THE PLAGIARISM QUESTION OF AI: HOW TEACHERS HAVE RESPONDED TO LLMS IN THE CLASSROOM

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The University of San Francisco

“THE PLAGIARISM QUESTION OF AI: HOW TEACHERS HAVE RESPONDED TO LLMS
IN THE CLASSROOM

A Thesis

Presented to the Faculty of the School of Education of the

University of San Francisco

In partial fulfillment of the requirements for the degree of

MASTER OF ARTS

in

Organization and Leadership

By

Anthony Ernesto Wolf

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Chapter 1: Introduction

ChatGPT is one of the fastest growing apps in recent history and has increased the amount of public discourse and raised expectations around the potential use of large language models (LLM) powered by Generative Pretrained Models (GPT) to carry out various tasks previously done by white collar workers in advertising, psychology, computer programming, and more. Education in particular has been seen as an area for which there is much potential for great benefit and harm. Khan Academy unveiled the potential of using ChatGPT as a private tutor through its in-house implementation, “Khanmigo;” and released an in depth tutorial on its use to support learning. Conversely, Tiktok and Meta’s advertisements now target students, claiming that GPT-4 can pen essays for them, circumventing the critical thinking process in English classes. This study attempts qualitate the downstream effects of publicly available LLMs in the classroom environment and discusses its implications for scholars, educators, and edtech innovators.

Statement of the Problem

While it is a commonly held point of view that technology will improve educational outcomes – and will generally benefit the field in which it is introduced – schools in America have faced new struggles with the introduction of technology such that this assumption may not always be the case: disinformation, distractions through the use of smartphones in class, plagiarism, and even cyber bullying are all new challenges that some schools have faced. New technologies in the field of artificial intelligence already seem to face some similar challenges in terms of racial biases, copyright infringement, and misinformation. Furthermore, the biases granted between dominant and oppressed groups within and without educational institutions can create inequalities that are not only represented between resourced and under-resourced
institutions but also within the intrinsic representation of the training data in artificial intelligence between majority and marginalized cultures (Raikes, 2023; Small, 2023). In spite of the salience of these criticisms in theory, current studies have few observational studies of the actual usage of LLMs within the classroom that can confirm or deny these criticisms or the benefits of AI in the classroom.

**Background and the Need for the Study**

ChatGPT is one of the fastest growing apps in recent history and currently has nearly 1.7 billion users (DeVon, 2023). Since the public release of ChatGPT by OpenAI in late November, 2022, there has been an increase in public discourse and raised expectations around the potential use of large language models (LLM) powered by Generative Pretrained Models (GPT). Recently, leaders in the industry met at a Wisdom 2.0 and AI Conference on October 30th, 2023. Opinions were varied: speakers like Reid Hoffman and Brad Lightcap have taken optimistic views on the future of AI as long as there is improvement; while speakers like Sherry Turkle and Tristan Harris caution against broad reaching implications of how AI has the potential to harm the general public.

There is a lot of expectation and excitement for the potential of AI as well as the expectation that AI is going to be revolutionary in the classroom. Big companies are taking advantage of the software to enhance their platforms. Microsoft has integrated GPT-4 into the Microsoft Office Suite (Spataro, 2023a), the Bing search engine (Mehdi, 2023b), and windows systems via the PRE co-pilot application with the purpose of upsetting Google’s place as a go to search engine (Spataro, 2023). Additionally, four months after the release of ChatGPT, Sal Khan (2023a), founder of Khan Academy unveiled the potential of using ChatGPT as a private tutor through its home implementation, “Khanmigo;” released an in-depth tutorial on how to use it to
purpose; and then hosted a Ted Talk speech (2023b) on the program two months after that. Finally, Tiktok and Meta’s advertisements now target students, claiming that GPT-4 can pen essays for them (Gaumann & Veale, 2023).

Throughout all this, however, there are very few measured results of the practical applications that educators on the ground have been doing to use the technology. The literature review seems to indicate that there are limited use cases where the mainstream LLMs such as ChatGPT are applicable to classroom usage even though the GPT-3.5 version is free and publicly available (Zamfiroiu et al., 2023). In fact, there appears to be few observations in LLM’s casual use in the classroom, and there may be evidence that its release to the general public is actually creating pushback via school policies and attempts to catch plagiarism (Šehanović et al., 2023), leaving much to be desired in hearing impressions of the technology from users in the educational space that stand to benefit greatly from the tutoring elements of GPT technology (Rawas, 2023) or at least the ability of LLMs to mask plagiarism (Elkhatat, 2023).

Schools are sensitive to the detrimental effects that plagiarism has on educational institutions in their legitimacy and their moral integrity even if the concept of plagiarism has many differing definitions that span a wide breadth of academic misbehavior (Almutairi, 2022; Ferrell & Daniel, 1995; Gregory, 2020; Khadka & Bhattarai, 2021). Still, studies seem to imply that plagiarism is caused by breaking down the expectations of fairness as well as other incentives to disrupt authority or even benefit from other conflicts (Ferrell & Daniel, 1995; Hamimed, 2023). While some studies (Adam et al., 2017; Almutairi, 2022; Gregory, 2020) recommend focusing on garnering trust and a focus on learning outcomes rather than punitive measures, some policies have preventative systems in place (Amigud & Pell, 2022).
In spite of any policy that can curtail the grander effects of new technology, the implementation of that technology and the way that it impacts the classroom will also be a function of the way that teachers use that technology in their interactions with students. While theories on complex adaptive systems (Burns & Knox, 2011) can model the multitude of ways teachers interact with new technology, there are many studies observing concrete ways that student teacher relationships can affect the way in which technology is applied to the classroom. These include but are not limited to the racialized lens (Elmesky & Marcucci, 2023), social and emotional learning (Blake & Dewaele, 2022), practical application (Collinson, 2001), and rule-making competencies (Pace, 2003) that account for the new technology. Due to the complexities of the classroom environment, it seems necessary to include studies that look more closely at the way that teachers and students then interact with LLMs to better trace the trends that may be happening in theory.

**Purpose of the Study**

This study aims to bridge the gap between speculation and the observable realities of the current applicability of LLMs in the classroom through a series of interviews with educators at various high schools. I hold the hypothesis that teachers will mostly not have yet implemented LLMs into productive forms in the classroom environment and that some teachers may even worry about it more than use it as a benefit to their pedagogy. This is for the following reasons: first, as a practicing teacher, my school –of approximately 50 students– hardly ever use chatGPT, and second, because conversations with other teachers about AI in the classroom seemed to be more interested in tools, such as GPTZero.me, to prevent students from using LLMs to write their papers rather than tips for implementing the technology themselves.
Research Questions

1. What’s the relation between teacher’s perceptions of their pedagogy and the use of LLMs?
2. What measures have teachers taken, pedagogically, in response to the introduction of LLMs?
3. What’s the relationship between the identity of teacher’s students and their response to LLMs?

Theoretical Framework

“Critical Pedagogy” refers to foundational class analysis by Paolo Friere’s Pedagogy of the Oppressed (1968). In it, Friere criticizes the use of banking pedagogy – through which teachers deposit knowledge to students as passive recipients – as a means from which oppressing cultures perpetuate the dominance of oppressed cultures. Instead, Friere argues for the problem-posing systems that focus on training students to solve problems as opposed to regurgitating what was taught. This allows students to validate their own cultural knowledge and eliminate hierarchies such that the pedagogy liberates both the oppressors and the oppressed. In the digital environment, critical digital pedagogy adapts Friere’s theory to account for the effects of emergent technologies. Dooly and Darvin’s (2022) focus on empowerment in digital spaces as a goal in teaching digital literacy explicate the ways that digital spaces can recreate exclusionary spaces and undermine the notion that young internet users are digital natives or that their empowerment through access to digital tools are a given. Therefore, the theory’s utility is the normative framework that evaluates pedagogy and pedagogical tools through the ways it empowers learners and fosters agency such as how the authors encourage digital activism and inquiry based learning.
One potential metric by which LLMs can be evaluated is through Lev Vygotsky’s concepts of the zone of proximal development (ZPD):

A full understanding of the concept of the [ZPD] must result in reevaluation of the role of imitation in learning. An unshakable tenet of classical psychology is that only the independent activity of children, not their imitative activity, indicates their level of mental development… But recently psychologists have shown that a person can imitate only that which is within her developmental level… Thus, the notion of a zone of proximal development enables us to propound a new formula, namely that the only "good learning' is that which is in advance of development.

(p. 13, 15)

The ZPD allows us to conceptualize the differences in effectiveness of students while they are assisted by tools. Vygotski believed that the role of tools is not to remedy the non-development of abstract thinking but as stepping stones to enable the development of abstract thinking that is otherwise impossible. Through this metric, the research questions can be evaluated based on how much they can expand the zone of proximal development or encourage learning that is “in advance of development” of an empowered problem solving learner.

The other metric by which we could evaluate LLMs is the extent from which they either promote culture hegemony or resistance:

This asymmetry between the pull of empire and the push of dislocation gives rise to imperial education on the one hand and colonial schooling on the other. Imperial education is training for inclusion into the metropole, which stands in contrast to colonial schooling, a form of management of populations in the ghetto. Imperial education is the project of inclusion: one that prepares a few model students to enter the university and
then, presumably, the middle class. These investments in empire are also investments in whiteness, often disguised as “college going culture” or “speaking standard American English.” (Paperson, 2010, p. 24)

The utility of Paperson’s theory is in the focus on whether LLMs are tools that contribute to the propagation of imperial education as investments in whiteness or if they are instead tools that promote resistance to colonial schooling. In this lens, LLMs potential to disseminate information that empowers students to emulate the model student can undermine the pull of empire and the push of dislocation by its use of standard American English as a way to disguise or translate culture otherwise excluded. However, it might be argued that this translation may still be an affirmation of dominant culture by presenting itself as factual or neutral to questions of included/excluded identities.

**Limitations of the Study**

Firstly, interviewing will not capture the full capabilities of the LLMs in the classroom. Many studies that show proof of concept for LLMs often cite the improvement in prompt engineering as a vector for growth in the use of LLMs (Guo & Wang, 2023; Trent, 2023; Zamfiroiu et al., 2023). However, the foundational differences between good and bad prompts beyond a certain point is difficult to measure and can be undermined by updates to LLMs systems that might reset users' understanding of the technology, but such difficulties are exacerbated by the fact that a lot of the underlying mechanisms behind the LLMs are due to emergent attributes as the model is fed more data and is given more processing power.

Impressions of LLM technology might be limited by first impression biases that can arise from the introduction of new technology similar to how the computers and smartphones of today cannot be fully measured by the applicability of early computers (Hemenway 2000; Collinson
2001). This can bias responses of teachers whose impressions may be affected by media surrounding AI rather than direct classroom experiences.

**Significance of the Study**

This study serves as a foundational snapshot of how a Bay Area/Silicon Valley school is interacting, gaining value, and/or meeting problematic behavior in the AI space. One can use this study as a foundational justification for further empirical research in observable trends involving LLMs or adjust school policies to better adapt to the on the ground conditions revealed by this study.

**Definition of Terms**

“Machine Learning” is a technological process by which machines adjust variables based on neurons in order to empower image recognition, LLMs, and other AI like technologies via big data.

