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# STUDENT AND TEACHER PERCEPTIONS ABOUT USING ACCOMMODATIONS IN THE GENERAL SCIENCE CLASSROOM

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STUDENT AND TEACHER PERCEPTIONS ABOUT USING  
ACCOMMODATIONS IN THE GENERAL SCIENCE CLASSROOM

By

Rhonda Lee McKimpson

THESIS

Submitted to  
Northern Michigan University  
In partial fulfillment of the requirements  
For the degree of

MASTER OF ARTS

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2008

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ABSTRACT

STUDENT AND TEACHER PERCEPTIONS ABOUT USING  
ACCOMMODATIONS IN THE GENERAL SCIENCE CLASSROOM

By

Rhonda Lee McKimpson

By law, greater numbers of students with special needs are in a general classroom. Now general education teachers must provide accommodations so students with special needs can learn the same material as the general student population. Surveys were given in general classrooms to students with special needs, general education students, and science teachers to evaluate how both students and teachers feel about accommodations and other issues relating to students with special needs in a general science class. According to the students' self-reported survey results, students receiving accommodations and students without accommodations were equally likely to receive a grade of C or higher in science. The student survey results suggest that accommodations are most effective if the general education students in the class are not even aware that accommodations are being provided to some students. Sixty-one percent of the surveyed teachers felt forced to give the accommodations to students with special needs in a general science class. Teachers also reported that providing accommodations required more preparation. Accommodations appear to work when given appropriately to students with special needs.

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## DEDICATION

This thesis is dedicated to my husband, Marv McKimpson, and to my children Nathan and JoAnn McKimpson, Karl McKimpson, Wendy McKimpson, and Neal McKimpson.

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This thesis follows the format prescribed by the APA Publication Manual and the Department of Education.

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## CHAPTER 1: INTRODUCTION

Increasingly due to No Child Left Behind legislation (NCLB, 2007) more students with special needs are now in general education classes. This thesis looks at students with special needs in general science classes. Are teachers knowledgeable and comfortable with accommodations, so students with special needs can succeed, or are these students being left behind? The National Science Teachers Association (NSTA) states "science for every student" (2007). Where would society presently be without the contributions of Thomas Edison, who had dyslexia; Isaac Newton, who stuttered and had epilepsy; and Leonardo da Vinci, who some think had dyslexia (RedDisability, 2008)? These great scientists would have most likely been left behind in current educational systems because of various learning difficulties (Cooper, Baum, & Neu, 2004). Perhaps some current students with special needs will become our future scientists.

In 2004, the Individuals with Disabilities Education Improvement Act (IDEA) was reauthorized for the education of students with special needs. This act calls for educating students with special needs in the least restrictive environment possible. By law, greater numbers of students with special needs are now placed in a general classroom. When these students are included in a general classroom, general education teachers must provide accommodations so students with special needs can learn the same material as the general student population.

Accommodating students with special needs in a general classroom, however, raises many questions. How does giving accommodations in a general science class affect grades of students with special needs? How do students with special needs perform in general science classes with appropriate accommodations? Are teachers willing to provide these students with accommodations so students with special needs can perform at their best? Are students with special needs being left behind? How do general science teachers best accommodate students with special needs so these students will succeed in science (i.e. receive a C or better grade average)?

### History

Because of NCLB and NSTA statements, all teachers in general education classes must be ready to include students with special needs. In very few cases do secondary teachers receive training on how to include these students in a general classroom (Sencibaugh, 2005). The number of students with special needs is increasing in general education classrooms (University of Washington, 2004). Particularly in high school general education classes, students are reluctant to accept accommodations (Thurlow, 2002). Whether students' reluctance to accept accommodations is because of peer pressure or because of their belief that accommodations are not necessary is not known at this time.

Science, health, music, and physical education classrooms are areas where students with special needs are first included. The focus of this thesis is on inclusion of students with special needs in science classrooms. In today's technological society, science plays an integral part in most people's everyday

life. Science is a most important subject for all students, especially students with special needs (McKimpson & Skornia, 2003; Zembylas, 2002). When teaching students with special needs, general education teachers may need to do more preparation, be more sensitive to what students can do, plan for additional time, and place greater emphasis on creating a positive learning environment. In addition, it may be necessary to consult with a special education teacher, and receive additional training (NSTA, 2007; Zembylas, 2002).

### Suggested Accommodations

The National Center for Learning Disabilities (2006) defines "accommodations" as "alterations in the way tasks are presented to help ... students complete the same tasks". Accommodations do not alter what a student has to do in class, just how a student does the work. Accommodations are sometimes needed for lectures, assignments, tests, labs, and/or classroom accessibility. However, general education teachers rarely have training in how to give accommodations to students with special needs (Coombs-Richardson, A-Juraid, & Stuker, 2000). When given a list of accommodations required for a student, teachers may have no idea how to arrange these accommodations to maximize the utility of each specific accommodation. Literature abounds with different methods of accommodating students with special needs (Burgstahler, 1996; Cooper, Baum, & Neu, 2004; McKimpson & Skornia, 2003; Price, Mayfield, McFadden, & Marsh, 2001; University of Washington, 2004).

Accommodations come in a variety of types and depend on the type of disability students need to have addressed. Some examples of accommodations

are giving a course syllabus on the first day of class, presenting materials in different ways (e.g., lecture, discussion, hands-on, or inquiry-self or teacher directed), providing study guides, and changing the environment in the classroom (Burgstahler, 1996; Cooper, et al., 2004; Price, et al., 2001). Course syllabi do not have to contain an entire year's assignments; one marking period is sufficient. Material presentation may use small amounts of reading and writing or none at all, assistive technology, or multiple presentation techniques (Cooper, et al., 2004; Price, et al., 2001; University of Washington 2004).

Students in a general classroom who receive accommodations are assisted so these students can learn the same material in the way best understood by the student. Students with special needs have the same requirements as other students in a general classroom. Examples of accommodations generally used include using a special structured program, tape-recorded books or lectures, peer mentoring, large print, extra time, and student organizers (Sencibaugh, 2005, McKimpson & Skornia, 2004, Price, et al., 2001, University of Washington, 2004).

#### Statistics of Accommodations

Students who received accommodations in a general classroom seem to do slightly better on standard academic grades than classmates who received subject instruction in a resource room (Rea, McLaughlin, & Walther-Thomas, 2002). Rea, McLaughlin, and Walther-Thomas (2002) found students with special needs who had a higher number of days in school had higher grades as long as these students continued to attend regularly. School attendance was higher for

students with special needs in an inclusive setting, but this inclusion did not seem to make a difference in student behavior. Behaviors of students with special needs will not be covered in this thesis. No information was available as to whether special education teachers had adjusted grades of students taught in a resource room (Rea, et al., 2002).

