FLEXIBLE DEADLINES AND THEIR EFFECT ON THE TURN IN RATE OF ASSIGNMENTS IN A HIGH SCHOOL CHEMISTRY CLASS

by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The purpose of this classroom research project was to determine the effect of accepting late work on the turn in rate of assignments in Introductory Chemistry classes at a Title I high school (*N*=119). Four late work policies were implemented in succession, each for the duration of one academic unit (2 weeks each). The treatments were: No Late Work, Grace Period (work was accepted one day late for full credit), Extended (work was accepted up to one week late for full credit), and Penalty (work was accepted one day late with a 20% penalty). The workload was kept as consistent as possible from unit to unit. For each treatment, the proportion of work that was turned in was calculated and subjected to statistical analysis. The No Late Work treatment was used as a baseline for comparison, with 75.6% of the work having been turned in. Accepting work one day late for full credit led to a small increase in the amount of work turned in by students (80.9%). Data suggests that the group of students who was most strongly affected were students who needed extra time to get help on material they were struggling with. Accepting work up to a week late at full credit led to a sharp decrease in the amount of work turned completed (55.3%). It is believed that this was due primarily to academic procrastination on the part of students who simply ran out of time or forgot about the work. When a 20% penalty was applied to late work, the turn in rate was the same as it had been when late work was not accepted (74.0%). This policy did not lead to an increase in the amount of work turned in on time either, with the rate remaining the same as it had during the Grace Period treatment. In short, there does not appear to be any benefit to accepting late work in cases where a sizeable penalty is also applied. For teachers looking to maximize the amount of work turned in, application of a short grace period seems to be the best route.

INTRODUCTION AND BACKGROUND

A teacher's job is to give students the tools and opportunities to learn. This typically involves a combination of direct instruction, student collaboration, independent practice, and more. But what happens when students simply don't complete the practice assignments? Not only does this leave them with fewer opportunities to strengthen their understanding and confidence in the material, but it also leaves the teacher with fewer opportunities to assess their progress and to identify potential areas of confusion that may require re-teaching.

I teach at a public high school of roughly 3,000 students, most of whom are from low socio-economic backgrounds with parents who have not pursued higher education, or, in some cases, even completed high school. In many homes, English is not the primary language, so there is a bit of a language barrier for some students as well.

Unfortunately, many students seem to exhibit low levels of motivation when it comes to learning and grades, and it is not unusual to have upwards of 20-25% of the students fail to turn in any given assignment, particularly if they were expected to spend time on it outside of class. This behavior seems to have been fostered by the local middle schools which have a no-fail policy in place, meaning that even students who do not complete assignments or master the material get passed on to the next grade, eventually arriving to high school with bad academic habits, holes in their education, and a poor understanding of the academic repercussions of their actions.

In an effort to encourage more students to complete practice assignments for my chemistry class, I began accepting late work at any time, right up until the end of the

grading period (each of which lasts roughly two months) penalty-free. My rationale was that if students had a legitimate time conflict, needed another chance to ask for help, or simply forgot about an assignment from time to time, a flexible deadline would give them the opportunity to complete the work and to practice the material prior to taking any exams. In short, I expected to see more students completing the practice assigned to them and, subsequently, for the turn in rate of assignments in my class to increase. To my surprise, however, the turn in rate decreased. This seemingly counterintuitive outcome led me to wonder if this was simply a fluke or if there was something more going on.

I undertook an examination of the available academic literature and found that there were countless factors that could play a role in determining whether a student completed any given assignment, and that many of these have been the subject of extensive research over the years. These include the amount and quality of the tasks assigned, student interest, student confidence and ability, adult support, student gender, and many others (Cooper & Valentine, 2001; Epstein & Van Voorhis, 2001; Xu, 2011; Warton, 2001). Surprisingly though, very little attention had been given to determining whether flexible deadlines had any significant impact on the amount of work that was turned in for a class. Since I couldn't find the answers I sought in the literature, I decided to conduct a classroom research project to address the following questions:

- Does accepting late work affect the turn in rate of assignments in a high school chemistry class? If so, what is the effect?
- Does the amount of extra time given to the students affect the turn in rate?

- Does imposing a 20% penalty motivate students to get their work turned in on time?
- How do these policies affect the teacher?

Potential Value of this Project

If a relationship were to be found between the implementation of flexible deadlines and the turn in rate of assignments in my classes, it could be used to guide me in the selection of the best late work policy for my students, one that would maximize the number of students who were completing the assignments, and thus practicing the material at hand. This extra practice could potentially lead to an increase in mastery of the subject and improved grades. From the teacher's perspective, having evidence-based answers to these questions would engender a higher level of confidence in the choice of late work policy than simply relying on anecdotes and personal preference. Not to mention the fact that there is no greater satisfaction for a teacher than seeing his or her students succeed. Finally, I believe that this information could also be useful to my colleagues who serve the same general student population as I do (of course, each teacher has a slightly different shuffle), in choosing the policy that would most benefit them and their charges.

CONCEPTUAL FRAMEWORK

Throughout history, educators have been aware of the importance of practice to their students' acquisition and mastery of new skills and knowledge. This practice usually is not fun, but its benefits are immeasurable for those who complete it. Unfortunately, a myriad of factors can interfere with this, many of which are completely outside of the

control of the teacher. One potential factor that is determined almost exclusively by the teacher though, is whether to accept late work or not.

Some studies indicate that offering students more control in when to turn in assignments increases their motivation to practice (Becker, 2006; Ryan & Deci, 2000). If this were correct, then we would expect to see a higher completion rate of practice assignments when flexible deadlines were provided. Other studies, however, suggest that fixed deadlines are important for helping students avoid academic procrastination, which can lead to lower quality work or work that is not completed at all (Ariely, 2008; Schraw, Wadkins, & Olafson, 2007). Logically then, it would follow that flexible deadlines may decrease the completion rate, and presumably the turn in rate, of assignments in a class. Determining which of these conflicting ideas is correct, or if perhaps a blend of the two would best motivate students to complete and turn in their work, would help me and other teachers select a late work policy that would be most conducive to encouraging student practice, and therefore, an increased mastery of the subject at hand.

A Brief Historical View of Human Excellence

While it may seem obvious now, the inherent value of practice toward mastery was not always accepted. In fact, through much of history, those with exceptional talent, be it artistic, athletic, or intellectual, were given little credit for their achievements. Instead, they were viewed simply as vessels filled with gifts attributable to "divine intervention" (Ericsson, Krampe, & Tesch-Römer, 1993, p. 363). As time went on though, people began to seek explanations that relied less on the gods and more on the predictable laws of the natural world.

