# THE EFFECTS OF RESPONSE CARDS ON 11th GRADE PHYSICS ACHIEVEMENT AND OFF-TASK BEHAVIORS

by

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A Master's Thesis/Capstone Project

Submitted in Partial Fulfillment

of the Requirements for the Degree of

Master of Science in Education

Curriculum and Instruction

Department of Curriculum and Instruction

State University of New York at Fredonia

Fredonia, New York

June 2015

CERTIFICATION OF THESIS/CAPSTONE PROJECT WORK

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## ABSTRACT

This study investigated how the use of response cards in an 11th grade Physics classroom impacted both students' academic performance and off-task behaviors. This experimental quantitative study applied an A-B-A design, wherein traditional hand raising was used for student response during the first week of the study or the baseline (A), response cards were used for the second week or the intervention (B), and traditional hand raising was used again for the third week of the study or withdraw of intervention and return to baseline (A). The central questions being investigated were as follows: How does the use of response cards impact student academic performance? How does the use of response cards impact student off-task behaviors? With a quantitative approach short daily quizzes were used to measure the students' academic performance and teacher observations recorded on a chart were used to measure the frequency of off-task behaviors over the three week period. The results showed that student academic performance increased while off-task behavior decreased.

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# The Effects of Response Cards on 11th Grade Physics Achievement and Off-Task Behaviors

## Introduction

### Problem

Teachers in the high school setting face a multitude of daily challenges, from instructional, to clerical and administrative, to behavioral; the list is never ending. One of the more challenging tasks a high school teacher is expected to battle is overcoming the deficiencies of traditional lecture in favor of an increase in active student participation (Murray & Lang, 1997). Traditional lecture creates an atmosphere in which students become passive and unconnected from their own learning, simply being required to record what the teacher says with minimal chance for interaction. Maintaining active engagement in a lesson is one of the most common behavioral concerns among school age children (Godfrey, Grisham-Brown, Schuster, & Hemmeter, 2003). Higher academic performance and decreased off-task behavior are directly linked to active student participation and engagement in the classroom (Heward, Courson, & Narayan, 1989; Heward, Gardner, Cavanaugh, Courson, Grossi, & Barbetta., 1996; Skibo, Mims, & Spooner, 2011). It would seem, then, that since increasing and maintaining active student participation in the classroom setting leads to higher academic performance and decreased off-task behavior, student-centered learning emphasizing active student participation should be at the forefront of what the model teacher in America's classrooms should strive to accomplish.

Traditional classrooms across America struggle with off-task and disruptive behavior, both of which lead to a decrease in student academic performance (Hubert, 2014; Lambert, Cartledge, & Heward, 2006). Off-task students have been a challenge for teachers since traditional school was founded and will continue to be as culture shifts toward a more easily distracted society and student behaviors adapt to these culture shifts. This is especially true in

the senior year of high school where students' motivation and achievement are jeopardized more so than in previous years of schooling. Student-centered learning can manifest in a variety of forms within the classroom. The appropriate manner through which to incorporate student-centered learning is entirely up to the teacher's discretion. Teachers often attempt many strategies in order to engage their students so as to reduce off-task behavior, such as small group instruction, reward systems, proximity, or response cards. When students are engaged, academic performance can increase. This study aims to answer the following question: how does the use of response cards affect students' academic performance and off-task behavior?

**Purpose**

A passive, teacher-centered approach will not work in traditional classrooms any longer. The purpose of this study, therefore, is to determine a means by which to enhance the teacher-centered approach. A goal of the study is to see if response cards can be utilized as a means of increasing both student academic achievement and student motivation in a $11^{th}$ grade physics classroom.

**Significance**

Response cards seem to offer such a means with which to actively engage and motivate students in a high school classroom in an interactive, meaningful, and effective way (Cavanaugh, Heward, & Donelson, 1996; Graham, Tripp, Seawright, & Joeckel, 2007; Gardner, Heward, & Grossi, 1994; Munro, Stephenson, & Roane, 2009; Narayan, Heward, Gardner, Courson, & Omness, 1990; Rindfuss, 1997; Skibo et al., 2011). They are a research proven, evidence-based method of active engagement in the classroom; however research on the use of response cards specifically in high school senior science classes is limited at best. Response cards appear to

offer a possible approach to combating the lack of motivation and achievement that accompanies the senior year of high school.

## Literature Review

### Student Achievement

The level to which a student performs on a given set of multiple measures of academic growth can be defined as student achievement (Gardner et al., 1994; Lawrence-Brown, 2004; Maheady et al., 2002; Murray & Lang, 1997). Student achievement is the main goal of schooling. If student achievement were not important, then there would be less reason for school. Schools intrinsically exist for the purpose of student achievement, among others, with every teacher action taken, school policy written, and high stakes examination administered existing for this purpose. There is no clear cut recipe for a teacher to have every student in his class succeed academically. Student achievement is a capricious entity that is influenced by an endless list of factors, both internal to the school and external. The teacher only has control of those factors residing in his classroom.

### Senioritis

*Senioritis* is a phenomenon that occurs nationwide in which at some point, usually after winter break, seniors in high school begin to disengage themselves from school (Blanchard, 2012; Kirst, 2001). They begin to consider the second semester of their senior year as more of a time for socialization than for educational planning and meticulousness. This phenomenon is distinctively rooted in American culture. The idea that students need to be actively engaged in rigorous learning experiences, at the responsibility of the school, so that they graduate equipped with the skills and drive necessary to be functional members of institutes of higher education and society is a little disputed fact (Greene, 2004; Henriksen, Stichter, Stone, Wagoner, 2008;

National Commission on the High School Senior Year, 2001; Sizer, 2002). In Britain, "students take their A levels and 0 levels at the end of their last year in secondary school, and these examinations are crucial for their future life chances" (Kirst, 2001, p. viii). In America, the opposite seems to hold true; a high stakes event does not await U.S. seniors in high school to determine their graduation. As students increase in grade level through junior and senior high school, the amount and level of rigor actually decreases (Eccles, Midgley, Wigfield, Buchanan, Reuman, 1993). Because of this decrease in rigor, maintaining student motivation throughout the duration of senior year can be quite challenging for even an experienced teacher. Four of six teachers in a research study by Blanchard (2012) indicated that they felt senioritis was a problem in their school building. Students in this study also indicated that being provided the opportunity to demonstrate their acquired knowledge in "authentic and creative" ways was encouraging to them as a student. Blanchard (2012) noted "innovative learning opportunities that develop critical thinking and problem solving skills are recognized as tools for success in the 21st century" (p. 7). Response cards can provide students with authentic opportunities to demonstrate their acquired knowledge to the teacher in a non-obtrusive and semi-private manner that also gives a chance for constructive feedback on an individual basis. If students are struggling during their senior year to maintain focus throughout a lesson, then it is the job of the teacher to modify his or her teaching to meet the needs of the students. The teacher is the one who should adapt to the class rather than the other way around, and response cards seem like a fitting manner in which to attempt this task.

**Decreased student achievement in 12th grade.** Students' senioritis during senior year causes them to lose precious time focused on learning and increasing achievement which ultimately is considered to be attributable to the difficult adjustment many students have making

the transition to freshman year in college (Blanchard, 2012; Kirst, 2001). The resulting lack of knowledge possessed by incoming undergraduates is then blamed on the high schools for not preparing the students in a well enough manner. Rather than using their senior year to prepare for placement exams that await them at the collegiate level, they elect to forfeit this opportunity and instead spend their time doing non-educational activities that will not benefit them in any way educationally speaking. Kirst (2001) stated that among those students who fail collegiate math placement exams are students who elected to forego taking a math their senior year of high school and have to draw only from math classes taken through their junior year of schooling. Attempting to rely on knowledge learned in classes one year prior, at the minimum, can be a daunting task that results in said failure. Such an occurrence truly hampers the student because instead of moving on to college-level math courses, they must spend their time in a remedial level math class relearning topics previously learned at the high school level. Not only will this delay their timeline toward earning an undergraduate degree, but it will cause the students more financial hardship with nothing to show for it. Most remedial classes required by colleges for underachieving incoming freshman do not carry credit, and consequently do not count toward the earning of their degree. As Kirst (2001) noted, "one result is that many students who received good grades in high school spend part of their freshman year in college enrolled in remedial writing, math and science classes" (p. 2).