Standard tests in math and language were slightly higher for students with special needs who were taught in a resource room, while test scores for reading, science, and social studies remained similar to scores of students with special needs who were taught in general classes (Rea, et al., 2002). The nation's average science scores were about equal in both 1996 and 2000 for students who received accommodations on tests and for those who did not (National Assessment of Educational Progress, 2003). Mastropieri, Scruggs, Norland, and Berkeley (2003) reported comparable declining performance of both grade 12 students permitted accommodations and those not permitted accommodations between 1996 and 2000. In 1996, students not permitted accommodations scored 150 ( $\pm 0.9$ ) on National Average Science Scale Scores, and students permitted accommodations scored 150 ( $\pm 0.7$ ). In 2000, scores differed by one, i.e. 147 ( $\pm 1.0$ ) and 146 ( $\pm 0.9$ ) between groups where accommodations were not permitted and groups where accommodations were permitted (Mastropieri, Scruggs, Norland, & Berkeley, 2003). These scores were true regardless of the proficiency level or gender of the students (National Assessment of Education Progress, 2003). In 2005, the National Assessment of Education Progress

(NAEP) found twelfth graders (with or without accommodations) actually lost levels of proficiency (Science for Students, 2007).

Dupuis, Barclay, Holmes, Platt, Shaha, & Lewis (2006) gave all students (both those with and without special needs) in a high school a survey to rate how students with special needs felt about being in a general classroom. This survey had two versions. Only students with special needs answered one version, and only general education students answered the other version. The study found that very few of general education students (23.3%) realized classes included a student with special needs (Dupuis, et al., 2006). The researchers concluded students with special needs tried to work harder when placed in an inclusive classroom.

Barclay, Holmes, Elmore, Dupuis, Lewis, and Shaha (2006) examined Florida students with disabilities and found the gap between general education and special education students closed between 2003 and 2005. Research by them also showed progress towards reducing the gap between on FCAT scores for regular education students and students with disabilities (184.4 vs. 101.6). On the other hand, Mastropieri, Scruggs, Norland, and Berkeley (2003) reported no difference between students who received accommodations and students who did not on standardized tests.

In Virginia, 213 students (44 of which had special needs) were given proficiency tests in various science disciplines. Of those special needs students tested, 48% performed at a proficient or advanced level in Earth Science, 56% performed at a proficient or advanced level in Biology, and 63% performed at a

proficient or advanced level in Chemistry (Mastropieri, Scruggs, Norland, Berkeley, McDuffie, Tornquist, & Connors, 2006).



## CHAPTER 2: LITERATURE REVIEW

Are science accommodations different from accommodations used in other classes? Many accommodations are similar for all classes, but science can be one of the easier subjects to accommodate students with special needs.

Science classrooms should rely heavily on inquiry (NSTA, 2007). Inquiry uses one of the most emphasized principles for inclusion of students with special needs, and is easily adapted to diverse learning styles (Grumbine & Alden, 2006; Haskell, 2000; Jarrett, 1999; Lamb, Hodges, Brown, & Foy, 2004; Maroney, 2003; McKimpson & Skornia, 2004; Ormsbee & Finson, 2000; Stefanich, 1998; University of Washington, 2003). Students in science classes are led in discovery, hands-on labs, small group work, or large group discussions. With growing numbers of students with special needs in general classrooms, more methods courses are needed to address how to teach with diverse learning styles (Stefanich, 1998).

This section contains a number of specific examples of inclusive classrooms. For example, the five alternate approaches to instruction is one type of program for an inclusive classroom (Stefanich, 1998). These five alternate approaches are taught to pre-service teachers during methods courses. Five approaches to instruction are 1) explicit teaching, 2) mastery teaching, 3) inquiry teaching, 4) guided study, and 5) exploratory learning (Stefanich, 1998).

Another method employs gaining and demonstrating knowledge (University of Washington, 2003). In this method, gaining knowledge is the actual teaching of information and demonstrating knowledge is the assessment.

A more recent educational method for teaching science has six principles: 1) using multiple approaches to teach information, 2) giving examples of skills necessary to succeed, 3) organizing class structure, 4) students knowing what is expected (i.e. rubrics), 5) teacher feedback, and 6) sharing of student strengths in class (Grumbine & Alden, 2006).

The state of Maryland uses a five-step program to make sure each student gets needed accommodations: 1) setting expectations, 2) finding the correct accommodation, 3) obtaining and putting in place the correct accommodation, 4) making sure accommodations are used every day, and 5) constantly reevaluating and improving accommodations (Section 4, Maryland, 2006). All of these programs rely on using different styles of teaching in a science classroom. Some other methods place a student feeling in control of their lives at the center of the program (McKimpson & Skornia, 2003), re-tooling lessons (Ormsbee & Finson, 2000), and co-teaching (Haskell, 2000, Maroney, 2003).

Teachers must use different ways of teaching to reach all students.

In the past, science quite often relied on a lecture format. A lecture format is difficult for students with special needs to understand (Haskell, 2000). If this type of delivery must be used, a teacher may copy notes for students with special needs. Copying notes is relatively simple and does not require excessive time. Reading notes does have a disadvantage of some students not listening to the

lecture. Copying notes and omitting certain key words or equations allows the student to listen actively and place key words in notes for important concepts. Copied notes with omitted words helps, but teachers need to emphasize the important concepts (McKimpson & Skornia, 2004).

A summer workshop was held for pairs of teachers (one special education teacher and one regular science teacher) to introduce inquiry in science using a co-teaching format (Maroney, 2003). These two teachers worked together to plan an atmosphere and environment to accommodate special needs students in a general science classroom. In the workshop, teachers were given information about planning an atmosphere and accommodations to help all students succeed in science. This type of workshop provided teachers with an opportunity to learn methods of inquiry and co-teaching. Although a stipend and credit were provided, the researchers had difficulty recruiting teachers and keeping teachers through the end of the project. Lack of time and possible reluctance to undertake new learning experiences makes professional development about accommodations to general faculty difficult (McKimpson & Skornia, 2004).

#### Interventions That Worked

A diversified teaching style is necessary to reach all students in a science classroom. This section includes successful examples of the use of diversifying pedagogy. A number of students with special needs are gifted in science or fine arts, as mentioned earlier with Edison, Newton, and da Vinci (Cooper, Baum, & Neu, 2004). One program, where reading and writing excellence was not required for students who are gifted and have special needs, had three stages:

Stage 1 identified talent, Stage 2 contained intense discovery training in science skills, and Stage 3 had a weeklong creative production. At Stage 3, science, engineering, and fine arts students were divided into teams to solve a problem. On the last day, each team gave its presentation. Some of the students in this project went on to win science fair competitions and other awards (Cooper, et al., 2004).

Other teaching methods use divisions, such as the 5-step Process for Accommodations (Section 4, Maryland, 2006). Currently these programs set the expectations, maintain learning expectations, suggest accommodations, make adjustments for test day, and ask for reflection (Section 4, Maryland, 2006). Of course, some of the Maryland steps contain accommodations all students may be able to use to enhance their learning experience.

Getting students with special needs to learn material and then show what was learned can be difficult. One workshop showed a general education and a special education teacher pair how to co-teach science classes (Crawley, 2002). This workshop was an intense 80-hour program done over 14 days. The teachers took the knowledge back and applied the skills in the classroom. Using surveys the researchers found general education students changed in their attitude toward the special education teachers and the students with special needs were more accepted by the general population.

A final method dealt with the "seven core principles" (Bergeson, et al., 2006). This program not only had the seven principles but also used a tiered system for students. Most students (90%) were in Tier I. If a student did not

perform well in class the student was moved to Tier II where the student received some small group help. If a student was moved to Tier III for not making progress, a review of the student's IEP was convened. The students in this program were "at-risk for failure" students or special needs students.

