

IMPACT OF COOPERATIVE LEARNING STRATEGIES ON GROUP WORK
WITHIN A SCIENCE CLASSROOM

by

Matthew Goode

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DEDICATION

I would like to dedicate this paper to the students I have taught during my first four years as an educator. You have all taught me so much about what it truly means to be a teacher. This past year, I have been especially grateful for the support of the students involved in this capstone. Your willingness to be flexible and adaptive, while also providing incredible insight into your own classroom experiences, has been invaluable. For that, I say thank you. This paper would not have been possible without your hard work and dedication.

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ABSTRACT

Group work is a critical aspect of student learning within the science classroom. The differences amongst students provide benefits for student learning, but it is also oftentimes the root of issues within peer-to-peer interactions. The objective of the study was to examine the impact of collaborative learning strategies on improving student success amongst various groups. Students completed pre- and post- surveys in order to analyze their perceptions on group work, as well as completed a formal assessment in both comparison and treatment groups. Select students participated in an interview, where personal views on group collaboration were shared. Within the study, students participated in various cooperative learning activities prior to completing group work. Based on analysis of data, I found a strong correlation between the implementation of cooperative learning strategies and improvement of student engagement, collaboration, and understanding of complex science concepts. The use of cooperative learning activities saw a positive gain for high school students in a science classroom.

CHAPTER ONE

INTRODUCTION AND BACKGROUND

As an educator, I believe it is important to keep in touch with what students want and need in the classroom. Learning can be a complex process for students due to a variety of factors, so better understanding them can really make a positive difference within the classroom. The purpose of this process is to gain insight on the daily interactions amongst my students within my classes. I wanted to gain information on how they were doing academically, while also giving them a space to describe how they are doing socially in the class. This social aspect of school is one that I believe a lot of teachers do not fully embrace in their classroom. Students need to show up to school for eight hours a day and learn a lot of new, complex information. There is no doubt that structured learning is needed to fulfill this goal of schools. Despite this need for structure, I also believe it is equally important for teachers to make sure that students genuinely enjoy being in their classrooms. I believe that students best learn from teachers they like and feel comfortable around. Once a solid relationship is established, then teachers can push their students academically in more complex content areas. Students need to know that their teachers care about more than just how they are doing academically. By building a strong rapport with students, I believe I am setting myself up to be the best teacher that I can be.

It is for this reason that I wanted to explore academic and social gain within groups in my classes. I believe that with effective group design and execution, learning within the classroom can be elevated to help students perform better both academically and socially. The purpose of my research is to analyze how students currently perceive group work within a science classroom and see if the addition of cooperative learning strategies can help improve this viewpoint. It has

been clear to me that students see group work in a variety of lenses. Some students see it as an opportunity to escape from stress and converse with friends, while others can see it as anxiety inducing and unneeded in the classroom environment. My goal is to help bridge this gap and show all my students the benefits that can come from effective collaboration and communication. I also believe that by emphasizing the importance of working with others effectively, I can better show students the value of school. School is not just a place to learn endless amounts of information, but rather also a place where students are learning how to become functional members of society. Being with and communicating amongst individuals from different backgrounds is not always easy for people in today's world. I believe that school is also teaching this skill to students and will allow them to learn in a safe, contained environment. To me, my students leaving my classroom more ready to become an adult is more important than knowing a bunch of scientific facts and information.

For my Action Research (AR) study, I operated under one, primary research question with three sub-questions. I was able to use the sub-questions as guidance to gain additional knowledge to better approach and analyze data for my primary research question.

Primary Research Question:

How does the implementation of group work and collaborative learning strategies impact student engagement and academic success within a science classroom?

Sub-Questions:

1. *How do students view the impact of group work within a classroom?*
2. *How does group work impact individual student learning?*
3. *How does group work allow me to better assess student understanding?*

CHAPTER TWO

CONCEPTUAL FRAMEWORK

Within the science classroom, group work is critical. Students oftentimes will work in small groups to analyze complex data sets, run inquiry-based labs, or discuss issues within the world around them. In order to best allow for students to find success in these group settings, thoughtfully designing group composition and procedures can lead to a better perception from students within these groups. Nguyen and Oanh (2025) found that by implementing unique, cooperative learning strategies within the classroom, students saw improvements both socially and academically. They also found a correlation between cooperative learning strategies and student engagement. This increase in engagement also led to overall student motivation and academic success. By allowing students to connect to one another in a way outside of the content area, it provides a space for them to better engage with each other about complex science ideas. By increasing relationship status amongst groups, students will also be more likely to listen to other ideas shared by their peers.

When looking into the literature, there is a correlation between social interactions and learning amongst students. Lev Vygotsky was a psychologist who looked at how learning can occur and discussed the idea of “play” within the classroom environment. Through social interactions, students can enhance their ability to learn complex topics. Vygotsky coined the term “Zone of Proximal Development (ZPD)” within his book *Mind in Society* (Vygotsky, 1978). The ZPD looks at the difference between what students can understand and apply on their own, and what they are able to accomplish with direct guidance and instruction. As a teacher, it is critical to find a perfect balance between the two ends of this spectrum. Students must be able to think

critically on their own, while also relying on instruction to further their education. By allowing students to work within group settings, this may allow students to work both independently and collaboratively when discussing topics with their peers. As their educator, it is important for me to listen to these conversations and help guide them towards engaging in complex, scientific ideas.

When looking at the main components of good group work, David and Roger Johnson (2009) propose that there are five main "essential elements of cooperation" that must be met. One of these elements that correlates to my study is the idea of "Positive Interdependence". In order for students to find their own success, they must also have the success of others in mind as well. By allowing students to create a culture within their groups in which they want all other students to find success, they in return can find more individual success within their work. Groups who can find common goals within the classroom setting can ultimately find more success for each student within the group.