“Large Language Models” (LLMs) are a specific type of AI algorithm specifically tailored for the purpose of analyzing and generating language. The paper specifically focuses on LLMs in the form of chatGPT and other forms of GPT software that rely on a Transformer Model as opposed to autocomplete software that often relies on static n-gram language models. See Lehmann and Buschek for more information (Lehmann & Buschek, 2021).

“Big data” refers to the mass collection of data through avenues such as social media, cell phone app usage, and online cookies to track users' internet usage, create measurable trends, and to use those trends through algorithms to increase engagement with their software and/or to sell that information to 3rd party marketers. See the Social Dilemma documentary, or works by Sherry Turkle for more information (Orlowski-Yang, 2020; Turkle, 2011).
Chapter 2: Literature Review

This study aims to bridge the gap between speculation and the observable realities of the current applicability of LLMs in the classroom through a series of interviews with educators at various high schools. I hold the hypothesis that teachers will mostly not have yet implemented LLMs into productive forms in the classroom environment and that some teachers may even worry about plagiarism more than value the benefits. This literature review creates foundational background research to understand LLMs, plagiarism, and trust in student-teacher relationships.

Section 1: ChatGPT

ChatGPT is a publicly facing large language model (LLM) or a type of Machine Learning (ML) system that works off of millions of word input parameters to generate a likely coherent response based on its training data. This has the potential for seemingly intelligent responses depending on the training data used in its later layers of the ML model. ChatGPT, powered by Generative Pre-trained Transformer (GPT) 3.5 (the version that powers ChatGPT’s free version) when free or GPT 4 when paid for with a monthly subscription, are the most generic at the moment, allowing users to ask any question within its terms of use.

Usability and Current Feasible Applications

Current articles cautiously explore the wide breadth of use cases for ChatGPT, often pairing praise of the usefulness of chatGPT with underlying problems that hinder a perfect implementation. Guo and Wang (2023) from the University of Hong Kong ran a relatively successful experiment in China on using chatGPT as an English as a foreign language assistant for B2 and C1 learners from the Common European Framework of Reference for Languages (CERF). They coded types of feedback into 5 categories and then asked the model explicitly to give such feedback, and measured this against lecturers’ typical feedback. Perhaps partially as a
result of measuring what the researchers were asking for, the model’s feedback was more balanced and included many more “informative” and “directive” coded pieces of advice that allowed students to receive more feedback on potential areas to revise and suggestions on how to revise, respectively. Additionally, the five lecturers who were surveyed after the fact rated the use of the model highly and at the B2/C1 CERF level, this implies a cross application to general English classes. These experiments were highly controlled as students did not have access to chatGPT and instead sent the papers through a foreign liaison who used the same prompting for every paper. Because Guo and Wang are coming from the perspective of applicability from a teacher’s perspective, they encourage furthering this research with more emphasis on prompt engineering and student feedback.

Trent (2023) similarly presented the use of chatGPT in an economics current events class for upper level undergraduates. His experiment had a professor implement the use of chatGPT into the classroom for the purpose of conversing with ChatGPT, having the model summarize articles, and posing questions designed by the students to best apply their knowledge of economics. Before and after the application of ChatGPT in the class, the students were surveyed on their opinions of ChatGPT and the use of LLMs in the classroom in general. As a result, when students were surveyed “44% [of students taking the class] stated that they would use ChatGPT to understand current events in the future.” Trent’s study conclusion operates under the assumption that the use of chatGPT appears to be an inevitable future with the advent of LLMs in professional work and thus gauges the success of the students on their ability to better use chatGPT, which did improve in the experiment. However, even with the slight change in difficulty curve, opinions on the use of chatGPT in academia did not change dramatically (though did change in a statistically significant way) still casts doubt on the usefulness of the
technology in relation to its ease of use. However unlike Guo and Wang, Trent leaves the use cases open to the students which adds a second dynamic of whether controlled usage would have been a better model for the experiment.

Further research articles note that aside from the experiments, there is an even wider breadth of use cases that have been theorized. For example, Huh, Nelson, and Russell (2023) conducted an expansive literature review on the effects of AI on the advertising industry, which includes both ML as a broader application of big data and the use of LLMs in advertising. They speculate that AI will play an integral part in making professional advertising immersive through their extended literature review. AI powered chatbots combined with search engines, for example, are predicted to fundamentally change the way users interact with search engines and the advertising associated with it. Similarly, they mention that AI powered influencers might change the way that social media is conducted by automating the connection process and augmenting their simulation of real conversation with the knowledge about users gained via big data.

Glaser’s “Emergent Technology” report (2023) notes that chatGPT has great coding potential for those in the field and provides an example of chatGPT producing valid code in R in response to user prompts and listed examples in his article, which is also an expansive literature review. Glaser’s perspective works in response to pushback against ChatGPT’s integration in the classroom and provides a list of potential opportunities for its implementation as backed by other researchers’ studies. While briefly mentioned by Glaser, coding appears to be one of the more popular uses by developers because their knowledge of technological systems and ML are transferable when using LLMs. Glaser also sees potential in chatGPT summarizing articles but cautions users due to its tendency to hallucinate facts using citations that do not reference real
articles. In spite of these admissions, Glaser’s report is optimistic given the large body of research and sees the issue as a potential “avenue of progress” by which students can develop critical thinking skills while the technology improves over time.

Still, there is a large gap in research between many of the theoretical predictions and the observable realities of the technology. Guo and Wang (2023) and Trent (2023) were some of the only studies applying LLMs in the classroom setting at all and their application of the technology was limited to single courses in either a controlled context used by the teachers or in the context of specific assignments. This is stark compared to the number of predictions about the use of the technology to assist or even replace specific tasks. Additionally while ideas for modifying the output of LLMs is discussed as a suggestion for future attempts to implement, the exact nature of the modifications and what about the prompt engineering that works is assumed to create gains when that has not necessarily been proven.

**Issues and Risks with ChatGPT**

Many articles that mention risks and flaws in using ChatGPT stem from its unfamiliarity in spite of its quick adoption by the general public.

**Current Issues and Risks.** According to Elkhatat (2023) text matching is low in ChatGPT and is a cause for concerns about plagiarism. He conducted an experimental study on ChatGPT promptings over 90 responses from GPT 3.5 and GPT 4 and tried to see if the text from different prompts had matched in the same way that plagiarism software might match quotations without in text citations. However, his research indicates that in theory, it would be hard to match text from ChatGPT back to ChatGPT using the current plagiarism checkers. 10%-40% of the text was matching with an average text matching of 20%. Admittedly, some companies claim that they now have the technology to detect ChatGPT use with some
confidence such as GTPZero.me, but this study shows that the process of detecting chatGPT and text from other LLMs may be more complicated than detecting run of the mill plagiarism. For example, one concerning gap in the research is that methodology includes the prompting that only asked for 100 word responses in the field of engineering. Such a study would have to be reproduced for essays in other fields of academia to verify the findings in a more realistic context.

Furthering the issue is that in spite of these gaps in catching plagiarism, students are taking advantage of the lack of infrastructure to catch these issues. According to Šehanović, Džambegović, and Stančić, “42% of students” (2023) in the survey of 304 university students and 29 lecturers at Bosnia and Herzegovina universities, admitted to using ChatGPT to write a full paper if need be. This is essentially AI powered ghost-writing. The authors attributed this issue to the gray area created by administrators who were unprepared to deal with the implications of ChatGPT in schools although some universities banned ChatGPT altogether due to its unfamiliarity.

On the other hand, in spite of being a tool feared for plagiarism, some aspects of the model’s output were found to be unnecessary and inefficient. In Guo’s (2023) aforementioned article, % of the feedback given by ChatGPT was found to be useless in his experiment. While they attribute extraneous feedback to prompting issues, that the data of responses with an updated prompt were not included seems to indicate that such adjustments are almost always understood after the fact and without training, student or instructor usage could further generate repetitive information and cause frustration with technology.

Furthermore, Zamfirescu, Vasile, and Savu (2023) caution that we cannot fully trust the accuracy of information given by chatGPT in spite of their optimism. They conducted a
systematic review of the 59 papers between November of 2022 and February of 2023. In use cases, asking for sources from ChatGPT will often yield back generic sources that are commonly known, or worse hallucinated sources that do not exist on the internet at all but advocate for certain points regardless. The authors caution to take these ideas into account when using the technology and ask for more use cases and deeper analysis on other difficulties from the model.

**Other Theoretical Risks.** In spite of the risks mentioned, Zamfiroiu, Vasile, and Savu (2023) conclude that ChatGPT could support or “even replace the consulting field” by being a starting point for many conversations that could later be had with an expert in the field based on the aforementioned review of the literature. Huh, Nelson, and Rusell (2023) similarly predict that LLMs will “likely cause a much bigger storm in the advertising businesses and workers” than previous big data developments given their non-exhaustive list of capabilities for LLMs to expand upon. The authors here are conducting an extended literature review for the Journal of Advertising for the purpose of measuring its current possible use cases and risks in the field.

Glaser (2023) mentions that chatGPT could give too much of an advantage to those that can afford the subscription to the GPT-4 model. This seems implausible because if the technology were to become ubiquitously used like the microsoft suite, schools could be expected to foot the bill on subscriptions. However, this is not a guarantee and even if so, there is still little information on how concretely GPT-4 outclasses GPT-3.5 in an educational context.

**Guidelines and Behavioral Adaptations to ChatGPT**

Despite these risks, many authors are still optimistic about chatGPT’s potential learning curve as a barrier to be overcome as opposed to writing off the technology entirely.

For example, Guo’s (2023) experiment and its large success, there were ideas for how to change the prompting such that the inefficiencies from extraneous feedback are further
minimized, even though new prompts were not tested in the experiment itself. Trent (2023) similarly posits that the use of chatGPT improved with the students’ use of the technology in the experiment over time. Although this led to mixed reviews among students when surveyed after the fact, it is clear that there is a learning curve that students can take advantage of to better access information in an efficient manner.

Finally, Šehanović, Džambegović, and Stančić (2023), recommended a series of guidelines for administrators to implement when it comes to the use of chatGPT including honor codes and clear guidelines. Huh, Nelson, and Rusell’s (2023) article includes a potential example of this policy: the policy of the marketing school within their research restricts the use of chatGPT for anything other than copy-editing and writing feedback. Although the amount of caution used for chatGPT and LLMs is variable, researchers seem to all agree that there is more room for users to learn prompt engineering and better improve upon the results received by chatGPT. This may imply that more controlled questions and prompts to chatGPT that are pre-established in the class are optimal; or that users need to be more practiced with the technology than the first year of public usage has allowed before we see the full benefits of LLMs in the educational field. These points are all made aside from the potential updates to the LLM itself from its development team, OpenAI.

There appears to be a gap in research concerning educational theory in regards to chatGPT. While critical thinking is often mentioned in the literature regarding chatGPT, none of the academic articles mention liberatory concepts such as problem-posing pedagogy or critical race theory and thus none of the adjustments take into account more the need for authentic equity in education.
Section 2: Plagiarism

Although the research usually observes plagiarism in university environments as opposed to high school environments, one study suggests that there is a higher percentage of students who would admit to behavior considered unethical in their high school career than in university (O’Rourke et al., 2010). The researchers surveyed 140 students on their attitudes towards and history of actions over the last semester on what neutrally coded unethical actions such as “passing information to other students.” Half of the participants were previously in high school and had a 10% greater rate of admitting to unethical academic behavior. Although there are significant developments that occur among high school aged students, the behaviors and development of high school students into university students can lend some similarities that are worth exploring, especially in later stage high schoolers. College preparatory environments – intentionally preparing students for the university environment – are likely to assign similar types of assignments, if on a smaller scale to scaffold students for the academic writing environment. Additionally, practices related to plagiarism are implicitly related primarily to writing assignments of which high schools and universities seem to share a similar process and are thus likely to be addressed in similar ways by educational institutions. Therefore, although there is room for research to suggest key differences between high school and university students, the literature review assumes that these populations are similar enough to warrant needed research.