Sir Francis Galton "was the first scientist to investigate the possibility that excellence in diverse fields and domains had a common set of causes" (Ericsson et al., 1993, p. 363). He analyzed the family trees of England's most eminent individuals, which he described as those of notable accomplishment and reputation, and found that they were often related to one another. Within a single-family tree there were often individuals spanning multiple fields of expertise (Ericsson et al., 1993; Galton, 1869; Hambrick, Oswald, Altmann, Meinz, Gobet, & Campitelli, 2013). Based on these findings, he concluded that innate ability and excellence was a heritable trait that provided a general superiority over others, one which could not be matched by any amount of training nor practice (Ericsson et al., 1993; Galton, 1869). He went on to argue that it was the responsibility of society to ensure that those individuals reproduced with one another to guide the evolution of the human species to ever-increasing heights, thus earning himself the nickname, *The Father of Eugenics* (Gillham, 2001).

Few still advocate for the implementation of eugenics, but many still hold onto the idea that elite talent and ability are driven almost exclusively by one's genetic shuffle at conception (Mosing, Madison, Pederson, Kuja-Halkala, & Ullén, 2014). Others suggest that expert-level performance within the field is due primarily to extensive, deliberate practice, not innate ability (Ericsson, 2007; Ericsson & Chase, 1982; Ericsson et al., 1993). The reality, however, appears to be more complex, with extraordinary individuals having had just the right blend of nature, nurture, and countless hours of deliberate practice (Campitelli & Gobet, 2011; Hambrick et al., 2013).

Deliberate Practice and Education

So, what is deliberate practice and what role does it play in the educative process? Deliberate practice can be defined as any task that is specifically undertaken with the goal of improving one's skill-level or abilities in a domain-specific field (Campitelli & Gobet, 2011; Ericsson et al., 1993). It is generally agreed that this sort of practice is not inherently enjoyable nor motivating, but that it "improves accuracy and speed of performance on cognitive, perceptual, and motor tasks…" (Ericsson et al., 1993, p. 367) and is necessary for the development of superior skills in almost any field (Campitelli & Gobet, 2011; Ericsson et al., 1993; Meinz & Hambrick, 2010). It takes a lot of practice to become an expert though.

Campitelli and Gobet (2008) surveyed 104 chess players of varying skill levels and found that, on average, it took a minimum of 3,000 hours of practice to achieve the level of chess master. In 1981, J. R. Hayes concluded that it took ten or more years of practice for a musician to achieve excellence in musical composition (as cited in Ericsson et al., 1993). And a biographical study of 123 eminent men of letters and 120 from the field of science found that poets and scientists often show creative promise by their mid-twenties, but do not produce their best creative works until at least their mid-thirties (Raskins, 1936).

While the goal of primary and secondary education is not to produce highly specialized domain-specific experts, the value of deliberate practice to these students is still profound. Not only does it increase the likelihood that the knowledge gained will be permanent, but it also helps them develop the ability to successfully tackle novel and

increasingly difficult problems. This, in turn, leads to greater confidence, automaticity, and motivation to continue learning (Brabeck, Jeffrey, & Fry, n.d.). It is important to note, however, that to fully gain these advantages, students must practice regularly, and the tasks must be intentionally designed to be "deliberate, goal-directed rehearsal paired with reflection on problem-solving processes" (Brabeck et al., n.d., Benefits of Deliberate Practice, para. 2). Simply repeating a task without active mental engagement, often referred to as busy-work in the field of education, does not provide the same beneficial results (Brabeck et al., n.d.).

Reasons a Student May Not Complete Practice Assignments

By its very nature, deliberate practice is not an enjoyable activity, and there are many reasons a student may not complete a given practice assignment. These can include individual attributes (like age, gender, ability, and home-life), whether or not the student has been given sufficient guidance and assistance from the adults in his or her life (including parents and teachers) to be able to successfully complete the task, and the student's personal view as to the value of the practice and their overall motivation to improve (Epstein & Van Voorhis, 2001; Xu, 2008).

The first of these categories, personal attributes, is almost entirely outside the control of the teacher. For example, studies have shown that female students are more likely to complete homework than male students (Xu, 2008; 2011). Another potential factor at play is the amount of personal responsibility a student has outside of the classroom. It is not unusual for families with lower incomes to ask the children to participate in caring for their siblings, helping around the house, or even finding part-time

work to help cover expenses (Cooper & Valentine, 2001). While these activities are often highly educative in their own right and can lead to better rounded adults with a strong sense of family and community, they also leave less time for schoolwork. This, in turn, means a higher likelihood that assignments will go unfinished.

The second category, adult support, is arguably the one that the teacher can most directly affect, at least during school hours. It is the teacher's job to ensure that all practice assignments "take into account the preexisting knowledge of the learners so that the task can be correctly understood after a brief period of instruction" (Ericsson et al., 1993, p. 367). If the students have not been adequately prepared to complete the practice, their motivation to try drops precipitously (Ryan & Deci, 2000), and the odds of them gaining benefit from the practice does, too (Ericsson et al., 1993). Not only must the material be scaffolded in a way that is accessible to the students, but it must also provide a logical sequence of increasing difficulty. Each assignment must be designed to guide students to the next, and there must be a clear, final goal in the teacher's mind at all times (Brabeck et al., n.d.; Ericsson et al., 1993).

Assuming that the proper scaffolding has been provided, there is also the matter of meaningful and immediate feedback, which is a necessary aspect of deliberate practice (Ericsson et al., 1993). A teacher can make him/herself available to the students by circulating and checking work, inviting questions, and sharing correct answers for students to self-check their work. Teachers can also offer encouragement through constructive feedback, clearly communicating expectations of high-quality work, and showing an interest in the students and their success. No matter how much the teacher

does, however, there is no silver bullet that will ensure that all students will complete all assignments.

The final category, which can be summed up as motivation, be it toward education in general or more narrowly to a specific class or assignment, can be influenced by the teacher, but ultimately must come from the student. Several studies have concluded that most students do not find school work to be an enjoyable endeavor (Xu, 2008). One such study, conducted by Xu and Yuan (2003), asked urban middle school students in New York to share their thoughts on homework. While some assignments were viewed favorably, many students complained that the work was boring and kept them from doing things that they were more interested in, like playing games or interacting with technology (Xu, 2008).