One of the primary issues I have noticed within groups in my own classroom is how differences amongst students oftentimes lead to frustrations within certain groups of students. Being a high school teacher, I often see students learning who they are during the duration of a school year. Finding social groups can be extremely challenging for certain students and oftentimes being put into groups with other students one may not know, can lead to heightened emotions and challenges with collaboration. It is for that reason that I wanted to better explore ways to prepare students for challenges they may experience within a group. It has been shown that with proper "training", students who consistently show "poor" group work habits can still end up finding success within new groups (Thurston, et. al., 2008). Since I am working with two,

co-taught classes, this is something I think about on a daily basis. Many of my students are coming into my classes with the same students they spend most of their time at school with. There are fewer co-taught sections offered within each content area, which leads to lots of overlap with students throughout the day. Any frustration that a student has with another will only magnify during the day with the more time that they spend with each other. By being mindful of setting clear expectations and guidelines for group work, I hope to better create a space for students to find success.

Another aspect of group work that I wanted to explore is the impact of group success and goals on the learning environment. With cooperative learning, I wanted to use specific activities in order to engage students as one collective group. I believe it can be easy for students to come together when there is a common goal, like in a game or competition. My goal is to have students come together in similar ways when it comes to completing work in class, like they do with games that they enjoy playing. Creating motivation around a common goal for students within their groups can, “create a situation in which the only way group members can attain their own personal goals is if the group is successful” (Slavin, 1996, p. 2). I believe that with the use of cooperative learning games and guidance within classwork, I would be able to create a common goal for each group to strive to attain.

In an article written by the US Department of Education (2001), they explored the use of smaller communities within schools and their impact on student success. One of the “communities” they discussed was the use of an Advisory system. This is essentially a way for teachers to form relationships with students that they do not have in class. My school currently has this system, and I am an Advisor. I believe that by forming a strong relationship with

students, I can get them to better see the value of the school as a whole. In my own classroom, I am always looking for ways to do the same with my actual students. I believe that students learn best from teachers they like. With that in mind, I also believe that students learn best when working with other students they like. By adding cooperative learning elements into my group work, I hope to create more relationships amongst my own students.

Another aspect I wanted to explore was the impact of group work on students of color. Being in a predominantly white school, I will oftentimes find myself analyzing my lessons to see if there could be an impact on any specific groups of students. My school often has incidents of small groups of “friends” who make racial comments at each other. Due to them being friendly with each other, students of color do not always feel like they are able to speak up and will undermine the comments said by their peers. By implementing cooperative strategies within group work, I hope to create a more welcoming environment for all my students. “Research and theory on cooperative learning suggest that more interactive, collaborative approaches, may be usefully applied to domains outside of education as a means to reduce prejudice” (Ryzin et. al., 2020, p. 9). I collected data in my project during my “Melanin” unit. In this unit, students explore the biology behind skin tone and how evolutionary pressures have led to the variety of skin tones we have around the world. Fostering safe groups in my class will allow my students to be able to have more in depth conversations about real societal issues surrounding skin tone.

There are benefits to creating stronger groupwork within a classroom setting. Whether socially or academically, there have been studies that have shown an increase in student performance. I believe that in order to allow students to best learn complex ideas, we, as teachers, must allow them to build strong relationships with us and their peers. Cooperative

learning is an avenue to allow for such relationships to be built. Although cooperative learning has many benefits, it really comes down to the ability of teachers to create positive habits in the classroom to see these improvements amongst students. Although I set high expectations for all of my students, I do still need to make sure that these expectations are clear and concise for my students to incorporate into their learning. In *Cooperative Learning: Review of Research and Practice*, Robyn Gillies discusses how teachers can be the leader within groups by modeling how to engage in specific dialogue amongst student groups (2016). By showing students how to interact with peers and provide guiding questions, I hope I will be able to see stronger discussions within my various groups of students. My goal within my study is to allow for my students to build the necessary skills to engage with other students within my own classes, and people in general throughout their own lives.

CHAPTER THREE

METHODOLOGY

Demographics

This study was conducted at New Trier high school in Winnetka, Illinois. The school currently consists of roughly 3,700 students. Students are split into two campuses, one being for Freshman, while the other is for Sophomore through Seniors. New Trier consists largely of an affluent population, with less than 5% of students qualified as “low-income families”. Our current student to staff ratio is 11:1. The school consists of 77% White, 10% Asian, and 9% Hispanic students. Our local community has an average household income of over \$250,000, with a poverty rate of less than 2.5%. Working with this population has both benefits and drawbacks that arise.

Within my study, 44 students participated amongst three separate classes. Two Co-Taught (CT) Biology classes and one Honors / High Honors split level course. Within the three classes, 24 were boys and 20 were girls. I had a total of 28 students who had an IEP and 4 who had a 504 plan.

My co-taught Biology classes contain only students who have an IEP. I co-teach with a special education teacher who can provide additional support for the needs of my students. While I oversee curriculum development and assessment choices, my co-teacher does a lot of work helping me create a classroom environment that allows for all students and learners to succeed. With this demographic of students, only 2 of my co-taught Biology students have taken a science

course previously. This created a unique opportunity to begin the foundation of science learning for those students.

Treatment

For my research treatment, I had a comparison group unit and a treatment group unit. The comparison unit was conducted as usual for my class. They were given the “pre” and “post” survey for the unit. This survey was conducted in class and was taken in less than five minutes. See appendix A for Likert survey. No other measures were taken other than collecting formative and informal assessment scores for comparison.

For the treatment group unit, students were placed into randomly assigned groups of 2–4, and those groups were changed with each new activity. My co-teacher and I wanted students to work with a variety of classmates over time and see how different group sizes play into student achievement and engagement. Some labs lend themselves to larger groups, while others were more successful in partnerships. Either way, groups were assigned at random and created a space where students are working with a variety of peers.