What Counts as Plagiarism?

While there are direct actions of cheating of which plagiarism is a subset, plagiarism is contested in definition because although there are some forms of direct and intentional plagiarism, sometimes plagiarism is indirect. When strictly defined some authors consider taking
more than 3 or 4 words of a quote directly from an author without citation to be a form of plagiarism causing many cases of unintentional plagiarism, while other authors are aware that plagiarism is quintessentially the stealing an author’s work rather than presenting their own.

For example, Amigud (2022) posits that the academic integrity people identify tend to lie on a spectrum rather than work in black and white ways. Furthermore, the actions people take and facing their consequences for the sake of integrity also tend to have consequences. Moving the decision making regarding a situation of academic integrity up the chain was surprisingly common. From his surveys of 80 international academic staff, he gives them a variety of situations and codes the responses about what the academics will do in that situation.

Furthermore, Ferrell attempts to categorize plagiarism into 4 major categories using surveys of 300 students which successfully create categories based on the types of offenses but also identifies clusters with a propensity towards various types of misconduct. He surveys 330 undergraduate teacher education students from four universities using a tool called the Academic Misconduct Essay.

**Plagiarism as an Implied Social Contract**

Still, in the same way that people understand aspects of theft that are clearly in the wrong, there are similar justifications for why plagiarism is wrong. Hamimed (2023) traces the various origins and semantic ideas of plagiarism and attempts to distinguish them from each other: For example, “literary theft” is the academic form of plagiarism through the lens of Canadian copyright infringement law which is stealing the work and using it. Plagiarism on the other hand is linked to self attribution and thus stealing “the logical substance itself.” There are also divisions of plagiarism in theory: accidental, unintentional, intentional, and self plagiarism —
which uses another piece of their work from a different paper and reproduces it in another context without referencing that paper.

Ferrell (1995) also identifies that there are distinct students – in regards to various types of misconducts that he surveys – who both self-report bad conduct as well as those who try self-report doing none of the types of misconducts listed. This seems to indicate if not that there is a cohort of students committed to the implied ethical standards of education, then at least an awareness that within education they should not admit to cheating of any form in academic settings.

Surprisingly, neither of the studies criticize plagiarism as a tool to avoid knowledge or skills acquisition, which becomes a later mentioned way to reframe arguments teachers use to prevent plagiarism. This gap may be due a justice and property oriented lens of test-taking or knowledge evaluation.

**What causes plagiarism?**

Khadka (2021) reports on the teachers’ perceptions of discrimination and nepotism in the government system and their frustrations seem to indicate that the students can tell when the system works unfairly towards them. He argues that this can create a sense among teachers that there is a lack of integrity in the school system and the lack of integrity makes the school more susceptible to plagiarism. Khadka interviewed senior level teachers through a series of case studies and they shared their experiences and struggles working through the system in Nepal through ethnographic-style interviews. Hammimad (2023) also notes that misuse of authority or dishonest behavior are potential reasons people plagiarize to rebel against the authority figure, but this also is present when there is a difference of opinion on the value of an assignment.
Hammimad also lists many more reasons that people commit plagiarism. These reasons fundamentally boil down to convenience (that time, scheduling conflicts, or difficulty to complete academic tasks are greatly decreased when using plagiarism as a tool), lack of knowledge (whether that is knowledge of the class content, or knowledge of what plagiarism is), and lack of prevention methods to best deter students.

Ma, et al (2007) similarly argue that technology in the 21st century has expanded the ways that blatant plagiarism can be conducted. For example, there is vast amounts of information that students can access online and copy and paste within a few mouse clicks. Thus most students were able to use an “only once” mentality to knowingly plagiarize on homework that was not interesting or engaging to them in order to get a good score. The authors studied the focus groups in order to ascertain the effects of digital cheating and plagiarism on middle schoolers, although the scope of the study was limited to one rural, one small town, and one urban middle school in Ohio. Most notably this offers the possibility that some students in high school may have low digital media literacy coming into high school but there is little research about this possibility and its relation to plagiarism.

What prevents plagiarism?

Conversely, ethical behavior is taken as best practice and underlines the correlation between good behavior and good academic integrity outcomes. Almutairi (2022) analyzed a questionnaire given to 450 students across three universities in Saudi Arabia and correlated the academic integrity of faculty members to the ethical behavior of students. After analyzing through factor analysis, the study concluded that perceived honest, fair, and responsible behavior was moderately correlated with ethical behavior and perceived respectful and trustworthy behavior were strongly correlated with ethical behavior.
Although Almutairi’s studies only apply to students in Saudi Arabia across three universities, there appears to be a shared logic of ethics and relationships by Ross (2017). In 16 sections covering the guidelines by various faculty members of Indiana University East, plagiarism is only mentioned by the biological sciences in the context of the shared knowledge of TurnitIn as a system and using options on Canvas software systems to prevent students from reading some feedback before submitting their own. Rather, more focus is placed on focusing on a good environment and relationships when listing best practices for educators in the online space. This approach is complemented by Cooper et. al (2022) who interviewed the opinions of 17 teachers in regards to recommended practices to proactively combat cheating as part of a larger phenomenology on the impacts of COVID-19 on Ontario primary and secondary schools: “Yet, rather than focus on disciplinary or preventative measures, several teachers used the context as an opportunity to reposition their assessment practices towards more authentic problem-based tasks that could not be plagiarised.” This practice indicates that the creating more authentic assessments— for example, ones that had to be analyzed and reflected on in context of the task – were a type of preventative innovation that doubled as a justification for process-based assessment. Rather than trying to catch kids plagiarizing, they made the test more conducive to doing the work on their own and in the moment.

Finally, “Addressing Plagiarism in A Digital Age” (2011) is a four part article divided among the authors who write about different aspects of digital plagiarism. Wayne Rhodes draws comparisons to music remixing and law school in order to encourage distinctions between ‘read only’ and ‘read-write’ types of literature, so that the aforementioned practice of copying 3-4 words from another author is less condemned and more encouraged for the purpose of allowing students to find their own voice. Vivian Zamel encourages teachers to help students find their
own prose in the writing process due to her experiences with a student whose opinion was suppressed in favor of an encyclopedic tone. Stephen Sutherland offer nine suggestions that essentially involving chunking work, asking for process over final product, and taking moments to very intentionally define and address plagiarism in its malicious contexts in order to leave room for teachable moments for non-reading, misreading, and/or the use of SparkNotes. Eleanor Kutz lastly analyzed the use of TurnItIn software that should catch plagiarism and concluded that the technology had some practical applications in the realm of teaching students how to properly cite sources, but ultimately that the technology creates a new environment that requires close analysis by instructors in order to properly identify intentional plagiarism.

There is a gap in the research on the empirical value of these strategies to prevent plagiarism or even to change the minds of students. This could be difficult to observe because students may be hard pressed to admit to plagiarism even in a confidential research environment, but it also seems like there is a divide among educators between what should be considered intentional plagiarism and what is a teachable moment for students. This ambiguity will be key to analyzing the applications of AI in the classroom and the key trait that teachers’ need as they play the role of educator and evaluator in the classroom: trust.

**Section 3: Trust in Student-Teacher Relationships**

As trust is one of many key components in preventing plagiarism, it is important to analyze how teachers create environments with good culture; in other words, how students can trust classrooms and teachers are fair to their ability and hard work. This is an apparent aspect of the way that previous developments in technology have affected the student teacher relationship.
**What is trust?**

Ennis and McCauley (2002) talk about the ways that trust can be built in the classroom environment, having defined it as being sure students can rely upon the teacher or the institution. The authors interview 18 teachers in urban environments regularly over the course of four months to identify themes and methods used by these teachers to engender trust. They conclude that it often involves persistence to work with students who have previously distrusted the system, shared expectation within the classroom such that students understand predictable consequences and can rely on them, commitment to work with students where they are at, and a voice to the students so that they can have some ownership of their own educational process.

Similarly, Elmesky (2023) also focuses on teachers’ susceptibility to bias and implicit racism, cultural mismatch, and anti-blackness. Their work is useful to show the ways in which students can come from an environment of distrust. Elmesky (2023) analyzes a longitudinal study of a school in a metropolitan area to create a number of motifs about black students in the area in order to dispel theories of “cultural mismatch” in classrooms in favor of theories of anti-blackness culture in the midwest. There is a predominantly black population at the school (*95%). The teacher’s tendency towards hyperdiscipline was originally thought of as a form of cultural mismatch but was later posited as a form of anti-blackness. Importantly, there was one student who due to her ethnic background as a Cuban American immigrant was accused of cheating after she had received tutoring from a grammar coach. There is a lot of evidence within the vignettes that implicit biases towards Whiteness can create distrust from teachers to students.

One adjustment that is notable in the classroom is that with the introduction of technology, trust is often preferable to the alternative because teachers are not equipped to outsmart classrooms full of children and enforce unnecessary rules upon them.
Trust in the Rulemaking

Regardless of the tools and technology in the classroom, Some research suggests that the teacher often sets the tone of the relationship. Pace (2003) talks about how the rules created in the classroom and the expectations set are often authority earned and assigned. She runs a longitudinal case study of a highly recommended teacher in a multicultural AP English classroom. Pace observes how the teacher would use her earned authority to guide the conversation and set clear expectations, but would need to rely on the assigned expectation as a teacher through grades and in class rules to mitigate the tendency for students to cheat off each other's tests to avoid answering on the reading. Students' interviews mirrored the appreciation for clear standards but complained that the amount of control in the classroom prevented students from having more conversations that they thought would have been more useful to how they relate the book to their experiences. Pace’s tracking of the classroom denotes how the way teachers and students respond to authority also affects the dynamics of their relationship. Students in this class appreciated clear expectations and desired the freedom to explore academic topics in ways they found relevant and interesting.

On the other hand, poor rulemaking can create environments of distrust and that thus promote poor relationships and promote breaking the rules of the environment. Adam (2017) conducted a review of the discourse surrounding the University of New Zealand in regards to the plagiarism policy. They interviewed 21 students and 2 faculty members and identified 4 major types of discourse within the university: confusion, (un)fairness, ethico-legal, and learning discourses. Students seemed to most desire an educational discourse in which they could learn what plagiarism is, why they needed to avoid it, and feedback on how they could avoid it or improve their writing without being punished for accidental plagiarism. In agreement with
Almutairi (2022), the implications of the paper is that teacher and administrative rule making — specifically regarding academic integrity — can create confusing or counterproductive results from the students these rules govern. Adam’s is taking a critical lens of the process by which some schools can make rules that harm the educational process by punishing curiosity that can unintentionally manifest as plagiarism. One gap created by Adam (2017) is trusting the expectations of the institution might be different than trust of the teacher themselves and make few distinctions about the alignment of standards among students and teachers – or the misalignment that can also occur at the high school level.