Teachers of students with special needs, can give many accommodations to these students in a general classroom, but will these students with special needs use the accommodations? The next section deals with the attitudes of general education teachers, general education students, and special needs students to accommodations and inclusion.

### Teacher Attitudes

Teachers in general education are generally negative towards having students with special needs in their classroom (Biddle, 2006; Coombs-Richardson, A-Juraid, & Studker, 2000; Ellins & Porter, 2005; Norman, Caseau, & Stefanich, 1996; Robinson, 2002). Teachers generally lacked the training to deal with most special needs students.

As a general science teacher with a special education background, I have had difficulty giving student accommodations in ways not noticed by the general student population. Although I try to incorporate some of the accommodations into the regular class routine, additional time on a test is hard to give to everyone because classes are constrained by set periods. Students only have five minutes between classes and other teachers do not appreciate entire classes being late.

Teachers in a general classroom usually also prefer to have some types of students with special needs rather than others; most teachers would prefer to

have cognitively impaired students rather than students with behavioral or emotional issues (Biddle, 2006). I have found behavioral issues difficult to deal with in any classroom. When I was in a resource room, the general education teachers tended to send behavioral problems to me rather than dealing with the behaviors in the general classroom.

The teacher's attitudes need to be changed if inclusion is going to succeed (Biddle, 2006). Starting at the university class level, incoming teachers need to have methods classes to help teachers deal with inclusion in the general classroom (Biddle, 2006; Coombs-Richardson, 2000; Norman, Caseau, & Stefanich, 1996). More observation time in an inclusive classroom and time observing a resource room are ways to help address this problem. Lack of preparation time also affects teachers' attitudes toward inclusion of students with special needs. Teachers need time to diversify the lessons and time to meet with special education teachers (Biddle, 2006; Norman, Caseau, & Stefanich, 1996; Robinson, 2002). The Coombs-Richardson (2000) study did try to address these two concerns by offering a workshop. Coombs-Richardson (2000) gave the participants information and practice in reducing outbursts in class, collaborating with other teachers, and accommodations for class work and tests. All of the tuition for the workshop was paid for, and the teachers received nine credits in special education, but few teachers participated. As a special education teacher I would have appreciated time to go and visit, if not co-teach, a general classroom.

Researchers have worked with pre-service teachers trying to change some of the issues with inclusion (Richards & Clough, 2004). Pre-service

teachers generally did not want disruptive students with behavior challenges included in class. Before teaching students with behavior challenges, the majority of pre-service teachers thought inclusion would have a positive effect on all students (Richards & Clough, 2004). When these teachers were surveyed after being in the classroom, the teachers still felt students with special needs fit in well in the general classroom and succeeded. Richards and Cloughs (2004) did not give their definition of succeeded. Inclusion was good for the students with special needs, but the teachers in the study felt having students with special needs in class was extra work for the teacher and kept the other students in class from learning as much (Richards & Clough, 2004). In review, inclusion is "extra" work for the teacher, but the teachers should "want" to make this effort so every student in their classroom can learn.

#### Student Attitudes

How do students with special needs feel about being in a general education classroom? Students are generally "passive recipients" (Miller & Fritz, 2000) when receiving instruction in the classroom. Since science should be taught using inquiry, it is one of the first classes where students with special needs are placed (McKimpson & Skornia, 2003; Zembylas, 2002). Students with special needs prefer being in a general classroom when appropriate accommodations are given (Kortering & Braziel, 2002; Miller & Fritz, 2000). Students have also reported that having a special education teacher co-teach in the general classroom is the preferred method of assistance (Kortering & Braziel, 2002; Kortering, McClanron, & Braziel, 2005; Miller & Fritz, 2000). The students'

biggest complaint was that some teachers yelled at the students with special needs and called the student lazy (Miller & Fritz, 2000). The most useful type of instruction was hands-on, discovery-directed studies, as shown by students' opinions of the Universal Design Learning interventions (Kortering, McClannon, & Braziel, 2005). Students with special needs reported science as the most interesting core subject (Kortering & Braziel, 2002).



## CHAPTER 3: METHODOLOGY

IDEA (2004) states students with special needs must be educated in the least restrictive environment possible, which means more students with special needs are being educated in the general classroom. As these students reach high school, do these students use the designated accommodations provided in the general classroom? How do other students feel about being in a class containing students with special needs? In this research, surveys were given to general education teachers, students with special needs in general education classrooms, and general education students to evaluate how each felt about issues relating to students with special needs in a general science class.

A survey of teachers can provide important information about how accommodations for students with special needs are given in the general science classroom. In this study, accommodations for students with special needs are the independent variable. The outcome variable is the grade students with accommodations receive in a general science class. How the teacher gives the accommodations can be a moderating factor. The study used surveys of teachers to understand how these teachers feel about giving accommodations to students. The teacher can willingly provide the accommodations, be neutral towards giving the accommodations, or dislike the extra work the accommodations require. Teacher's attitudes might also have a moderating influence on the grades a student with accommodations receives and might correlate with student grades.

## Teacher Survey

A one-page teacher survey was developed. See Appendix A. The first set of questions included information about classes currently being taught by the teacher, type of school (urban, rural or suburban), and teaching experience. The second set of questions contained information about whether the teacher uses accommodations in the classroom and how the teacher feels about giving accommodations. The third set of questions was about co-teaching. For the purposes of this study, co-teaching was defined as two teachers, where usually one general education teacher and one special education teacher share teaching duties in a general classroom (Crawley, Hayden, Cade, & Baker-Kroczyński, 2002). Teachers were first asked whether classes were co-taught. If classes were co-taught, the teacher was asked if the co-teacher was a general education teacher, a special education teacher, or some other individual with experience working with students.

The survey was developed by compiling questions from several previous surveys done by researchers. These previous studies asked teachers about their attitudes toward students with special needs in the general science classroom and generally found that teachers responded negatively (Biddle, 2006; Ellins & Porter, 2005; Norman Caseau, & Stefanich, 1996). Accordingly, it was important to use the same questions as in the previous studies in order to find out if attitudes and practices had changed as more students with special needs were placed in general classes. Several teachers and technical writers not involved in the data collection were asked to evaluate the clarity of the questions and the

ease of reading and answering the survey. Northern Michigan University Human Subjects Research Review Committee granted permission to conduct this survey research (#HS08-160).

The surveys were distributed by hand or postal mail. To preserve respondent anonymity the mailed surveys had an enclosed envelope with postage for the return of the survey. All envelopes and surveys were separated before being counted. Hand-delivered surveys were returned to my school mailbox in an unmarked envelope. I counted the results by hand and used SPSS Statistics (SPSS, Inc. Chicago, IL) for statistical analyses.

This study measured the data quantitatively. Data reliability was maintained through anonymity since no personal information was gathered and survey responses were not linked to respondents. All responses were considered truthful. The questions were peer evaluated to determine whether the questions asked would elicit the response desired, contributing to the validity of the survey.