While it is hardly surprising, research shows that people are more likely to complete something that they find "interesting, pleasant, and satisfying in itself," which is referred to as intrinsic motivation (Alivernini, Lucidi, & Manganelli, 2008; Ryan & Deci, 2000, p. 71). Absent this, people must rely on extrinsic motivation to help them power through, focusing on the benefits associated with completion of tasks which they find unpleasant (Alivernini et al., 2008; Ryan & Deci, 2000). So, to increase student motivation toward completing practice assignments, teachers can either make those assignments more personally relevant and interesting to the students, thus increasing the intrinsic motivation attached to them, or try to ensure that the students understand the value of completing them, thereby boosting the extrinsic motivation (Ryan & Deci, 2000).

During their research into the Self-Determination Theory, Ryan & Deci (2000) found that there are three basic needs when it comes to fostering self-motivation in students or anyone else. First, the individual must feel competent at the task; no one enjoys trying their hardest if they are sure they will fail regardless. Second, an individual is more likely to be motivated when they feel secure and socially connected to others. This is one of the reasons that building a healthy and supportive learning environment is so critical in the classroom. Finally, the individual must feel that they have some say in the process they are undertaking, in this case, learning. Ryan & Deci (2000) found that "threats, deadlines, directives, pressured evaluations, and imposed goals diminish intrinsic motivation" because they removed the sense of autonomy from the subject (p. 70). Based on these findings, one would predict that fixed deadlines would create an environment that lowered student motivation, and potentially the amount of practice assignments that they completed. Some studies, however, seem to have found almost the exact opposite to be true.

Flexible Deadlines and Procrastination

"Not all students know how to budget their time wisely" (Xu, 2016, p. 212). This often leads to procrastination, and students who engage in this behavior often face a plethora of problems, both personally and academically. First, they are more likely to have "unhealthy sleep and diet patterns," along with elevated levels of anxiety and other negative emotions until they finally complete the task at hand (Xu, 2016, p. 212). Second, they are more likely to become overwhelmed and either cheat or turn in an assignment that is of inferior quality (Xu, 2016). In some cases, this may even lead a student to

failing to turn in an assignment altogether once “they realize that the work takes more time and effort than they expected” (Xu, 2016, p. 212).

In the past, procrastination was viewed as a “personality trait” that was likely caused by “low self-esteem” and “character flaws such as laziness or lack of self-control” (Zarick & Stonebraker, 2009, p. 211). More recent research has found that this seemingly irrational behavior may have roots in a much more predictable set of inputs.

One of these is a faulty evaluation of costs and benefits. People tend to value their current time as more valuable than their future time, often exaggerating the costs of starting an assignment or other task now and downplaying the cost of doing so later. After all, “the events and emotions of the day are immediate and pressing, those of the future are vague and less vivid” (Zarick & Stonebraker, 2009, p. 212).

Another potential issue identified by Ferrari, Keane, Wolfe, & Beck is “task aversion” (as cited by Zarick & Stonebraker, 2009, p. 211) which is the tendency to delay doing things that we simply don’t want to. Uncertainty in how to approach a task can lead to procrastination as well, since the act of having to determine the requirements for the task at hand and then plan an approach before even beginning adds an additional level of potentially unpleasant work that could more easily just be put off for later (Xu, 2016).

Procrastination is certainly not an issue limited to children, but it can present a real challenge when it manifests in young people who have not yet learned to effectively manage their time. “Considering the prevalence and lasting negative impact of academic procrastination, it becomes clear that teachers need tools to reduce procrastination in order to enhance learning and self-regulation skills for all students” (Xu, 2016, p. 213).

One potential strategy that teachers could use to discourage procrastination on assignments is implementing rewards of some sort, like bonus points or liberties (like listening to music while they work) for work that is completed before the deadline (Xu, 2016). Another approach would be to break larger assignments into smaller chunks with more frequent deadlines to help keep the students on track (Xu, 2016). In a similar vein, Dan Ariely conducted a research project on his own classes at Massachusetts Institute of Technology to determine how altering due dates affected the quality of the work his undergraduate students produced.

Each of his three consumer behavior classes were given a differing set of rules for due dates of the three major assignments that would comprise the entirety of the work for the class. The first class was told that they could turn in the work at any time during the semester, but they had to firmly commit to their own personal due dates by the end of the week. If they missed their self-imposed deadlines, then they would lose one percentage point for each day it was late. The second class was told that they could turn in their work at any time without penalty. The third class was given firm, teacher selected due dates that were evenly spaced through the semester with the same one percent penalty per day as the first group for late work (Ariely, 2008).

At the end of the term, Ariely compared the overall quality of the papers, as measured by grades, and found that the students with an open-ended, penalty-free policy ended up with the worst grades. The class with the firm, teacher-selected due dates ended up with the highest grades. And the class with self-selected due dates fell in between (Ariely, 2008).

He inferred that procrastination was the culprit. Those students who had no choice in the due dates were aided by the external regulation that increased the pressure to complete the work on an evenly spaced schedule. Those who had no due dates likely waited until the end of the term and found themselves in a rush to complete all three papers, which they did, but at a lower quality. And those who chose their own were a mixed bag. Some, likely aware of their own propensity toward procrastination, set evenly spaced due dates for themselves to help stay on track. Others, who were possibly less self-aware, set due dates for the very last day, and likely ended up producing lower quality papers just as the group with no due dates had (Ariely, 2008).

Ariely concluded "First, that students do procrastinate (big news); and second, that tightly restricting their freedom (equally spaced deadlines, imposed from above) is the best cure for procrastination" (Ariely, 2008, p. 145). It is not hard to imagine that university students attending a prestigious school like Massachusetts Institute of Technology have probably developed better study habits than a random group of high school students. It seems reasonable, then, to suspect that high school students would also likely face an increase in academic procrastination when given more flexible deadlines, and that, for at least some of them, this procrastination may lead to assignments never being finished.

This classroom research project aims to discover whether the use of flexible deadlines increases the turn in rate of assignments, as predicted by the Self-Determination Theory, decreases the completion rate of assignments, as Ariely's study

suggests, or has no real effect on the completion rate whatsoever, perhaps indicating that the two competing effects simply cancel one another out.

METHODOLOGY

Treatments

To determine whether flexible deadlines affected the turn in rate of assignments in the high school chemistry classes I teach, and, if so, what that effect was, I implemented four different late work policies during the Spring of 2019. Each policy was enforced through the duration of one academic unit, each of which lasted two weeks. I also attempted to determine how additional flexibility in the amount of time students were given to turn in late work affected the overall turn in rate of assignments. And, finally, whether the incurrence of a 20% penalty for late work dissuaded students from the academic procrastination that sometimes goes along with flexible deadlines. The parameters for each treatment were determined through a combination of personal experience, in depth conversations with my fellow science teachers, and the results of student and teacher surveys on the topic.