**How Technology Affects Trust**

Other articles about trust look specifically at the way technology has changed the student teacher relationship and hints to the ways that trust is built as defined earlier. This is important because the way that students have a voice in the classroom is changed by technology. Hemenway (2000) takes a large survey of California teachers and interviews 25 of the 150 survey participants. He finds that technology has allowed many students to work on their assignments independently and find knowledge to higher degrees. Teachers see their new role is that of a coach and arbiter of good or bad information which are available to students in equal measure. The article is a mostly positive understanding of technology’s effects on students and fails to account for the development of AI or most of the later apparent negatives such as the aforementioned use of technology for plagiarism. However, it is a useful mirror of the way emergent technology changed the pedagogical landscape.

Collinson (2001) similarly argues for the ways that her experiences as a teacher show the ways teaching has changed and has not changed as a result of technology. She interviewed one of 81 participants in a national survey from a previous study and looked to speak to that specific
teacher’s case in the article. One finding was that trust building exercises such as garnering feedback to democratize the classroom and explaining classroom policy decisions continues to relax the teacher-student relationship in a positive way. These methods are corroborated by aforementioned articles on best practices online. More pertinently, the description of the qualities of good student/teacher relationships speak on the ways that trust is built in the classroom. On the other hand, some of the experiences show that there are more ideas and methods related to technology that now have to be addressed in the classroom such as plagiarism, doxxing, and even navigating the web for quality information. There is a gap in covering the suburban environment likely created by the interest in the needs of students in the urban environment whose educational process is a target of reform.
Chapter 3: Methodology

This research attempts to distinguish the practical uses and criticism of Large Language Models (LLMs) in the classroom environment from the theoretical research on the topic, aforementioned. As stated in chapter 2, there are gaps in the research in educational theory regarding LLMs, the practical application of academic integrity policy, and the focus on suburban environments in measuring teacher trust of students. The research attempts to bridge some of these gaps by focusing on phenomena that are teachers’ experiences of LLMs. The research questions for this study are as follows:

1. What’s the relation between teacher’s perceptions of their pedagogy and the use of LLMs?
2. What measures have teachers taken, pedagogically, in response to the introduction of LLMs?
3. What is the relationship between the identity of teachers’ students and the teachers' response to LLMs?

As aforementioned, I hold the hypothesis that teachers will mostly not have yet implemented LLMs into productive forms in the classroom environment, that some teachers may even worry about it more than use it as a benefit to their pedagogy.

To answer the research questions and prove or disprove my hypothesis, this study is conducted as a qualitative phenomenological study. Phenomenology as a method is appropriate because it attempts to understand the essence of an experience that can be shared by a research population. Questions of teachers’ perceptions of the use of LLMs qualify because teachers are the research population and their experiences of teaching as LLMs emerge in the public eye are being examined. Furthermore, phenomenology is a lens that allows researchers to examine
measures taken in the classroom beyond the surface level policy decisions and understand the interactions teachers’ pedagogy may have with policy decisions themselves. Finally, teachers’ identities are only being measured in response to LLMs, rather than being taken as a whole as one might do in a narrative or an ethnography. Because the common factor of the research question is tied to LLMs as opposed to the teachers’ identities, a phenomenology seems most appropriate to the research design.

**Research Setting and Participants**

**Setting**

All interviews were conducted on video conference platform Zoom, except for one, which was conducted in person at the interviewee’s home at their request. Most interviewees on Zoom either connected into the interview from their home with two interviewees opting to take the interview at their place of employment.

**Participants**

Seven educators with classroom experience at the high school level were interviewed through a semi-structured interview process that first focused on providing a context to understand their pedagogical values and practices and then examined their opinions and practices concerning LLMs. The sampling procedure used by the research was convenience sampling, pulling on the network of the teacher. Initially, interviewees were going to be chosen among high school classroom teachers with familiarity with LLMs. In order to further remove biases from the interviewees, none of the interviewees chosen were working with the researcher when LLMs were published for public use. In theory, this would allow the interviewees to comment on the practical applications of LLMs as well as the theorized challenges.
Eventually the requirement for familiarity with LLMs was dropped because the lack of familiarity could also be considered a possibility that could be analyzed under the research questions. For example, “What measures have teachers taken, pedagogically, in response to the introduction of LLMs?” could be answered with ‘nothing due to unfamiliarity’ and then follow up questions in the protocol could focus on what has been noticed or what has been a priority in the meantime. This ended up occurring with one of the interviewees.

Additionally, the requirement to teach as a high school classroom teacher was loosened after two of the interviewees – who have experience with high school students in a classroom setting – revealed during the interview that their current role does not primarily include classroom instruction.

One of the interviewees had a background as a paraeducator which meant that she worked alongside classroom teachers with specific vulnerable students. While this undermined the first question which presumed that pedagogy would typically refer to the way classroom teachers instructed in the classroom setting, there were two reasons that this was eventually included in the findings: first, that pedagogy could also have been referred to by the way that the classroom teacher assigned paraeducators to the student, and second, that the paraeducator had a closer perspective of the student and a greater understanding of their neurodivergent identity, which served as strong evidence for the third research question.

The other interviewee was from a teacher with 20 years of experience but was on special assignment from the school and started their position after instructions from the school’s principal allowed him to focus on coaching teachers and serving as an on-call substitute when necessary. This data was retained because the interview showed the perspective of an experienced teacher who worked closely with technical staff.
In total, the seven educators interviewed were a diverse group that spanned a wide range of educational backgrounds and mostly worked in suburban environments. Aside from the aforementioned non-classroom teachers, there were three classroom teachers who taught a class of students in person. Of the three classroom teachers, one taught honors chemistry and marine biology, another taught journalism, and the third taught law. Finally, there was a teacher who taught 8th-12th grade levels of math in a virtual classroom through zoom, and a humanities teacher who primarily taught one-on-one at the 8th and 9th grade level. Six of the interviewees worked directly for or were contracted with a public school district while the remaining teacher worked for a private school. All of the interviewees worked within the Bay Area as defined by the Association of Bay Area Governments or within Santa Cruz County. A table is provided with teacher pseudonyms in Appendix A.

**Instrumentation**

The interview protocol was developed as a semi-structured interview with the intention of tackling the research questions in two specific ideas in mind: first, to understand the pedagogy of the teacher and second, to get a understanding of the perceptions, influences, and motivations for the teachers’ policies and opinions about LLMs. The pedagogy of teachers interviewed were represented by the goals they have for their students, the way they approach these goals, and the way they differentiated their teaching strategies to meet the needs of all of their students. If not mentioned, follow up questions were planned to interrogate interviewees' sense of how student identities played a role in the classroom. The understanding of teachers’ policies around LLMs were asked about in the second part of the interview so as to not prime interviewees with their perceptions of LLMs prior to describing their pedagogy. A full copy of the protocol for a semi-structured interview is provided in Appendix B.
Collection

After participants signed the consent form as per the Institutional Review Board (IRB) standards, data was collected from interviews which were scheduled at the interviewees’ convenience and ran between 30 and 45 minutes. The interviews were transcribed using Zoom’s recording and transcription features with the exception of the in person interview which was recorded and transcribed using the recorder app on a Google Pixel 6 smartphone. All quotes taken from the transcripts were verified using the audio recording. A protocol for a semi-structured interview is provided in Appendix A. Originally, two of the interviews were going to be excluded from the data due to the status of two educators who revealed over the course of the interview that they did not directly instruct in the classroom environment. However, some of their direct experiences contained valuable information that corroborated with the initial findings and were thus included as crucial outlying perspectives.

Analysis

The collected data was categorized by common topics that emerged through the interviews. The coding method used to organize the categories involved methodically reviewing each interview transcript for common themes and topics. Quotations were then compared and chosen to most accurately and succinctly represent these common concepts. These interviews were then transcribed, categorized, and coded into 5 main themes related to the research questions.

Plan for Protection of Human Subjects

Participants had given informed consent through the approved process from the University of San Francisco as modeled by the Institutional Review Board through a blanket approval, Protocol #1438, under the supervision of Dr. Seenae Chong for the Spring 2024
master’s thesis course (Organization and Leadership Course 655). This process prioritizes the privacy and psychological safety of the human subjects. In addition, I completed a “Human Subjects Research” course accredited by the Collaborative Institutional Training Institute (CITI) and a certificate of completion is provided in Appendix C. The names of participants have also been changed when discussed in findings.

**Researcher Background**

In spite of measures to minimize bias including careful convenience selection to avoid potential interviewees who were working at the same educational institution as the researcher, and extensive feedback and review of the questions, there may be bias from sources as follows.

This research was initially inspired by a lot of curiosity, optimism, and later jadedness with the way that ChatGPT was being advertised as a solution to educational issues without clear application. The initial literature from the research I had done on the issues seemed widely speculative at best, and many were suspiciously similar in tone to the way that I would ask questions of ChatGPT and Google Bard, and later a wide host of LLMs. Yet, I have written about the subject in my academy’s newsletter which goes out to parents and have designed elective courses for the 1 on 1 teaching environment that are meant to cover the ethics and best practices for most forms of generative AI. In many ways, my optimism about the usefulness of a tool may be a form of sunk-cost fallacy and could skew my views to understand the tool – powerful as it is – as more valuable than it otherwise is proven in the data.

Lastly, my own experiences as a teacher, a fledgling researcher and an AI enthusiast may have influenced the placement of follow up questions and clarifications. For example, there may have been moments where I have asked clarifying questions that may have influenced or skewed the direction of the conversation from what may have otherwise resulted from more patience to
listen to the interviewees’ stories. Although it maintains the facade of objectivity, the lens of research is as deeply personal as the research is to the passion of the researcher.
Chapter 4

The research method described in chapter 3 aims to distinguish the practical uses and criticism of Large Language Models (LLMs) in the classroom environment from the theoretical research on the topic. By using a semi-structured interview, participants explored the research questions for this study, listed as follows:

1. What’s the relation between teacher’s perceptions of their pedagogy and the use of LLMs?
2. What measures have teachers taken, pedagogically, in response to the introduction of LLMs?
3. What is the relationship between the identity of teachers’ students and the teachers' response to LLMs?

As aforementioned, I hold the hypothesis that teachers will mostly not have yet implemented LLMs into productive forms in the classroom environment, that some teachers may even worry about it more than use it as a benefit to their pedagogy.

The findings are organized first into themes in order to cover all of the pedagogies used by the participants and then specific findings that were relevant were grouped by research question.

Themes in Self-Perceived Pedagogies

Comparable to the wide breadth of teaching environments and subjects taught by this group of educators, there was also a diversity of self-described approaches that the teachers employed to educate their students. While there are two common trends that some of the educators have in common, all of the interviewees are represented in this section so as to give a foundation from which to understand the relationships that the research questions seek to answer.
These common trends are the focus on leveraging specific teaching tools in a predetermined learning process and leveraging feedback in recreated professional environments.