### Student Survey

The student survey was conducted at Peoria Notre Dame High School in Peoria, IL. Peoria Notre Dame is a non-public, 4-year college-preparatory high school accredited by the North Central Association of Colleges and Secondary Schools. The school is recognized by the State of Illinois as a high achieving school, and currently has approximately 800 students. Graduating students typically have a mean ACT composite score of 24, and more than 95% of these graduates continue their education at the college level. The students surveyed were enrolled in one of six general science classes taught by me—one

freshman-level physical science class, two freshman-level Honors physical science classes, two sophomore-level biology classes and one upper-level (primarily junior and senior) Honors Principles of Engineering class. Each class contained at least one student with special needs. These included students with learning disabilities such as dyslexia, reading comprehension problems, and tracking deficiencies, as well as students with Asperger's syndrome and Tourette's syndrome. Some students also exhibited behavioral issues.

The survey instrument was a one-page survey designed by the researcher and based upon the research literature. This survey consisted of 7 yes/no questions and 11 questions ranking the responses with interval scaling from 5 to 1 (5 being Definitely, and 1 being Not-at-all). The student survey is in Appendix B. This survey contained questions other researchers have asked students (Biddle, 2006; Ellins & Porter, 2005; Norman, Caseau, & Stefanich, 1996), which adds to the construct validity of the survey. I supplemented the research questions with items involving science: " Do you like science (yes/no), " Every student should receive the same accommodations in class regardless of whether a disability exists (rank 5 to 1)", " I received a grade of C or better on my last grade report (yes/no)", and "Science classes are of average difficulty (rank 5 to 1)". These questions were necessary to obtain information needed for effectively interpreting each response.

As required by the Northern Michigan University Human Subjects Research Review Committee under approval #HS08-160, each student's parent was asked to give permission for the student to answer the survey and the

surveys were given only to students who had parental permission recorded. The survey was administered to these students by a substitute teacher on a day in which I was out of the building. This teacher read a standard set of instructions and definitions to each class and then distributed the survey. Completed surveys from each class were collected in an envelope. All surveys were placed in the same envelope so the person completing the survey remained anonymous.

## CHAPTER 4: RESULTS

Thirteen teachers out of 20 returned surveys (65%). Of the 13 teachers responding to the survey, 6 were from public schools and 7 were from private schools. These 13 teachers had varied years of teaching experience and average numbers of students in class. The teachers were from three types of environments, including five teachers from urban schools, five from suburban schools and three from rural schools. The geographical areas included teachers in the schools of the Upper Peninsula of Michigan, the Chicago area, and Central Illinois. The range of teaching experience was wide, ranging from less than one year of teaching experience up to nearly 42 years of experience. All responding teachers had classes containing students with disabilities.

### Teachers

Responses of the teachers were consistent across subject areas and number of years taught. Table 1 gives a synopsis of years of teaching experience and the average number of students per class for the teachers responding to the survey. The raw data is in Appendix F. There was no difference between areas of science taught.

Table 2 has a summary of the results of the survey. The complete listing of the statistical results is in Appendix C. The majority of the surveyed teachers, 8 out of 13, felt forced to give accommodations to students with special needs. The teachers' feeling towards giving the accommodations was the same regardless of the years of teaching or the type of school. Half of the teachers ( $n =$

6) felt giving these accommodations was unfair to other students. Teachers with between 11 and 25 years experience and those teaching in urban schools did not think giving accommodations was unfair to other students.

Table 1

*Descriptive statistics for Teachers' reporting of the average number of students in classes and average years of teaching experience.*

	N	Min	Max	M	SD
Students	13	18.00	24.00	21.38	1.66
Teaching years	13	1.00	41.50	21.96	13.50

*Note.* N = number of teachers responding, Min = minimum, Max = maximum, M = mean, SD = standard deviation

Approximately 50% of the teachers (n = 7) modified a student's grade as an accommodation, and 69% (n = 9) had modified their teaching for an entire class due to having a student with accommodations in a general science class. Teachers with 11 to 25 years teaching experience were the more likely to modify a student's grade as an accommodation.

All teachers agreed that accommodations were necessary for students with special needs. About 25% of the responding teachers (n = 4) felt more information on how to give these accommodations was needed. Seventy percent

of the responding teachers (n = 9) felt giving accommodations required more time to prepare the material. One-third of the teachers (n = 5) thought giving accommodations was inconvenient. None of the teachers felt giving accommodations was a waste of time. Two teachers responded that more information was needed on why accommodations are necessary. These teachers spanned a wide range of teaching experience; one was a relatively new teacher and the other had been teaching for over thirty years. Two teachers co-taught classes with special education teachers. The teachers co-teaching classes were from rural and suburban schools, and both had less than 25 years teaching experience. All of the surveyed teachers had students with accommodations in at least one of the classes taught each day.



Table 2

*Results of questions asked of teachers about accommodations in a general science class.*

Question	<u>Frequency</u>		<u>Percent</u>	
	Yes	No	Yes	No
Do you ever adjust a student's grade as an accommodation?	7	6	53.8	46.2
Do you ever feel forced to give accommodations?	8	5	61.5	38.5
Do you ever feel that giving these accommodations is unfair to other students?	6	7	46.2	53.8
Have you modified your teaching for the entire class due to having students with special needs in your general science classroom?	9	4	69.2	30.8
I feel that accommodations require more preparation.	9	4	69.2	30.8
I feel that accommodations are inconvenient.	5	8	38.5	61.5
I wish there was someone to help me administer the accommodations.	4	9	30.8	69.2

*Note.* N = 13 teachers.

All teachers surveyed displayed a strong trend towards accommodation in the general science classroom. Nevertheless, approximately one-half of these teachers had concerns about the administration of accommodations. About 30% of the responding teachers (n = 4) would either like or appreciate some help administering the accommodations.

### Students

Permission slips were mailed to all 124 students in the researchers general science classes. Of these 124, 70 were returned (56%). Some students asked their parents not to return the permission slip because no extra credit was given for taking the survey. All special needs students in the general science classes surveyed opt to do the survey. Students answered most survey items, but 3% of survey items were not answered by some students. Interval scaling was used to compile the data and an analysis of variance (ANOVA) statistical analysis was run on the compiled results.

Overall results from the student survey are summarized in Table 3 and Table 4. Only about 20% of the responding students thought there were students with special needs in their general science class. The same percentage responded that they received accommodations, but 43% of the students said accommodations were used. This may have been due to the students' misunderstanding exactly what an accommodation was, even though accommodations were explained the week preceding the completion of the survey.

Table 3

*Overall yes/no results from student survey*

Question	Frequency		
	Yes	No	%Yes
There are students with disabilities in my class.	14	56	20%
I have friends with disabilities.	41	29	59%
Do you receive accommodations in science class?	15	54	22%
If you receive accommodations, do you use them?	29	38	43%
If you were paired with a student who needed help in class would you want to stay paired with them?	48	20	71%
Are your grades and other students' grades calculated the same?	65	4	94%
I received a grade of C or better on my last grade report.	69	1	99%

Table 4

*Overall results from student survey*

Questions	5	4	3	2	1	M	SD	SEM
Like classes with students with disabilities.	8	8	42	6	1	3.2	0.85	0.11
Class is better, it contains many different students.	19	16	25	6	2	3.6	1.08	0.13
Learn better with students with disabilities - teachers teach in different ways.	10	16	27	6	7	3.2	1.15	0.14
My classmates with disabilities are treated equally in class.	21	8	32	5	1	3.6	1.06	0.13
Because ... experience in class ... more comfortable ... people with disabilities.	15	23	20	9	2	3.6	1.06	0.13
I learn better in classes with general education classes.	13	20	22	8	4	3.4	1.12	0.14
I work harder in general education classes.	9	14	27	10	7	3.1	1.15	0.14
Because of my experience ...I am more respectful of people different from me.	30	17	16	3	0	4.1	0.94	0.12
Every student should receive the same accommodations	16	5	21	9	16	2.9	1.47	0.18
Science classes are of average difficulty.	7	27	24	10	1	3.4	0.91	0.11
I like science.	20	18	15	4	11	3.5	1.40	0.17

