Online Versus Traditional Learning: Academic Performance and Learning Disabilities

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In an ever-changing society, it is essential to understand how students learn best**.** In society today, the growing area of online learning is prevalent. With limited research regarding online versus traditional face-to-face learning, there is a need for more information on this topic. Online versus traditional learning in college undergraduates at universities is apparent, especially since the start of COVID-19 (El Refae et al., 2021). While face-to-face learning was the usual format that undergraduate college students utilized, the transformation to online learning changed rapidly. The research in this study area also changed (Van Der Werf & Sabatier, 2009). With each of these learning environments playing roles in students' quality of life, it is essential to understand how each environment affects students differently. This topic yearns for further research when comparing online versus traditional learning to several different factors, like academic performance, learning disabilities, and context. College student success is the top priority for many universities, and knowing this information can help colleges better understand how their students are succeeding in different and new learning formats (Mohammadian et al., 2021). Addressing students' perceptions of learning will further enhance the learning experiences in online and traditional learning.

When examining academic performance, several studies note the differences between online versus face-to-face learning and how these environments affect students. In addition, due to the pandemic, there have been changes in learning atmospheres, such as hybrid or blended learning models. Hybrid or blended learning courses are now present in the learning world. This study's hybrid or blended courses are theoretically synchronous with traditional, in-person courses. Adding in the elements of information retention and assistive technology advantages will further allow the audience to conceptualize why a student may perceive more success in one environment over the other. This could aid professors in planning proper lessons for each environment to give students the most adaptive plan possible (Zhu et al., 2020). Also, inspecting cheating factors in each setting could aid in student retention and allow professors to understand how to eliminate cheating in physical or digital classrooms (Adzima, 2020). Further, the factor of with or without a learning disability will allow readers to demonstrate how different types of students act in each environment while still studying the portions above. It is critical to understand how those with learning disabilities engage and excel in each environment to help all students head in a positive direction regarding their learning. With these factors, it is also essential to look at the contexts of each environment and how they differ. These differences are vital in understanding the roles of academic performance and learning disabilities in each class style. The learning atmosphere, sensory aspects, technological differences, and interactions could all affect the abovementioned factors (Manning-Ouellette & Black, 2017). This topic's general importance is allowing universities, professors, and students to understand how online versus traditional learning affects them. This could improve each environment to allow them to be equally as successful in the long run and further allow students to understand their perceptions behind each learning atmosphere.

Addressing academic performance and its relation to online versus traditional learning portrays many similarities in previous literature. According to Mgutshini (2013) and El Refae and colleagues (2021), students have a higher academic performance in online or distance learning courses. The GPA is higher in excelling students, and it appears that students who are not as proficient tend to drop the online courses (El Refae et al., 2021). Mgutshini (2013) references that students in the online setting performed better than traditional students in examinations, which led to higher GPAs. It was also noted that students in online courses spent more time studying their course materials than in-person students (Mgutshini, 2013). Bacolod and colleagues' (2018) found no significant differences surrounding academic performance in the online or traditional learning environments. Although, it is apparent that online learning showed adverse effects on academic performance for students with lower achievement or GPAs before the course began (Bacolod et al., 2018). Additionally, Bacolod and colleagues (2018) point out that higher-performing students succeed better in distance learning courses, much as El Refae and colleagues (2021) mentioned. Students who entered these courses with excellent academic performance tended to perform better online than in person. Generally, studies have shown that online learning leads to higher academic performance in many students, especially those who are higher-performing (El Refae et al., 2021; Mgutshini, 2013; Bacolod et al., 2018).