**Specific Tools and Processes**

Some educators enforce engagement with specific tools and processes so students demonstrate learning instead of regurgitating ideas without a deeper understanding of the concepts. For example, Jim’s goal was to demystify math for his students so that they could be self-reliant. He described his process as giving the foundational math principles as tools for the students so they could do the work of understanding and practicing the ideas themselves as opposed to passively listening to a source of authority. He furthers this goal from the way he runs his classroom: “The teacher has managerial authority, but the students have intellectual authority, which means they can challenge the teacher on specific results or conclusions.” By setting the expectation to be challenged, Jim is hoping that his students avoid seeing him as the authority on math and learn to become self-reliant by double checking his work. This then leads into the way that they would work on assignments together. Students would have a set of steps in the math problem that struggling students can take the first step on while flourishing students can try the next steps after that to solve the problem using the principles they are given. Overall, Jim’s strategy of giving students the tools to try the problem on their own and rewarding intellectual authority is supposed to avoid a passive engagement with the math or floating through class using buzzwords from the teacher.

Denise similarly has a process to give her students note-taking principles—through a guide—that they use to do the work of understanding and practicing ideas. She had often criticized her peers for letting her students engage in passive video watching which also echoes Jim. One key difference is that instead of sticking to a single process that students can complete
partially, Denise’s process is scaffolded through repeating the tool’s use across different assignments. Additionally, she has more flexibility to adjust her managerial authority to the student’s social/emotional needs from her one-on-one teaching environment, such as discussing the concepts in class with bare minimum note taking or letting students who are well-adjusted to her note-taking guide follow through in more detail independently. However, her dedication to a deeper learning and intellectual engagement ultimately places these two teachers into the same category.

*Professional Projects and Feedback*

Another common trend from a group of educators was tying in a project or goal into the skills they wanted to pass on to their students through the lens of profession: Jane teaches a journalism class and used to work as a journalist, and Calvin teaches a law class and also used to work as a lawyer. This innate link present in both classes entices assessments of skills in simulations of the respective work environments implied by the profession from which the class is inspired. For example, Jane’s class produces their school’s magazine to grade on performance within the newsroom which assesses communication, collaboration, creativity, and critical thinking through the ways that students play their role in drafting, editing, interviewing, and doing the other tasks otherwise relevant to a newsroom. Calvin’s class similarly participates in multiple mock trials for the assessment of students’ reading, writing, critical thinking, and public speaking. These environments are beneficial to the students' skill development because both teachers can lean on their professional background to inform their feedback and measure outcomes in the faux workplace environment.

Of course, both teachers do not expect their students to take up the professions that they once held, nor are they directly graded on results of every step of the process. Rather, they speak
to the myriad of soft skills aforementioned. These goals are then measured through the way that students engage with the class as a whole rather than with a given process. The way Calvin describes his process is a quintessential way that this plays out: “I give them a lot of examples on how to do [a mock trial]. They draft something, they receive my feedback, they redraft it... Then gradually I pull back until hopefully they can feel confident doing it on their own in front of me for a final for a summative assessment.” Unlike the direct demonstration of skill through a predefined process, these teachers give their students more freedom both in what they want to create and in the process of creating itself. Students get to see real examples of how the writing assignment they are working on was completed before but the methods and subject of the writing are completely up to the student. Since they are grading students on their accumulation of skills through taking feedback and gradually gaining confidence until they attempt the summative assessment, both Jane and Calvin participate in a project-based learning that is more flexible in process.

**Miscellaneous Teaching Styles**

This section represents the other half of the teaching styles, which appear disconnected from the others and do not appear to have key similarities that can be described as a pedagogical approach, although two of the three educators listed do not specifically instruct as the primary instructor of a classroom. These individuals are noted by a paraeducation environment, an honors classroom environment, and a special assignment role.

**Amy: Paraeducator’s Pedagogy.** Individualized learning created exceptional circumstances because Amy’s perception of her pedagogical approach is directly tied to the one teacher to one student learning environment. Most notably, Amy’s work as a paraeducator offers individualized assistance to students who need it due to their individualized education plan (IEP).
While some IEPs call for individualized assistance with classwork or physical disabilities, many of Amy’s priorities suggest that the main obstacle to her students are behavioral due to mild to severe autism diagnoses. When asked to describe the goals for her students, she said, “We want the students to be safe to have a positive learning environment so that they're all able to follow directions such as sit and keep their hands to themselves.” While Amy’s goal is also to aid in a transition from special education environments to generalized education, her response suggests that without the individualized attention Amy provides, these students could endanger themselves and others. Therefore, the individualized pedagogy is deeply intertwined with the way that the students’ psychology affects their ability to participate in the educational environment.

To put how exceptional Amy’s situation is into perspective, Denise is the only other educator in the interviewee group who works in an individualized environment, but unlike Amy’s students, Denise’s seem to mainly focus on teaching accommodations for her students rather than behavioral accommodations. Denise described accommodations such as verbalizing outlines or allowing more processing time for student responses to directions or questions. These differences suggest that while both teachers encourage learning through individualized attention, Amy’s case is exceptional in that managing student behavior and emotions is the main priority of her work, only then followed by providing the needed accommodations for that student.

**Lily: Teaching Care within the Bounds of the Honors Curricula.** Lily represents a significantly unique approach as she felt restricted by the obligation to her school to teach a traditional class but made efforts to show care intermittently in order to achieve her classroom goals. Lily’s student goals included a myriad of soft skills including collaboration and problem solving as well as moral goals like conscientiousness and responsibility. She admitted that there
were limited opportunities to promote these skills in some of her classes. Notably, her honors chemistry class required worksheets and lectures due to the depth of the curricula and how it was pre-differentiated to students who flourished in their previous classes. Still, she made efforts to model that care for students through reflection questions and allocated time outside of the predetermined structure of the honors class to show the care she wants to model for students. This pattern is further highlighted in a project she assigned to her marine biology class where students had to take care of fish in a class aquarium. “They’re not even on the standards. It’s how to raise a fish and not kill it… how to keep something as a pet and take care of it and have a responsibility for it,” she said about the project. There could be many reasons that Lily’s projects are only able to be implemented like Jane and Calvin’s in the context of marine biology, but Lily seems to hint that she has more time to teach beyond the standards. Regardless, Lily separates from both other types of pedagogical approaches in that she creates separate addendums and adjustments on top of the initial course material and traditional methods to show and teach care to her students.

**Michael: Equity Grading from the Special Assignment Perspective.** Michael’s 20 years of teaching experience informs the promotion of equity grading, which is the philosophy of meeting students such that they have sufficient practice and ability to explore to build a love of the subject. For Michael, this practice meant convincing teachers to reevaluate grading so that students can retest, turn in work late, or have alternative means of showing mastery over course materials, such as the projects presented by Jane, Calvin, and Lily. This had a range of implications that Michael was eager to talk about, but what categorizes Michael into a more traditional approach is the way he approaches coaching teachers: “Our staff is great. We have amazing teachers, and I just have to point out what [teachers and students] are doing to each
other. I don't have to teach you anything… the same idea keeps kind of getting reinvented sometimes… a lot of the practices they're already doing.” While he talks about teachers often feeling defensive about their own teaching and grading style, Michael is only looking to make small changes and adjustments towards his ideas by pointing out the ways their practices can be helpful or harmful. Michael’s goals are an exception to the others because he primarily works with teachers and is thus difficult to measure specific aspects of pedagogy in his class. However, the way he works with teachers to give them options and opportunities seems to suggest that his work is also problem-posing both to the teachers and in the ideal ways he would have teachers work with students.

**Do LLMs Fit in the Pedagogy?**

The first research question asks “What’s the relation between educators’ perceptions of their pedagogy and the use of LLMs?” To answer the question, this previous section of the findings is organized by the types of pedagogies teachers prioritized. This then supports the potential relationships between those viewpoints and the use of LLMs in this section.

Ultimately the use of LLMs within the pedagogical framework of the teachers is divided into three types of answers: yes, no, and no answer. The answers seem to trend with how much LLMs are compatible with the pedagogy of the educator: teachers whose policies can seamlessly implement the technology are quick to embrace it; teachers whose policies are at odds with LLMs passionately refuse its usage; and educators whose priorities run parallel to the question can ignore the question altogether. The rest of this section details the common rationale for these decisions.
Yes, and We Need to Embrace That Future

Although the majority of teachers had some usage for LLMs in their personal life or in teaching preparation, only three of the teachers had policies and motivations for using LLMs in the class itself. Among those who promoted the use of LLMs in the classroom (Michael, Jane, and Lily), there appeared to be two motivations: proactive guidance away from complete plagiarism and practical applications of LLMs.

Interviewees from this group all wanted to prevent the complete replacement of student work with LLM responses and they believe that this is more likely to happen if teachers are not proactively guiding their students away from that practice. Making parallels to other types of technology, Michael believes that students already have the tools and need training to stop them from using it inappropriately in the same way that kids might use Google or copy from Wikipedia without guidance. Jane had similar opinions and—as an example of the inevitability of LLMs—recalled when she allowed a student to present to the journalism class on the use of LLMs in their writing process. Still, she also noted that this allowed her class to have a productive discussion about positive and negative uses of LLMs and guide some ways students can use LLMs in their writing process.

References to how LLMs can be seen as a tool students can use to assist learning were present as well. The teachers recognized creative ways that LLMs can be utilized for learning as follows: Lily mentioned that she would allow students to use LLMs to simplify concepts; Michael sees ideas of using LLMs for a rough draft or feedback before a student-created final draft to be compelling; and Jane also integrated the use of LLMs into the writing process to give feedback that students can reflect on when making first round revisions to their work. All of these examples were examples of students using LLMs to augment their own work rather than
specifically using LLMs for the work itself. However, all of these methods are signs that the teachers saw opportunities for students to use LLMs in a positive way and were accepting of those uses.

**No, and It Actively Uproots the Process**

The educators who have the most resistance to LLMs had two opinions in common that aligned with their skill-specific learning process. First, they do not hold the use of LLMs as productive or helpful to their students. Denise and Jim both felt that LLMs interfere with the skill-building they focus on in their pedagogy even though they teach completely different subjects. To these teachers, integrating LLMs into the workflow is plagiarism because the students are able to circumnavigate the learning process that they had laid out for their respective students. As Denise put it, “[ChatGPT] is a skill killer… If they don't understand the master’s level stuff they're producing, why is it even helpful?” Denise and Jim’s fears are that students by having LLMs do the work for them are circumventing the skill building from take-home assignments.

Secondly, they both believed that students should be putting in a certain amount of work into the learning process that LLMs avoid. Jim directly states that “students should be working more than the teachers” when describing his philosophy and notes that LLMs allow students to take advantage of the calculating power of websites like Wolfram Alpha while also answering word problems in cohesive problems without engaging with the work of figuring it out themselves. Jim can draw parallels from these methods to previous methods students would use to cheat on practice assignments without LLMs. While Denise does not have an equivalent that she experiences students use, she also can see students disengaging from the work and questions the benefits of time saved from using LLMs when they could be practicing. To her, the system
she has in place to outline and analyze work – the one that she wants to impart on students – requires work and attention. Overall, both Denise and Jim’s pedagogical techniques require student effort in a way that is incompatible with the assistance of LLMs and that is the foundation of their opposition in spite of having entirely different class curricula.

**I Don’t Have Time for This**

Importantly, the question of LLMs sometimes did not interact with the needs or approaches of the classes. That is why in the question of new technology, two educators did not attempt to engage with the idea of LLMs and their use in the classroom at all. Amy’s work as a paraeducator focused on the behavioral priority among neurodivergent students rather than the question of LLMs. Amy had seen positive benefits of generative AI when a class was shown the effects of image generation by a representative from Adobe to students and can imagine how it might be useful in a learning process or otherwise stifle creativity from those experiences.