At the start of each unit, I introduced a team-building activity or game tailored to that specific set of groups. Each activity presented to the groups occurred for roughly 5-10 minutes prior to completing the in-class work. The idea was to help these new groups build relationships and get comfortable working together before we dive into labs or projects. My goal was for students to start off by building trust and communication so that collaboration becomes more natural and effective as the unit progresses. These team-building activities included but were not limited to; Jenga, trivia, Uno, Connect 4, ping-pong, and various other board games / activities.

At the end of the unit, we dedicated time for each group to complete a post-unit survey and reflection. This treatment component took students roughly five minutes to complete. During this session, students talked through what went well and what didn't, honestly assessed their own impact, and then assigned both self and group grades. Carving out time for this type of reflection was meant to help students notice how they work with others, take ownership of their strengths and weaknesses, and find ways to improve when they move to a new group. The treatment occurred for roughly six weeks for both sets of classes.

Data Collection and Analysis Strategies

For data collection, three primary data pieces were collected and analyzed. The first was pre- and post-survey data within my Likert Survey (Appendix A). Students answered a series of 10 questions that related to their view on various aspects of the classroom environment. The next piece of data was formal assessment data. Students completed a formal assessment at the end of both the comparison and treatment unit. Changes in averaged class scores within my courses will be analyzed to determine any significance. My final piece of evidence came in the form of student interviews. Three students were randomly selected to participate in an in-person interview examining their own views of different aspects of the course. The interview consisted of 10, open-ended questions (Appendix B).

While examining data, I used both qualitative and quantitative analyses. The average class formal assessment scores were compared using a t-test to examine any significance. The responses within my Likert survey were also compared using a t-test after responses were quantified on a 1-4 scale. Student quotes from interviews were used as means of qualitative data for support on changes seen within the two other data sets. Claims were made based off the

significant changes in quantitative data and were supported using my own classroom observations and qualitative data within my interviews.

To gauge progress on my research questions, I used Table 1 to ensure proper examination occur. For each research question, one or more data collection method was used in order to analyze unique aspects of my classroom and action research study. Before use, the Likert survey was reviewed by peers, colleagues, and professors in order to ensure effectiveness. This survey was also examined by my special education co-teacher in order to assess for accessibility for all students within our classes. The data collection matrix below was discussed and updated upon completion of treatment in order to best analyze data associated with specific research questions.

Table 1. Research Question Data Analysis Matrix.

<i>Data Collection Matrix</i>	Data Collection Methods			
	1	2	3	4
	Pre-Survey / Post-survey	Classroom Observations	Student Interviews	Formative Assessment
Research Questions				
<i>How does the implementation of group work and collaborative learning strategies impact student engagement and academic success within a science classroom?</i>	A, C	C, E	A, C	B, D
<i>How do students view the impact of group work within a classroom?</i>	A	C	A, C	
<i>How does group size and composition impact student learning?</i>		C, E		D
<i>How does group work allow me to better assess student understanding?</i>		C, E	A, C	B

Key used to describe how each data collection method is useful in answering corresponding AR question

- A. Data will show student like or dislike towards group work
- B. Data will show academic growth between treatment groups
- C. Data will show social growth between treatment groups
- D. Data will show impact of group collaboration
- E. Data will show student engagement in science material

IRB Exemption

The research design for this Action Research project received an exemption from Montana State University's Institutional Review Board, and compliance for working with human subjects was maintained (Appendix C).

CHAPTER FOUR

DATA ANALYSIS: CLAIMS AND EVIDENCE

Results

When looking at my data, I examined results from my Likert Survey, Assessment Data, and Students interviews within three primary categories. To best assess the impact on student learning, I wanted to examine the results with these categories all in mind.

1. Understanding and Application of Science Content
2. Group Work and Peer to Peer Interactions
3. Student Confidence and Support within the Classroom

For each Likert Survey response, student responses were converted to a 1-4 scale. Responses of “Strongly Disagree” scored a 1, responses of “Disagree” scored a 2, responses of “Agree” scored a 3, and responses of “Strongly Agree” scored a 4. This allowed me to analyze the data within a quantitative lens and run t-tests to examine significance of data changes.

As a teacher, I value relationships and community above all else. This is where I believe teachers can make their biggest impact. I understand the importance of assessing student learning in complex ideas. When looking at my Likert survey (N=44), I saw significant changes within my first category described above. In the pre-survey, question 1 scored a 3.02, while in the post-survey it scored a 3.34 (Figure 1). This 0.32 change had a p-value of 0.035 and was qualified as

significantly different due to its t-value of 1.995. I also saw significant change within question 3 of the survey. The average score in question 3 improved by 0.34 (Figure 1), which led to a p-value and t-value of 0.036 and 2.052 respectively. Question 2 within my survey saw no change in average score, with both the pre- and post-survey scores having an average score of 2.92 (Figure 1).