5 = strongly agree, 1 = strongly disagree, M = mean, SD = standard deviation, and SEM = standard error mean

Pearson product moment correlation coefficients were calculated between the various rank items on the survey to investigate relationships between these items for all students. Only one pair of responses, “Learn better in general ed classes” (rank item 6) and “Work harder in general ed classes” (rank item 7) showed a marked correlation ( $r = 0.64$ ). Several pairs of responses showed moderate correlations. Two items from Table 4, “Like being with SWD” (rank item 1) and “Comfortable around people with disabilities” (rank item 5), showed correlation coefficients between 0.5 and 0.6 when associated with “Class better with SWD” (rank item 2). Three items, “Like being with SWD” (rank item 1), Class better with SWD” (rank item 2) and “Comfortable around people with disabilities” (rank item 5) showed correlation coefficients ranging from 0.4 to 0.5 with “More respectful of different people” (rank item 8).

A chi-square analysis was also run to examine possible differences between students with and without accommodations with respect to receiving a grade of C or higher in the class. This analysis confirmed the null hypothesis that no difference existed between these two groups. Both groups were equally likely to receive a grade of C or higher.

The data were analyzed separately for the freshman (graduation year 2011) and sophomore (graduation year 2010) classes since those two classes had the most respondents ( $n = 65$ ). The four questions with statistically significant differences between these two groups are given in Table 5 and 6. Complete statistical results are in Appendices D and E.

Table 5 has the descriptive statistics for these four questions. The students seem to have higher interest in science as they progress through high school. A similar trend was observed for the upper-level students. One senior (graduation 2008) and four juniors (graduation 2009) answered the surveys.

Table 5

*Group statistics for the four significant items from the student survey by year of graduation (2010 and 2011).*

Question	Class	N	M	SD	SEM
Learning better	2010	26	3.88	1.071	0.210
	2011	38	3.21	1.094	0.178
Work harder in	2010	25	3.76	1.091	0.218
	2011	39	2.82	1.097	0.176
Science average difficulty	2010	26	3.77	0.908	0.178
	2011	39	3.28	0.887	0.142
I like science	2010	26	3.88	0.993	0.195
	2011	39	3.10	1.553	0.249

N = number of respondents, M = mean, SD = standard deviation, SEM = standard error of the mean

These five students answered the same as the freshman and sophomore students except liking science. The five upperclassmen liked science better than the underclassmen.

Table 6

*Statistically significant student survey results from ANOVA.*

Questions	F	Sig
I learn better in classes with general education students.	5.960	0.018
I work harder in general education classes.	11.220	0.001
Science classes are of average difficulty.	4.618	0.035
I like science.	5.171	0.026

As shown in Table 7, only 23% of the Honors Physical Science students definitely liked science.

Table 8 summarizes responses to the Yes/No questions by type of class. Even though all of the general science classes contained at least one student with disabilities in each class, very few students responded that their class contained students with disabilities. Students in Honors Physical Science and Principles of Engineering, both of which are honors classes, were more willing to work with students with special needs than with students in biology or (regular) physical science. It is also interesting to note that more students reported that

they used accommodations than reported that they received accommodations. All but one student in each class felt grades were calculated the same for general students and students with disabilities. Only one student was receiving a grade lower than C at the time the survey was taken. All of the students with special needs in the general science classes received a grade of C or higher. One student with special needs received a B+ in an honors science class.

Table 7

*Number of Honors Physical Science students liking science.*

Item	5	4	3	2	1	No Response
I like science.	7	7	6	3	7	0

*Note.* Total N = 30, 5 = Definitely like science, 4 = Somewhat like science, 3 = Neutral, 2 = Do not really like science, and 1 = Definitely do not like science.

Complete student survey data broken down by class is in Appendix G.



Table 8

*Student responses to questions by type of science class.*

Question	Biology		PSci		H PSci		POE	
	Y	N	Y	N	Y	N	Y	N
Disabilities in class	4	20	4	6	6	24	0	6
Friends with disabilities	10	14	7	3	22	8	2	4
Receive accommodations	7	17	1	9	6	24	1	4
Use accommodations	16	8	4	6	8	21	1	3
Pair with student with disabilities	18	4	5	5	22	8	3	3
Grades calculated the same	23	1	9	1	29	1	5	0
Receiving grade of C or better	24	1	10	0	30	0	5	0

Y = Yes, N = No, PSci = Physical Science, H PSci = Honors Physical Science,  
POE = Principles of Engineering

## CHAPTER 5: DISCUSSION

The results of the teacher survey indicate few of the teachers feel entirely comfortable giving accommodations. Lack of being comfortable is a concern, since teacher expectations may lower performance of students with disabilities who are placed in general science classrooms. Co-teaching might be one way schools could address this issue and accommodate the growing numbers of students with disabilities in general science classes. Indeed, co-teaching with special education teachers might be very helpful in the administration of student accommodations. Unfortunately, co-teaching does not seem characteristic of the schools where the respondents teach. The teacher survey results also show 50% of the general education science teachers feel accommodations are unfair to other students. Teachers need more training in why accommodations are given. Having teachers who understand how to give accommodations will allow students with special needs to receive higher grades in science classes.

Since all teachers will continue to have more students with disabilities in the general classroom, in-service programs to help these general education teachers need to be developed. These in-services should deal with only a few types of accommodations at a time. Otherwise teachers who need this training the most may be overwhelmed with information and become frustrated. Indeed, the less-experienced teachers were generally the ones who expressed the greatest need for additional help administering, or additional training in providing

accommodations. Perhaps more experienced teachers have already developed strategies for administering accommodations effectively.

Teacher in-services to educate all teachers on administering accommodations and individualized help might alleviate the concerns by giving the teachers current information on accommodations. More opportunities for pre-service teachers to practice working with students who receive accommodations might be valuable. Perhaps pairing pre-service teachers with special education teachers for a portion of their student teaching experience would be helpful.

Teacher in-services could be given at the beginning of the year to give needed information to general education teachers on working with students with disabilities in the general classroom. Short workshops during this first in-service could be developed to give practice in using the accommodations while teaching the general class work. In-service training would also give general classroom teachers an opportunity to ask questions about accommodations required by their students during the next school year and provide a chance for more experienced teachers or special education teachers to mentor less experienced faculty about ways to teach students with special needs most effectively.

The number of students who reported that they did not like science was very surprising. Having only 14 out of 30 Honors Physical Science students say anything about liking science was particularly unexpected. These students voluntarily selected the Honors class, so one would have anticipated that they would like science. In fact, most responding students were either neutral towards science or did not like science.