However, she had no experience seeing her students use AI independently for any assignment, let alone working with LLMs. Because her working protocol as a paraeducator had not yet implemented LLMs, she could not bring up specific examples to color her understanding of LLMs.

What is most complicating about the data is that Calvin, while also being a teacher that can be open to LLMs, was reluctant to engage with the use of LLMs proactively. One way that he justifies this is that firstly, he had very little experience with LLMs at all. He admitted to his class that he could not tell if work submitted by LLMs was distinguishable from student created work and told me that he had very little experience with LLMs personally. Another way he justifies this is that he felt that he had no way to gain metrics by which to measure the effectiveness of any policies he could put in place. Because he had no assured way to distinguish
one type of work from another, he felt that it would be inappropriate to act on any suspicions he may have about his students’ use of LLMs. This exception is important to highlight that in spite of having a philosophy that can be amenable to LLMs, he was unwilling to implement LLMs into his process for other reasons.

**What Measures Are Taken About LLMs?**

The second research question asks “What measures have teachers taken, pedagogically, in response to the introduction of LLMs?” There are three main findings that address this question as follows:

*Measures from School/District Policies Layered on Top of Class Policy*

Often the policies of the school needed to be taken into account before participants decided upon their own classroom policies. There were two types of school/district policies: fully blocking the software in Michael, Jane, Jim, and Amy’s schools and permitting teachers to make the decision for their own classroom in Lily, Denise, and Calvin’s schools. No schools required the use of LLMs in their classroom and Lily had said that her location could not require students to use ChatGPT in the classroom due to privacy law. However, the division on schools’ policies is undermined by the students’ ability to access LLMs regardless of the policy. Jim’s position as a virtual teacher best illustrates this because the technical constraints with enforcement so directly undermine his support of his schools’ policy. He cannot force students to not use LLMs even though they are banned because there is no physical presence that Jim can use to stop students. This frustration even caused him to predict that because it will be so easy to use LLMs for plagiarism it would overwhelm the administration at his school. Still, not all of the teachers think that undermining the school’s policy in that way is necessarily bad. For example, Jane’s campus generally blocks LLMs but the desktop computers in her classroom can access LLMs.
Teachers were divided on their responses to the policies. Some teachers, like Michael, Jane, and Lily, understood ways that they could influence school policies within the system and Jane even went so far as to be on her district’s AI task force addressing policy. However, teachers would more often provide information to other teachers and administrative staff; this is the case in all of the schools permitting LLM usage as well as Michael and Jane’s schools. Some teachers felt like there could still be more support for using LLMs even if they permit it. For example, at Calvin’s school, he felt that even though he was shown support materials at his location, he still did not understand how to best use the technology. Similarly, some teachers at Lily’s school are waiting for more guidance and decisive best practices. She feels like her school is being unclear and indecisive because it is hard to enforce standards set and there is a clear divide between teachers at her location on what should be done. However, she was able to share a powerpoint given by a colleague on some ways that LLMs could be used.

*More Complicated Than Just Banning the Use of LLMs or Not*

All of the teachers agree that students using LLMs to answer questions without further student input was a form of plagiarism, and a little more than half of the educators had taken measures to detect use of LLMs to combat this type of plagiarism. The subsections that follow track the ways the interviewees would prepare assignments to dissuade or catch LLM plagiarism, check for LLM plagiarism in the assignment itself, and dole out consequences if a student is found using LLMs for plagiarism.

*Methods of Preparing for LLMs.* As mentioned in findings discussing teachers who allow the use of LLMs in the classroom, they tend to have conversations and class policies that address how to use LLMs with integrity. Michael advises teachers to adjust their homework and grading policy to better account for the strengths of each student equitably and sees the LLMs as
a part of that process. Calvin, while admitting that he cannot distinguish between authentic work and LLMs, encourages students to cite their use of LLMs when using it with work. However, he has yet to see any students quote LLMs in his class. Jane also went so far as to demonstrate ChatGPT’s use to her students and go over the various suggestions it can give to students so as to both showcase positive ways that the technology can be used and to clarify policy and prohibit certain ways that it can be used in her class.

Two teachers, Denise and Lily, had also structured their assignments to account for using LLMs. Typically this takes the form of a multistep problem that is scaffolded such that it would be more inconvenient to use LLMs such as a lab report. However, a stand out case was structuring a check for LLMs into the question itself. For example, Lily’s class—which allowed the use of LLMs to create practice problems and simplify topics—addressed the use of LLMs through a hidden prompt. The hidden prompt was written in white text using a small font which instructed the LLM to use the word “coconuts” in the answer given about the homework assignment. Once the student copied and pasted the homework assignment into the LLMs software prompt, it would follow the instructions and signal the teacher once the work was turned in. One objection about Lily’s policy during the interview was that it seemed like it would be noticeable to students such that they could make adjustments accordingly. While she acknowledged this, she explained that “most kids who use ChatGPT to write their like answers don't notice it, because they're not the type of kids to notice it.” In other words, while students would be able to avoid this method if they were careful to read what they are copying into an LLM as they are using it to solve problems, Lily thinks it is a handy layer of filtering to put before checking the work itself.
**Tone Checking.** Once the work was turned in, the most common measure was to compare the tone of the work to the tone of previous work. Because LLMs tend to use a specific tone of speaking, there were multiple examples of teachers being able to flag work for further investigation because of the way that the work was written. Jane notes succinctly that “AI papers sound pretty generic, and they're pretty formulaic; so it's not too hard to be able to sort of discern if a student has over relied on AI.” The ease at which teachers felt they could discern these works caused some educators to express frustration and even felt insulted when a student would previously turn in work that is their own and then use an LLM to finish a homework later in the class. Although teachers note that this is sometimes motivated by a time crunch or procrastination, to them the differences are obvious.

There are two notable addendums to the tone check policy to check against false positives. The first is that Jane would verify her suspicions after the fact using Google Docs. Google Docs track changes to writing over time so she could tell if an assignment was written over time or copied and pasted into the document. The second addendum is Jim’s policy, which is to allow the student to explain the concepts they are accused of taking from LLMs and explaining them during a study hall after class. While Jim’s is sympathetic to the view that his policy seems punitive, he notes that being virtual exacerbates the distrust that can form by being distant from students and unable to more directly engage them from their computers.

Lastly, the tone check policy also highlights the hesitancy to use AI checking technology, which while rarely mentioned, generated skepticism from the two teachers that did mention it. Michael was unsure how that would work because he understood the models were not tied to each other and were generally unregulated, while Jane would only use the checker to start a conversation after having other forms of evidence.
**Consequences of plagiarism.** Most teachers had a zero tolerance policy, marking the use of LLMs to replace work as plagiarism and doling out consequences such as giving zero points on the assignment, sending the student to talk with the administrative staff, and/or communicating with the students’ family. Participants compared using LLMs to plagiarism often, even when differences in enforceability and potential positives complicate their policies. For instance, Michael observed a teacher and described their consequence policy as follows: “There is a teacher that was giving grades to students, handing them their papers back and was writing ‘AI crushed this paper.’ Then, that student got a 0. But the AI got 50 points, or whatever it was like, because how do you prove that?” Michael’s hesitancy speaks to the contrast from his own policy, but this quote illustrates similar methods used by Jim, Denise, and Lily. Jim invites students to explain their work in study hall or take a zero on the assignment and a conversation with the dean of students. Denise gives the student a zero and reports it to their family in a scheduled weekly letter from individual teachers.

While typically the consequences of using LLMs to fully complete their work mirror the consequences for plagiarism, there are a few other approaches that are intended to be more instructional. For example, Jane took moments when students were caught using LLMs on assignments as an opportunity to talk to students and have them reflect on other alternatives. The student relied on ChatGPT due to a lack of time, so once the student reflected that they could have communicated their difficulties, they were given an opportunity to redo the assignment with points taken off. Alternatively, Lily gives a verbal warning to the student if they use it to replace their own writing voice on classwork: “...I will call the student out on it and be like ‘Are you gonna write your own thing?…Come on, guys like, I know, if it's AI; it's kind of obvious.’” As aforementioned, Lily allows the student to use LLMs to help simplify concepts and only holds
students accountable if they are using it to replace work. Ultimately while the most common consequence of using an LLM to replace work is punitive, there are more lenient consequences that hint at attempting to be instructional.

**Student Identity and LLMs**

The third research question asks “What is the relationship between the identity of teachers’ students and the teachers' response to LLMs?” Identity tended to be talked about in a broader definition than race, gender, or class and was often not mentioned when talking about LLMs with a few exceptions. The findings related to identity are split between how teachers are considering student identity in the classroom and how those identities are accounted for within assignments to bring out their unique identity and voice in writing:

**Identity in Relation to Student Needs**

Some teachers spoke about marginalized identities in their classrooms such as race, gender, and neurodivergence. However, it was often in a larger context of caring for the students’ needs. For example, Lily asked her class about their favorite animals, reflection questions about things they cared about, and other personal questions meant to show care for their identities as individuals. She then used some of the information in small ways to reinforce that positive environment by putting stickers of the students’ favorite animal on their homework assignments when they were returned with feedback. By making these small gestures, she is making efforts to reinforce care in an environment of primarily Asian and White students focused on high achievement over questions of race. Similarly, Jim’s attempts to include students using less Eurocentric examples were primarily focused on showing equal respect to every individual and were justified by his knowledge of the research that shows care leads to higher achievement. For both Lily and Jim, the identities of students were considered in ways to show care and thus
considered in relation to ways to receive care rather than as an exclusively racialized consideration.

Jane also was very conscious about an environment that meets the needs of student needs but talked about it in terms of building multiple structures to help students overcome problems and does not explicitly mention marginalized identities. One example of such a structure is grading older students with editorial roles on how well they manage their underclassmen. By grading students on resolving conflict and putting up systems to help handle situations over time, Jane also represented some of the work to tackle identity related issues as a conflict resolution question. Another structure reinforcing this is a weekly lunch meeting with editors that allow problem solving and collaboration for approaching these problems. When describing her approach towards differentiating in her class, Jane said, “it's usually miscommunication more than anything that is causing a conflict, and so who's gonna mediate that conversation. Well, it depends on what they're fighting about.” Jane might mediate herself as a last line but she structured her class to be able to handle disputes on their own. While these structures are not specifically targeted at issues experienced by marginalized identities, they are the main vehicle to account for identity and the needs of students.

Lastly, Denise also referenced meeting students’ neurodivergent identities when talking about consideration as well. However, the context of her comments were mostly in how to work with a student who needs extra accommodations, a certain style of teaching, or learning different methods due to the needs of the student. She described how sometimes that would require understanding the likes of a student who has a cultural gap due to age so that a teacher can connect concepts they understand as parallels to the course material. The care Denise shows
often utilizes the one on one environment to commit to a deeper level of understanding and adjustment of course material of the student's identity than Jane’s and Lily’s.

Still, identity was a complicated topic for Denise to talk about because reactions to her own identity and a Black woman seemed to become grounds to challenge her authority:

“I got this student as a substitute who [pause]. Let's just say he didn't want to take information from me. Yeah, that's the way we'll put it. And so he was more comfortable taking information from John Green. I don't know what you could see: the visual difference between me and John Green.”