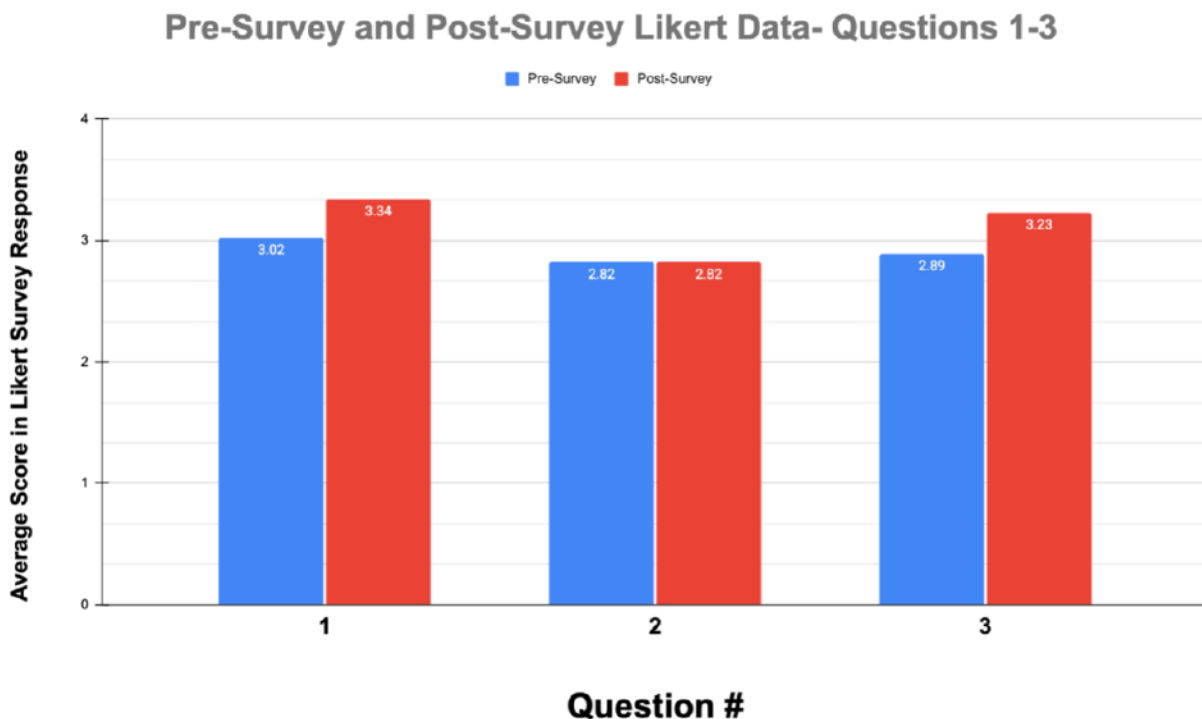


Figure 1. Likert Survey data from questions 1-3. (N=44)

When looking at my next category, I saw the most statistically relevant positive growth regarding group work dynamics. In the pre-survey, question 4 scored a 2.77, while in the post-survey it improved to a 3.23 (Figure 2). This 0.46 change had a p-value of 0.012 and was qualified as significantly different due to its t-value of 2.58. I also saw significant change within question 6 of the survey. The average score in question 6 improved by 0.38 (Figure 2), which led

to a p-value and t-value of 0.035 and 2.14 respectively. Question 5 within my survey saw a slight decrease in average score, moving from a 3.05 in the pre-survey to a 2.93 in the post-survey (Figure 2), resulting in a non-significant t-value of -0.74.

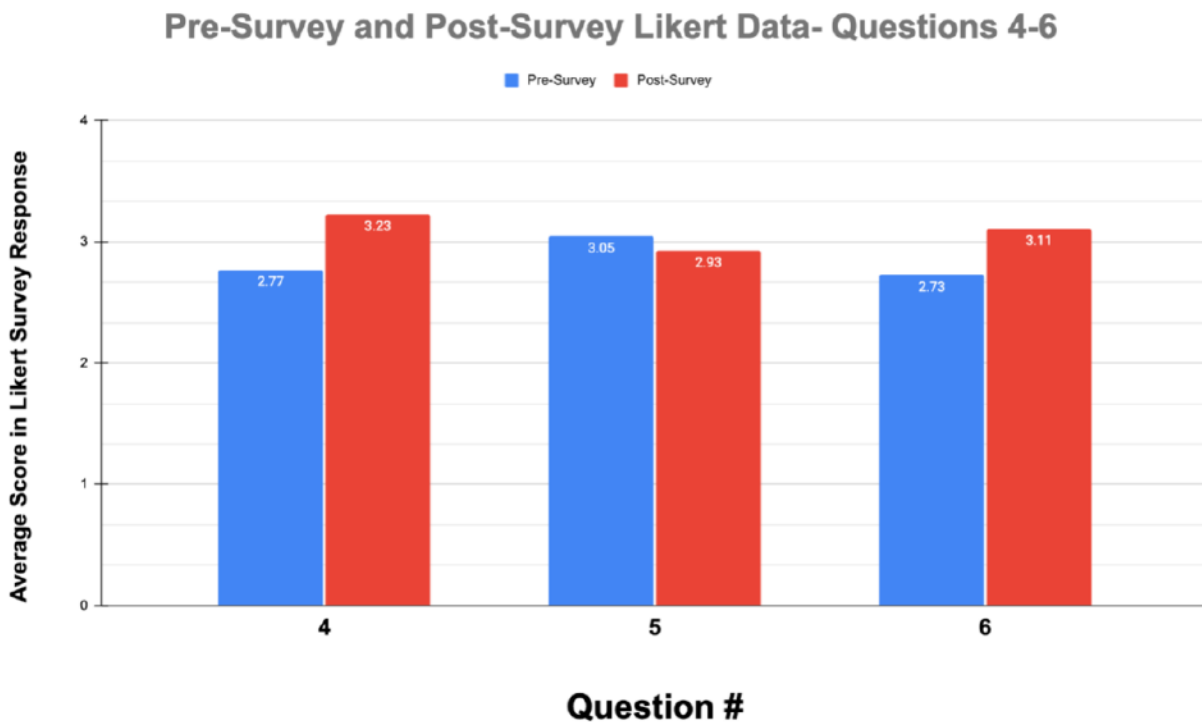


Figure 2. Likert Survey data from questions 4-6. (N=44)

When looking at my final category, I was able to find some significant changes with my student responses. In the pre-survey, question 7 scored a 2.64, while in the post-survey it improved to a 3.25 (Figure 3). This 0.61 change had a p-value of 0.001 and was qualified as highly significant due to its t-value of 3.55. I also saw significant change within question 10 of the survey. The average score in question 10 improved by 0.50 (Figure 3), which led to a p-value and t-value of 0.012 and 2.58 respectively. Question 8 saw an insignificant positive trend,

improving from 3.16 to 3.39, while question 9 saw a negligible decrease from 3.50 to 3.45 (Figure 3), resulting in a non-significant t-value of -0.40.