The four treatments were as follows and were implemented in the order listed: 1) Grace Period - Students were allowed to turn in work up to one school day past the deadline with no penalty; 2) Extended - Students were allowed to turn in work up to one week late with no penalty; 3) No Late Work – Late work was not accepted; and 4) Penalty – Students were able to turn in work up to one school day late, but it incurred a 20% grade penalty for being late.

The order of the treatments was decided at random to minimize the likelihood that any difference was based more on student maturation as the semester progressed than on the policy itself. In the beginning of each unit, I went over the late work policy for that unit with the students and then clearly posted it on a brightly colored sign at the front of the room. It was referenced regularly to ensure that all students were adequately aware of the current policy. Additionally, students were given reminders as the hard deadline for assignment submission approached to minimize the chances that confusion may arise as to whether an assignment could still be turned in.

Every effort was made to keep the workload for each unit consistent in terms of assignment style, difficulty, and the frequency of assignments (seven to nine per unit) to minimize the likelihood that any observed differences were due to factors other than the late work policy. In all cases, students were encouraged to ask questions in class, during homeroom, or after class if additional assistance was required. It should also be noted that novel assignments, such as inquiry labs and others that were deemed more interesting to students, were not included as it was believed that there was a higher likelihood that these assignments would be completed by students, potentially skewing the results.

Demographics

The students in all four sections of my Introductory Chemistry (periods 1-4) were asked to participate in this classroom research project, but the data of four students was excludeded due to chronic attendance issues. Additionally, I only included students who were present for the duration of all four units of study, and therefore treatments, to ensure as fair a comparison as possible. This left me with a sample size of 119 students.

Most of the students were sophomores (84%), but there were also 14 11th graders and 3 seniors in the group. Ninety-four of these students were Hispanic, eighteen were African American, four were Asian, and three were Caucasian. Seventy-four percent of the students at our school were classified as economically disadvantaged at the time of this study, based on the fact that they qualified for free or reduced-rate lunches (US News & World Report, 2018). The gender split was 71 girls and 48 boys. Twenty-three percent of the students held an overall GPA of 3.0 or higher, 48% held between a 2.0 and a 2.9, and 26% had less than a 2.0 (two students had a GPA below 1.0).

They were typically friendly students, but many had less than ideal work habits, which often led to wasted class time and missing assignments. Many came from homes in which parents had not completed their own education, making it more difficult for them to provide the guidance and support necessary for their children's academic success. In the words of one student, many kids simply did not "really have a leader in their life to teach them how to take initiative and lead themselves."

Instrumentation

PowerSchool (the grading software used by our district) was used to add a notation of *Late* to the score for any assignment that was turned in after the deadline but before the late work window closed for that unit. Work that was not turned in at all was marked *Missing*. These notations were used to determine the number of Late and Missing assignments per unit by comparing the numbers of each at the start and end of each unit. These numbers provided the raw data for the statistical analysis which will be described further in the Data and Analysis section.

Prior to the implementation of the treatments, all students were asked to complete the *Late Work Survey for Students* (Appendix A). The survey consisted of five questions including whether late work should be accepted, whether the option to turn work in late would change the amount or quality of the work that was turned in, and whether students who turned in late work deserved full credit. For each question, the students were asked to share their opinion and the rationale behind it.

Teachers at the school were asked to complete the *Late Work Survey for Teachers*. While similar to the student survey, this one instead focused on which late work policy the teacher used in their own classroom and how they felt it affected student work (Appendix B).

The results of both surveys were used to better understand the psychological and metacognitive underpinnings of my results. Throughout the study, I also kept a personal journal with observations and records of challenges, successes, and feelings to assist me in answering how these various policies impacted me, personally, as an educator.

Verifying Validity

While, by the very nature of a classroom research project, it would be impossible to set up an environment in which there were no confounding factors, every effort was made to ensure that the results reflected the true effect of each treatment on the turn in rate of assignments in my chemistry classes. Firstly, the difficulty and workload of each unit were as standardized as possible. Before the project began, I had tested out a system in which the students ranked each assignment in terms of difficulty. I had hoped to use this information to verify that the four units covered during the classroom research

project were approximately equal in terms of the difficulty. Instead, I quickly found out that the students were poor judges of their own learning, regularly rating assignments as "easy" even when they failed them. Due to this discrepancy, I decided to scrap it from the project rather than to risk including misleading data.

Instead, in addition to relying on my own expertise, several other science teachers were consulted and asked to evaluate the units and assignments. Assignments that were deemed more novel and likely to be more interesting to the students, like labs, were excluded from the study. Also, when a holiday or student-free day occurred during a given treatment, the total number of assignments for that unit was decreased to account for this.

Additionally, a member check was completed at the end of the project to assess how the students themselves felt each treatment had affected them and their classmates. This was weighed and compared against my own analyses to ensure that the students weren't responding to something that I was unaware of. For example, if they felt that they had turned in less work during a unit because it was more difficult, or they had a huge project due in another class that week, I wanted to know. As it turns out, they did not mention any confounding factors. Instead, their interpretations mirrored my own, reassuring me that my conclusions were reasonable.

In the end, all sources of data were triangulated with one another to determine not only which late work-policy was most effective at cajoling students to turn in the most work, but to also understand the causes behind the patterns that were observed (Table 1). After all, a better understanding why students do what they do may be useful in both

guiding teachers toward providing the most appropriate supports in the classroom, as well as guiding the students themselves toward making better choices in the future.

Table 1
Data Triangulation Matrix

Research Question	1. Turn in rate of work	2. Amount of late work	3. Late work survey for students	4. Late work survey for teachers	5. Teacher Journal	6. Member-Check
Effect of accepting late work	X		X	X	X	X
Effect of extra time for late work	X	X			X	X
Effect of 20% penalty	X	X			X	X
Effect on teacher	X	X		X	X	

This research project was exempt from a full IRB review because it presented the lowest amount of risk to subjects, and data were reported without identifiers (Appendix C).

DATA AND ANALYSIS

Student and Teacher Perceptions on Late Work

I set out with the goal of determining whether accepting late work affected the turn in rate of assignments in my high school chemistry classes, and, if so, how. The first step in this process was determining what the students themselves thought about the practice of a teacher accepting late work and how they thought it might affect them.