Denise heavily implied that the initial foundations of defiance among some kids in her practice came from differences in race as a Black teacher at a predominantly white school. As a result of the defiance, she has to reconcile her identity as the teacher of the class with her identity as a Black woman.

Furthering the complications is the role of technology in the defiance that Denise experiences. She argues simultaneously that LLMs emboldened defiant behavior by creating a Dunning-Kruger effect as well as gave her options to de-escalate conflict. On one hand, she perceived that the students were more confident in the LLM’s answer than the one that they wrote themselves and would lie to her when asked if ChatGPT wrote the answer they gave. On the other hand, while emboldened by technology to create that conflict, LLMs also were also used to help adapt to the student’s defiance. During the experience with the aforementioned student, she made ChatGPT read a transcript of the video to make concept checking questions since she had no time to review the video herself. In this way, Denise’s classroom environment is complicated by the relationship between race and technology.
Student Voice in Writing Assignments

Some of the teachers valued the identity of the student through their voice within the writing. Notably, Calvin and Jane classes create assignments with the intention of utilizing the student’s voice. When asked about how he considers identity in the classroom, Calvin talked about how his assignments start with examples and a generalizable format, but ultimately students get to choose the approach they have towards arguing a case assigned to them. For Jane, students’ voices in class can even go so far as to call for action for others such as in one case where students presented on an AI face filter that lightened skin, enlarged eyes, and morphed the faces shown in the filter towards a Eurocentric beauty standard. Jane said, “I have students who will write an editorial about what they want to have changed or in this instance of the skin lightening thing. They wrote an article about it.” Because the work was inspired by the students and they were putting their own concerns into the writing, their work was being catered to their identity. While both teachers used a generalizable format that students can use to complete their assignments, ultimately they recognize that the approach that students take will often align with their interests and their identities.

Finally, Denise stood out as an exception because student voice was a priority in her classroom. Denise explicitly brought up during the interview that students could use LLMs to eliminate their voice in assignments. She elaborated on this concern that students would sound uniform and even later reiterated that it is valuable for students to be able to express something in a way that sounds like them as individuals. To Denise, this was an explicit skill that was undermined by LLMs and that justified her policy.
Chapter 5: Discussion, Recommendations, and Conclusions

When beginning the research process, I argued that the complex nature of the classroom environment required a study to more closely understand the way students and teachers interacted with LLMs. This study attempted to capture this phenomenon by interviewing educators in suburban schools around the bay area about their experiences with LLMs in relation to their classroom. I hypothesized that teachers will mostly not have yet implemented LLMs into productive forms in the classroom environment and that some teachers may even worry about it more than use it as a benefit to their pedagogy. The findings appear to indicate a more positive integration of LLMs than originally hypothesized, though some of the predicted concerns were still measurable.

Interviewees revealed three key findings. First, there appears to be a relationship between how LLMs were perceived being used and the teacher’s policy. Second, there were a variety of measures taken to prevent the full replacement of plagiarism by LLMs. These included structural changes to assignments, systemic and perception-based checking within the assignments and policies that punished those who contributed to plagiarism. Third, ideas of identity were often connected with broader terms than commonly understood vectors of marginalized identities and conversations that included marginalized identities when talking about LLMs were few.

Discussion

Discussion of the use of LLMs, rather than mirroring the findings, were divided into understanding the research questions through different theoretical lenses. It so happened that certain theories were better able to interpret the findings in their totality and while the theoretical lens did not exclusively link to any specific section of the findings, Vygotsky’s ZPD best interpreted the relation between self-perceived pedagogy and LLMs, empirical evidence and
digital critical pedagogy best interpreted the measures taken in response to LLMs, and Paperson’s theories best interpreted the relation between identity of students and the response to LLMs.

**Understanding the Role of LLMs through ZPD**

The findings seem to indicate application within the participants’ pedagogy and the need to guide ethical uses of the tool were often associated with accepting LLMs, whereas circumventing the perceived learning process was met negatively. In other words, the more important question of pedagogy and the use of LLMs was whether or not LLMs encouraged or hindered the learning process. For example, two teachers both strictly rejected LLMs because it would encourage students to circumvent the style of work that they had intended for students in their pedagogy. One way to interpret this is through the lens of Vygotsky’s (1978) zone of proximal development (ZPD): the teachers are attempting to scaffold certain skills and understanding towards the subject matters that they are teaching. As Denise says, LLMs are a “skill killer” because the students are not demonstrating that they are learning the skill. Instead they are relying on LLMs in order to complete assignments to avoid “working more than the teachers” as Jim would say. Typically when applying the theory of the ZPD, the goal of using tools and others’ knowledge to scaffold the educational outcomes and then remove the scaffolding over time so that the students are more able to complete the tasks with their socially acquired knowledge.

An apt parallel to model this concept can be seen in the way that Jim’s school developed policy over the math assistance tool, Wolfram Alpha. Wolfram Alpha can give step by step processes to solving math problems using all the knowledge of mathematics that is available and the software rarely makes mistakes except at the highest levels of math. However if students try
to follow this method of completing their assignments, they usually do not understand the work that they have copied from the tool. Furthermore it might implement mathematical techniques that the student has not yet learned or understood. That is why Jim preferred to scaffold the step by step process and teach certain fundamental skills that build on top of each other to allow students to solve more complicated problems. In the same way, both Jim and Denise seem to believe their classes teach fundamental skills that LLMs would replicate in a way that does not instruct the student.

Applying this theory also explains the examples that Jane and Lily give where it would be appropriate to apply LLMs to the classroom environment. Jane allows students to use LLMs to get a first round of feedback on their writing, a practice tested by Guo and Wang (2023) and found to give feedback in a way that teachers approve. Lily allows students to use LLMs to summarize articles at their leisure, a practice that Trent (2023) tested and found 44% approval from college economics students. In both cases, the studies tested the use of LLMs as an assistance to assignments—rather than a replacement themselves—and found positive outcomes. Thus, the research supports these teachers’ decision to apply LLMs as a scaffolding device that allows students to focus on higher level thinking instead of requiring rephrasing or first round feedback that might otherwise need to be provided by a tutor. The methods they permit are not replacements for critical thought or the goals set out by the teachers, but rather are helpful to complete assigned tasks in a way that focuses more on building soft skills than the tedium needed to start addressing those skills.

Teachers who tend not to engage with the question are also understandably incentivized by the intersection—or lack thereof—between the goals they have for their students and the ways that the technology can scaffold the understanding of those goals. Amy never had to engage with
LLMs in her practice because she was primarily focused on the social emotional needs of the students. If there is a situation where a student is too energetic or otherwise dysregulated to be able to participate in a classroom, it then makes sense that the student would be less able to have the patience to read through the outputs of a LLM. In such a situation the benefits of using LLMs run parallel to the needs of the student. Regardless of the mode of teaching, the first and foremost priority will probably be the students' emotional needs or accommodations as given by an IEP. Therefore, because the ZPD created by the tools’ use does not stretch the students’ capabilities in the direction of better social-emotional learning, LLMs are naturally not considered.

*The Plagiarism Question*

Some of the literature review’s key gaps were the empirical evidence on how teachers’ strategies to prevent plagiarism and the empirical evidence on how teachers are dealing with LLMs in the classroom setting. A major assumption of my hypothesis was that teachers would see LLMs as a threat to their classroom environment because it could encourage the proliferation of cheating and thus these concepts would end up intersecting. The findings from this study seem to both confirm and contradict this idea for some of the participants. After taking the policies and information given to them by their school or school district, the participants used a number of different methods to address plagiarism with differing philosophies: punitive methods which seemed to be undermined by LLMs and course-correcting methods which seemed to be successful at adapting to the introduction of LLMs.

**Undermining the Pressure.** Teachers who saw LLMs punitively seemed to struggle because LLMs undermined their ability to enforce their standards and put students at an advantage in conflicts with the teachers. One major difficulty for teachers with a punitive lens
towards their students was the reality that students can use LLMs at home. All participants understood this and it continued the trend for technology to make cheating easier (Ma, 2007). One example of how LLMs undermine a punitive approach is through Jim’s class. Jim employed a philosophy that the students should be doing more work than teachers, and denied the use of LLMs in the class as a result. He also enforced it by treating the use of LLMs as akin to plagiarism and sent students caught using LLMs to the dean of students. However, in spite of using that policy, he still predicted that his administrators will get overwhelmed as more and more students become aware that the tools are easier to use than tackling the problem themselves. That prediction hinted that plagiarism is high in his classroom environment even though he is using punitive measures. If so, Hammimad’s (2023) research suggested that this could be a gap between the knowledge of the student and the task they were given, an attempt to save time under pressure, or a tool that they perceive as unprevented in spite of his policies; Jim’s use of the tone check method might run into issues if the output of LLMs are not as uniform stated as Elkhatat’s (2023) research mentioned.

Alternatively, one interpretation of Denise’s students is that of a representation in how the tool itself being unexplained and unexplored created defiance. Her students experienced a Dunning-Kruger effect because they seemed to have found a tool that gave them the right answers, but their work was likely more easily tone checked because some the output from ChatGPT and other LLMs are either irrelevant to the question (Guo, 2023) or is outright incorrect (Zamfiroiu et al, 2023). These students may have had a disagreement about the value of the outlining skills she was teaching them (Hammimad, 2023) and believed that if the tool could complete the task for them that they should rely on it. Still, it is important to recognize that Denise’s methods still followed recommendations to address the tool in many other ways such as
restructuring assignments—that were deployed during COVID-19 pandemic where students were virtual and easily able to locate information online (Cooper et al., 2022)—and encouraging student voice as “Addressing Plagiarism in A Digital Age” (2011) recommends. While trust-building may be the next logical recommendation (Cooper et al., 2022; Ross, 2017), Denise has had many opportunities in the one-on-one environment to do so, which hint at a more nuanced issue of identity, described later.

Regardless of whether resistance to assignments were seen as ways to conveniently avoid work or whether students had a full disagreement with the value of the skills being taught to them by Jim and Denise’s respective processes, critical digital pedagogy (Dooly & Darvin, 2022; Friere, 1968) implies that the conflict itself calls the effort to force students not to use LLMs into question. Jim and Denise made the assumption that students ought to be punished for the use of LLMs because “they don’t understand the master’s level stuff they’re producing” but insisted that their process was the one that students must follow unless proven otherwise, such as in Jim’s study hall post-accusation. That seems like a banking-style of teaching because although Jim’s problem solving steps or Denise’s outline skills are ones that are seen as useful, they are promoted as the only way to complete the class instead of allowing room for a more universally designed approach. This mindset seems to create situations that can discourage learners and lead to more conflicts which students will win—as seen in the COVID-19 digital learning space (Cooper 2022).

**Trust in the Process.** In contrast to a punitive process, Jane seemed to have found out how to incorporate LLMs in ways that engender trust without significant sacrifice in academic integrity. Often students would be in charge of working with each other to solve problems and Jane had clear expectations for who would mediate conflicts and the end product of a
student-produced magazine gave students the freedom that was essential to leveraging authority in a way that builds trust (Pace, 2023). Technology use before LLMs were introduced into the environment had already been integrated and leveraged to allow more independent work, relax the student-teacher relationship, and help distinguish between good and bad information as found in previous research (Collinson, 2001; Hemenway, 2000). That is why when a student discovered LLMs and wanted to give a presentation about it to her journalism class, Jane was able to guide that discussion, point out appropriate use cases for her classroom, and set standards that were well understood in the classroom.