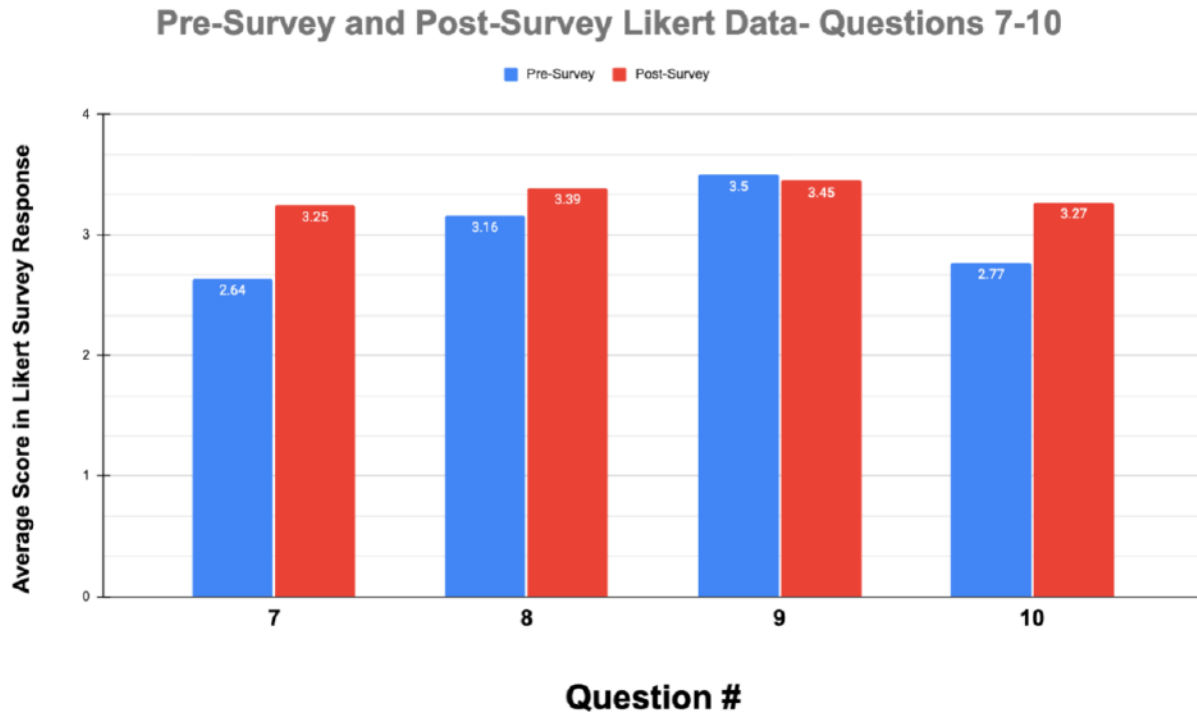


Figure 3. Likert Survey data from questions 7-10. (N=44)

When looking at the data from the Likert survey as a whole, I saw significant, positive changes in 6 out of the 10 survey questions. Questions 1, 3, 4, 6, 7, and 10 all had p-values under the 0.05 threshold, which led to their significance. Despite not being statistically significant, there was a positive increase in question 8, no change in question 2, and a slight decrease in average score in questions 5 and 9. All pre- and post-survey question changes can be seen below (Figure 4).

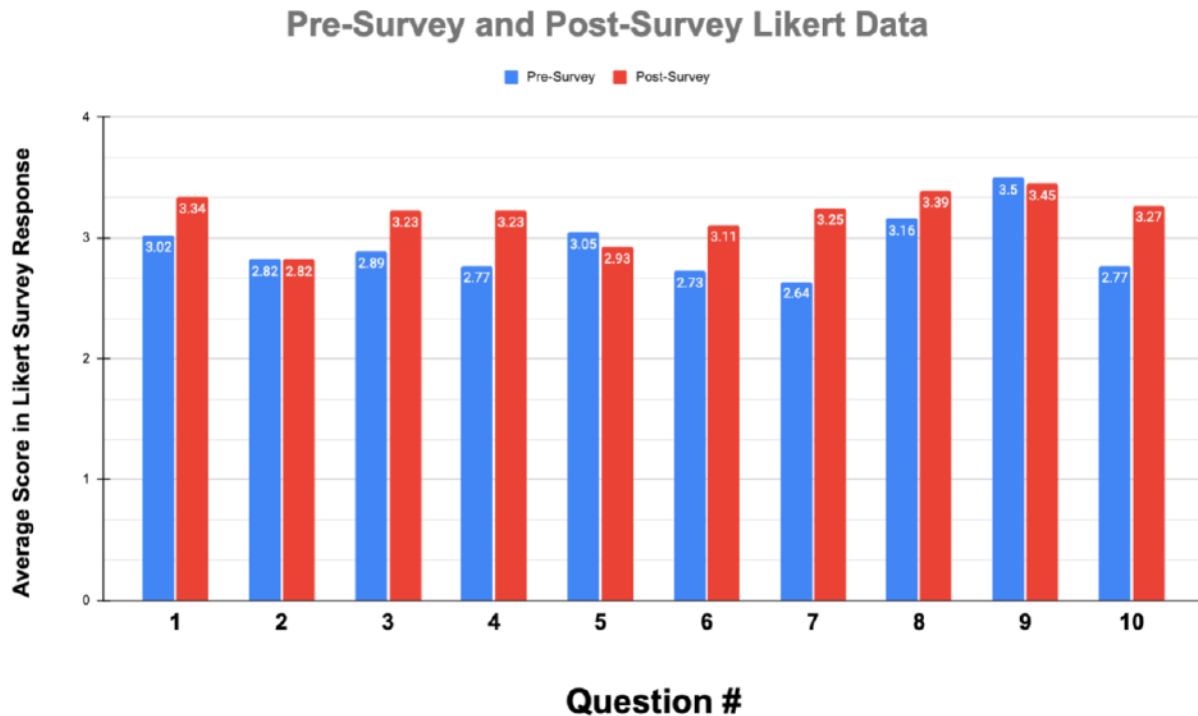


Figure 4. Complete Likert survey data. (N=44)

The next data set collected examined student scores on their formative assessment. When looking at the comparison unit, both my CT and Honors/High Honors classes earned an average class score of 81% on their respective assessments. In the treatment unit, my CT Biology classes earned an average score of 89%, while my Honors/High Honors class earned an average score of 84% (Figure 5). Within my CT Biology assessment scores, there was a significant change in scores, with a p-value of 0.0012 and t-value of 3.75. With my Honors/High Honors Biology assessment scores, there was not a significant increase seen. The change that occurred had a p-value of 0.1740 and a t-value of 1.41.