The results of the Late Work Survey for Students showed that 92% of the students who participated (*N*=99) felt that teachers should accept late work. On this point, students and teachers were of a similar mindset because when I asked the teachers at my school whether they accepted late work, 86% (*N*=21) of those who responded to the Late Work Survey for Teachers indicated that they did (Tables 2 & 3).

Table 2
Results of Late Work Survey for Students

Q1. Should accept late work?		Q2. Amount expected to be turned in?		Q3. How much extra time?		Q4. More procrastination?		Q5. Full credit?	
YES	92%	MORE	62%	1-2 DAYS	81%	YES	71%	YES	58%
NO	8%	SAME	27%	3-4 DAYS	6%	NO	29%	NO	42%
		LESS	10%	1 WEEK OR LONGER	13%				

Table 3
Results of Late Work Survey for Teachers

Q1. Accept late work?		Q2. Affects amount turned in?		Q3. Quality of work?		Q4. How much time?		Q5. Full credit?	
YES	86%	MORE	19%	HIGHER	67%	1-2 DAYS	18%	YES	18%

NO	14%	SAME	67%	SAME	10%	3-4 DAYS	18%	NO	82%
		LESS	14%	LOWER	24%	1 WEEK OR LONGER	65%		

When it came to those who felt that late work should not be accepted, be they student or teacher, their primary concern was that accepting late work would lead to more student "laziness and procrastination," with one student putting it this way, "it will give students more reasons to slack off."

The rationale for accepting late work, on the other hand, differed quite a bit between the two groups, with students focusing primarily on circumstances that occasionally prevented them from completing the work on time, like having "sports and activities" or "a lot of work in other classes," especially if they also had "to take care of [their] siblings at home." While teachers focused more on giving second chances to students who had made poor decisions so that they would stay engaged and have an opportunity to raise their grades.

Not surprisingly, these divergent viewpoints led to a significant difference in the amount of extra time that the two groups (students versus teachers) felt was appropriate for accepting late work. An overwhelming number of students, 81%, felt that one to two additional days would be ideal. I expected students to be much more generous in their recommendations on this topic, but one of my more mature students put it this way, the work should be done while it "still applies to the lesson that the teacher is on" so the student can "practice the subject before a test."

Teachers, on the other hand, tended to give the students much more time than that to turn in late work, with 82% of them accepting late work a week or more later. In fact, most teachers who responded indicated that they gave students until the end of the quarter or even semester to turn in late work. Again, considering their primary rationale for accepting late work in the first place, namely giving students a chance to improve their grades, it made sense that they would extend this as long as possible, in some cases right up to the time grades were due.

Interestingly, while most of the teachers who accepted late work stated that they did so for the purpose of giving students a chance to improve their grades, only 19% of them believed that doing so would actually lead to an increase in the turn in rate of assignments in their class, and only 10% felt that the work that was turned in would be of a higher quality. So, while the stated goal may be to offer students another chance, most seemed pessimistic that students would take it. In contrast, amongst the students, 63% felt that a teacher who accepted late work would receive more work from students than one who did not. Seventy-one percent of them believed that it would also lead to more student procrastination, seemingly agreeing with Ariely's (2008) predictions on the subject.

The final question posed in these surveys was whether students should earn full credit for late work. Fifty-eight percent of students felt it was warranted as they had, in fact, completed the work and, therefore, deserved the points. Only 18% of the teachers offered full credit for late work, with most siding instead with students who felt that those who had "worked hard" and got the work done on time should get more points than those

who took longer. Several students and teachers specifically stated that they felt it was "unfair" for late work to earn full credit.

I believe that this, too, makes sense considering their original assessment of the value and purpose of accepting late work. Most students felt that it was important in certain circumstances where, due to factors outside of their control, they could not reasonably have finished the work in time. In these situations, assuming that the work was turned in within a day or two, I can understand how full credit, or close to it, would seem fair. Inversely, for teachers who were more inclined to view the acceptance of late work as a mercy granted to students who had made poor decisions, offering full credit for it would seem overly generous and may unintentionally encourage procrastination.

The Effects of Accepting Late Work

The next step was to find out whether accepting late work affected the turn in rate of assignments in my class. To do this, I compared the results from all four of the treatments, using the No Late Work treatment as a baseline for comparison.

When late work was not accepted, the turn in rate for assignments was 75.6%. When work was accepted one day late for full credit, the turn in rate for assignments increased slightly to 80.9%. When students were given a full week to turn in late work penalty-free, the turn in rate dropped to just 55.3%. When work was accepted for a day late, but a 20% penalty was applied, the turn in rate was 74.0% (Figure 1).

A one-way ANOVA was used to determine if these differences were statistically significant. The results showed a highly significant effect for the four conditions, with $F(3,472) = 16.7$, and $p < 0.00001$. Accepting late work did affect the turn in rate of

assignments in my class. Understanding the nature of that effect, however, was a little complicated as the results of this sort of analysis cannot be teased out treatment-by-treatment directly. Instead, I looked to the spread of the data (Figure 2).

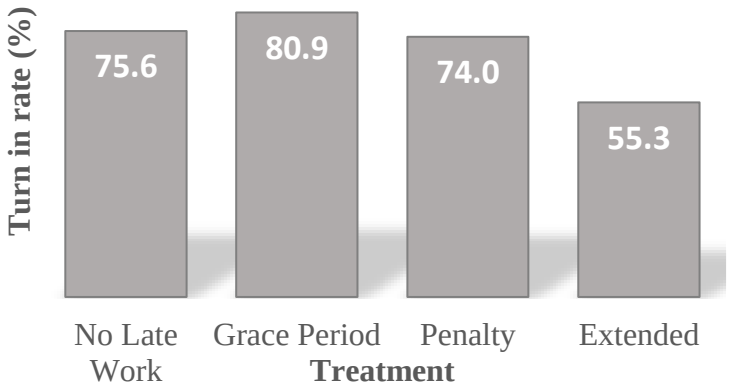

Figure 1. Turn in rate of assignments by late policy, (*N*=119).