One research based strategy to enhance and increase student achievement is response cards. If applied in a senior level course, students could be more apt to participate in daily lessons and thus retain a greater amount of the information presented to them. This in turn could increase their achievement and combat a majority of the negative effects of senioritis.

**Decreased student motivation in 12th grade.** Schools have routinely used a combination of awards, incentives, and, most commonly, grades as a means of keeping students motivated to work hard and remain motivated in school (Blanchard, 2012). The problem with this tactic is that these influences are all externally motivating factors that, once a student is all but guaranteed acceptance into an institute of higher education, do not carry the same weight as held previously. Students can be motivated "when they are able to connect their learning to something of personal relevance and value" (Blanchard, 2012, p. 19). Students need to individually connect the learning they are doing with a greater purpose than the learning itself. When viewed through this lens, senioritis seems to be the rational response to the American educational system which discredits the academic content of the senior year as pertinent and valuable to further education of high school seniors.

## Student-Centered Learning

Student-centered learning is when "the learning environment has learner responsibility and activity at its heart, in contrast to the emphasis on instructor control and the coverage of academic content found in much conventional, didactic teaching" (No, T.C.F.S., 2012, p. 23). Student-centered learning makes the student the focus of the classroom, with every action taken in the classroom carefully thought and calculated to have the greatest positive impact on the student. Student-centered learning is all about getting students engaged in their own learning. In student-centered learning, the teacher's main role is to assist and guide the students toward meeting the goals set forth by the teacher (Overby, 2011). It is not up to the teacher to talk at the students, but rather to work more behind the scenes and assist the students through their struggle with the curriculum. This is not to say that the teacher is doing less work, they are just doing different work on a more individual basis with the students. Most students do not do well sitting

idle while being talked at by a teacher, so "the trick is to have students learn while they are busy having fun" (Moye, 2010, pp. 8-9).

Through brain imaging techniques, Jensen (2005) showed that brains involved in an engaging task show an increase in neuron activity. Increased neuron activity is direct evidence of the student processing the information at a higher rate and in a more meaningful way. It can be assumed, then, that if students are involved in an engaging task, they are absorbing and retaining more of the information being presented to them than if they were to idly sit and gain the information in a passive fashion. A plethora of different techniques can be used to get students engaged in a task in the classroom setting. If students can be engaged in classroom activities then the focus of the learning goes back to the student, making them at the center of that learning. If student-centered learning is truly a teaching method in which classroom activities are carefully thought out and premeditated such that they will have the greatest positive impact on the student, then it would stand to reason that research proving that students have increased neuron activity and thus process information at a higher rate shows that an increased focus of the classroom teacher on student-centered learning would be in the best interest of all parties involved in the learning experience.

**Differentiated Instruction**

The modern classroom requires a teacher that can cater to the needs of all his students. Differentiated instruction is a process wherein a teacher "supports the classroom as a community to which age peers belong, where they can and should be nourished as individual learners" (Lawrence-Brown, 2004, p. 36). When a teacher is correctly performing differentiated instruction each student is receiving exactly what he or she needs to be successful, even if their learning requires a technique or teaching strategy different from that of a peer. Regardless, it is

an accepted fact that students learn their best when their learning styles and interests are taken into account by the teacher (Lawrence-Brown, 2004; Subban, 2006). Each student in a classroom may have an individual learning style but there are common themes among the learning styles that a teacher can differentiate for. One such theme is the need to get students up and involved in the classroom, a foundational cog to the differentiated instruction model of teaching (Subban, 2006). Response cards afford students the opportunity to become active participants in the classroom.

Differentiated instruction must also incorporate a social aspect to student learning. According to Subban (2006), "social interaction between the learner and a knowledgeable adult enhances the possibility of intellectual activity" (p. 944). This socialization increases the development of communication skills and cognitive development. Students tend to mirror what they see, and being socially involved with a competent adult, like the teacher. This social involvement with the teacher forces the students to put into practice the ideas and skills they have learned in the classroom, further enhancing their learning experience.

**Student Participation**

One way to measure whether the student is on task, and is attentive throughout the course of a daily lesson is through student participation (Gardner et al., 1994; Godfrey et al., 2003; Graham et al., 2007; Heward, 1994; Lambert et al., 2006; Munro et al., 2009; Rindfuss, 1997). Student participation is a crucial component to learning. In order for learning to take place, students must first be participating in class, in whatever mode is required by the teacher. If a student's brain is elsewhere and not focused on the learning task at hand, then anything else the teacher does is a loss and might as well have never been considered in the first place. Among its many forms, student participation is often times thought of as volunteering answers to teacher

posed questions during class discussions (Gardner et al., 1994). To offer an answer a student must first be paying attention to what the teacher is saying, and then after hearing the posed question must then individually think of a possible answer. This requires a certain level of cognitive function and is most certainly class participation.

**Student participation in the traditional classroom.** Disruptive behavior in the traditional classroom setting is a hurdle any teacher must conquer to effectively instruct a class of students. Disruptive behavior can be defined as a student engaging in one or more of the following behaviors:

> engaging in a conversation with others during teacher-directed instruction, provoking others (i.e., making faces at others, laughing at or touching others, making noises or sounds with voice, tapping objects, pounding on desk, voicing disapproval with instruction, throwing or twirling objects), attending to other stimuli (e.g., looking at or playing with other objects in desk or misusing response cards or other instructional tools), writing notes to friends or drawing pictures, spitting, sucking on fingers, or leaving assigned seat without permission (including tipping back in chair on two legs). (Lambert et al., 2006, p. 91).

All of the aforementioned behaviors can and will significantly decrease the amount of meaningful instructional time a teacher spends with the class as this time is instead spent guiding the class back to proper on task behavior. In a study conducted in a second grade, rural school math class by Hubert (2014), initial baseline observations found that 5% of students in the class were daydreaming during the day, 40% of students in the class were talking out of turn, 10% of students in the class were touching others, 10% of the class had busy hands and fidgeting with objects, and 15% of students in the class got out of their seat. These findings concur with a study

led by Gardner et al. (1994) in which students in the traditional classroom setting only had a response rate of 53 student responses given 1,103 response opportunities. This is a meager participation level of 4%. Student achievement is not going to flourish when only 4% of response opportunities are taken advantage of by students. A traditional classroom setting where hand-raising is paramount cannot and will not engage students in any meaningful way that creates solidified student learning and a lasting memory of the knowledge gained. Students who can, instead, remain mentally present, focused, and attentive during class are less disruptive and increase their time spent learning as well as their response rates to teacher posed questions (Gardner et al., 1994; Lambert et al., 2006).

## Response Cards

Response cards are defined as "reusable signs or cards held up simultaneously by each student in the class to indicate his or her answer" (Gardner et al., 1994). They can be made of many different types of materials ranging from simple paper to shower board purchased at home improvement stores. The key component of response cards is that every student in the class has their own personal response card to use. The effectiveness of response cards lies in the empowerment given to each student to voice their own opinion about a teacher posed question. Response cards have been proven as an effective means of raising student learning and participation when compared to traditional classroom questioning techniques such as hand-raising (Gardner et al., 1994; Heward, 1994). To implement response cards, however, certain criteria must be properly met for their efficacy.

**Proper response card format.** Two main types of response card formats dominate today's educational landscape: pre-printed and write-on (Blackwell & McLaughlin, 2005; Gardner et al., 1994; Heward, 1994). Pre-printed response cards are constructed before class and

distributed to each student. A pre-printed response card can include simple multiple choice answers, numbers, colors, or parts of speech, for example, as possible answers the students can display when prompted (Blackwell & McLaughlin, 2005). An example of a pre-printed response card is shown in Figure 2 (Reeve, 2013).