Within the factor of academic performance, information retention of material and cheating are also included. When comparing online versus in-person learning, information retention and cheating can play significant roles in how impacting academic performance is impacted. Mohammadian and colleagues (2021) and De Freitas and colleagues (2015) draw a similar conclusion regarding these factors. Online learning can undoubtedly lead to lower reten-

tion rates (De Freitas et al., 2015; Mohammadian et al., 2021). There are many reasons that this is the case and many that still need to be studied. According to De Freitas and colleagues (2015), interactions among classmates and engagement in the classroom are typically where higher information retention rates are discovered. In this case, a traditional classroom may warrant more ability to listen to questions from classmates and other interactions. Mohammadian and colleagues (2021) discuss that financial limitations, students' ethnicity, and professors' engagement are also essential factors influencing retention. Suppose a student is focused on their college debt concerns. In that case, if their ethnicity plays a role in other areas of their life, or if a professor is not proficiently teaching the subject, there is a significant area for poor retention in the online environment. Retention and cheating can often correlate because the more students cheat, the less information they retain (Adzima, 2020). According to Adzima (2020), students reported they were five times as likely to cheat in an online class rather than in a traditional model. Without the supervision of a professor, cheating behaviors seem to occur more often. Additionally, higher exam scores were recorded in online exams not proctored versus those that were proctored (Adzima, 2020). It seems that cheating is more prevalent in the online setting; therefore, it leads to much lower retention rates in online courses than in face-to-face (Adzima, 2020; De Freitas et al., 2015; Mohammadian et al., 2021).

Investigating another major factor being studied is the impact of online versus traditional learning on students with and without learning disabilities regarding academic performance. The previous studies have looked at all students, but looking at students with learning disabilities is another component. It can allow readers to fully understand the impacts of these learning environments from another viewpoint. This factor is essential to the research because

many students identify as having a learning disability and do not receive adequate academic attention (Richardson, 2016). Richardson (2016) found that students typically preferred online courses whether students had learning disabilities or not. While no significant differences pointed to why this was the case, there was student preference (Richardson, 2016). This study discovered similar academic performance in both online and traditional courses, but students with disabilities in online courses had higher pass rates than in the traditional setting (Richardson, 2016). In Rekkedal's (2011) study, online learning was also the student preference. Rekkedal (2011) indicates that a positive learning experience is possible through a combination of support and follow-ups after an online learning class. This experience could be much more positive. It could also improve academic performance (Rekkedal, 2011). The learning room solution is the method, Rekkedal (2011) suggests because it allows those with learning disabilities to have a much more individualized experience. This could be a significant reason students with learning disabilities succeed in the online environment (Rekkedal, 2011).

A component that is also helpful for students with or without learning disabilities is assistive technology. Assistive technology is a helpful accommodation for people with or without disabilities that enhances independence in various areas of their lives (Guy & Lownes-Jackson, 2015). Assistive technology or other mobile technology can be helpful in both students with or without learning disabilities. Specifically for students with learning disabilities, Qahmash (2018) found drastic improvements in academic performance because the technology lessened the learning challenges they could encounter. It could be argued that the availability of assistive technology to students with learning disabilities has dramatically impacted the way they can learn (Qahmash, 2018). Technology in the classrooms has allowed for a better creative

space and enhancement tool for all students (Guy & Lownes-Jackson, 2015). Higher academic performance was discovered in online simulations in Guy & Lownes-Jackson's study (2015). Students with learning disabilities could thrive in the classroom if assistive technology were offered regularly in postsecondary education (Floyd, 2012). The mobile and assistive technology would allow students with or without disabilities to thrive in an online environment with the proper instruction and support (Floyd, 2012). As Manning-Ouellette & Black (2017) address, online courses are more user-friendly than ever through technology.