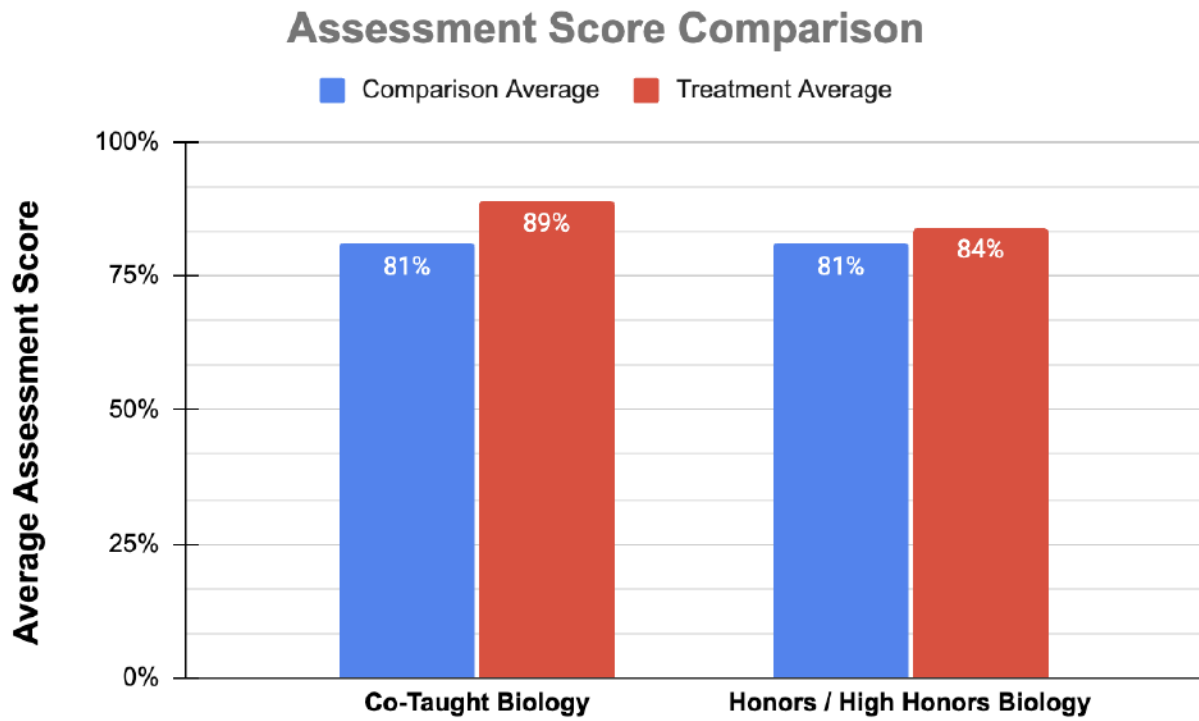


Figure 5. Formal Assessment Data comparison. (N=44)

CHAPTER FIVE

VALUE: REASONING AND REFLECTION

Claims from the Study

After compiling and analyzing my data, I was able to interpret my results and develop four claims. The four claims are as follows:

1. Collaborative learning environments led to better transfer of knowledge between students in groups. Both classroom levels saw increases in formal assessment scores. My evidence for this was the significant increase in formal assessment within my co-taught Biology classes from 81 to 89 percent.
2. Co-Taught Biology students see greater impact gain within groups when implementing collaborative learning strategies when compared to Honors students. There was a significant difference between the improvement of formative assessment scores between both level (Co-Taught vs Honors) courses, while my honors biology courses did not see a significant change from 81 to 84 percent.
3. Collaborative learning strategies impact student confidence in sharing ideas and participating in group discussions. My evidence for this was that students saw an increase in overall engagement within groups and more individual involvement in group discussions.
4. Despite benefits associated with collaborative learning, student perception of “fairness” within groups remained a challenge. My evidence for this occurred within my student interviews. These interviews revealed inequities still being seen within groups from students.

Reasoning

My first claim acknowledges the growth in academic understanding seen within my various students. As a teacher, I believe collaboration and discussion leads to a stronger understanding of content. Students who are able to best explain a complex phenomenon are able to show true mastery of that component of science. Within my data, I saw an increase in formal assessment scores with both of my class, including a significant change within my CT Biology courses. Students within those classes oftentimes struggle with self-confidence and can oftentimes see school as “not for them”. The 8% increase in formal assessment scores between my comparison and treatment unit was indicative that students made improvement in understanding the content being taught. Within my student interviews, student #1 stated, “If some people don’t understand it....and someone understands it really well, they can kind of like teach them. Because...they might learn from a student.... if a student has a different way of explaining it, like they might make another student be able to understand it more”. This quote shows me that my students see the value to listening to their peers and are comfortable with reaching out to help when needed. I oftentimes will tell students within a group to ask their peers prior to asking me but in the past have not found much success. I believe the increase in community, due to cooperative learning implementation, allowed students to build stronger relationships with peers in their groups. The quote above was from a student who is in my CT Biology course. Within group work in their class, I would often see students directly looking at others work instead of asking them to explain it. The improve community within groups has led students to feel more comfortable sharing ideas and listening to others.