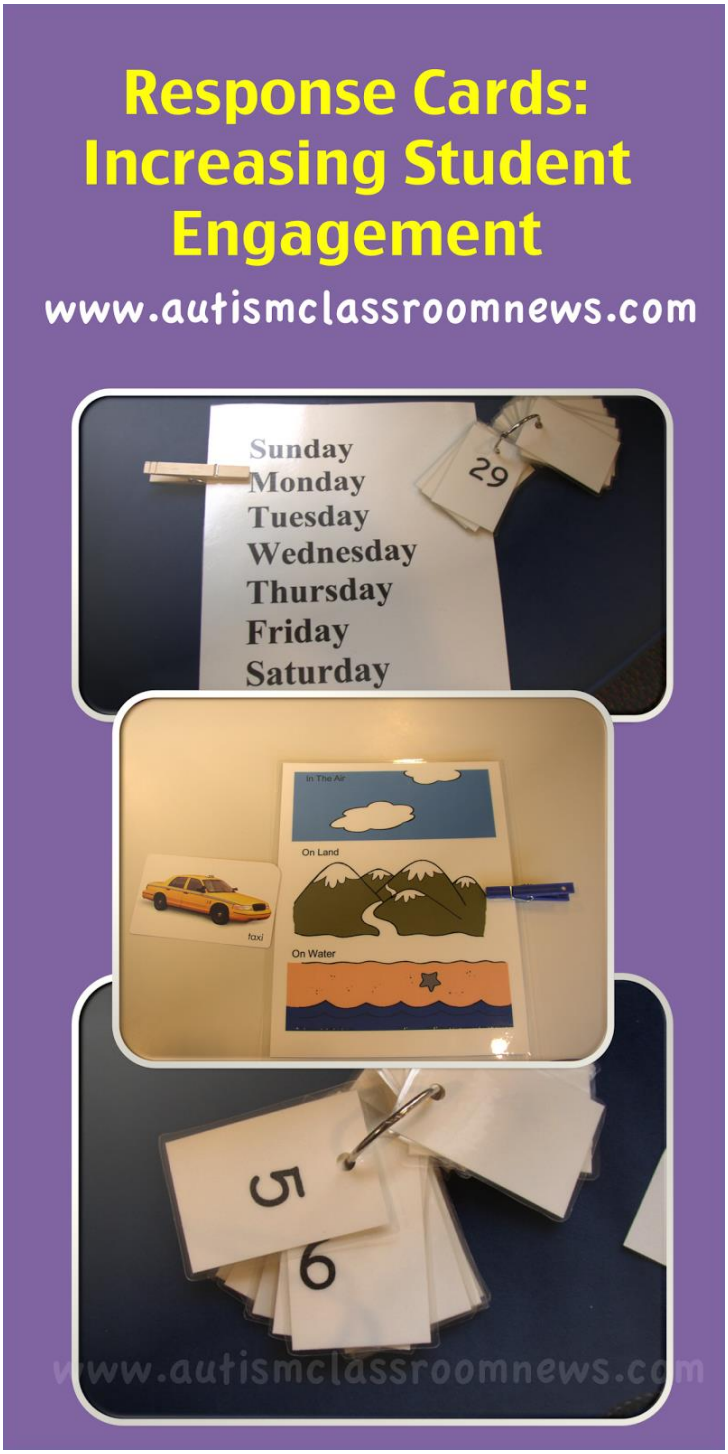


*Figure 2.* Response card example

A student may have multiple pre-printed response cards to choose from, however, they should be limited in quantity (Blackwell & McLaughlin, 2005). It's also important that the format of the

cards is easy to read for both students and teachers. This will help minimize the amount of downtime that could end up becoming associated with the use of response cards. If students or teachers are struggling to read the cards then precious time is needlessly wasted. Often times a teacher will also provide their students with an organizational strategy to use when multiple pre-printed response cards are to be used at one time. One such strategy is to fasten all of the pre-printed response cards to a key ring so the students can flip through until the desired response card is found. Pre-printed response cards are quicker in use as students spend less time submitting their response; however, they limit the teacher as far as what types of questions can be asked of the students throughout the lesson.

Write-on response cards offer a greater flexibility in student answers. This increased flexibility is due to the fact that write-on response cards are simply blank white boards (or something similar) that students write their response on and hold up when given a teacher prompt (Blackwell & McLaughlin, 2005). The increased flexibility that accompanies write-on response cards opens up multiple avenues for teachers to travel down when creating opportunities for students to respond. Limited only by their imagination, the students can create anything they wish on their response card. The only limit to the students' creativity is the size of the response cards. The downside to write-on response cards is that since the students write their responses, the cards' legibility can be compromised (Blackwell & McLaughlin, 2005). As such, write-on response cards can thus slow down the pacing of a lesson as the teacher will spend more time deciphering what the students wrote on their response cards. This is especially true when response cards are implemented in a younger setting where students are still honing their fine motor skills and printing capabilities. Regardless of format, the teacher must maintain a quick pace and regularly prompt the students to submit their answers all while monitoring and

providing feedback to the students during the response card activities (Blackwell & McLaughlin, 2005; Gardner et al., 1994; Heward, 1994).

**Proper response card implementation.** Proper response card implementation suggests that the class, as a whole, be given response cards such that each student has his own personal card for submission of answers (Graham et al., 2007; Gardner et al., 1994; Heward, 1994; Heward et.al., 1996; Cavanaugh et al., 1996; Munro, Stephenson, & Roane, 2009; Narayan et al., 1990; Rindfuss, 1997; Skibo et al., 2011). The class then is posed a question by the teacher and they record their responses on their response cards. Given a teacher prompt, the students collectively raise their response cards and display their answers to the teacher. The teacher prompt is critical to implementation of the response cards. All students must wait and hold up their response cards simultaneously to avoid students simply synthesizing their answers by reading another student's response card that was prematurely held up for teacher viewing. Such student activity must be avoided in order for response cards to maintain their validity as a teaching instrument.

Teacher feedback is directed toward the whole group, giving the students each a means of personal gratification and criticism of their individual answer (Munro et al., 2009). When more than one fourth of the class does not answer the posed question correctly the teacher should explain the necessary steps involved in arriving at the correct answer and have the students correct their own personal answer if they are using a write-on response card (Lambert et al., 2006). This teacher correction helps the students in the learning process while avoiding students developing misconceptions that will be more difficult to correct in the future. Response cards allow a teacher to see what answer each student believes correctly satisfies the question. Being in possession of all student answers to a posed question, most notably incorrect answers, allows the

teacher to be in a better position to provide feedback to the whole group. This knowledge also allows the teacher to steer the lesson in a more appropriate manner, as the decisions made are based on concrete evidence of where the students are all currently at with their understanding of the subject material being taught.

Both students and teachers feel that response cards are easy to use (Rindfuss, 1997). Adapting previous lecture outlines and quizzes from past years makes implementing response cards an efficient process (Rindfuss, 1997). Perhaps it is this ease of use which makes the proper implementation of response cards so effortless for both teacher and student. A lively pace must also be kept during question and answer sessions employing the use of response cards to decrease the opportunity for student off task behaviors to occur (Heward et al., 1996; Rindfuss, 1997). If the students are being kept busy doing something they enjoy, because it actively involves them in the lesson and gives them a sense of control over their learning, the opportunities for off-task behavior to occur will be fewer and farther between.

**Student achievement with response cards.** Response cards are an effective tool at any teacher's disposal for cultivating a positive atmosphere which will increase student achievement (Blackwell & McLaughlin, 2005; Gardner et al., 1994; Godfrey et al., 2003; Graham et al., 2007; Heward, 1994; Hubert, 2014; Lambert et al., 2006; Maheady, Michielli-Pendl, Mallette, & Harper, 2002; Rindfuss, 1997). Any good teacher should seize the opportunity to employ a teaching technique in their classroom that will bolster student achievement, especially one as effortless to implement as response cards. Students are more actively engaged when using response cards, a trait previously discussed to increase student performance and achievement across the board. A direct correlation seems to exist between this increase in engagement and student performance on test scores in previous studies conducted on this issue (Blackwell &

McLaughlin, 2005; Godfrey, Grisham-Brown, Schuster, & Hemmeter 2003; Graham, Tripp, Seawright, & Joeckel, 2007; Heward, 1994; Hubert, 2014; Rindfuss, 1997). In a study by Hubert (2014) the use of response cards increased the mean assessment score percentage of correct responses from 40% to 65%. Also, Gardner, Heward, and Grossi (1994) showed an increase in student participation from 4% to 68% response rates when response cards were used in lieu of traditional hand-raising techniques. Given the breadth of the research completed on student achievement as related to response cards one can effectively assume that implementing response cards in a classroom will have predictably positive results for student achievement. The trick is for a teacher to successfully determine which intervention strategies, differentiated for the class, to use with the response cards to reach all students at their own personal level.

Regardless of strategy, it is important that the teacher makes it known to the students that they are checking "each response given for accuracy" (Hubert, 2014, p. 27). The students need to know that they cannot simply write an answer simply for the sake of writing an answer. They need to know that the teacher is looking at what they are writing and evaluating them based off their answer. If the students feel as if their response is seen by the teacher the response cards will carry more credence when implemented in the classroom setting. Then, and only then, will the response cards lead to an increase in student achievement in the classroom setting. If the students do not feel the importance of the response cards, then the resulting leap in their own personal classroom achievement and successes then the response cards' respective effectiveness will wear off.