Examining the contexts of the online and traditional learning environments would further allow students to perceive how academic performance may excel in one area over the other. Manning-Ouellette and Black (2017) found that interaction was significant in explaining why a student may succeed in one setting over another. Lower academic performance in online courses was found, but with more peer interaction online, there was a boost in academic performance (Manning-Ouellette & Black, 2017). In both the online and traditional settings, engagement with faculty and students was the top reason students were successful (Manning-Ouellette & Black, 2017). It is also found that since the online setting can be taken from various locations, there is room for more opportunities and time to better understand the material before returning for another class (Manning-Ouellette & Black, 2017). According to Zhu and colleagues (2020), online courses can also be more beneficial due to personalization, clarity of requirements in words, time management, and work-life balance. It allows a student to better engage in the course through discussion boards. Frequently, students are over-talked in traditional courses and cannot speak up to engage (Manning-Ouellette & Black, 2017). Some contexts of traditional learning environments include in-person lectures, discussions in the classroom, and presentations (Woldeab et

al., 2020). Woldeab and colleagues (2020) specify, as much of the other literature does, too, that technology is one contextual factor that significantly enhances the context of online learning.

Culminating the above information, it is apparent that much of the research leans towards online learning environments producing higher academic performance among students with learning disabilities. The research on this topic for students without learning disabilities is not particularly defined. That is an area where further research is warranted. Many correlations can be developed with the factors of online versus face-to-face learning, academic performance, and learning disabilities. Additionally, retention, cheating, and assistive technology factors further develop relationships between these various research areas. This research study will further address these different categories and help answer the research questions and hypotheses.

The current study will explore how online versus face-to-face learning environments affect academic performance and retention rates in undergraduate college students with or without learning disabilities. It has been discovered that this overarching question is essential as no literature specifically covers this topic. There are already limited studies that address online versus face-to-face learning, and when one adds in these additional factors, there seems to be less and less research. Working to answer this question would help other researchers and colleges better understand student learning and where they achieve the most before they graduate. Stemming from this central question, how does cheating play a role in online versus traditional learning when looking at academic performance and retention rates? For professors to better design their online or in-person courses, it is crucial to understand where students' cheating occurs most and how this affects their overall academic performance (Adzima, 2020). In addition, regarding students with or without learning disabilities, does the context of

each environment serve a significant purpose, whether online or in-person? Information collected on this topic would allow the research to come full circle regarding the main question mentioned. Regarding context, are there specific traits that can help us understand why a student may choose one setting over the other? Since students have been forced to learn in both online and traditional formats, it is intriguing to question their environmental preferences.

Based on previous literature, it is hypothesized that online learning environments will positively affect academic performance and information retention rates for students with learning disabilities. The online learning environment will lead to more success for students without learning disabilities. The rationale for this hypothesis is that those with learning disabilities have more experience with technology because of their use of assistive technology throughout their lifetime (Qahmash, 2018). Students without learning disabilities may succeed the same in the online environment because they feel better supported. Material that was arduous to grasp could be relearned through the online videos (Mgutshini, 2013).

When examining the roles of cheating, cheating will increase and be more prevalent in improving academic performance and information retention in an online setting. There will likely be a decrease of cheating in face-to-face courses, but cheating will still occur to some extent, affecting students' academic performance and information retention. This conclusion occurred because there are many ways to cheat without the professor knowing in a personal space, especially if the exam is not proctored (Adzima, 2020). Cheating still occurs in the traditional setting, and students will inevitably find a way even in a traditional classroom (Adzima, 2020).

It is also hypothesized that the context of an online versus traditional learning environment will significantly impact a student with or without learning disabilities. Especially for students with learning disabilities, the context of an online learning environment would be preferred due to fewer distractions in their personal setting. Another hypothesis is that specific traits, like the context, people, or professor interaction, may encourage students to prefer the online rather than the traditional classroom. On the opposite, students may prefer to stay in the traditional setting because they feel it improves their academic performance and retention of the course. The explanation for both hypotheses is that online learning can be more personalized toward what the student needs to achieve success (Zhu et al., 2020). The clarity of requirements, the designing interface, and the learning progress monitor are just some examples of helpful context in the online setting (Zhu et al., 2020).