Since each general science class surveyed had at least one student with special needs in the class, it was surprising that only 14 out of 69 students thought their class contained students with special needs. This low number might be explained by the way in which accommodations were given. In my general science classes, I have found students with special needs will routinely refuse accommodations unless these accommodations are provided in discrete or "sneaky" ways. I pass out copies of the notes while passing back homework assignments, and I check planners for homework due dates when I am checking questions or vocabulary for completion. I offer extra test time for everyone. Usually, only the students with special needs take the extra time on tests, but I do have a few general students who use the extra time also. At the beginning of the semester, I also consult with each student to understand what the student expects from the class and any assistance that the student feels will be needed. I give the class a partner exercise to work on while I talk to each student. This way the class is quiet and no one pays much attention to my conversations.

I also try to vary the pairing of students for science laboratory exercises. For small activities, I sometimes allow the students to choose their own partner, which allows me to see how the students with special needs interact with other people in a more informal setting. Usually, struggling academic students pair together and the more successful academic students pair together. This may be an issue for further research.

Although the number of individuals covered under this study was small, the results give direction as to what help teachers may need to administer

accommodations to students with special needs in general science classes, and how students respond to accommodations given in these general science classes. To extend this research, greater numbers of teachers and students should complete the surveys and more science classes need to be included.

As required by the Northern Michigan University Human Subjects Research Committee, all of the students surveyed in this study had parental permission and were in general science classes taught by me at Peoria Notre Dame in Peoria, IL. Administration of accommodations might be significantly different in general science classes taught by other teachers at Peoria Notre Dame or in general science classes taught at other high schools.

Before administering the student survey to additional people, however, the wording of some items on the student questionnaire should be reviewed. As noted above, the survey was administered to students on a Friday when I was out of the building. When I returned the following Monday, several students asked me questions which suggested that they may not have fully understood some items of the survey. In particular, some confusion existed about the term "accommodation, which may explain why 29 students reported using accommodations while only 15 students reported receiving them. (See Table 4.) Although I explained some terms before the students took the survey, apparently explaining accommodations to the classes of general science students did not skew the data, as the students asked once again what accommodations were.

The findings of this study also suggest several "best practices" for helping students with special needs achieve a grade of C or better in a general education

science classroom. First, teachers in general education science classrooms need to be given assistance in providing required accommodations for students. This assistance may be offered in several ways, including formal in-service training sessions and/or informal mentoring programs by more experienced teachers or special education professions. Second, required accommodations need to be provided to students discretely and unobtrusively as possible. The student survey results suggest that accommodations are most effective if the general education students in the class are not even aware that accommodations are being provided to some students. Third, teachers must ensure that performance standards are, in fact, the same for students with and without special needs. If class members perceive students with special needs are allowed—or perhaps even expected—to perform at a lower level, the cohesiveness of the class is likely to suffer.

Finally, accommodations need to be provided to students as early as possible in their high school career. This study shows students' opinions of science and science classes changes significantly from the freshman to the sophomore year. Ensuring the accommodations are effectively provided during the freshman year maximizes the likelihood that students with special needs will develop a positive image of science and science classes.

All of the students with special needs in the general science classes covered under this study received a grade of C or higher, which supports the use of accommodations can produce successful results.

## CHAPTER 6: CONCLUSIONS

Our society is rapidly progressing towards a plan to have all students with disabilities in a general classroom. Teachers in these general science classrooms need to understand fully why accommodations are needed to help students with special needs succeed in science, since 8 out of the 13 teachers felt forced to give accommodations. These same teachers also need to know how to administer the accommodations. Many (7 out of 13) teachers modified grades as an accommodation. In this study, teachers (4 out of 13) reported needing help with accommodations, which points towards teachers needing more training to work with students with special needs in their general classrooms. Teachers also need instruction on how to give the accommodations to students with special needs in a way so the student is willing to accept the accommodation.

I suggest educating the general education teacher as possibly the best way to provide support for accommodations to students with special needs. In-services, workshops, and guidance could occur in mini sessions or full courses. The pre-service teacher needs to have more preparation in giving accommodations before pre-service teachers have their own classrooms with students needing accommodations. The student with special needs deserves to have a general education teacher who is knowledgeable in administering the necessary accommodations.

If the general education teacher is given support and training needed to administer the accommodations, everyone can succeed, including the student with special needs, who has a much better chance in achieving a C grade. Teachers do not need to feel overwhelmed by the accommodations. Ultimately, when accommodations are properly administered, the school system will end up with a higher achieving student body.

Students also need to use the accommodations. If students more fully understood why the accommodations were being given more students with special needs might use them. The student use of accommodations would increase if these accommodations were given in a more appropriate way.

I teach in a general science classroom and I have a special education certification. All of my students with accommodations achieve at a level of C or higher. I have had experience in a resource room giving accommodations, and I understand the science curriculum. Further research must test whether science teachers with special education certifications produce students who have higher academic grades and standardized test scores than science teachers without special education certifications. Based on my research, I recommend all science teachers use accommodations for students--especially students with special needs—who are doing poorly in science classes. Based on the results in my classroom, I anticipate improvement in science achievement of students with special needs when accommodations are provided.



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APPENDIX A

Teacher's Survey

Classes currently teaching: \_\_\_\_\_

Average # of students per class: \_\_\_\_\_

Total years of teaching: \_\_\_\_\_

Would your school be considered :                      urban                      suburban                      rural

Do you have students in general classes with accommodations?                      Yes      No

Do you currently co-teach one or more classes?                      Yes      No

Do you ever adjust a student's grade as an accommodation?                      Yes      No

Do you ever feel forced to give accommodations?                      Yes      No

Do you ever feel that giving these accommodations  
is unfair to other students?                      Yes      No

Have you modified your teaching for the entire class due to  
having students with special needs in your general  
science classroom?                      Yes      No

I feel that accommodations are (circle all that apply):

- a) A waste of time
- b) Necessary for the student
- c) Require more preparation
- d) Inconvenient

My understanding of why students need accommodations:

- a) Is thoroughly understood
- b) I need more training to understand why accommodations are necessary
- c) I wish there was someone to help me administer the accommodations

I co-teach with:

- a) Another general education teacher
- b) A special education teacher
- c) Other

## APPENDIX B

### Student Survey

Science class: \_\_\_\_\_

Class year: \_\_\_\_\_

There are students with disabilities in my classes.	Yes	No
I have friends with disabilities.	Yes	No
Do you receive accommodations in science class?	Yes	No
If you can receive accommodations, do you use them?	Yes	No
If you were paired with a student who needed help in class would you want to stay paired with them?	Yes	No
Are your grades and other students' grades calculated the same?	Yes	No
I received a grade of C or better on my last grade report.	Yes	No

**Rate your feelings on the following. 5=strongly agree and 1= strongly disagree**

I like being in classes with students with disabilities.	5	4	3	2	1
My class is better because it contains many different students.	5	4	3	2	1
I learn better in my classes with students with disabilities because teachers teach in a lot of different ways.	5	4	3	2	1
My classmates with disabilities are treated equally in class.	5	4	3	2	1
Because of my experience in classes with students with disabilities, I am more comfortable around people with disabilities.	5	4	3	2	1
I learn better in classes with general education students.	5	4	3	2	1
I work harder in general education classes.	5	4	3	2	1
Because of my experience in classes with students with special needs, I am more respectful of people that are different from me.	5	4	3	2	1
Every student should receive the same accommodations in class regardless of whether they have a disability or not.	5	4	3	2	1
Science classes are of average difficulty.	5	4	3	2	1
I like science.	5	4	3	2	1