**Student participation with response cards.** Active student participation with response cards has proven to decrease students' off-task and mischievous behaviors in the classroom (Blackwell & McLaughlin, 2005; Heward et al., 1996; Hubert, 2014; Munro et al., 2009; Skibo

et al., 2011). Response cards offer a quick, simple, yet effective means for a teacher to actively engage students in their learning with minimal intrusion to the regular flow of a daily lesson. In a study by Cavanaugh, Heward, and Donelson (1996), the subject teacher reported an increased level of student attentiveness during response card reviews. The study found that beginning each class session with a short test facilitated a focus of student attention and helped foster a controlled environment for the day's lesson. This method of beginning classes with a quick review test of previous material is a multi-faceted classroom management approach that offers numerous benefits. Not only does it afford the students an additional opportunity to review previously learned information and build a more concrete understanding of the learning, but it also funnels the, often times chaotic, mood of the students toward learning as the focus of the class with them at the center. By getting the students on task quickly, there is less chance of disruptive behaviors occurring later on in the period. As opposed to traditional hand-raising techniques, which garner a high school student participation level of 4%, response cards were able to coax a 68% high school student participation rate out of the same set of students (Gardner et al., 1994). The same study by Gardner, Heward, and Grossi (1994) also found that, based on data collected in the study, "if response cards were used instead of hand-raising during a single 30- min lesson each school day, each student would make approximately 3,700 additional academic responses over the course of a 180-day school year" (p. 69).

According to Blackwell and McLaughlin (2005) "if the teacher spends less time gaining attention and keeping students on the lesson on task more time can be allowed for learning" (p. 4). Wasted class time not only disrupts the flow of the lesson, but also takes away precious instructional time that could otherwise be used for more opportunities for student response or teacher guidance. This wasted time could then lead to a decrease in student achievement if it

becomes a regular occurrence in the classroom. Thirty seconds to redirect a student happening a few times, three for instance, per class seems like a small amount of time spent away from instruction. When this seemingly small amount of time is extrapolated across a whole year worth of class time, assuming a 180 day school year, that 90 seconds of off-task behavior and subsequent teacher correction per class add up to 4.5 hours' worth of lost instructional time. This amount of time wasted can be crippling to any student, let alone a whole class.

A teacher needs to craft their classroom in such a way that students do not feel the desire to be off-task and waste valuable class time. Response cards create an enjoyable atmosphere within the classroom for both students and teachers alike. Hubert (2014) stated, "the teacher enjoyed that the students were all encouraged to be active participants for all questions that were asked. The students seemed to enjoy using the response cards" (p. 27). Student participation is all but certain to increase when the students are unaware of the learning they are doing because they are caught up in the moment having fun during the daily lesson. All of this success surrounding response cards was achieved with minimal extra effort being put forth by the teacher.

Since response cards are a research proven method to increase student motivation it makes one wonder if they would also increase student motivation in a senior level class. They do not require an external motivator to succeed because they do not rely on tangible external rewards. Rather, they internally motivate students to want to answer questions correctly and receive feedback from their teacher as to the correctness of their response. They are also an easy to use teaching strategy both for the teacher and student. This ease of use fits in quite well with the decreased ambition high school seniors possess. As such, they seem to be an effective means

with which to counter the significant apathy and decrease in motivation that characterizes high school seniors.

## Methodology

The purpose of this quantitative study was to examine the efficacy of response card use to promote student achievement and decrease off-task behaviors, specifically with 11th grade students in Physics. The research study was performed in an A-B-A format. Stage I of the study involved collecting baseline data through the use of daily quizzes and on-task monitoring charts filled in by the teacher to establish what level of academic achievement and off-task behaviors the students involved in the study already possess. Once baseline was established, Stage II implemented the response cards and the same instrumentation was used to collect data as was used previously in Stage I of the study. Stage III of the study involved repeating Stage I to assure that any findings by the study could be attributed to the use of response cards and reinforce the data collected.

### Sample

**P**urposive sampling was used to obtain the sample set for this research study. Purposive sampling is selective sampling wherein the primary researcher chose the group of participants based on what he felt was representative of typical 11th grade physics students. Purposive sampling was used because prior knowledge suggests that the 11th grade students in Regents Physics are representative of typical 11th grade seniors in any high school across Western New York. The participants were included in the sample if they were in the 11th grade of their schooling, attended the school district at which the research was conducted, turned in the appropriate permission slips, and were enrolled in Regents Physics.

**Setting**

This research study was conducted in the Western New York area. The district in which the study took place is large and urban. The school within the district where the study took place graduates between 100-130 students per school year. The school is comprised of grades 5-12 housed in one building. The district student population is diverse in ethnicity with 21% being White, 50% Black or African American, 17% Hispanic or Latino, 7% Asian or Native Hawaiian/Other Pacific Islander, 3% Multiracial, and 1% American Indian according to the New York State Education Department's website for school report cards (2014).

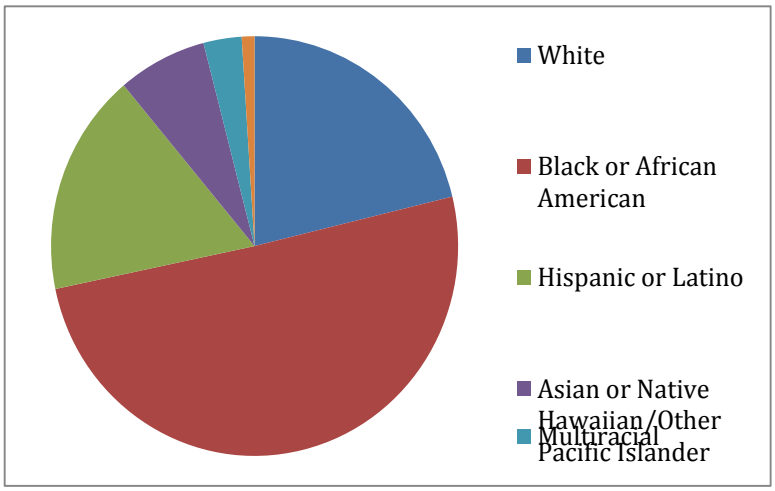


*Figure 3.* School district ethnicities

The school student population is 64% white, 20% Black or African American, 1% American Indian or Alaska Native, 3% Multiracial, 6% Asian or Native Hawaiian/Other Pacific Islander and 7% Hispanic or Latino according to the New York State Education Department's website for school report cards (2014).

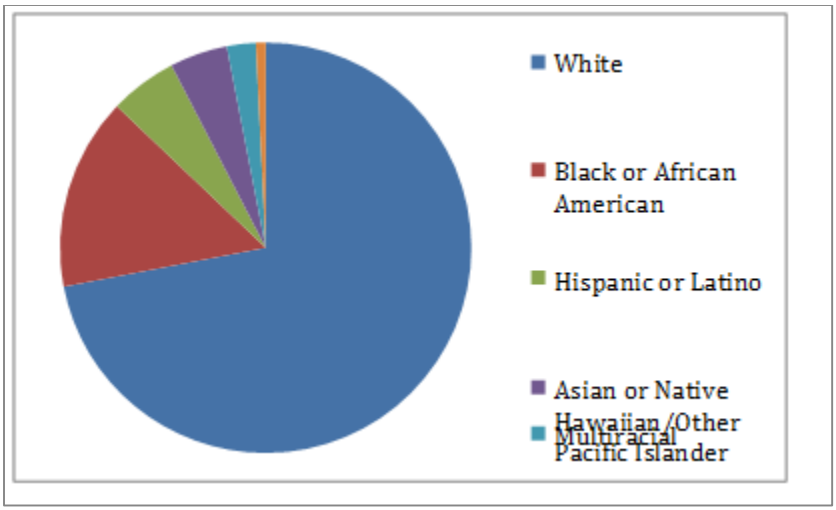


*Figure 4.* Junior/senior high school ethnicities.

The classroom where the study took place was a typical high school science room. It consisted of six lab benches arranged in a U-shape with two additional lab benches in the back of the room for demonstrations and experimentation as shown in Figure 5.

