

THE EFFECT OF LANGUAGE FRAMES ON COMMUNICATION SKILLS IN A  
SIXTH GRADE STEM CLASSROOM

by

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## ABSTRACT

Teaching 6th grade students in a collaborative environment can be challenging. This action research project focused on using language frames to guide students in communication interactions. The research was done in a pre-engineering classroom as part of a Science, Technology, Engineering, and Math (STEM) Program at the middle school level. Two classes of students, a total of 57 students, participated in the study. Students were provided with sentence frames that could be filled in with their own words allowing them to express their ideas and reasoning. Some of the language frames also provided students with the ability to show they are listening to other students by restating what was heard. Written surveys and collaboration rubrics were analyzed to find a small increase in communication among collaborative groups. Students' self ratings on their listening and communication skills increased as well as the opinions towards working in groups. Video observations showed a more dramatic increase in students' time spent communicating from before the treatment time. Although there is not strong data to directly support the use of language frames, students communicated with each other more and the overall classroom environment improved from the teacher point of view. Completing the action research project also provided a more in depth practice of collecting and analyzing data as a teacher.

## INTRODUCTION AND BACKGROUND

Littleton, Colorado, is a suburb on the southwest side of Denver, Colorado.

Littleton is home to Lockheed-Martin which plays a role in many of the rocket launches and space exploration missions in the recent years along with other important engineering companies. With this there is a growing need for Science, Technology, Engineering, and Math (STEM) programs for younger students, especially in our area.

Deer Creek Middle School began a 7-8 STEM program in the 2012-2013 school year and added a 6<sup>th</sup> grade in the 2013-2014 school year. Ninety sixth grade students were included for the pilot of the program that will be expanding to 120 students for grade 6 in the 2015-2016 school year. With the usual classes of Language Arts, Science, Math, and Social Studies the students also be take a pre-engineering elective class. In this class, students learn about various kinds of engineering and work on related in-class projects.

The new sixth grade students for the 2014-2015 school year came from a wide range of elementary schools in our district. Of the 126 students who applied for the program, students applied from 20 different elementary schools (R. Hoover, personal communication, October 13, 2014). When the school year began the first week was spent on group activities to bring students together and get to know each other. During these times it was found that students lacked the social skills needed to successfully participate in groups. With a program focused on STEM and 21<sup>st</sup> Century Skills, it is imperative that students are able to communicate effectively to allow for collaborative groups to reach their full potential.

After observing groups for a few weeks, the need of teaching students how to appropriately talk to each other in a classroom setting was found to be the foundation of the issues occurring. Many students would become frustrated with group members and soon the class erupted into yelling at other members. After providing more opportunities to collaborate and guiding students on better communication, students were able to better work together but outbursts at group members were still frequent. My research looked at how providing language frames for students to use while communicating and voicing opinions in a group help alleviate some of this collaborative classroom dysfunction.

### CONCEPTUAL FRAMEWORK

Deer Creek Middle School's STEM program has a strong focus on Project Based Learning (PBL) and using 21<sup>st</sup> Century Skills in the classroom. Although students are learning the same standards set forth by the state of Colorado and Jefferson County School District, the PBL model is a new experience for the students entering our program and for the sixth grade team of teachers. The Buck Institute for Education (BIE) is a nonprofit organization that provides resources for teachers to incorporate PBL in their classrooms ("About BIE," n.d.). Their definition of PBL is "a teaching method in which students gain knowledge and skills by working for an extended period of time to investigate and respond to a complex question, problem, or challenge." They also list the vital parts of PBL such as significant content, in-depth inquiry, an open-ended driving question, and 21<sup>st</sup> century competencies. The later are listed as problem solving, critical thinking, collaboration, communication, and creativity ("What is project...", n.d.). This is

what the team of teachers for the sixth grade students have adopted as the definition for the PBL lessons used in the classroom at Deer Creek.

Today's workforce is constantly changing and with the introduction of new technologies, students must be able to overcome the new challenges to be successful has been driving the use of PBL lessons in the STEM classrooms. The business world has agreed that the original 3 R's (reading, writing, and arithmetic) are no longer all that are needed, but must be combined with the 4 C's: communication, collaboration, critical thinking, and creativity ("An Educator's Guide...", n.d.). These 4 C's, also known as 21<sup>st</sup> Century Skills, are being included in the STEM program alongside PBL lessons to be sure students are prepared for their futures. Even Vygotsky's Social Development Theory mentions that collaborative group work plays a vital role in the cognitive development of students and that students should have an active role in their learning. This makes the classroom more student-centered and less teacher-centered ("Social Development...", n.d.) much like collaborative groups in PBL provides.