Furthering a culture that is adaptable to the use of LLMs was the methods of detecting plagiarism and the response in an instructional method. Although the research does not cover the use of Google Docs’ version tracking, it seems to provide an objective measure that could only be avoided by directly copying work manually. This would not only contradict one of Hammimad’s (2023) motivators, saving time, but it also creates the basis for further conversation when there is a suspicion of plagiarism that is similar to TurnItIn in that they both are starting points from which the research recommends further verification or a conversation ( “Addressing Plagiarism in A Digital Age” 2011, Ross 2017). So when that conversation about plagiarism was finally approached in Jane’s classroom, focusing on what caused the infraction and using it as a moment for instruction rather than being punitive is likely more positive because it solidifies the trustworthiness of the teacher as someone invested in the education in a fair and responsible way (Almutairi 2022). Jane’s system is not way seen within the finding to implement this pedagogy. Lily’s use of callouts on small, in-class assignments similarly signal a proportionate response to minor misuse of LLMs within the classroom and follows the same principles.
A More Critical Digital Pedagogy in Our Identity

Although much theory and research around student identities are acutely aware of issues of race, gender, class, neurodivergence, and marginalization as vectors of analysis, many of the teachers broadened the definition of identity to include personal preferences and differentiation, while changing the lens of conversation to that of respect and proper treatment. Trust building in terms of creating shared expectations (Pace, 2003) and giving a voice to students so they have ownership in the process (Ennis & McCauley, 2002) both lead credence to proper teaching methods that explain the teachers’ decisions. Jane’s system of holding students accountable and Jim’s intentions to show equal respect to all of his students both seem to aim towards a more dependable classroom environment.

However, Denise’s experiences still show hints of where there ought to be awareness of the ways that technology can interact with the relationship between racial dynamics. Her experience was that one student who had defied her was not accepting her instruction and would rather learn from Crash Course hosted by John Green, a white cis-man. While there could be some underlying context such as being a substitute teacher, there is a case to be made that the trust between them was undermined by anti-blackness. Elmesky (2023) primarily described anti-blackness in schools in terms of white teachers hyper disciplining black students, but it still could explain the student’s motivation for their initial defiance towards her. Paperson (2010) speaks to projects of inclusion being not only an inclusion into the middle class lifestyle, but also as an investment into Whiteness being that middle class lifestyle in the guise of college going culture and Standard American English. Their lens divides Imperial Education from Colonial Schooling using the language of standardization is useful in evaluating the source of defiance. Understanding the situation through this lens, LLMs emboldening defiant behavior and being the
solution to that defiant behavior both come from the bias towards Whiteness as expressed by standard American English (Paperson, 2010).

That is to say that if the student was defiant because they would rather receive information from Whiteness, then LLMs creating a representation of that Whiteness and placating the student has troubling implications at how LLMs can recreate environments that at the very least encourage the voice of LLMs if not discourage the expression of students’ voices (Dooly & Darvin, 2010; Paperson, 2010). Denise explicitly worried about students losing their voice in their writing, but many participants created assignments that utilized and nurtured that voice. With early collegiate students are already replacing their own voices with LLMs in their essays (Šehanović, et al., 2023) and conversations of replacing professionals with LLMs (Zamfirou et al., 2023), student voice is even more necessary to empowerment and digital activism because replacement via LLMs may become even more likely without their unique voice.

**Recommendations**

Recommendations have been divided into an evaluation of the different modes participants used to detect plagiarism via LLM and options for further research.

**Evaluating Methods of Detecting LLMs**

While being the most widely used, tone checking has the most vulnerability and requires the most effort by the teacher because the style of writing has to be compared to the past work of the student. This becomes less viable as there are more and more students and it becomes increasingly difficult for teachers to track all of their students, creating situations where enforcement is inconsistent. Inconsistency in enforcement can cause any LLM policy to backfire as students resist against what appears to be an unfair practice (Adam 2017; Amigud 2022).
Furthermore, it punishes students who may go out of their way to improve or change their writing style, which can have troubling implications for students of color or who use colloquial forms of English within their writing (Elmsesky 2023, Paperson 2010). Therefore, while it may be compelling or convenient, teachers should avoid using tone checking in favor of more consistent forms of identifying plagiarism.

The other less used methods have various levels of tenability but are preferable to tone checking. Although Lily had success using hidden prompts within their assignments to successfully detect a case of using LLMs to plagiarize, this also seems untenable. While it may successfully detect students who are lazy and do not check the prompts that they paste into an LLM before turning in assignments, this inadequately covers the wide range of reasons people would be motivated to cheat such as difficulty completing academic tasks, opposing teacher authority, and convenience (Khadka 2021, Hammimad 2023, Howard 2002). Document tracking seems likely to be viable even though there is little research studying its effectiveness but from a principled level, it creates a subtle reminder that it would be less convenient to copy a prompt from an LLM by hand since a document tracker would be able to catch text that was copied and pasted (Ma 2007, Hammimad 2023). Finally, most of the research backs restructuring work in order to avoid plagiarism entirely (“Addressing Plagiarism in A Digital Age” 2011) and while this can be more difficult depending on the field of work, it is essential to create more of these approaches to not only avoid plagiarism but also because it often gets away from simple answers into the more authentic context in which the principles are applied.

Notably, that strict bans and punishments for using LLMs to replace work were ubiquitous in classrooms hint that the agreed-upon standard for LLMs is that it cannot be used to replace work. While perhaps unsurprising, this aligns with understanding plagiarism as a literary
theft (Hammimed 2023) or as a threat to knowledge and skill acquisition. However, the more nuanced question of whether using LLMs at all should be considered plagiarism are in part obfuscated by the court proceedings surrounding LLMs, but are addressed by some policies of asking students to cite when using LLMs. Regardless of the consequences, that the policies are explained by teachers can be seen positively because there were no stories of students who questioned the policies or found them to be particularly unfair.

**Further Research**

Researchers need to focus on the specific practices within critical digital pedagogy in order to better understand the concepts brought up by LLMs. While there is some research that suggests some appropriate uses of LLMs, this study reveals more ways that teachers are trying to use LLMs that still need to be tested. For example, there can be more research on how well LLMs summarize articles and make explanations easier to students compared to how much it might either lead them astray or cause more time to be used than traditional methods of looking up information. As long as there is more research going into the expansion of LLMs in the public sphere, it is worthwhile to expand research on the ways that technology interacts with the rest of the classroom environment. The extent of understanding its effectiveness will help policy makers and education specialists determine where LLMs may be able to fit into an IEP or in general practices. Whatever the research specifies as best practice, it still seems that as long as we understand writing is a process rather than just a result, there appear to be plenty more methods that educators can use to better manage questionable uses of LLMs while still teaching students proper ways to leverage it for a more positive educational environment. Lastly, although its traces are barely a modicum of presence within this study, issues with how individuals of marginalized identities have their voices suppressed by LLMs are likely going to emerge as the
use of the technology proliferates.

**Conclusion**

The goal of this research was to bridge the gap between speculation and the observable realities of the current applicability of LLMs in the classroom. Currently, teachers’ applications of LLMs tend to be linked to their ability to apply the technology to their pedagogical methods. To the point where LLMs disrupt pedagogical practices, teachers employ a number of different methods to discourage, detect, and punish the use of LLMs. Finally, while there is trace evidence of complex interactions between identity and LLMs, one of the participant’s interactions suggests that there are ways LLMs can embolden racially motivated defiance.

If LLMs are going to be touted as a future mode of education, it needs to account for the ways that people will actually use the software. We cannot assume that the technology automatically makes a process more valuable. Rather it is important to understand the potential ways people are using the tools that are given to them in order to understand their best usage.
APPENDIX

Appendix A: A list of participants and information

<table>
<thead>
<tr>
<th>Name</th>
<th>Race</th>
<th>Age Range of Students</th>
<th>Class Size</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amy</td>
<td>Asian</td>
<td>1st-12th Grade</td>
<td>1</td>
<td>SEL</td>
</tr>
<tr>
<td>Jane</td>
<td>White</td>
<td>9th-12th Grade</td>
<td>25~</td>
<td>Journalism</td>
</tr>
<tr>
<td>Michael</td>
<td>White</td>
<td>6th-12th Grade</td>
<td>Special Assignment</td>
<td>History</td>
</tr>
<tr>
<td>Jim</td>
<td>White</td>
<td>9th-12th Grade</td>
<td>10~</td>
<td>Math</td>
</tr>
<tr>
<td>Denise</td>
<td>Black/Mixed</td>
<td>6th-12th Grade</td>
<td>1</td>
<td>Humanities</td>
</tr>
<tr>
<td>Lily</td>
<td>Asian</td>
<td>10th-12th Grade</td>
<td>17~</td>
<td>Chem/Marine Bio</td>
</tr>
<tr>
<td>Calvin</td>
<td>Asian</td>
<td>10th-12th Grade</td>
<td>22~</td>
<td>Law</td>
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</tbody>
</table>

Appendix B: Interview Protocol

Introductory questions

“Thank you for your time meeting for this interview. This is for my Master’s Thesis at the University of San Francisco. My main interest for the thesis has been my work as a teacher seeing how AI has affected the educational environment. Is it alright if I record the interview? These are used to make sure that I am understanding the exact things you say rather than what I think you said. We can stop recordings at any time. Do you have any questions for me before we begin?”

1) How did you come into teaching as a profession; what is your background in teaching?

2) Why did you become a teacher?

3) What are your goals for your students?

4) After your student leaves the classroom, what should they know?

5) What are the practices and processes that you use to move students towards these goals?

6) Can you give me an example where you differentiated your teaching to two different students? (Follow up: To what extent are student identities considered? How do you consider student identities when supporting them to meet those goals?)
AI Knowledge Questions: “These next questions will concern the use of generative AI tools such as chatGPT and Google Bard (now called Gemini) that generate text responses based on Large Language Model hereby referred to as generative AI or AI for short”

7) How familiar are you with AI?

8) What’s your sense of how students use AI?

9) Are you concerned about AI in your classroom?
   a) If so, what are some ways you are concerned? (Add followup: Can you tell me about how this has shown up specifically in your classroom?)
   b) If not, why are you not concerned? What are some positive or useful ways AI has been used in your school? (Follow up: Can you give me a specific example?)

10) What class policies have you implemented in regards to the use of AI in the classroom?

11) What research, school policy, feedback, or experiences have influenced the reasoning for the class policy (or lack thereof)?

12) What has your school done in response to the AI being made public to students? What has / has not been a success?

13) What are the most common misconceptions or questions you have had to deal with in regards to the use of AI in the classroom?
Appendix C: CITI Certification

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
COMPLETION REPORT - PART 1 OF 2
COURSEWORK REQUIREMENTS*

* Scores on this Requirements Report (Part 1) reflect quiz completions at the time all requirements for the course were met. The Transcript Report (Part 2) lists more recent quiz scores, including those on optional (supplemental) course elements.

- Name: [Redacted]
- Institution Affiliation: University of San Francisco (ID: 4098)
- Institution Email: aewolf@ucsf.edu
- Institution Unit: Leadership Studies
- Curriculum Group: Human Subjects Research (HSR)
- Course Learner Group: Same as Curriculum Group
- Stage: Stage 1 - Basic Course
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