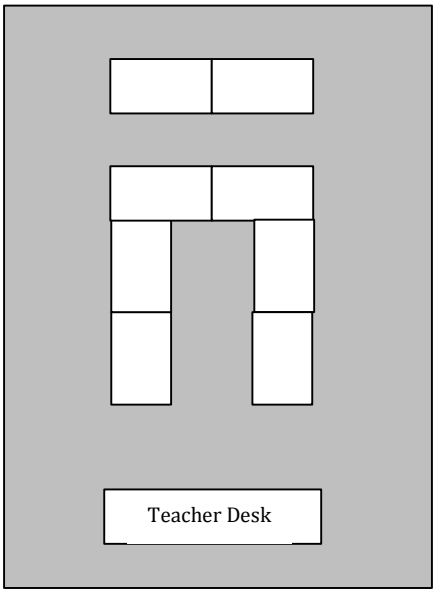


*Figure 5.* Classroom layout.

The classroom also contained a computer, and projector for instructional use. The content covered during the course of the study was comprised primarily of information, ideas, concepts, vocabulary, and mathematical relationships governing mechanical (amplitude, frequency,

wavelength, wave phenomena, transverse and longitudinal waves), and electromagnetic waves (light, refraction , diffraction, reflection, Snell's Law, Electromagnetic Spectrum, index of refraction, speed of light in a vacuum).

**Participants**

This research study consisted of students from two classes of 11th grade students, 17 females and 15 males total between the two classes, registered in two general education Regents Physics classes at a large, urban grades 5-12 school of about 1000 students in Western New York. The participating students ranged from 16-18 years in age. Most came from a low to middle income household, with a small percentage coming from a privileged upbringing. None of the participating students were identified as students with disabilities requiring an IEP; however, two students had a 504 plan. One was for a major medical impairment that substantially limits a major life function and another was for hearing loss. Eleven students, seven females and four males, were enrolled in one Regents Physics class, 2nd period. The other 21 students,10 females and 11 males, were enrolled in8th period. The participating students were selected from the 11th grade population based on class enrollment in the primary investigator's two Regents Physics classes and conditional upon the return of a signed individual and parental consent form.

The primary investigator and teacher was a Caucasian male with seven years of teaching experience at various high school grade levels across multiple subjects. At the time of the research he served as a high school physics teacher.

**Dependent Variables**

The main dependent variables being researched in this study were student academic achievement as evidenced with quiz scores and students' off-task behaviors as evidenced with

observations of student behavior. Off-task behaviors being watched for included, but were not limited to, staring off into space, talking with a peer about topics unrelated to the class discussion, playing games or using other apps on a cell phone, and touching other students. Quiz scores were based on a percentage of responses correctly given on a written quiz at the conclusion of the daily lesson, multiple-choice in structure.

**Independent Variable**

The use of response cards was the independent variable in this study. All students in the class were shown what response cards were and given demonstrations of their proper implementation. The primary investigator/teacher also made clear the expectations of the students during the use of response cards in this research study.

**Procedure**

The action research study occurred during the regularly scheduled times of the two aforementioned Regents Physics classes. A class period lasts 45 minutes in length from bell to bell. The procedure of this research was broken into three separate stages, one to establish baseline data, a second to collect data with the use of response cards, and a third withdrawal stage to substantiate any findings discovered during the second stage. An A-B-A research design was used to compare the effects of traditional hand-raising techniques to the use of response cards with respect to student academic achievement and student off-task behaviors across two separate classrooms.

**Initial consent.** A response card thesis study consent form was distributed to each of the students enrolled in Regents Physics for the purpose of gaining permission for the student to be included in the research study. The same consent form was also distributed to the parents of each student enrolled in Regents Physics. The consent form outlined the basic procedure of the

research study and informed all involved parties of any risks and benefits that could occur as a result of participation in the study. The consent form also indicated that all personal identification information will be kept confidential along with individual performance on the daily quizzes and off-task behaviors data gathered. Finally, the consent form also stressed that participation in the research study would be completely voluntary and any questions should be addressed to the primary researcher.

**Stage I.** The first stage of this study was to collect baseline data on both classes of Regents Physics. The baseline data were used for comparison between traditional hand-raising techniques and response card usage as evidenced in student academic achievement and student off-task behaviors. The baseline data were collected concurrently across two individual sections of 11th grade Regents Physics. Daily quizzes pertaining to the lesson were administered on every day of the week to establish a baseline of traditional classroom lecture and note taking effectiveness. Throughout baseline data collection the students' only method of answering a teacher posed question was limited to traditional hand-raising. The teacher also completed a modified functional behavior assessment (FBA) for each student across two sections of Regents Physics. The FBA was modified such that it did not study the antecedent or consequence to the behavior, but rather simply tracked the student behavior being studied. The students' scores on the quizzes were calculated and compiled into a class average, and subsequently plotted on a line graph. The students' off-task behaviors were also plotted on a graph. The baseline data were collected across a timeframe of one week.

**Stage II.** The second stage of this study was to collect data on both classes of Regents Physics while response cards were being utilized by the classroom teacher/principal investigator. The response card data were collected across two individual sections of 11th grade Regents

Physics. Daily quizzes pertaining to the lesson were administered every day of the week, during which response cards were used as an alternate means to traditional hand-raising during lecture and note taking and relevant data was collected. Throughout the response card data collection timeframe students' only method of answering a teacher posed questions was limited to response cards. The same modified FBA sheet was also utilized for this stage of the research, again only used on days when a daily quiz was administered. The students' scores were then compiled, averaged, and plotted on a line graph. The response card data were collected across a timeframe of one week.

**Stage III.** Stage III of the research study was a repeat of Stage I exactly as previously presented. The purpose of Stage III was to reduce the chance that any findings in the study were caused by a variable other than the response cards.

**Instrumentation**

The researcher used questions selected from previous New York State Regents Physics examinations to construct the daily quizzes. The researcher also collected student off-task behaviors through the use of a modified FBA. The researcher collected data on the time interval length and date during which data was collected, the activity description and expectations from the students, and whether the student was on task or off task for 10 minute intervals of time during the class period. The data was recorded on a data sheet kept for each student.

**Validity Considerations**

Students were made aware that their choice of participation or non-participation in this research study had no bearing on their grade in the course. The same quizzes were distributed to all students in each class participating in the study. A separate, but equal difficulty, version of the quiz was given to 8$^{th}$ period than was given to 2$^{nd}$ period to ensure the integrity of the quiz

was not compromised. The researcher also used inter-rater reliability checks by teaming with another teacher, teacher A, who graded the quizzes separately and without any knowledge of the scores assigned by the primary researcher. A reliability coefficient was then calculated by summing the number of agreements between the primary researcher and teacher A, then dividing by the sum of the number of agreements and disagreements between the primary researcher and teacher A and multiplying by 100%.

## Results

The data were collected in a high school Physics classroom for 15 class periods. These periods lasted 45 minutes each and the author was the students' instructor for all class periods. The instructor also observed the students each day and was responsible for using a checklist to chart their off-task behavior, which will be discussed further in this section of the paper. Assessments were consistently given at the conclusion of each lesson in the form of a short, five question multiple choice, quiz that took the students 5 minutes or less to complete. The quizzes were given during the unit of study on mechanical and electromagnetic waves and encompassed both conceptual knowledge and mathematical skills learned by the students. The unit of study, and consequently the assessments, was a three week unit that lined up nicely with the A-B-A format of baseline, intervention, withdrawal this research project was designed after. The traditional hand raising was used in the first and third weeks, and response cards were used in the second week. The data was analyzed using Microsoft Excel.