Online versus traditional learning has many questions regarding academic performance and learning disabilities. With research, these questions could be answered more entirely, allowing other studies to begin. These learning environments can significantly impact college students and their success in their undergraduate years. Further research will allow colleges, professors, and students to better understand which environment they learn best in and why. They could achieve a higher academic performance and information retention for the future regardless of whether they had a learning disability. Throughout this study, the hope goal is to discover the students' perceived differences between online versus in-person learning to enhance academia in the future further.

Methods

Participants

The study consisted of 154 participant's ages 18 to 55 years old (M = 21.62, SD = 4.39). The majority of the participants identified

as male (15%), female (80%), and non-binary/third gender (5%) (Refer to Table 1). Out of 154 participants, there were those who self-reported with learning disabilities (14%) and those without learning disabilities (86%) in the survey (Refer to Table 2). Participants also self-identified ethnicity as African American/Black (5%), Caucasian/White (84%), Bi/Multiracial (2%), other (9%), and prefer not to say (1%) (Refer to Table 3). Major was predominantly psychology (22%), with speech-language pathology (8%) and nursing (5%) being next followed by other individual majors for the majority of the sample pool.

Table 1: Gender	
	%
Male	15%
Female	80%
Non-Binary/Third Gender	5%

Table 2: Learning Disability	
	%
Learning Disability	14%
W/O Learning Disability	86%

Table 3: Ethnicity	
	%
African American/Black	5%
Bi/Multiracial	2%
Caucasian/White	84%
Other	9%
Prefer Not to Say	1%

Measures

Self-Created Scale Measuring Academic Performance and Information Retention. This 6-item scale was used to measure academic performance and information retention of students with and without learning disabilities. The participants were asked about their learning disability status, and whether it will be medically diagnosed or self-diagnosed. If they did not have a learning disability, they marked that they did not have a learning disability. They also were asked for their GPA, and the grades they typically get in online and traditional courses. An example of a learning disability item was, "Do you identify as having a learning disability?" and an example of an academic performance item was, "What is your current GPA (grade point average)?"

Self-Created Scale Measuring Cheating Behaviors. This 11-item scale was used to measure cheating behaviors in the online and traditional learning environments. There were five items for online and five items for in-person. The other question was fill-in-the-blank for GPA. They responded on scales from one to five. One was considered very unlikely and five was considered very likely. An example item from that scale was, "On a scale from 1-5 (1 being very unlikely and 5 being very likely), how likely are you to cheat in a traditional classroom?"

Self-Created Scale Measuring Context. This 12-item scale was used to measure the context of online versus traditional learning environments. This measure contained two items regarding learning disability status as well as two more items addressing learning disabilities and distractedness in online or traditional environments. An example item from this scale was, "If you do not have a learning disability, are you more distracted in the online or the traditional learning environment?" The other items were scales from one to five measuring distractedness in both the online and traditional settings with one additional fill-in-the-blank item. One was considered very unlikely and five was considered very likely. An example item from this scale was, "On a scale of 1-5 (1 being not likely and 5 being very likely), for an online class, how likely are you to do each of the following?"

Self-Created Scale Measure Support and Structural Factors. This 23-item scale was used to measure support and structural factors as well as technological savviness in online and traditional settings. Out of these items, four items measured academic performance, ten items measured the distractedness, and nine items measured support and structural factors as well as technological savviness. It was found that the support & structure online measure had good internal consistency, Cronbach's alpha = 0.79. It was also found that the support & structure in-person measure had good internal consistency, Cronbach's alpha = 0.80. An example item for academic performance was, "What grades do you typically get in your courses?" An example item for distractedness was measured on a scale from one to five and stated, "On a scale from 1 -5 (1 being not distracted and 5 being very distracted), how distracted are you in online classroom settings?" One last example for support and structural factors was also measured on a scale from one to five and stated, "As a student, do you feel supported in your online classroom?"

Demographic information was collected upon completion of the survey, including age, gender, ethnicity, and major.