## APPENDIX C

### STATISTICAL RESULTS FROM TEACHER SURVEY

	N	Descriptive Statistics			
		Minimum	Maximum	M	SD
Number of Students	13	18	24	21.38	1.66
Years Teaching	13	1	42	19.85	12.92

Question Number	Survey Results					
	Frequency		Percent		Valid Percent	
	Yes	No	Yes	No	Yes	No
1	13	0	100	0	100	0
2	2	11	15.4	84.6	15.4	84.6
3	7	6	53.8	46.2	53.8	46.2
4	8	5	61.5	38.5	61.5	38.5
5	6	7	46.2	53.8	46.2	53.8
6	9	4	69.2	30.8	69.2	30.8
7A	0	13		100		100
7B	100		100		100	
7C	9	4	69.2	30.8	69.2	30.8
7D	5	8	38.5	61.5	38.5	61.5
8A	9	4	69.2	30.8	69.2	30.8
8B	2	11	15.4	84.6	15.4	84.6
8C	4	9	30.8	69.2	30.8	69.2
9A	0	13	0	100	0	100
9B	2	11	15.4	84.6	15.4	84.6
9C	0	13	0	100	0	100



## APPENDIX D

### Student Survey Interval Data

#### ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
liking	Between Groups	.486	1	.486	.643	.426
	Within Groups	45.385	60	.756		
	Total	45.871	61			
Better	Between Groups	.235	1	.235	.211	.648
	Within Groups	69.249	62	1.117		
	Total	69.484	63			
DiffWays	Between Groups	.376	1	.376	.268	.606
	Within Groups	85.560	61	1.403		
	Total	85.937	62			
Equally	Between Groups	.046	1	.046	.042	.838
	Within Groups	67.223	61	1.102		
	Total	67.270	62			
Comfort	Between Groups	.088	1	.088	.085	.772
	Within Groups	63.182	61	1.036		
	Total	63.270	62			
Learn	Between Groups	7.015	1	7.015	5.960	.018*
	Within Groups	72.970	62	1.177		
	Total	79.984	63			
WorkHard	Between Groups	13.446	1	13.446	11.220	.001**
	Within Groups	74.304	62	1.198		
	Total	87.750	63			
Respect	Between Groups	.342	1	.342	.406	.526
	Within Groups	51.372	61	.842		
	Total	51.714	62			
AllSsAcc	Between Groups	.072	1	.072	.032	.859
	Within Groups	140.537	62	2.267		
	Total	140.609	63			
SciDiff	Between Groups	3.703	1	3.703	4.618	.035*
	Within Groups	50.513	63	.802		
	Total	54.215	64			
LikeSci	Between Groups	9.541	1	9.541	5.171	.026*
	Within Groups	116.244	63	1.845		
	Total	125.785	64			

\*\*p >0.001, \*p>0.1

## APPENDIX E

### Student Survey t-Test Data

#### Group Statistics

	YrGrad	N	Mean	Std. Deviation	Std. Error Mean
Learn	2010	26	3.88	1.071	.210
	2011	38	3.21	1.094	.178
WorkHard	2010	25	3.76	1.091	.218
	2011	39	2.82	1.097	.176
SciDiff	2010	26	3.77	.908	.178
	2011	39	3.28	.887	.142
LikeSci	2010	26	3.88	.993	.195
	2011	39	3.10	1.553	.249

#### Independent Samples Test

		Levene's Test for quality of Variance		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Learn	Equal variance assumed	.039	.844	2.441	62	.018	.674	.276	.122	1.226
	Equal variance not assumed			2.452	54.652	.017	.674	.275	.123	1.225
WorkHar	Equal variance assumed	.110	.741	3.350	62	.001	.939	.280	.379	1.500
	Equal variance not assumed			3.354	51.532	.002	.939	.280	.377	1.502
SciDiff	Equal variance assumed	.019	.892	2.149	63	.035	.487	.227	.034	.940
	Equal variance not assumed			2.139	52.851	.037	.487	.228	.030	.944
LikeSci	Equal variance assumed	10.541	.002	2.274	63	.026	.782	.344	.095	1.469
	Equal variance not assumed			2.476	62.928	.016	.782	.316	.151	1.413

## APPENDIX F

### Raw Data Results from Teacher Survey

	YES	NO	% yes	Feelings based on experience					
				0-10 yrs		11-25 yrs		26-45 yrs	
				Yes	No	Yes	No	Yes	No
Have students with accommodations	13	0	100	4	0	4	0	5	0
currently co-teach	2	11	15.38	1	3	1	3	0	5
ever adjust student's for accommodation	7	6	53.85	2	2	3	1	2	3
feel forced to give accommodation	8	5	61.54	3	1	3	1	3	2
giving accommodations unfair to other students	6	7	46.15	2	2	1	3	3	2
modified teaching for entire class	9	4	69.23	4	0	3	1	2	3
				Feelings based school location					
				Urban		Suburban		Rural	
				Yes	No	Yes	No	Yes	No
Have students with accommodations				5	0	5	0	3	0
currently co-teach				0	5	1	4	1	2
ever adjust student's for accommodation				2	3	3	2	2	1
feel forced to give accommodation				2	3	4	1	2	1
giving accommodations unfair to other students				1	4	3	2	2	1
modified teaching for entire class				4	1	3	2	2	1
				Feelings accommodations on experience					
				Accommodations	%	0-10 yrs	11-25 yrs	26-45 yrs	
				waste of time	0	0	0	0	0
				require more preparation	9	69.23	3	3	3
				necessary for student	13	100	4	4	5
				inconvenient	5	38.46	1	2	2
				understanding of why students need accommodations					
				thoroughly understood	9	69.23	3	3	3
				more training needed	2	15.38	1	0	1
				help administering	4	30.77	2	1	1
				Co-teaching done with					
				another general education teacher	0	0			
				special education teacher	2	15.38			
				other	0	0			

APPENDIX F—CONTINUED

Raw Data Results from Teacher Survey

<b>Total years of teaching experience</b>	18
	42
	3
	1
	33
	23
	23
	38
	34
	33
	20
	10
	8
Mean	22
Median	23
Mode	23,33

<b>Average number of students per class</b>	23
	22
	21
	18
	23
	23
	21
	20
	21
	22
	20
	20
	24
Mean	21
Median	21
Mode	23

APPENDIX F—CONTINUED

Raw Data Results from Teacher Survey

Types of Schools

			% from
Rural school	3		23.08
Urban School	5		38.46
Suburban School	5		38.46
Stdev	1		

## APPENDIX G

### Raw Data Results from Student Survey

	<b>Biology</b>		<b>Physical Science</b>	
	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
students with disabilities in class	4	20	4	6
friends with disabilities receive accommodations	10	21	7	3
do you use accommodations	7	17	1	9
would you pair with a student with disabilities	16	8	4	6
grades calculated same	18	4	5	5
grade C or better	23	1	9	1
	24	1	10	0
	<b>Honors Physical Science</b>		<b>Principles of Engineering</b>	
	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>
students with disabilities in class	6	24	0	6
friends with disabilities receive accommodations	22	8	2	4
do you use accommodations	6	24	1	4
would you pair with a student with disabilities	8	21	1	3
grades calculated same	22	8	3	3
grade C or better	29	1	4	1
	30	0	5	0