The effects of response cards use on student achievement can be found in Figure 6, Figure 7, Figure 8, and Figure 9. The assessments used were scored out of 100 points per quiz per day. Figure 6 shows the class average quiz score versus day number of data collection. Figure 7, Figure 8, and Figure 9 show the percentage of students scoring in each grade bracket

for the baseline, implementation, and withdrawal phase of the study. The class mean quiz score during the baseline, days 1-5, was 68 out of 100 possible points. Zero students (0%) scored an average score between 1-10 points. One student (3%) scored an average score between 11-20 points. Zero students (0%) scored an average score between 21-30 points. Two students (6%) scored an average score between 31-40 points. One (3%) student scored an average score between 41-50 points. Seven students (22%) scored an average score between 51-60 points. Seven students (22%) scored an average score between 61-70 points. Six students (19%) scored an average score between 71-80 points. Six students (19%) scored an average score between 81-90 points. Two students (6%) scored an average score between 91-100 points. When response cards were implemented, days 6-10, the class mean quiz score was 82 out of 100 possible points. Zero students (0%) scored an average score between 1-10 points. Zero students (0%) scored an average score between 11-20 points. Zero students (0%) scored an average score between 21-30 points. Zero students (0%) scored an average score between 31-40 points. Zero (0%) students scored an average score between 41-50 points. Two students (6%) scored an average score between 51-60 points. Five students (16%) scored an average score between 61-70 points. Nine students (28%) scored an average score between 71-80 points. Four students (12%) scored an average score between 81-90 points. Twelve students (38%) scored an average score between 91-100 points. During days 11-15, when the use of response cards was terminated, the class mean quiz score was 69 out of a possible 100 points. Zero students (0%) scored an average score between 1-10 points. One student (3%) scored an average score between 11-20 points. One student (3%) scored an average score between 21-30 points. One student (3%) scored an average score between 31-40 points. Two (6%) students scored an average score between 41-50 points. Six students (19%) scored an average score between 51-60 points. Three students (9%)

scored an average score between 61-70 points. Twelve students (38%) scored an average score between 71-80 points. Five students (16%) scored an average score between 81-90 points. One student (3%) scored an average score between 91-100 points.

A Chi-square test was calculated by using the number of students with a passing versus failing mean quiz score for both response card use and non-response card use. A passing score was considered a score above 65%. The data was plotted in a 2x2 table as shown below in Figure 6. The p value for the below data was calculated to be 0.038867. This is below a p value of 0.1 meaning that the data is statistically significant.

| Day Number | Class Average |
|---|---|
| **1** | 61 |
| **2** | 67 |
| **3** | 74 |
| **4** | 67 |
| **5** | 71 |
| **6** | 77 |
| **7** | 83 |
| **8** | 82 |
| **9** | 81 |
| **10** | 86 |
| **11** | 74 |
| **12** | 66 |
| **13** | 65 |
| **14** | 64 |
| **15** | 66 |

*Figure 6.* Class Average versus Day Number.

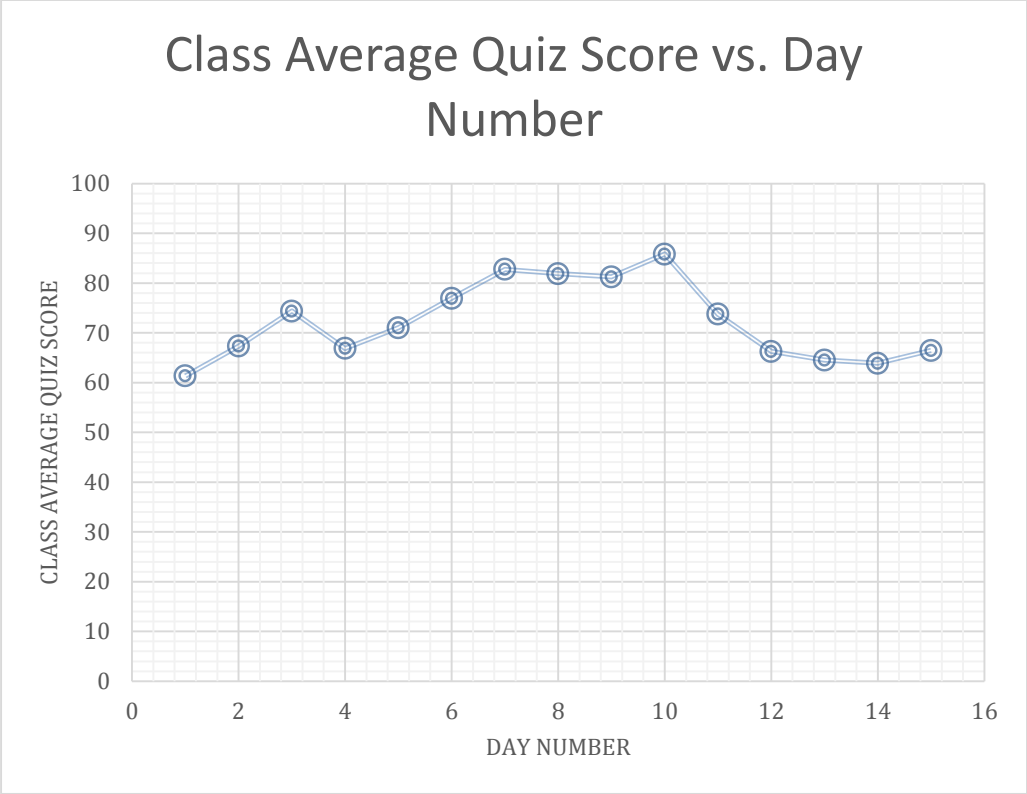


*Figure 7.* Class average quiz score versus day number.

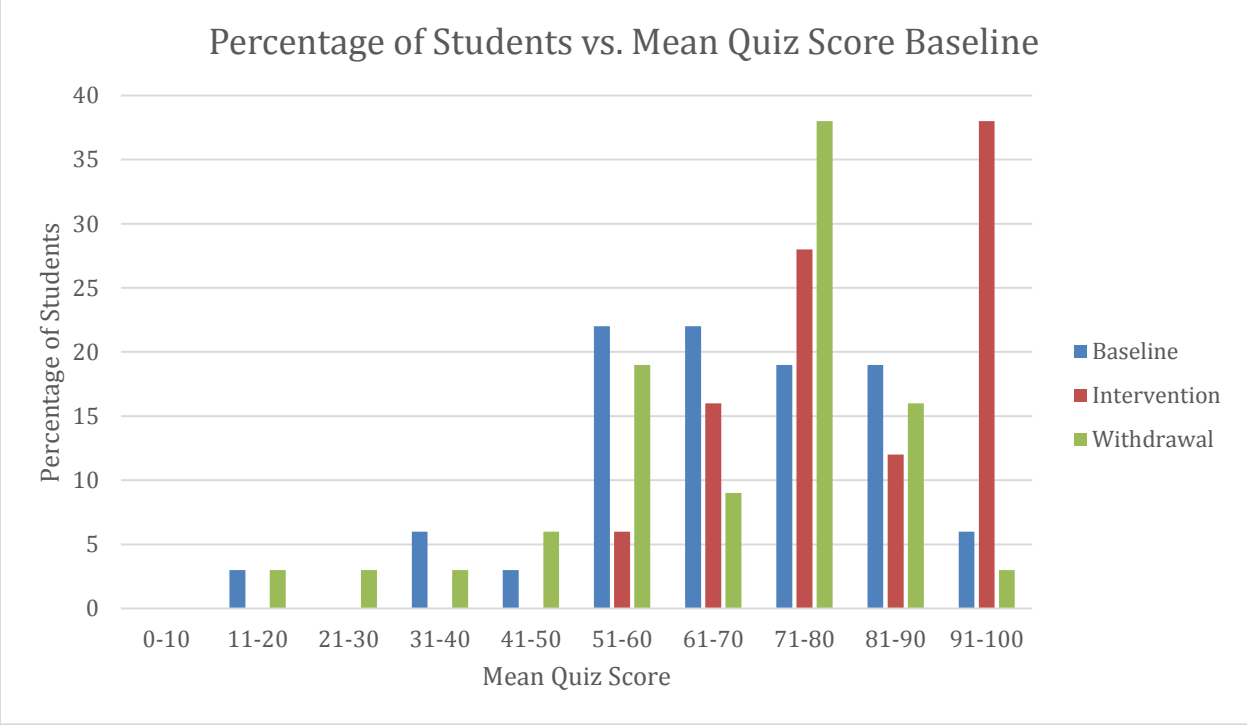


*Figure 8.* Percentage of students vs. mean quiz score.

The mean total points earned by each student versus the day number of data collection was also calculated. It can been seen that the amount of points earned on the daily quizzes increased from days 6-10 for a majority of the students. During the baseline, days 1-5, and withdrawal, days 11-15, portions of the study the mean total points earned per day is not as great as during the intervention, evidencing less student academic performance during these times. Specifically during the baseline the mean is 67.875 points/day and during withdrawal the mean is 63.438 points/day. During intervention the mean is 80.563 points/day.

The inter-rater reliability checks on quiz scores were calculated using the formula described in the methods section of this paper. There were 2,400 total student responses graded during the 15 days of this study. The primary researcher and teacher A agreed on 2,396 student responses scored. The reliability coefficient was calculated to be 99.8%. This high of a reliability coefficient was to be expected considering the multiple choice nature of the student assessments administered.