My second claim expands on the notion that students within my CT Biology classes tend to benefit more from the cooperative learning strategies than students within my Honors/High Honors courses. Within these courses I teach primarily students with specific, educational needs. These needs vary from student to student but oftentimes will either fall into three categories; educational, emotional, or executive functioning support. With these various needs in mind, this creates a lot of challenges for these students within groups. Students in these courses can sometimes be negative on themselves for being in “special ed” Biology, as some students call CT Biology. In my second interview, my student stated, “I have been trying, like, get out of this boundary between special ed and mainstream classes. This is really motivating to me”. This quote shows me that students in my courses can see themselves as “different” than another student. This perception can be even more magnified within groups of students where there is a wide variety of abilities and skills. I believe the increase in community and understanding of each other from cooperative learning implementation pushed students to be able to look past these differences. This connectiveness allowed for deeper conversations amongst students, and ultimately more learning. Although the benefits of cooperative learning impacted my students in my Honors/High Honors course, I tend to see less of an overall gap between student groups in that class. This smaller margin of differences ultimately led to less improvement in those students. We can see that with the 8% increase in formal assessment average in my CT Biology classes compared to the 3% increase in my Honors/High Honors course. The gain was still present, but not statistically significant.

My third claim stated that student confidence in sharing their ideas grew due to the implementation of cooperative learning strategies. Going into the study, this was the aspect I was

most interested in. I am a firm believer that student success in the classroom directly correlates to confidence. Psychologist Lazar Stankov has studied in the impact of student confidence on learning. In one study he found that, “confidence accounts for 46.3% of total variance in achievement” (Stankov et al., 2014, p. 24). This emphasis on confidence is critical to know as a teacher who is trying to build the confidence of their students. Within my Likert survey, the statement with the most drastic change (+0.61) was “I feel comfortable sharing my ideas in group work.”. This increase in student confidence was also apparent in my own classroom observations during the study. I oftentimes saw multiple students engaged in science dialogue within one group. This was not typical in my courses prior to the study. By implementing “team building” activities, students were able to build better relationships with their peers. In one interview, a student discussed that smaller groups provide a space for students to share their ideas prior to a whole class discussion. This student stated how they are, “more willing to get (a question) wrong in a smaller group because it feels less awkward. It is easier to talk through ideas in a smaller group that I trust”. This has shown the importance of strong group discussions prior to class conversations. With students discussing and sharing ideas within their groups prior to a larger class discussion, I was able to have more in-depth lectures with my students in a whole-class setting.

My final claim stated an issue I noticed when compiling my data. Despite finding growth in confidence and academic achievement, there was still an equity gap between students on their view on “fairness” within their groups. In my Likert survey, I saw a decrease in the score for statement number 5, which stated, “In group work, everyone gets a fair chance to be involved.”. This decrease (-0.12) in student response shows me that there is still work to do with equity

amongst groups. In my student interviews, one student stated, “one person is always doing a lot of the work, and there’s some people who aren’t doing any of the work”. With this in mind, I feel the need to implement stronger group norms to alleviate that. Individual confidence may have gone up for many students, but they are still aware that group work has its own inequities.

Reflection

Within High School science classes, group work is a part of every teacher's courses. Having students working in groups allows them to facilitate strong conversations between peers, while also allowing them to take the lead and explain complex ideas to others. When looking at students outside of the classroom, I believe it is critical for people to be able to explain their ideas in an effective way. I believe by fostering strong group work in the classroom, teachers can best set up their students for success in their future lives.

Within this study I was able to see a variety of growth within my students. I believe the implementation of Cooperative learning strategies within my students is something that any teacher can utilize within their classrooms. I found that not only did I find Improvement in student learning and engagement, but I also saw many students build relationships with new classmates as well as myself. Creating an environment where all students feel connected and valued allows for any teacher to teach their students complex ideas. One of the biggest issues with teaching high-level courses is that the material being taught is sometimes very challenging for students. I believe by using effective group work, any teacher can help overcome those barriers for students.

When looking at the variety of Cooperative learning strategies that I implemented within the study, many of them took very little time out of the class yet added great value to the overall

experience. I also believe that throughout this study I was able to show students the true Value of a high school education. I know that many students see high school, and school in general, as a place to just learn new ideas. As an educator, I think school provides so much more for students and I believe that this study allowed my students to start to see that on their own. I was able to show my students that I valued relationships and proper communication in my classes. Despite me wanting my students to understand science at a deeper level, I believe the improvement of communication and working with others is a skill that will follow my students in their future endeavors.

When reflecting on my study, one thing that I would change in the future is being more intentional on specific student roles within groups. Due to students sharing that they do not think group work is always seen as “fair”, I believe by giving specific roles to students I can help create stronger group norms for them. If I were to implement this into my study, I would originally give students very specific roles and over time take away some of those specificities. I would hope that by showing the students what roles there should be within their groups, they then can implement their own roles within their specific groups that they believe will best serve them.

Another aspect of data collection that I did not do, was to gain feedback on how students felt about specific cooperative learning strategies that I used. Since I used a variety of activities, it could have been helpful for me to figure out which ones they believed were the most fun, and I'm not bringing them the most together. This will be something I hope to do in future student reflections.

In conclusion, I am satisfied with the results in this action research project. I believe the treatment provided to my students during the study is one that I can easily apply to future classes. I believe that any teacher who is looking to improve group work within their classes can find success by taking time out of their class to allow for Cooperative learning strategies to be implemented.

Other Questions to be Investigated

Within the study, I was able to find a lot of valuable data that helped me better answer the questions of the study. This data was significant most of the time and allowed for reflection for me as an educator. Despite this valuable data, there were a few questions that I determined may be valuable for future exploration and research. These are questions that I hope to explore within my own classrooms within my teaching career.

The first additional question is how we could alter the timing of cooperative learning strategies within the classroom setting. I also conducted my activities right in the beginning and now further implementation was used connecting to that original activity. It may be worth exploring more use of cooperative learning within the lesson or at the end for challenging classes or groups of students.