Collaboration is a large part of PBL and is most frequently seen as group work or collaborative groups ("An Educator's Guide...", n.d.). Small group learning settings often show better grades, deeper understanding and longer retention of information, better teamwork and communication, and fewer dropouts than the traditional learning setting. Just using groups in the classroom does not show these benefits unless they are used properly. Dysfunctional groups could actually show lower levels of learning than independent learning while creating frustration and resentment toward other students. (Oakely, Felder, Brent, & Elhajj, 2004).

Dean Brown found when studying the use of cooperative pre-activities and cooperative learning structures in a biology class that students' understanding increased when compared to those without the cooperative opportunities. Along with this, the data showed an increase in the self-confidence of the students and their motivation to be engaged (Brown, 2014). Matthew Haack also studied the use of cooperative learning on students' understanding in biology. His study found an increase in understanding on assessments for the higher achieving students but inconclusive for the middle and low achieving students. But a benefit of cooperative for all levels of students was seen when looking at long-term concept knowledge. Students also maintained a more positive opinion through the use of cooperative learning when compared to without the collaboration (Haack, 2014)

According to *An Educator's Guide to the "Four Cs,"* communication is essential to successful group experiences and learning. Working with diverse group members requires compromising to reach a goal while sharing the responsibilities. Communication is defined by the guide as "being able to articulate thoughts and ideas effectively using oral, written, and nonverbal communication skills in a variety of forms and context." This includes both the ability to communicate effectively but also listening empathetically. With this students must listen to interpret meanings and attitudes. ("An Educator's Guide..." n.d.). The communication skills that students gain the classroom can also extend beyond the school walls into other areas of their lives. Most research done in the area of teaching students communication skills is limited to teaching students to be part of a democratic society. This is important because the democratic community depends on

many factors including the open discussion of topics. Participants in such discussions should be able to easily identify points, provide evidence, and critique what others say. Learning these skills promotes understanding among students (Larson, 2000)

Students at the middle school level are at an age of development where collaborative group interactions are especially important. There is not much research on how to best teach students to communicate with one another. Through searching for techniques, one way to help increase student participation and communication skills that was found is through the use of language frames. Language frames, or sentence starters, are where students can fill in their thoughts and information and encourage them to use academic vocabulary. (Frey & Fisher, 2011). Goldsmith offers the idea of sentence starters on an anchor chart for listening while in a group. This encourages students to ask their partners to explain their reasoning and listen to each other. It also resists one student answering and the rest following along when working together, but encourages all students to offer their thoughts (2013).

## METHODOLOGY

The students in the sixth grade Pre-Engineering & Technology class came into the program with few communication skills. Because the program stresses 21<sup>st</sup> Century Skills, being able to communicate is important. Even basic collaboration skills rely on communication skills making it important to teach the students how to talk appropriately. This project focuses on the impact of language frames on academic conversations in collaborative groupings. The research methodology for this project received an

exemption by Montana State University's Institutional Review Board and compliance for working with human subjects was maintained.

### Participants

Of the 89 current students in the sixth grade STEM program at Deer Creek Middle School, 57 students played a part in this study. It is the first year these students have been at the middle school and the first year for many students to be at the same school together. This is a unique program for the students in our district and attracted students from a variety of backgrounds and elementary schools.

When parents hear a STEM opportunity they perceive it as a gifted and talented program in our district but Deer Creek's STEM program is available for learners of all abilities. For this reason there is a wide range of learning abilities in the group. Of the 53 students five have an Individual Education Plan (IEP), four have a 504 Plan, and 26 have an Advanced Learning Plan (ALP). Four of the students are twice exceptional meaning they have both an ALP and an IEP, or a 504. Thirty-five of the students are males while only 18 are female.