Procedure

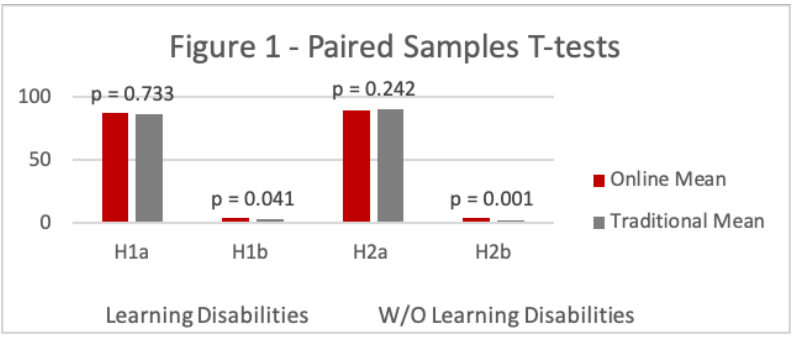
Participants were asked to fill out an online survey through Qualtrics. They were first given an implied consent where they were asked to consent to participate. They also had to confirm that they were a current college student or that they had graduated in the past five5 years. If they consented and met the college student requirement, then they completed the survey. If they did not consent or if they did not meet the college student requirement, they were directed to the end of the survey. The data was cleaned and sorted through a spreadsheet and was then interpreted. Each measure builds from the previous scale, which explains why some data may overlap.

Results

Initial data were collected from 182 participants. However, after removing participants who did not complete the survey or did not meet the criteria, the sample of analyses consisted of 154 participants. After cleaning the data, reliabilities, and average and computed variables were generated for hypothesis testing. The support and structural factors measures section shows information regarding reliability and average scores.

Hypothesis Testing

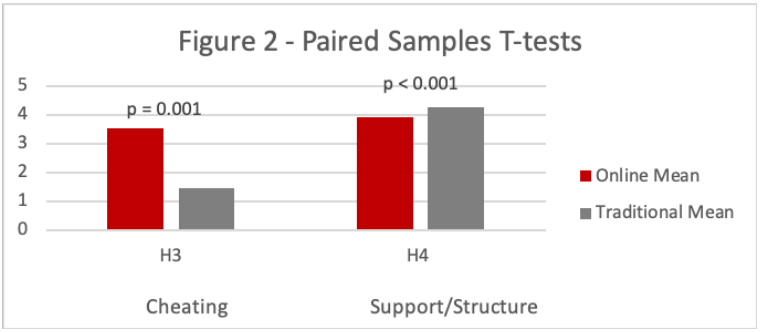
In order to test those with learning disabilities, the first hypothesis stated that online learning environments would positively affect academic performance and information retention rates. A paired-samples t-test was used. Specifically, a paired samples t-test found no significant differences between online learning grades (M = 87.55, SD = 7.68) and traditional learning grades (M = 87.09, SD = 8.08), $t(21) = 0.35$, $p = 0.733$. This difference represents a small effect, $d = 0.07$. These findings do not support hy-



pothesis one, as there was no significant difference between online grades and traditional grades. The second hypothesis stated that that the context of an online learning environment would be preferred due to fewer distractions in their personal setting. A paired-samples t-test was used. Specifically, a paired samples t-test found significant differences between online distractions (M = 4.14, SD = 1.08) and traditional distractions (M = 3.27, SD = 1.20), $t(21)$ = -2.18, p = 0.041. This difference represents a small to medium effect, d = -0.46. These findings do not support hypothesis two, as there was a significant difference between online and traditional distractions; although, it was found that the traditional environment is actually less distracting.

