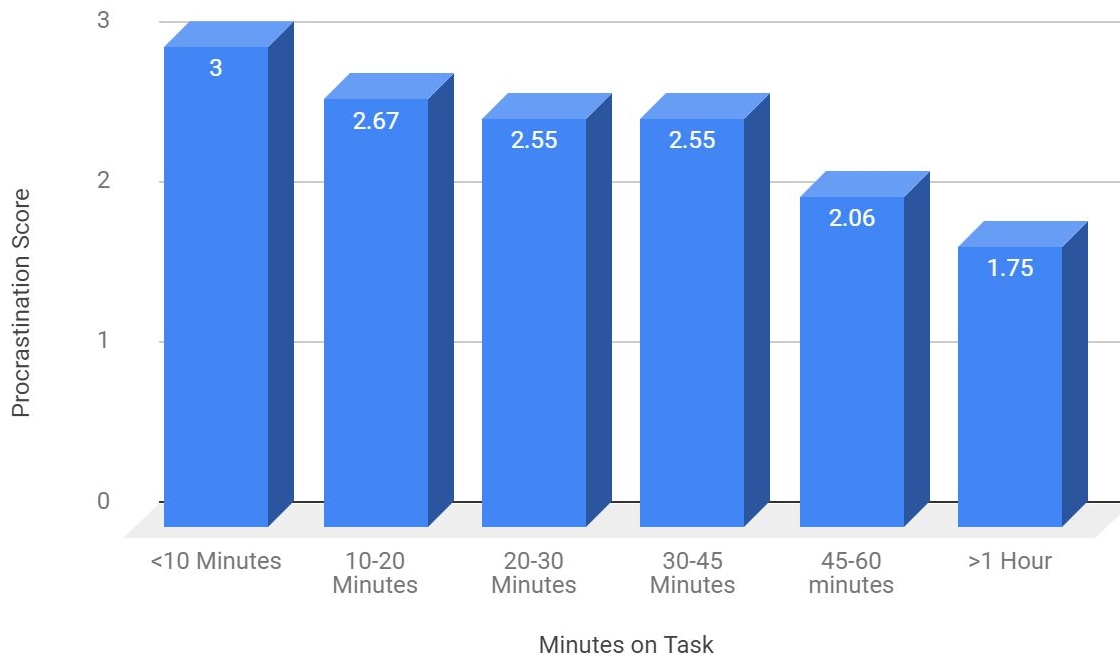


Procrastination and Popular Activities



In a separate question, the students were asked to which device they use to procrastinate the most. Overwhelmingly, the main device used to procrastinate is a smartphone, being the main device used by 77% of all students surveyed, with the nearest, and only competitor to this figure being computers at 18.4% of students. On top of this, Social Media is the most common activity for students to do on their device with about 75.5% of students using it when they procrastinate. After this, about 59.2% Watch Videos and 58.3% of students message others as common activities they do when procrastinating. In other words, this links a portion of Lian's study to this study, though not very strongly. To explain, the survey distributed was not designed in order to test the level of Social Media addiction like Lian's study was, however with Social Media and Phone use being so high compared to other options, it is safe to say these categories are incredibly popular choices for Procrastination, as well as strongly correlated with procrastination.