### Intervention

Students have used the Collaborative Work Rubric before when completing projects both about themselves and about their group members (Appendix A). Students were again asked to rate themselves and their group members before and after the completion of the unit. Their personal rating and group member ratings were looked at to see if there was an increase in the two areas of "Listening to other members of the group," and "Co-operating with my team." These areas directly relate to communication

skills. Students also completed the Student Communication Pre-Unit Survey about communication and the level of enjoyment when working in groups (Appendix B). Using a Likert Scale, students rated how comfortable they are in group discussions and how they feel about their skills to do such. A Student Communication Post-Unit Survey was given to have students reassess their level of comfort and abilities (Appendix C). It also asked students to reflect on their skills after learning to use the language frames versus before. Throughout the unit, student interactions were recorded and analyzed for communication between students. Regular recording was attempted but the recording technology did not always work and the quality of the recordings was not as good as planned. Table 1 shows the research questions asked and the data sources used for analysis.

Table 1  
*Data Triangulation Matrix*

Question	Data Source		
Focus Question: Does using language frames in the group setting increase communication among groups in a pre-engineering classroom?	Group Member Collaboration Rubric	Group Interaction Videos- Pre-Treatment	Group Interaction Videos- During Treatment
Sub Question 1: How does the student opinion toward group communication change with the use of language frames?	Pre-Unit Student Survey		Post-Unit Student Survey
Sub Question 2: How does the use of language frames affect student enjoyment of working in groups to complete projects?	Pre-Unit Student Survey	Group Interaction Videos- Pre-Treatment vs. During Treatment	Post-Unit Student Survey

Initially students were introduced to the language frames listed in Figure 1. Students were told language frames are a tool they could use to communicate and that the blanks in each one is where information to fit the situation could be added to fit their needs. Then, each pair of students were given a set of 18 paper squares, each with a language frame printed on it. In pairs they read the papers, identified similarities and differences, and then sorted them into categories that they felt would be appropriate. When students finished early they were invited to compare with the students across from them. This allowed students to look at the frames and read through each one more thoroughly than just reading them aloud in class.

When completed with the card sort it was discussed as a class that communication includes both listening and sharing ideas. Students were then asked to resort the paper squares based upon which frames could show listening and which would allow for the sharing of ideas. A few of the language frames puzzled students, such as “My idea is similar to \_\_\_\_’s idea, but \_\_\_\_.” A discussion followed about why they might fit in one category more than the other or if there should be a category for both listening and sharing.

- Can you explain what you mean?
- Why do you think \_\_\_\_\_?
- Can you give an example of \_\_\_\_\_?
- What do you think?
- We haven't heard from you yet.
- Do you agree?
- I found out from \_\_\_\_\_ that \_\_\_\_\_
- My theory is \_\_\_\_\_ because \_\_\_\_\_
- I'd like to add \_\_\_\_\_
- I disagree with \_\_\_\_\_ because \_\_\_\_\_
- I question \_\_\_\_\_ because \_\_\_\_\_
- What I hear you saying is \_\_\_\_\_
- I think that \_\_\_\_\_ is saying \_\_\_\_\_
- I agree with \_\_\_\_\_ that \_\_\_\_\_ because \_\_\_\_\_
- My idea is similar to \_\_\_\_\_'s idea, but \_\_\_\_\_
- Maybe we could \_\_\_\_\_ because \_\_\_\_\_
- What if we \_\_\_\_\_ so that \_\_\_\_\_
- What I was trying to say was \_\_\_\_\_

*Figure 1.* Language frames used in treatment.

The card sort activities allowed students to actively read, think about, and share thoughts about each of the language frames. Students were then assigned to write a script in a small group to demonstrate how a group of friends might use the language frames to solve the problem of what game to play. Writing the script allowed students to make the language frames flow in a conversational setting. Sharing some scripts to the class provided various ways for the same frame to be used in different situations. Posters were also posted in the room for all to see of each of the language frames.

Throughout the card sort, script writing, and into the project assignment, the language frames became part of the teacher language. When using the language frames in the classroom setting, I would emphasize the words in the frame, motion to the poster, or at least look towards the wall of posters when using the tool.

The following problem was then proposed for the next project:

Eggs everywhere are dying in horrible automobile accidents! It seems that all the egg car designers do not believe in building safe cars. Your job is to design and build a prototype car that has safety as a priority. Your group must protect at least one egg. If you would like to add an extra challenge, you may choose to protect two eggs in one vehicle. Please note that the vehicles will be rolled down a steep ramp and smash into a wall with an impact that can be violent and will most likely cause the car to roll.