In order to test those without learning disabilities, the first hypothesis stated that the online learning environment would lead to more success. A paired-samples t-test was used. Specifically, a paired samples t-test found no significant differences between online learning grades (M = 89.91, SD = 7.68) and traditional learning grades (M = 90.51, SD = 5.94), $t(128)$ = -1.18, p = 0.242. This difference represents a small effect, d = -0.10. These findings do not support hypothesis one, as there was no significant difference between online grades and traditional grades. For the next hypothesis, the context of an online versus traditional learning environment will significantly impact a student, a paired samples t-test compared distraction scores in online versus in-person courses. A paired samples

t-test found significant differences between online distraction (M = 4.02, SD = 1.03) and traditional distraction (M = 2.59, SD = 1.04), $t(129) = -10.12$, $p = 0.001$. This difference represents a large effect, $d = -0.89$. These findings support hypothesis two, as there was a significant difference between online and traditional distraction, which means that these learning environments impacted students. These first two hypotheses are compiled into figure 1.



In order to test the third hypothesis, cheating will increase and be more prevalent in improving academic performance and retention rates in an online setting, and that there will likely be a decrease in cheating in face-to-face courses, affecting students' academic performance and retention rates, a paired samples t-test was used. Specifically, a paired samples t-test found significant differences between online cheating (M = 3.52, SD = 1.29) and traditional cheating (M = 1.45, SD = 0.90), $t(152) = -18.33$, $p = 0.001$. This difference represents a large effect, $d = -1.48$. These findings do support hypothesis three, as there was a significant difference between cheating online and cheating in a traditional setting. A correlation was also utilized when comparing cheating and academic performance. A Pearson correlation indicated a not significant, small, negative relationship between cheating and grades, $r(148) = -0.11$, $p = 0.180$. This illustrates that there was no significance between academic performance and cheating. This finding fails to support the hypothesis that cheating did affect academic performance.

In order to test the fourth and last hypothesis, which stated that specific traits, like the context, people, or professor interaction, may encourage students to prefer the online setting rather than the traditional classroom, and that on the opposite, students may prefer to stay in the traditional setting because they feel it improves their academic performance and retention of the course, a paired samples t-test was used. Specifically, a paired samples t-test found significant differences between online support and structure (M = 3.91, SD = 0.70) and traditional support and structure (M = 4.27, SD = 0.60), $t(139) = -5.95$, $p < 0.001$. This difference represents a medium effect, $d = -0.50$. These findings failed to support hypothesis four, as there was a significant difference between online and traditional support and structure; although, the traditional setting was better supported. This data is illustrated in figure 2.

Discussion

This study tested the impacts of online and face-to-face learning environments and learning disabilities on academic performance.

In the learning disability population, it was found that course format did not significantly influence academic performance, thus failing to support hypothesis one. These findings contradict Qahmash (2018), who found that academic performance improved in the online environment due to assistive technology users. Qahmash (2018) is further supported by Richardson (2016), who found that when comparing students with learning disabilities and those without, similar academic performance was found in both online and traditional courses. For the second hypothesis, this study found that students are more distracted in a traditional environment than online, which is the opposite of the hypothesis. Even though Zhu and colleagues (2020) discussed how online allowed for more personalization, Qahmash (2018) discovered that mobile devices in a traditional classroom lead to fewer distractions. Al-

though mobile devices could also be used in an online setting, by using them in a traditional classroom, students stay focused on the task at hand (Qahmash, 2018). This could be due to the teacher's presence and a specific amount of time to complete an assignment (Qahmash, 2018).

In the population without learning disabilities, it was found that course format did not significantly influence academic performance, thus also failing to support hypothesis one. These findings contradict Woldeab and colleagues (2020), who determined that academic performance could be improved in the traditional setting if instructors use proper teaching techniques that differ from an online environment. Hypothesis two, on the other hand, had supporting results. It was found that students without learning disabilities were impacted due to environmental distractions. Zhu and colleagues (2020) stated how online and traditional learning experiences could be significantly improved if different principles were instilled in each setting. If these principles were initiated, the distraction of each environment to students could diminish (Zhu et al., 2020).