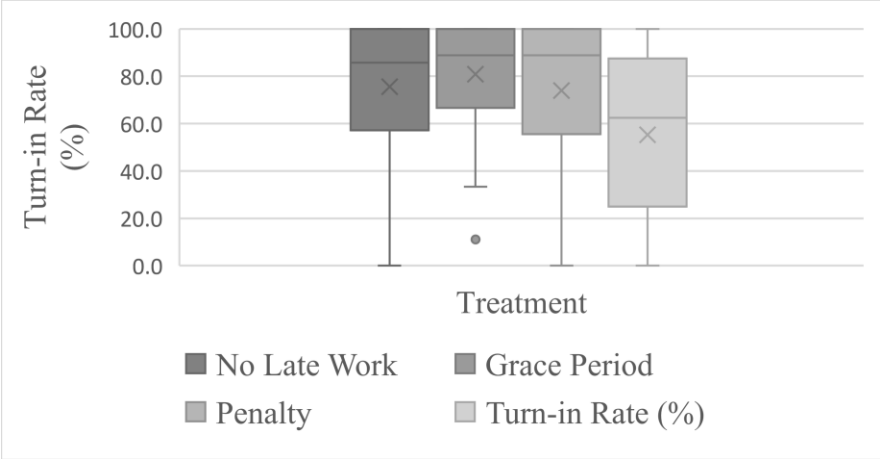

Figure 2. Effects of late work policies on the turn in rate, (*N*=119).

While there was a lot of overlap of data between the No Late Work and the Grace Period treatments, making it unlikely that there was any real effect on the mean or median, there was a significant shift in the bottom quartile (Figure 2). During the No Late Work treatment, 21% of the students (*N*=119) turned in less than half of the assigned work, with four turning in no work at all for the entire unit. When late work was accepted

for one day, only 9.2% of them turned in less than half of their work, and everyone turned in some work.

The results of the Extended and the No Late Work treatments were compared as well. In this case, though, there was a marked difference in almost every sense. First, there was much less overlap in the data (Figure 2). Second, the mean, median, and all quartiles dropped significantly. The number of students turning in less than half of their work increased to 39%, with 17 turning in no work at all. One student told me that the reason she had not turned in work during the Penalty treatment was that she had chosen to complete the work for her other classes instead "because [she] knew [she] could turn in [her] chemistry work later, but then [she] got too busy to get it done."

Finally, the results of the Penalty treatment were compared to those of No Late Work. It became clear that there was no difference in the turn in rate of the two (Figure 2). It seems that although accepting late work can have an effect on the turn in rate, a policy that offers only one extra day coupled with a hefty grade penalty does not change the amount of work turned in.

The Effects of More Time

To answer the question of whether offering students more time to turn in late work affected the turn in rate more directly, an independent samples t-test was run comparing the Grace Period and Extended treatments. These two were chosen for comparison as they both allowed for late work and they both offered full credit, meaning that the only difference was the amount of extra time offered, with the Grace Period

granting a single day while the Extended offered a full week. Again, a highly significant difference was found between the outcomes of the two.

When students were given one additional day to turn in late work, they turned in much more (M=80.87, SD=20.9) than when they were given a full week to do so (M=55.25, SD=29.5); with t=-6.77, and $p < 0.00001$ (see Figure 1). In fact, the amount of Missing work increased by 55% when they were given longer to turn in their work. It seems that while accepting late work for an extra day at full credit may help some students get more work turned in, extending that to a full week has a notably detrimental effect on many students (Figure 2).

While both data sets show a relatively high standard deviation, I believe this is due more to the diverse nature of the classroom than to a lack of a clear pattern. The reality is that in a class there are some students who will turn in all work regardless of the policy a teacher puts in place, and there are some students who will, likewise, turn in little to no work no matter what the teacher does. That being said, many of the students did, in fact, show a notable decrease in the amount of work they turned in when the late work policy was loosened. In several cases, students who typically turned in 70-80 percent of their work per unit suddenly turned in none.

The Effects of Penalizing Late Work

Another sub-question that I set out to answer with this classroom research project was whether imposing a grade penalty on late work would encourage students to turn in their work on time. To determine this, I compared both the amount of work turned in on time as well as the amount of work turned in late during both the Grace Period treatment,

which granted students one extra day penalty-free, and during the Penalty treatment, which also granted them one extra day but at the cost of a 20% deduction (Figure 3).

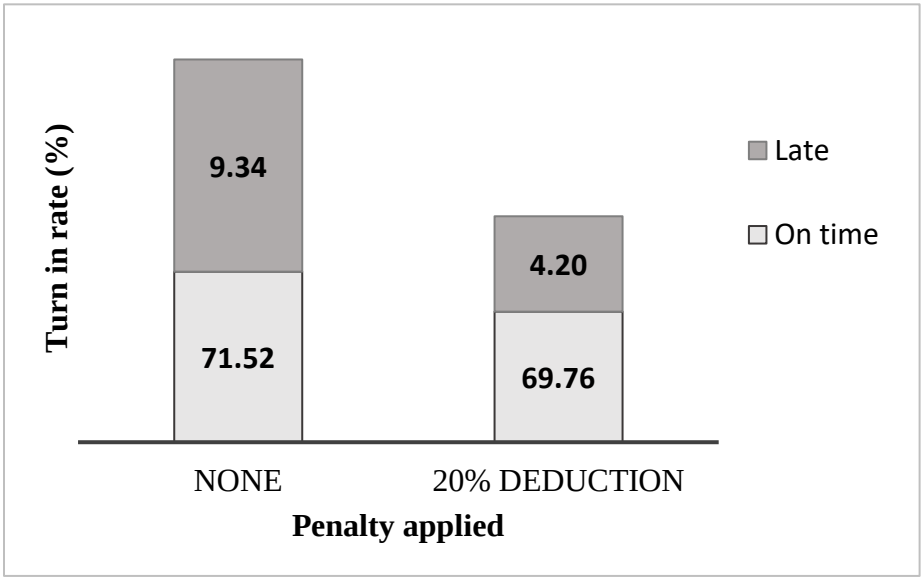

Figure 3. Effect of a 20% grade penalty on the amount of late work turned in, (*N*=119). These treatments were used for this analysis as they both offered students a chance to turn in work one day late, but at differing point values.

The results of an independent samples t-test showed that there was no statistical difference in the amount of work turned in on time whether or not a 20% penalty was imposed (M=69.75, SD=31.29), or not (M=71.62, SD=22.30), with t=0.52994 and p=0.596654. There was, however, an effect on the amount of work turned in late, with 9.23% (M=9.23, SD=10.8) of the work being turned in late when there was no penalty, but only 4.20% (M=4.2, SD=7.5) of the work being turned in late when there was (Figure 3).

An independent samples t-test showed that this difference was highly significant, with t=4.19, and p = 0.000039. This suggests that not only does this policy fail to encourage students to turn work in on time, but it seemingly discourages them from

taking advantage of the opportunity to turn in late work, thus negating the benefit of a teacher accepting late work in the first place.

It should be noted, however, that this unit ended the day our school went on Spring Break for a week. This means that some students could have turned in late work the day we came back, but I suspect that many forgot or just didn't make it a priority, so this portion of the project should be retested.