The effects of response cards on frequency of students who engaged in off-task behaviors can be seen in Figure 10, which shows the relationship between response card use and percentage of students who engaged in off-task behavior during the day's lesson. The mean percentage of students engaging in off-task behavior during the baseline data collection, days 1-5, was 47%. This means about 15 of 32 students engaged in some behavior that was not lesson related during the 45 minute class period. The mean number of occurrences off-task behaviors observed per period, 45 minutes, during the baseline data collection was 19. This represents a frequency of 0.42 off-task behaviors per minute. During the intervention phase of data collection, days 6-10, the mean percentage of students who engaged in off-task behavior was 34%. In other words, about 11 of the 32 students studied engaged in some off-task behavior

during the use of response cards. This is a decrease of approximately 12.5%, or 4 students, who engaged in off-task behavior as compared to the baseline data results. The mean number of occurrences of off-task behaviors observed per period during intervention was 13. This represents a frequency of 0.29 off-task behaviors per minute, a decrease from baseline data. When the use of response cards was terminated for the withdrawal phase of the study, days 11-15, the mean percentage of students who engaged in an off-task behavior during the 45 minute lesson was 41%, or about 13 of 32 students. This is an increase of 6.2%, or about 2 students, from the intervention phase of the research study. The mean number of occurrences of off-task behaviors observed per period during withdrawal was 17. This represents a frequency of 0.38 off-task behaviors per minute, an increase from the intervention data collection. The noticeable decrease in off-task behavior during the use of response cards as compared to baseline data showed that, overall, the use of response cards is a beneficial classroom management technique in this setting to help students in remaining more focused during class.

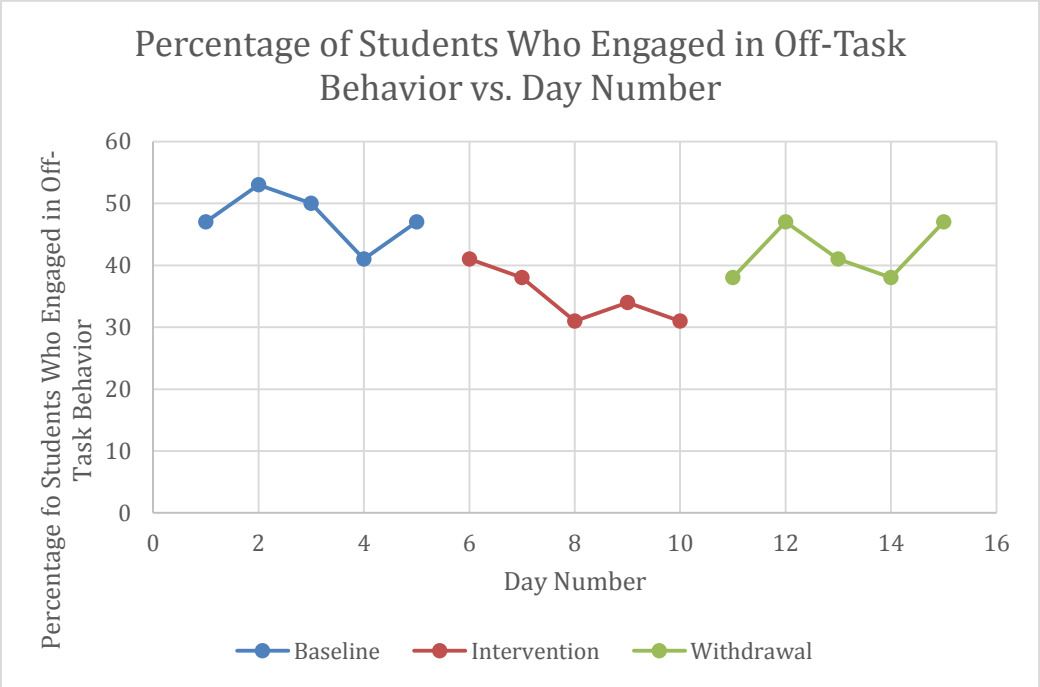


*Figure 10.* Percentage of students engaging in off-task behavior versus day number.

It was also observed that the beginning and end of the class period were the most likely times that students engaged in off-task behaviors. While focus on these particular times was not the primary goal of this research the tendency of students to perform off-task behavior during these times was an area of interest discovered during the study. During the baseline data collection the mean percentage of students who engaged in off-task behaviors within the 0-11 minute and 33-45 minute marks was 31% of the total class, or about 10 of the 15 students who engaged in off-task behaviors did so within the first or last 11 minutes of the class period. This represents 66% of the off-task behaviors occurring in this timeframe. When response cards were implemented, the number of students who engaged in off-task behavior during the first and last 11 minutes of the class period decreased to 26% of the total class, or about eight of the total 11 students who engaged in off-task behavior. The percentage of off-task behaviors occurring in the first and last 11 minutes remained similar to the baseline phase, however, and represented 76% of all off-task behaviors occurring during this time. Finally, when the use of response cards was withdrawn from the teaching routine 28% of the total class engaged in off-task behaviors, or about nine of the total 13 students who engaged in off-task behavior. The percentage of off-task behaviors occurring in the first and last 11 minutes of class was 69%, very similar to both the baseline and implementation percentages.

## Discussion

The results found in this research project suggest that response cards were effective in both increasing student academic performance and decreasing off-task behaviors in a high school physics classroom. The students' academic performance was tracked using daily quizzes consisting of five multiple choice questions each. The students' off-task behaviors were tracked using a modified functional behavior assessment which required the students' individual number

of off-task behaviors be recorded every 11 minutes during the class period. The teacher used a chart which required simple tally marks be made whenever an off-task behavior was observed during the lesson. This made the data collection possible while delivering the lesson.

The findings of this study show the students benefited academically form the use of response cards. The number of students passing their daily quizzes during the intervention phase, days 6-10, of the research as compared to the baseline, days 1-5, and withdrawal, days 11-15, shows that the use of response cards does significantly improve student achievement. Student performance increased from a class mean of 68/100 points during the baseline data collection to 82/100 points during the use of response cards. This data represented a mean increase of 24 points for the class. These academic achievement increases represented as much as one to two letter grades in the students' course average during the use of response cards. Most students also achieved their highest quiz score during the use of response cards. These findings are very consistent with the results of the study done by Gardner, Heward, & Grossi (1994) with inner city students and extent these results to a new population of students, specifically urban students enrolled in a high school physics course.

The results also showed that the use of response cards is a beneficial teacher strategy for decreasing the amount of students' off-task behavior. There is a clear relationship evident in Figure 11 showing this idea to be true. The average number of students engaging in off-task behavior dropped from 15 of 32 students in the baseline data collection period to 11 of 32 students in the intervention data collection period. While this may not be statistically significant, this decrease in number of students engaging in off-task behavior shows that response cards may be an effective tool for reducing the amount of student off-task behavior.

When response cards were used by the teacher it was also easily noticeable that more students were active participants in class, answering teacher posed questions. The number of students who answered questions during the baseline and withdrawal portions of data collection was significantly lower, leading to poorer student engagement. For example, during the baseline and withdrawal portions typically three or four students raised their hand to respond to a question while the remainder of the students waited and listened for the answer. Many students never raised their hand once during the baseline and withdrawal periods. In addition to engaging more students and reducing the amount of off-task behaviors coupled with increasing student achievement the use of response cards was gratifying for the teacher and provided an immediate sense of where every student was at with their own personal learning. All of these findings are consistent with previous research that show an increase in student performance and decrease in off-task behaviors during the use of response cards (Cavanaugh, Heward, & Donelson, 1996; Graham, Tripp, Seawright, & Joeckel, 2007; Gardner, Heward, & Grossi, 1994; Munro, Stephenson, & Roane, 2009; Narayan, Heward, Gardner, Courson, & Omness, 1990; Rindfuss, 1997; Skibo et al., 2011), & Barbetta., 1996; Skibo, Mims, & Spooner, 2011).

**Significance**

Throughout the course of this study response cards proved to be an easily implemented and impactful teaching strategy. The teacher noticed the proper use of response cards was easy to explain to students, easy for the students to quickly grasp, and easy to set up compared to other teaching strategies. Based on teacher observations, the students seemed to sincerely enjoy using the response cards, and performed better on assessments while remaining on-task more frequently during their use. The students commented to the teacher that the response cards were fun to write on and helped them understand the material better than traditional lecture based

lesson delivery. Seeing all students pushed to be active participants for all questions posed during the daily lessons also made educating the students more enjoyable for the primary researcher. When students could no longer hide behind the answers offered by others, and were forced to critically think about and answer all teacher posed questions, all students were more focused and cognitively present in the lesson.