Students were able to select their group members for the project and given the following student objectives for the project: students will clearly state the problem to be solved, research the physics of car crashes, create a sketch of their vehicle ideas, select appropriate materials for the application, construct a product model that looks appealing, convey a clear and concise message about the process taken to develop the product and its features, test and evaluate their design to identify areas of weakness to create an improved vehicle plan.

Throughout the entire project, students needed strong communication skills. In groups of two to four, students had to be able to share ideas, discuss the positives and negatives of each idea, and provide individual input about any suggested changes along with listening to others. The project began with jigsaw activities about inertia and momentum. Each student had to participate in one or the other and report back to the group what was learned. All students had to take a quiz about both topics and needed to be sure their group members could clearly communicate their findings from the activity. For research, each group was assigned an online research document guiding them to

various resources and some important questions to answer. This guided students to research about car safety features and how they work to protect humans in the event of a crash. Groups could choose to divide the work and assign parts to each member or complete the research together. At the end of the document, all members had to provide input for a paragraph that summarized the research findings. This required students to talk with group members, make sure the work was divided evenly if it was divided, make sure everyone was participating, and that the work was actually completed on time.

Given specific criteria, groups were required to submit at least three brainstorming options for egg vehicles and select one to build. Limited materials were provided and students were encouraged to bring approved materials from home. With the supplies, students built a design for a car body that could be fastened to a provided wheelbase. During brainstorming and construction, group members needed to be able to communicate individual ideas, reasoning for those ideas, and support their choices for the final design and materials chosen.

Upon completion of their car the students tested their car with raw eggs and recorded their observations. When this was complete, each group submitted a final project report using a given outline of questions to be answered. These included things like their justification for the safety features built in their car, the materials they chose to use, and the process taken to create the vehicle. This was a document that each group member needed to provide input on. Some chose to have one group writer while others would proofread, add comments, or provide the basic information for the paper in outline form.

## DATA AND ANALYSIS

The goal of this research was to see if using language frames in the group setting increased communication among groups in a pre-engineering classroom. While researching this topic, it was also looked at to see if student opinions changed towards group communication and the enjoyment of working in groups when using language frames.

The data from the research showed an increase in communication amongst groups in a pre-engineering classroom with the use of language frames. Student ratings from the Collaborative Work Rubric were combined to look at each student prior to and after the unit of treatment. “Cooperating with my team” and “Listening to other members of the group” were two categories that were focused on from the rubric. When looking at students’ self ratings ( $N=53$ ) for their listening skills the class had an average of 3.15 ( $SD=0.63$ ) at the beginning of the treatment. By the end of the treatment, the class average was 3.49 ( $SD=0.54$ ). Of the 53 students 32, or 60%, rated themselves higher while only 12 decreased their ratings. The other nine students kept their ratings the same. The class average for cooperation on the Group Member Collaboration Rubric ( $N=53$ ) went from 3.05 ( $SD= 0.77$ ) to a 3.47 ( $SD=0.57$ ). Of the 53 students 34 students, or 64%, rated themselves higher with only 11 students decreasing their rating in cooperation. The remaining 8 students had the same rating. The difference in ratings from before to after the treatment period is not large enough to be significant, but does show an increase in both listening and cooperation.

During video observations there was also an increase in student communication. Due to the poor quality of the sound on the videos exact conversations could not always be heard but student interactions were visually observed, counted, and timed. Student interactions of 30 seconds or less were tallied while communication greater than 30 seconds were timed. Table 2 shows the number of times communication occurred for less than 30 seconds and how much time for the interactions greater than 30 seconds. A difference of 34 percent can be seen in time spent communicating between the pre-treatment and during treatment videos. In one pre-treatment video a group of two students did not even acknowledge each other for twenty minutes. One member of another group began talking to their partner who did not even glance up to make eye contact with the student talking. The videos taken during the time of treatment showed students explaining more about their ideas and dividing work evenly versus all working on the same task. This was a great amount of growth for some of the students but a positive increase in communication for the class as a whole.