The Effects on the Teacher

While it would be lovely to live in a world where decisions made on classroom policy could be based solely on the needs of the students, the reality is that we, as teachers must also take into consideration our own limitations and well-being. After all, you cannot help anyone when you, yourself, are drowning. To that end, I included one final sub-question in my classroom research project: how do the various late work policies affect me, the teacher. By its very nature, this data is much more subjective, relying primarily on notes that I took over the course of this project, reflecting on my feelings, thoughts, and experiences with each. Here I will share some of the themes that emerged.

For each of the three treatments in which late work was accepted, there was an ambivalence on my part. On the one-hand, it was nice be able to "give the students another chance when they needed it." On the other, I couldn't help but to feel that some of the "less mature kids were procrastinating" as a direct result of this leniency, especially during the Extended treatment.

Either way, whether kids hadn't completed the work on time due to legitimate reasons or due to procrastination, it still made it more difficult to give immediate feedback,

which is an important part of ensuring students benefit from deliberate practice (Ericsson, 1993), as I never had the option of going over an assignment with the kids the day it was due, or even returning graded work the next day. If I had, the students who hadn't finished on time would have been able to copy the correct answers from a friend and get full credit. Hardly the lesson I was hoping to impart.

Instead, I was forced to keep each assignment bundled together until all the late work was turned in. Under the Penalty treatment, this meant some students weren't getting work back for a full week, which made me very uncomfortable as a teacher. Also, I am personally disinclined to clutter, so having to keep additional paper work on my desk and having multiple piles of various assignments was a bit stressful for me, personally, although I am sure that some would feel perfectly comfortable with it. I must admit, I was very happy when the Extended treatment was over with. It felt like it had been "worse for me, and worse for the students."

The No Late Work treatment was exactly what it sounded like. Work had to be turned on the day it was due or no credit would be given (barring an excused absence, of course). There was definitely a higher level of urgency in the class. When the first assignment was due, "kids were hustling to bring it in by the end of the day." It felt good to see them making their school-work a priority, and it was nice to be able to go over the work immediately with them.

One thing that I did not like about this policy is that it left me little room to show empathy or build trusting relationships with the kids. If a student came to me with a good reason for needing extra time, like one student who had been at the "hospital visiting [her]

grandmother, and [she] didn't have [her] book" with her, or the student who had "left [their work] on [their] desk" and had no one who could drop it off, asked for an extension, I had to say no to avoid the appearance of favoritism. This made me feel guilty, and it seemed to make the kids feel that their well-being and success were unimportant to me. I believe that "there is a fine balance between being a fair and effective educator and being a caring and empathetic human being, and these kids need us to be both."

INTERPRETATION AND CONCLUSION

The primary goal of this classroom research project was to determine whether accepting late work affects the turn in rate of assignments in the high school chemistry class I teach. It seems that it does have an impact on the amount of work turned in, but the nature of that effect varies dramatically depending on the specific policy that is implemented. For example, when students were given an extra day to turn in late work for full credit (Grace Period), there was a slight increase in the amount of work turned in as compared to when late work was not accepted (+5.3%). When students were offered full credit for work that was turned in up to a week late (Extended), the amount of work turned in dropped by 20.3%. Lastly, when a 20% penalty was applied to work turned in a day late, the amount of work remained the same as it would have been had late work not been accepted at all (Figure 1).

If one's goal is to maximize the amount of practice assignments turned in, the best late work policy is to accept work one day late for full credit, as it only treatment that led to an increase in the amount of work turned in. Based on my results, I believe that this small, but meaningful increase can be attributed primarily to two groups of students.

Those who knew how to do the work but were unable to finish it on time due to unexpected circumstances, extracurricular activities, or family obligations, and those who were struggling with an assignment and needed extra help or more time to finish it.

Of the two groups, the data seems to indicate that the more profound effect was on the latter, as evidenced by the significant shift in the amount of work turned in by the bottom quartile of students during the Grace Period treatment (Figure 2). This coincided with an observation I made during this treatment: "A lot of kids [were] coming in to ask for help on the work during homeroom the day an assignment [was] due and then taking the work home to finish it." It is my belief that these struggling students would have otherwise given up when they realized they couldn't complete the work by the due date, but instead they were able to use the extra time to either ask for help or to continue working through challenging problems at a pace they felt comfortable with. And while this policy created some challenges for me, the teacher, in terms of requiring more organization and forcing me to delay going over work with students, the additional opportunities to help my students and the increased turn in rate of assignments made it feel worthwhile.

Interestingly, no such increase in the turn in rate was seen during the Penalty treatment, during which work was also accepted one day late but at a 20% penalty. When I asked my students to share their thoughts on why the outcome of this treatment may have differed from that of the Grace Period, many stated that the penalty discouraged them from turning in late work. They explained that although they were only losing 20% of their grade, which would leave them with a B- were they to turn in a perfect paper,

they were anticipating a situation in which they earned a C and then lost 20%, leaving them with an F. With this scenario in mind, many simply chose to skip the assignment altogether. As one student put it, “it’s better than nothing, but nobody’s excited to get an eff.” Several students nodded in agreement and many voiced similar opinions throughout the day.

This seems to support my suppositions about the type of students who take advantage of an extra day for late work. Namely, those who know how to complete the work but are prevented from doing so on time due to scheduling conflicts, and those who are struggling with the assignment. I believe that those who belong to the former group still turned in the work as they knew that even with a 20% deduction, their grade on the assignment would be reasonably high. This would explain why some late work was turned in, even with the penalty in place (Figure 3). The latter group of students, however, may have simply decided that the extra time and work needed to complete the work was not worth it in light of the 20% they would be penalized, which would likely leave them with a “bad” grade. After all, as the Self-Determination Theory tells us, feeling competent at a task is a key ingredient in motivating an individual to complete it (Ryan & Deci, 2000).

A secondary goal of this classroom research project was to find out whether the amount of extra time given to students affected the turn in rate of assignments. To answer this question, the results from the Grace Period treatment, in which students could turn in late work for a single day, were compared to those of the Extended treatment, which allowed students to turn in work up to a week late. In both cases, the students earned full

credit for late work, so the primary difference between the two treatments was the amount of extra time given to the students. The results were clear. Giving the students more time to turn in late work led to a sizable decrease in the amount of work turned in. When students were given one extra day, 80.9% of the work was turned in. When they were given one week, only 55.3% was. When I asked the students what they thought had caused the precipitous drop, most of them offered a variation of what one student put quite succinctly, “a lot of kids procrastinated and just forgot about it.”