**Limitations**

With present results from the study positive for both student performance and frequency of off-task behaviors, inherent limitations to this study still remain. Firstly, this study was limited by the relatively small number of student participants (N=32) and timeframe (15 classroom sessions) during which the data was collected. A more thorough research study would have included a significantly larger number of student participants than the 32 in this study. Also, a more thorough study would collect data for a longer baseline, intervention, and withdrawal phase than the five days allocated to each in this study. This would provide a better understanding as to the long term effectiveness of response card use in the classroom. Another possibility would be the addition of a fourth phase for the reimplementation of response cards to study whether the student academic performance and off-task behaviors would undergo the same changes as seen in the first intervention phase.

Secondly, the research design itself caused some limitation to this study. Since the primary investigator served as both the data collector and evaluator while also teaching the class fidelity is a concern. Certain precautions were taken to reduce any bias, such as the inter-rater reliability checks and the use of strictly multiple choice questions on quizzes to reduce the

amount of teacher discretion required when grading. Some off-task behaviors may have gone unnoticed by the teacher as well due to this limitation. A more rigorous investigation would implement the use of properly trained external individuals for the purposes of data collection to remove this possible bias.

A final limitation to this research study was that it did not investigate whether students' academic gains continued over time with the continued use of response cards, or if the students could generalize the information learned from the response card use to other assignments in class. A more detailed research study could implement measures to gauge the effectiveness of response cards' effects on maintenance and generalization of knowledge learned through the use of response cards.

**Conclusions**

In conclusion, this research study examined the effects of response cards on student academic performance and off-task behavior during physics lessons across a fifteen day data collection window in a 11$^{th}$ grade physics class at an urban district in Western New York. The present results indicate that student performance on assessments was increased during the use of response cards. The results also show that students remained on task and attentive a greater percentage of class time with the use of response cards compared to without. Throughout the use of response cards the primary researcher also noticed the ease of use and the increased enjoyment had by the students during their implementation.

There are a number of directions further research in the response card field could explore. It would be most interesting to investigate the long-term effects of response card use and whether they would remain effective when used for larger stretches at a time, or if the students would get bored with them. Also, would the knowledge gained by students during the use of response

cards and the relative academic gains observed persist throughout the entire school year or at least a few months? Would the students' off-task behaviors remain at the lower observed levels if response cards were used for a longer amount of time? Further it would be interesting to see what impact, if any, response cards have on the performance and behavior of students with more significant learning or behavioral challenges than those studied in this project. Future research will be challenged by these questions. The educational profession needs to continue to explore all avenues to increase student performance and behavior and gather the requisite research and data to substantiate any further ideas on this matter.

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## Appendix A

## Student Off-Task Recording Chart

| **Student Off-Task Behavior** **Date: _____**<br>**Time When Observation Began: _____** | | | | |
|---|---|---|---|---|
| Student | 0-11 minute mark Number of off-task behaviors | 11-22 minute mark Number of off-task behaviors | 22-33 minute mark Number of off-task behaviors | 33-45 minute mark Number of off-task behaviors |
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## Appendix B

### Response Card Thesis Study Consent Form

You are being asked to take part in a research study of how high school students' academic performance and student achievement are impacted by the use of response cards. We are asking you to take part because you are currently enrolled in Regents Physics at _____. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

What we will ask you to do: If you agree to be in this study, you will complete short daily quizzes as part of the instructional lesson to measure student achievement and will be subjected to teacher recording of student off-task behavior throughout the course of daily lessons.

Risks/Benefits: There are no potential risks associated with this research study. Students may, however, gain academic improvement through the use of response cards during this study.

Your answers will be confidential. The records of this study will be kept private. In any sort of report we make public we will not include any information that will make it possible to identify you. Research records will be kept in a locked file; only the researchers will have access to the records.

Taking part is voluntary: Taking part in this study is completely voluntary. You may skip any questions that you do not want to answer. If you decide not to take part or to skip some of the questions, it will not affect your current or future academic standing at Pine Valley Jr/Sr High School. If you decide to take part, you are free to withdraw at any time.

If you have questions: The researchers conducting this study are Daniel Bittinger and Prof. Guangyu Tan. Please ask any questions you have now. If you have questions later, you may contact Dan Bittinger at dbittinger@pval.org or at (716) 965-1013. You can reach Prof. Tan at guangyu.tan@fredonia.edu

You will be given a copy of this form to keep for your records.

Statement of Consent: I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Your Signature _____ Date _____

Your Name (printed) _____

# Appendix C

## CITI Certificate

### COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)
**COURSEWORK REQUIREMENTS REPORT***

* NOTE: Scores on this Requirements Report reflect quiz completions at the time all requirements for the course were met. See list below for details. See separate Transcript Report for more recent quiz scores, including those on optional (supplemental) course elements.

- **Name:** Daniel Bittinger (ID: 1780621)
- **Email:** bitt8737@fredonia.edu
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Unit:** Education
- **Phone:** 673-3311

- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 1.
- **Stage:** Stage 2 - Refresher Course

- **Report ID:** 7745886
- **Completion Date:** 12/10/2014
- **Expiration Date:** 12/09/2016
- **Minimum Passing:** 80
- **Reported Score*:** 100

| REQUIRED AND ELECTIVE MODULES ONLY | DATE COMPLETED |
|---|---|
| SBE Refresher 1 – Defining Research with Human Subjects | 12/10/14 |
| SBE Refresher 1 – Privacy and Confidentiality | 12/10/14 |
| SBE Refresher 1 – Assessing Risk | 12/10/14 |
| SBE Refresher 1 – Research with Children | 12/10/14 |
| SBE Refresher 1 – International Research | 12/10/14 |
| Biomed Refresher 1 - Instructions | 12/10/14 |
| SBE Refresher 1 – History and Ethical Principles | 12/10/14 |
| SBE Refresher 1 – Federal Regulations for Protecting Research Subjects | 12/10/14 |
| SBE Refresher 1 – Informed Consent | 12/10/14 |
| SBE Refresher 1 – Research with Prisoners | 12/10/14 |
| SBE Refresher 1 – Research in Educational Settings | 12/10/14 |
| SBE Refresher 1 – Instructions | 12/10/14 |

**For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.**

**CITI Program**
Email: citisupport@miami.edu
Phone: 305-243-7970
Web: https://www.citiprogram.org

# COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI PROGRAM)

## COURSEWORK TRANSCRIPT REPORT**

** NOTE: Scores on this Transcript Report reflect the most current quiz completions, including quizzes on optional (supplemental) elements of the course. See list below for details. See separate Requirements Report for the reported scores at the time all requirements for the course were met.

- **Name:** Daniel Bittinger (ID: 1780621)
- **Email:** bitt8737@fredonia.edu
- **Institution Affiliation:** SUNY - College at Fredonia (ID: 273)
- **Institution Unit:** Education
- **Phone:** 673-3311

- **Curriculum Group:** Human Research
- **Course Learner Group:** Group 1.
- **Stage:** Stage 2 - Refresher Course

- **Report ID:** 7745886
- **Report Date:** 12/10/2014
- **Current Score**:** 100

| REQUIRED, ELECTIVE, AND SUPPLEMENTAL MODULES | MOST RECENT |
|---|---|
| SBE Refresher 1 – History and Ethical Principles | 12/10/14 |
| Biomed Refresher 1 - Instructions | 12/10/14 |
| SBE Refresher 1 – Federal Regulations for Protecting Research Subjects | 12/10/14 |
| SBE Refresher 1 – Informed Consent | 12/10/14 |
| SBE Refresher 1 – Research with Prisoners | 12/10/14 |
| SBE Refresher 1 – Research in Educational Settings | 12/10/14 |
| SBE Refresher 1 – Instructions | 12/10/14 |
| SBE Refresher 1 – International Research | 12/10/14 |
| SBE Refresher 1 – Defining Research with Human Subjects | 12/10/14 |
| SBE Refresher 1 – Assessing Risk | 12/10/14 |
| SBE Refresher 1 – Privacy and Confidentiality | 12/10/14 |
| SBE Refresher 1 – Research with Children | 12/10/14 |

**For this Report to be valid, the learner identified above must have had a valid affiliation with the CITI Program subscribing institution identified above or have been a paid Independent Learner.**

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