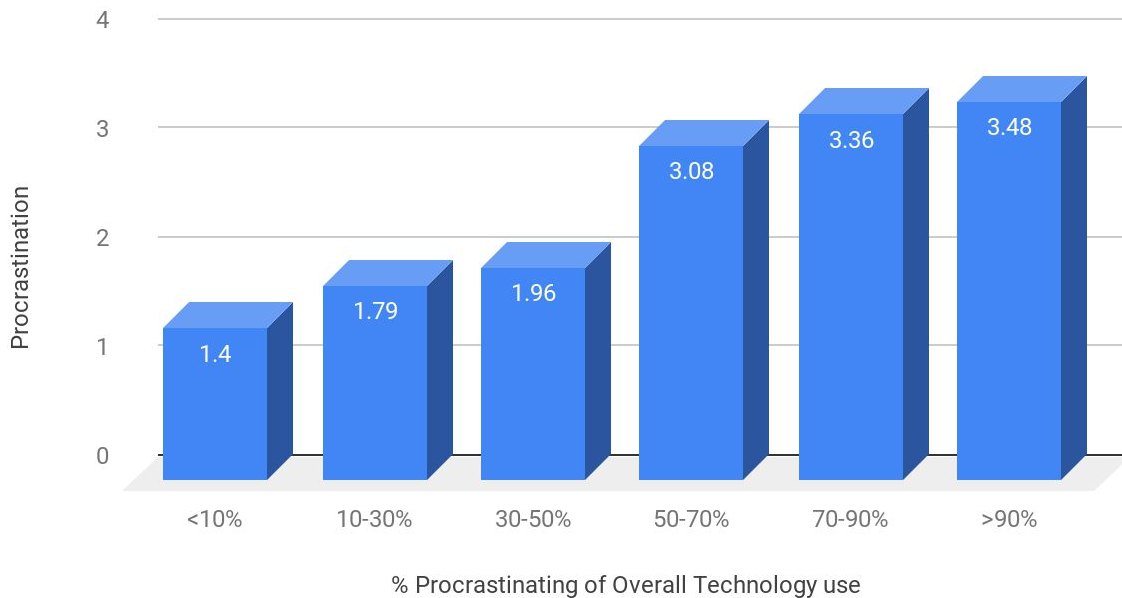
Procrastination and Focus



Respondents were also asked for what period of time they were able to stay on task before they became distracted by a device. The average time among those surveyed was in the range of 30-45 minutes on task. However, the distribution for the answers is mostly even, meaning that the amount of time a student can stay on task is mostly up to the person themselves, and there is no specific trend that speaks for describing all High Schoolers. In that sense, it can be inferred that it depends on the student of how much a distraction technology is. As shown, the ability to focus on a task is negatively correlated with procrastination. Furthermore, since everyone surveyed had access to some form of technological device, the variance in how people are distracted likely stems from their own personal control. In other words, it is not as if some students had that much greater an access to technology than others. From this, it is likely one's

ability to refrain from technology use limits the direct causes of procrastination. Therefore, this suggests one's self-control is the determining factor in technology use. Still this alone is not enough to prove this.

Technological Procrastination and Overall Procrastination



In order to gain a basic understanding of the extent of procrastination within technology use, a question was asked to estimate the percentage of the overall time using a device was spent procrastinating. Using this data by comparing it to the procrastination measure, we are able to find out whether the “Technological Procrastination” of students lined up with the measure of Academic Procrastination. Expectedly, as the % of time a student is procrastinating of the total time using a device increases, so does the procrastination scores. However, instead of a gradual slope of increasing procrastination, there is a jump of 1.2 in the average procrastination score between 30-50% and 50-70%. This jump suggests that the frequency that technology is used for procrastination influenced by some other factor, that being a person's self control. This result

stands in line with Pychyl and Flett's study that argues procrastination is a product of the failure of regulating one's actions, or deficient self control.

Conclusion

Overall, procrastination in High Schoolers is not extreme, but more average and centralized than anything else, which deviates from my hypothesis that High Schoolers exhibit increased procrastination behaviors. However, the range of answers in the procrastination scores shows a trend in which Procrastination increases until 12th grade, where it falls to its lowest. In other words, the concept of growing out of procrastinatory behavior, at least in the teen years, is not linear. Therefore, external factors are likely in play which trigger a student's self control. Then, in terms of technology use, increased technology is positively correlated with procrastination, which parallels Shuai-lei Lian's findings. Therefore, my findings suggest that procrastination studies done on college students, even in other countries, are still applicable towards US High School Students. Also, it supports my prediction that technology use among High Schoolers vary, in that the range of the amount of technology use differs greatly between the students. Although procrastination and many aspects of technology use are positively correlated, the variations in score have an explanation, that being a student's self control and ability to resist the urge to procrastinate. Ultimately, this was unable to prove my hypothesis that technology is not a cause of procrastination since correlation is not the same as causation. However, I was able to prove that self control is a major variable in determining what level of procrastination and the amount of technology use they exhibit.

Limitations

In terms of difficulty, the hardest step was finding a balanced and large sample. For example, across grade levels there are varying amounts of students taking AP classes. In the case of 9th grade freshman, there is only one AP class offered, as there is not much demand coming from freshman in wanting to take an AP level course. Furthermore, having all the students in a specific class was difficult as well. For instance, some teachers did not greatly motivate their students to take the survey as much as what would have been ideal. In other words, the teacher either did not require his students to take the survey, did not make time in class for it to be completed, or did not make the link to the survey easily accessible (such as posting the link online for students to access). Also, another teacher did not end up distributing the Survey at all. As a result, the sample size became limited to 103 students, and was not more or less equally spread out over the grade levels.

Further Directions

Although this study gathered information and statistics on Procrastination Trends in High Schoolers, it does not look at reasons that explain why certain trends may take place. The most notable of these trends would be why procrastination dips as much as it does in 12th grade, or why 11th graders exhibit a score so much higher. Similar to how this study was done, another Survey could be distributed geared towards external factors that may affect students procrastination instead of simply gathering surface-level data on procrastination.

However, the end goal would be to use all the data collected to develop a method that would help alleviate student's procrastination. For instance, for students with weak self control, an app or program of sorts could be developed to help guide a student to avoid such behaviors. Through creating a method for students regularly affected by procrastination, it would be possible to help alleviate some of the symptoms of chronic procrastination, and improve the lives of those who use it.

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