Table 2  
*Video Observations Data*

	Combined Video Time (minutes)	Number of Student interactions < 30 seconds	Combined Communication Times Excluding <30 sec (minutes)	% of Time Spent Communicating > 30 seconds
Pre-Treatment	64.57	28	31.82	49%
During Treatment	89.07	8	74.27	83%

The median ratings for the statements added to the Student Communication Post-Unit Survey, but not included in the pre-survey, are listed in Figure 2. Here it can be seen

that the ratings are slightly more towards the positive than negative opinions. The most neutral rating is in the feeling that there is no change in group work. According to the survey students felt slightly more than neutral that language frames helped them share their ideas, hear what others had to say, and that group work is more enjoyable.

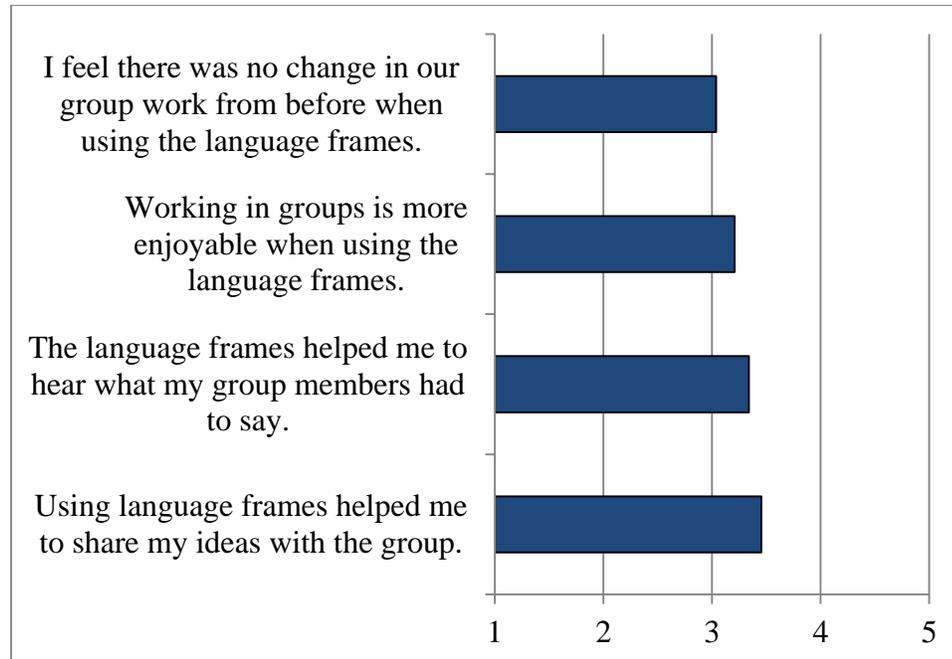


Figure 2. Student communication post-unit survey responses, ( $N=53$ ).

The data focusing on the first sub question about how does the student opinion toward group communication change with the use of language frames showed a small increase based on survey ratings ( $N=53$ ). Between the pre and post-unit communication survey there was an increase in the median rating from 3.79 to 4.08 on the prompt about being good at communicating with classmates. The median for being easy to communicate with others to get a job done also increased from 3.53 to 3.81. There was a decrease in the median rating on the arguing with the group to get them to listen from

1.91 to 1.58. Figure 3 shows the median Likert ratings that students gave to the communication survey.