APPENDIX G—CONTINUED

Raw Data Results from Student Survey

**Rating Feelings on Subjects**

**BIOLOGY(23)**

<b>By type of Science</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>No Response</b>
like being with SWD	3		17	2	1	
class better with SWD	5	7	9	1	1	
learn better class with SWD	3	5	12		3	
SWD treated equally in class	8	2	9	3	1	
comfortable around people w/disabilities	4	8	9	1	1	
learn better in general ed classes	8	7	7	1		
work harder in general ed classes	7	6	8	1		1
more respectful of different people	11	5	7			
everyone should receive same accommodations	6	1	6	3	5	2
science classes are of average difficulty	3	9	8	2	1	
I like science	5	9	7		1	1

**Rating Feelings on Subjects**

**PHYSICAL SCIENCE(10)**

<b>By type of Science</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>No Response</b>
like being with SWD	1	2	4	2		1
class better with SWD	2	1	5	2		
learn better class with SWD	2	2	3	2	1	
SWD treated equally in class	3	1	5	1		
comfortable around people w/disabilities	2	5	3			
learn better in general ed classes	3	4	3			
work harder in general ed classes	1	3	5		1	
more respectful of different people	6	1	3			
everyone should receive same accommodations	3	2	3	1	1	
science classes are of average difficulty	2	5	3			
I like science	3	1	2	1	3	

APPENDIX G—CONTINUED

Raw Data Results from Student Survey

Rating Feelings on Subjects	HONORS PHYSICAL SCIENCE(30)					
	5	4	3	2	1	No Response
By type of Science						
like being with SWD	3	6	17	2		2
class better with SWD	11	8	9		1	1
learn better class with SWD	4	7	11	3	3	2
SWD treated equally in class	8	3	17			2
comfortable around people w/disabilities	7	9	8	3	1	2
learn better in general ed classes	1	8	11	6	3	1
work harder in general ed classes	1	5	11	8	5	
more respectful of different people	10	10	6	2		2
everyone should receive same accommodations	5	1	11	5	8	
science classes are of average difficulty	1	11	11	7		
I like science	7	7	6	3	7	

Rating Feelings on Subjects	PRINCIPLES OF ENGINEERING(6)					
	5	4	3	2	1	No Response
By type of Science						
like being with SWD	1		4			1
class better with SWD	1		2	3		
learn better class with SWD	1	2	1	1		1
SWD treated equally in class	2	2	1			1
comfortable around people w/disabilities	2	1		2		1
learn better in general ed classes	1	1	1	1	1	1
work harder in general ed classes			3	1	1	1
more respectful of different people	3	1		1		1
everyone should receive same accommodations	2	1	1		2	
science classes are of average difficulty	1	2	2	1		
I like science	5	1				



APPENDIX G—CONTINUED

Raw Data Results from Student Survey

**FRESHMEN(40)**

<b>Rating Feelings on Subjects</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>No Response</b>
like being with SWD	4	8	21	4		3
class better with SWD	13	9	14	2	1	1
learn better class with SWD	6	9	14	5	4	2
SWD treated equally in class	11	4	22	1		2
comfortable around people w/disabilities	9	14	11	3	1	2
learn better in general ed classes	4	12	14	6	3	1
work harder in general ed classes	2	8	16	8	6	
more respectful of different people	16	11	9	2		2
everyone should receive same accommodations	8	3	14	6	9	
science classes are of average difficulty	3	16	14	7		
I like science	10	8	8	4	10	

**SOPHOMORES(24)**

<b>Rating Feelings on Subjects</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>No Response</b>
like being with SWD	4		17	2	1	
class better with SWD	6	7	9	1	1	
learn better class with SWD	4	5	12		3	
SWD treated equally in class	9	2	9	3	1	
comfortable around people w/disabilities	5	8	9	1	1	
learn better in general ed classes	8	7	7	1	1	
work harder in general ed classes	7	6	8	1	1	1
more respectful of different people	12	5	7			
everyone should receive same accommodations	6	1	6	3	6	2
science classes are of average difficulty	4	9	8	2	1	
I like science	6	9	7		1	1

APPENDIX G—CONTINUED

Raw Data Results from Student Survey

**Rating Feelings on Subjects**

**JUNIORS(4)**

	5	4	3	2	1	No Response
like being with SWD			3			1
class better with SWD			1	3		
learn better class with SWD		1	1	1		1
SWD treated equally in class	1	1	1			1
comfortable around people w/disabilities	1	1		1		1
learn better in general ed classes	1		1	1		1
work harder in general ed classes			2	1		1
more respectful of different people	2	1				1
everyone should receive same accommodations	2	1			1	
science classes are of average difficulty		1	2	1		
I like science	4					

**Rating Feelings on Subjects**

**SENIOR(1)**

	5	4	3	2	1	No Response
like being with SWD			1			
class better with SWD			1			
learn better class with SWD		1				
SWD treated equally in class		1				
comfortable around people w/disabilities				1		
learn better in general ed classes		1				
work harder in general ed classes			1			
more respectful of different people				1		
everyone should receive same accommodations			1			
science classes are of average difficulty		1				
I like science		1				

## APPENDIX H

### HRSSC PERMISSION LETTER

March 17, 2008

TO: Rhonda Lee McKimpson  
Education

FROM: Cynthia A. Prosen, Ph.D.  
Dean of Graduate Studies & Research

RE: Human Subjects Proposal #HS08-160  
"Do special Needs Students who Receive Appropriate  
Accommodations in a General Science Class Earn a Grade of "C"  
or Better?"

The Human Subjects Research Review Committee has reviewed your proposal and has given it final approval. To maintain permission from the Federal government to use human subjects in research, certain reporting processes are required. As the principal investigator, you are required to:

A. Include the statement "Approved by HSRRC: Project # (listed above) on all research materials you distribute, as well as on any correspondence concerning this project.

B. Provide the Human Subjects Research Committee letters from the agency(ies) where the research will take place within 14 days of the receipt of this letter. Letters from agencies should be submitted if the research is being done in (a) a hospital, in which case you will need a letter from the hospital administrator; (b) a school district, in which case you will need a letter from the superintendent, as well as the principal of the school where the research will be done; or (c) a facility that has its own Institutional Review Board, in which case you will need a letter from the chair of that board.

C. Report to the Human Subjects Research Review Committee any deviations from the methods and procedures outlined in your original protocol. If you find that modifications of methods or procedures are necessary, please report these to the Human Subjects Research Review Committee before proceeding with data collection.

## APPENDIX H—CONTINUED

### HRSSC PERMISSION LETTER

D. Submit progress reports on your project every 12 months. You should report how many subjects have participated in the project and verify that you are following the methods and procedures outlined in your approved protocol.

E. Report to the Human Subjects Research Review Committee that your project has been completed. You are required to provide a short progress report to the Human Subjects Research Review Committee in which you provide information about your subjects, procedures to ensure confidentiality/anonymity of subjects, and the final disposition of records obtained as part of the research (see Section II.C.7.c).

F. Submit renewal of your project to the Human Subjects Research Review Committee if the project extends beyond three years from the date of approval.

It is your responsibility to seek renewal if you wish to continue with a three-year permit. At that time, you will complete (D) or (E), depending on the status of your project.

kjm