Another question that could be further investigated is the time taken to conduct each activity with students. This is something my supervisor and I discussed during the year, that being what the optimal time for student participation of the activities within my classes. My supervisor believed the use of the activities led to improvements, but we both wondered if sometimes a shorter or longer game may be of more valuable for student success.

Implication to my Teaching

In regard to how I believe this study will impact my future teaching, I believe this study showed me how simple tweaks within the classroom environment can lead to large changes. When looking at the study as a whole, I wanted to do something that I believe was simple enough to allow me to re-create a similar study in the future. Group work is something that is always going to be evolving with my classrooms and classrooms for all educators. I believe as an educator is important to constantly look for ways to improve the day-to-day interactions that occur within the classroom. I believe that students learned best within an environment that they feel comfortable, and orchestrating effective group work is one of the best ways to do so in my opinion.

When looking at my classroom in the future, I hope to consistently incorporate, cooperative learning strategies in order to improve the communication amongst my students. The study has also showed me the value of taking time out of the academic coursework to have fun with students. At the end of the day, our jobs as educators are to teach students material, but I believe that students learn best from educators that they truly believe have their best interest in mind. From looking at the classroom observations and student interviews, it is clear that my students saw the effort I was making in order to make class more fun for them on a daily basis. This incorporation of “fun”, although decreased total classroom learning time, led to stronger academic performance and classroom behavior as a whole within all of my classes.

I hope to use this study to help guide conversations that I have with other colleagues within my department. During the study, I already had multiple colleagues come up to me and asked me questions about what I was doing in the classroom and many already tried to

implement components into their own classes I believe that we are working in an ever-changing environment as educators, and thinking of new ways to teach students complex ideas is something that I will always look for to implement.

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APPENDICES

APPENDIX A: LIKERT SURVEY

Likert Student “Pre” and “Post” Survey:

Student Survey: Group Collaboration and Classroom Learning

Name: _____

For each question below, carefully read the statement and circle the choice that best reflects how you feel about that given aspect of your experience in class

1. I usually understand what we are learning in class.

Strongly Disagree

Disagree

Agree

Strongly Agree

2. I feel challenged with the work we complete in class.

Strongly Disagree

Disagree

Agree

Strongly Agree

3. I know how to use the information we learn in class in order to think about science.

Strongly Disagree

Disagree

Agree

Strongly Agree

4. Working in groups helps me understand the lesson better.

Strongly Disagree

Disagree

Agree

Strongly Agree

5. In group work, everyone gets a fair chance to be involved.

Strongly Disagree

Disagree

Agree

Strongly Agree

6. I learn new things from my classmates when we work together.

Strongly Disagree

Disagree

Agree

Strongly Agree

7. I feel comfortable sharing my ideas in group work.

Strongly Disagree	Disagree	Agree	Strongly Agree
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8. I feel okay asking questions in class if I don't understand.

Strongly Disagree	Disagree	Agree	Strongly Agree
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9. I feel supported by my teacher(s) and classmates.

Strongly Disagree	Disagree	Agree	Strongly Agree
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10. I feel confident adding to classroom discussions.

Strongly Disagree	Disagree	Agree	Strongly Agree
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APPENDIX B: STUDENT INTERVIEW QUESTIONS

Interview Questions and Probes:

- 1. How do you usually feel about coming to school each day?**
 - a. *Probe:* What specific things at school make your day better or worse?
- 2. What motivates you most to do well in school? Do you believe you do well in school?**
 - a. *Probe:* Can you give a time when you felt especially motivated or unmotivated?
- 3. How do you feel about biology compared to your other classes?**
 - a. *Probe:* What aspects of biology do you find most interesting or least enjoyable?
- 4. When you think of a "good biology class," what comes to mind?**
 - a. *Probe:* Can you describe an activity we did in class that you felt was valuable?
- 5. How do you usually feel about working in groups in class?**
 - a. *Probe:* What makes group work helpful or annoying for you?
- 6. When I assign you to work in a group, what role do you tend to take on?**
 - a. *Probe:* Can you think of a time when you had to step out of your usual role in a group?
- 7. What helps you learn biology the best? Notes, visuals, labs, or group discussions?**
 - a. *Probe:* Why do you think this way of learning works best for you?
- 8. How comfortable are you speaking up in class to share your ideas or ask questions?**
 - a. *Probe:* Can you describe a moment when speaking in class was either positive or challenging for you?

APPENDIX C: IRB EXEMPTION

N

NoReply@TOPAZTI.net

🗨️

↩️ Reply

↩️ Reply all

➡️ Forward

📧

📅

⋮

To: walter@montana.com; @ Goode, Matt; Szott, Brenna

Mon 2/23/2026 1:29 PM

****External Sender****

Hello Goode, Matt,

Your protocol was reviewed by the IRB and has been approved.

PI: Goode, Matt
Approval Date: 2/23/2026
Title: Impact of Cooperative Learning Strategies on Group Work - Goode

Protocol #: 2026-2466-EXEMPT
Review Type: Exemption
Expiration Date: 2/23/2031

Work described under this protocol may now commence. The PI is responsible for ensuring that the protocol accurately describes research practices being conducted.

- > Review Category designation determined by the IRB can be found in the final section of your protocol.
- > Any changes must be submitted via Amendment prior to implementation.
- > Per the Common Rule, research only requires Interim (annual) Review by the IRB if 1) it was reviewed via Full Committee or 2) is regulated by the FDA.
- > All research is subject to post approval monitoring.
- > All protocol types must be renewed 5 years after approval.
- > Inform the IRB once your research is complete so that the protocol may be inactivated.

Please contact your IRB Program Manager with any questions or if you are in need of assistance. Thank you for your diligence in the care of human subjects research participants.

Institutional Review Board for the Protection of Human Subjects | Office of Research Compliance | Montana State University