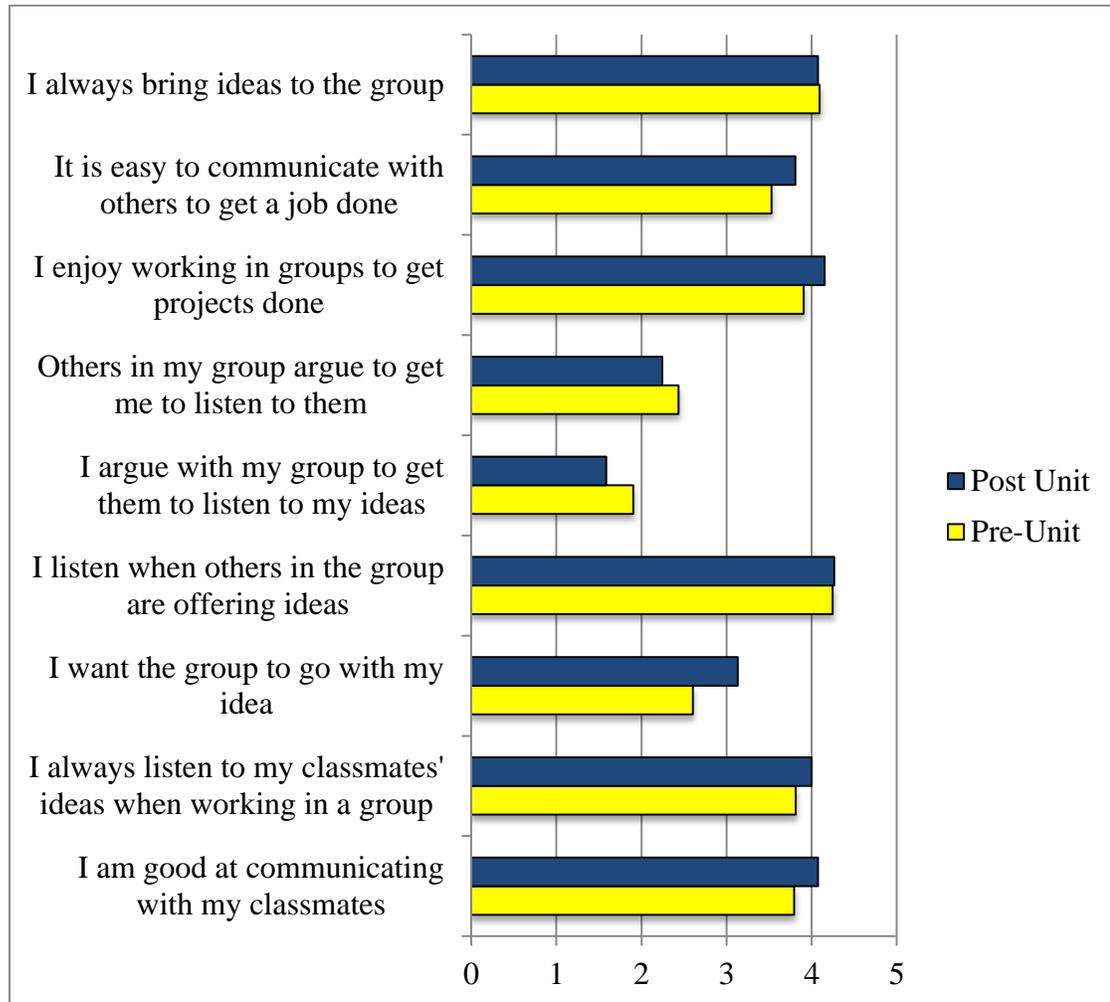


Figure 3. Student communication pre versus post-unit survey responses, (N=53).

The final sub question of how does the use of language frames affect student enjoyment of working in groups to complete projects had support for a positive effect although the change in data is not dramatic. Figure 3 shows the median Likert ratings that for the following statements were used to analyze this question. When asked about enjoying group work to get projects done, the median rating went up from 3.90 to a 4.15. The videos also support this as there were more student-to-student interactions among

students when working on the unit during treatment than the pre-treatment project.

Students interacting more frequently and interacting with group members would seem to imply they found group work more enjoyable or at least were more comfortable in the group setting.

Overall, the data is supportive that there was an increase in communication among groups, a more positive opinion of working in collaborative groups, and group work became more enjoyable for students when using the language frames they were introduced to. The collaboration rubric and student surveys showed support for using language frames. Although the data for each response itself is not a large increase, there is a suggestion of improvement overall based on the fact that eight of the nine responses moved to a more positive attitude. The slight increase in each individual prompt after such a short period of time may not be enough to justify the use of language frames, but overall there was a positive shift in communication and this provides support, even just enough to do a trial over a longer period of time. Most dramatic support was given with the increase in communication seen in the videos.

#### INTERPRETATION AND CONCLUSION

Although the purpose of this research was not to look at the retention or understanding of information through improving group communication skills, dysfunctional groups can have a negative impact on student learning. By introducing language frames, the data showed that there was more communication among students. Students felt that it was easy to communicate in groups, had greater enjoyment of

working in groups, and less arguing both from others and themselves to share ideas.

Videos and rubrics also show a decrease in dysfunction.