In this study, the results supported the third hypothesis. Significant results were found between cheating online being more prevalent than cheating in the traditional classroom. Adzima (2020) discovered that cheating was more prevalent online due to a litany of different factors. Age, gender, and online course experience played a significant role in this finding (Adzima, 2020). After completing data analysis, it was apparent that cheating online lowered retention (Adzima, 2020). Further, the correlation determined no significant difference between students' grades due to their cheating behavior. Adzima (2020) pointed out that cheating may not affect overall grades, but it could still affect specific test scores in online and traditional learning environments.

In discussing the final hypothesis of this study, the data determined a significant difference between the support and structure of each environment. Although, the results demonstrated that the traditional environment seemed to be more supportive than the online environment. This finding is the opposite of what was hypothesized. While Woldeab and colleagues (2020) found that a supportive online course could be preferred because of the resources and activities being more readily available, Manning-Ouellette and Black (2017) discovered that the traditional environment is better for support and structure because it gives the ability to verbally process information and immediately relays it to students and professors around us. The online environment does not give this quick of a return when processing information. Further, academic performance did not improve significantly in either setting due to support and structure, which allows us to comprehend that it comes down to student preference (Manning-Ouellette & Black, 2017). It is determined by how the students believe they perform best, even if their academic performance remains relatively stable (Manning-Ouellette & Black, 2017).

Limitations

Most literature regarding differences in a learning environment was published prior to the current COVID-19 pandemic. However, this pandemic has dramatically influenced research regarding online versus traditional learning. This could have made the results different from the original hypotheses, as this study occurred after the height of COVID-19 disturbances. The effects of COVID-19 on the traditional and online learning environment could have changed the way students perceive each environment. Moving from the traditional environment to Zoom or completing online learning back to traditional could affect students. After experiencing both environments, students could perceive their academic per-

formance, cheating behaviors, context, and more, differently. Using more articles past the height of COVID-19 could have resulted in different hypotheses and results that better matched the hypotheses mentioned in the literature review.

Another significant limitation of this study must consider the population researched. While there were 154 participants analyzed, only 14% of these participants had learning disabilities. That means that approximately 22 participants that took this survey identified as having a learning disability. This is a small sample pool to pull data from, especially since results were created from this minimal amount of data. While gender was not explicitly examined in this study, it is also vital to address that 80% of the population was female, which could skew the ending results. Given this information, it is apparent that the data could have limitations due to small sample sizes.

Future Research

After examining this study, it appears that more research needs to be completed surrounding this topic. It could be necessary to look not only at college students but also at high school and even younger students. These students transferred from traditional schooling to online and back to traditional due to pandemic protocols. The results discovered in this study could change by population, and it is essential to study these other populations. The end goal is student success. Schools and colleges must understand how, where, and why their students perform best.

Further, investigating specifically the effects Zoom has on students could be interesting. Since most school systems switched to Zoom learning, others could understand how students performed on this platform. Understanding how well they executed tasks could allow Zoom to update its website features and allow teachers and students to learn better through an online platform. They could

find ways to eliminate the distractions and allow students to flourish still while doing online school. If Zoom's specific aspects are causing havoc on students, this piece could be altered to improve student success.

Finally, there was a litany of factors covered in this study. After finding the results, it became clear that individual research on each factor could significantly improve the educational realm. Many areas within each factor could further be studied, and it could help students, professors, and school leaders better their school environment. Adding a possible psychological aspect of mental health would lead to an even grander study. It may give insight into other factors outside of those studied in this research that could be hurting or helping students in the classroom.

This study investigates academic performance, cheating behaviors, and support and structure in online and traditional settings surrounding students with and without learning disabilities. It is found that while the learning setting does not have a significant effect on academic performance, it did affect cheating behavior and aspects of support and structure. These findings give better insight into the impacts of online and traditional learning environments on students. While COVID-19 and small sample sizes may affect the results, future studies could reduce these limitations significantly with future studies. More effective results could be discovered by addressing a larger sample size and the effects of just a Zoom classroom. Moreover, focusing more on specific aspects could grow this research to an even more extensive study. With more in-depth research, results could lead to a more significant advantage when helping students find out and understand how they succeed best.

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