Ariely (2008) appears to have been right, offering students too much flexibility in due dates encourages procrastination, which is often detrimental to academic success. He concluded that, in terms of setting deadlines, “tightly restricting [student] freedom … is the best cure for procrastination” (2008, p. 145). Based on my own experiences with this classroom research project, as well as personal experiences with deadlines and procrastination, I am inclined to agree. This policy is the worst for both students and the teachers who work hard to provide them with meaningful practice assignments which must be completed to provide benefit to anyone.

The final question addressed by this classroom research project was whether applying a 20% penalty to late work motivated students to get their work turned in on time. It did not. The amount of work turned in on time was nearly identical whether full credit was offered or not, and in both cases, less work was turned in on the due date than had been when late work was not accepted (Figures 1 & 3). And since students are less likely to turn in late work when there is a penalty, there was also no improvement in the turn in rate of assignments under this treatment. In short, this policy seems to offer no

improvement in the amount of work turned in on time or in total as compared to not accepting late work at all.

It is important to remember that this is only one study, and while every effort was made to control confounding variables, in a classroom setting it is obviously impossible to do so completely. There are many additional factors that could have, and likely did, come into play. For example, although attempts were made to standardize the units as much as possible, it would be impossible for the same students to learn the same material four times. Also, this year has seen an aggressive flu season and many of my students became stricken during the study. While there was no unit in which more students seemed to be absent than in any other (which leads me to believe that it did not skew the results of this study), it is possible that I underestimated its effect. Additionally, although the treatments were implemented at random, it is possible that a different order may led to different results, particularly if the students were suffering academic fatigue as the quarter progressed or if they found one unit to be more difficult than the others. Retesting in varied treatment order is suggested.

More studies are needed to determine how students of varying grade levels, academic rankings, socioeconomic levels, parental support, and ethnicities are affected.

VALUE

This classroom research project allowed me to determine how various late work policies affect my students and the amount of work they turn in. In doing so, not only did I learn that accepting work one day late for full credit will likely lead to a small increase in the amount of work turned in, but, more importantly, that doing so would likely

directly benefit the students who are struggling the most in my class. I have already implemented this late work policy for the remainder of this school year and will continue to use it in future years. I have also rearranged my schedule to offer more chances for the students to get help after school. It is my sincere hope that this will lead to more student success and more satisfaction on my part, knowing that I helped kids who may have otherwise given up.

I will be sharing these findings with my fellow teachers in an upcoming staff meeting and I hope that my colleagues will consider modifying their own late work policies as a result, or perhaps embarking on their own classroom research projects to see if this pattern holds true for their classes as well. In the end, more data can only help us to better understand our students and their needs.

In the future, I would like to run another iteration of this classroom research project with some modifications. First, I would like to know if the increase in the turn in rate of assignments seen when work was accepted for one additional day extends any further than that. For example, what happens if students are given two or three days to turn in work? At what point, exactly, does accepting late work go from benefiting students to becoming detrimental?

In a similar vein, I am interested to know how varying the value of the penalty affects the turn in rate. Do smaller penalties have the same effect that the 20% penalty did? Would a five percent penalty, for example, be less intimidating to students?

I would also be interested in looking at the possible effects of offering bonuses for finishing work early rather than penalties for being late. This idea came up in my

literature review, but I did not have enough time to include another treatment in this classroom research project.

As is so often the case in research, this experience has helped me answer some of my initial questions while replacing them with so many more to explore. I look forward to doing so with additional classroom research projects in the future.

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APPENDICES

APPENDIX A

LATE WORK SURVEY FOR STUDENTS

Participation in this research is voluntary and participation or non- participation will not impact class standing in any way.

1a. Do you think teachers should accept late work? (Circle one)

YES *NO*

1b. Why?

2a. Does a teacher accepting late work change the amount of work you turn in for that class?

YES *NO*

2b. If so, do you turn in more or less work?

2c. Why do you think this happens?

3a. If a teacher does allow late work to be turned in, how much extra time should students get?

3b. Why?

4a. Do you think that having the option to turn in work late makes you more likely to procrastinate?

YES *NO*

4b. Why?

5a. Do you think teachers should give full credit for late work? (Circle one)

YES *NO*

5b. Why?

APPENDIX B

LATE WORK SURVEY FOR TEACHERS

Participation in this research is voluntary.

1a. Do you accept late work from your students? (Circle one)

YES *NO*

1b. Why or why not?

2a. How do you think accepting late work affects the amount of work students turn in? (Circle one)

They turn in more work. *They turn in less work.* *They turn in the same amount either way.*

2b. Why do you think this occurs?

3a. How do you think accepting late work affects the overall quality of the assignments that are turned in? (Circle one)

The quality is higher. *The quality is lower.* *The quality is not affected.*

3b. Why do you think this occurs?

The last two questions are only for teachers who accept late work.

4a. If you do accept late work, how much extra time do you give students?

4b. Why do you feel this is the best amount of extra time to give?

5a. How much credit do you give for late work?

5b. What is your rationale for this?

APPENDIX C

IRB EXEMPTION CERTIFICATE

MONTANA
STATE UNIVERSITY

INSTITUTIONAL REVIEW BOARD
For the Protection of Human Subjects
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MEMORANDUM

TO: Melony Walsh and Walter Woolbaugh

FROM: Mark Quinn Mark Quinn CJ
Chair, Institutional Review Board for the Protection of Human Subjects

DATE: October 22, 2018

RE: *"The Effects of Accepting Late-Work on the Turn-In Rate of Assignments in a High School Chemistry Class" [MW102218-EX]*

The above research, described in your submission of October 19, 2018, is exempt from the requirement of review by the Institutional Review Board in accordance with the Code of Federal regulations, Part 46, section 101. The specific paragraph which applies to your research is:

_X_ (b) (1) Research conducted in established or commonly accepted educational settings, involving normal educational practices such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

_X_ (b) (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

____ (b) (3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (b)(2) of this section, if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

____ (b) (4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available, or if the information is recorded by the investigator in such a manner that the subjects cannot be identified, directly or through identifiers linked to the subjects.

____ (b) (5) Research and demonstration projects, which are conducted by or subject to the approval of department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

____ (b) (6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed, or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the FDA, or approved by the EPA, or the Food Safety and Inspection Service of the USDA.

Although review by the Institutional Review Board is not required for the above research, the Committee will be glad to review it. If you wish a review and committee approval, please submit 3 copies of the usual application form and it will be processed by expedited review.