With more communication among the students it should provide for more functional collaboration allowing an increase in the retention and understanding of content. Brown saw this as part of his research using collaborative activities in a biology classroom and an increase in students' understanding (Brown, 2014). As part of the STEM program at Deer Creek it is important that students are able to learn in collaborative groups as with the PBL format, groups are vital. This goes along with Vygotsky's Social Development Theory that socialization and interaction with peers must come before cognitive development ("Social Development..."). Continuing to use the language frames presented to the students should also follow them in future years. These students will remain grouped together throughout 7<sup>th</sup> and 8<sup>th</sup> grade and they will need to continue to overcome and increase the level of social skills the students have. By increasing their communication and collaboration skills, along with critical thinking and creativity, these students will be more prepared for the future according to the National Education Association ("An Educator's Guide...").

In the future, language frames will be the first thing introduced to students at the beginning of the year. With more practice using the language frames through the year, students might find them more valuable to use. As I walked around the room during the project, I did find students refereeing to the posters when the conversation was beginning to get frustrating. So they were referencing the tools given to them, but more use may make them a regular part of their group work. The language frames may also be helpful

in other projects where students have to do more analyzing among group members. More in-depth conversations will need to take place in groups as students complete the STEM program and the problems presented to them become more difficult. The use of the frames would help them practice and explain their reasoning for their thinking. This year was the first year of the sixth grade STEM program and a lot was learned by all the teachers. In preparation for next year more front loading of communication and collaboration skills are planned.

Some basic classroom properties were already set up in the pre-engineering classroom that might have made the language frames more useful than in other classrooms, one being the classroom arrangement. In the room students have tables that fit two students side by side. From the beginning of the year these tables were arranged in groups so that one table of two students faced another set of two students. This allowed for easy access to their table top partner, or the student next to them, and their table group of four. Because of an odd number of tables, one group had an additional table making it a group of 6. Their other classes also used similar seating arrangements and styles so they were used to group seating throughout the day.

Communication skills was also a topic discussed throughout the school year in multiple classes with the students. In pre-engineering the students were asked questions like “Why is communication important?” This allowed for students to learn and show that communication is a vital part of daily life and later a professional life.

The teacher use of the language frames was annoying for some students in the beginning, but was important because it continually reminded students the tool was there

and that they can be used for a variety of conversations. Eventually the language frames became part of my daily conversations both with the students and outside of the classroom with other students, teachers, and administrators. Even as adults we can still work on our communication skills.

#### VALUE

The use of language frames made being in the classroom more enjoyable for myself as a teacher. Although the increase in responses to the communication survey was not large, the use of the language frames reduced arguing in class allowing more enjoyable class periods. This made it easier to get to know the students because I was walking around answering questions rather than solving disagreements. Teaching students to communicate was frustrating because of the lack of guidance, but well worth the time. By carrying out this active research project I was able to learn, teach, and utilize a great communication tool for these students. Language frames will become a tool I use from here on out in my teaching as it made my life much easier.

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APPENDICES

APPENDIX A  
COLLABORATIVE WORK RUBRIC

## Collaborative Work- Rubric- Personal

Name: \_\_\_\_\_

Rate YOURSELF on how well you communicated and collaborated while working on the project by highlighting what you did in each row.						
Topic ↓	How did I do? ⇒	Level 1: Beginning	Level 2: Developing	Level 3: Accomplished	Level 4: Exemplary	Rating
<b>Participating in the tasks</b>		<b>I did not participate in any of the tasks or assignments.</b>	<b>I participated less than half the time on any tasks or assignments.</b>	<b>I participated on more than half, but not all the tasks and assignments.</b>	<b>I participated in all the tasks and assignments.</b>	
<b>Completing my tasks</b>		<b>I did not complete any of the tasks assigned to me.</b>	<b>I completed fewer than half the tasks assigned to me.</b>	<b>I completed more than half, but not all, the tasks assigned to me.</b>	<b>I completed all of the tasks assigned to me.</b>	
<b>Listening to other members of the group</b>		<b>I did not listen to other members of the group; I did things my own way.</b>	<b>I did not listen to other group members' ideas or suggestions very often.</b>	<b>I listened to other group members' ideas and suggestions nearly all the time.</b>	<b>I listened to other group members' ideas and suggestions, and then decided if it would help the project to follow them.</b>	
<b>Co-operating with my team</b>		<b>I argued with my group members and tried to get them to do things my way.</b>	<b>I sometimes argued with other group members.</b>	<b>I discussed things with other group members and had only a few arguments.</b>	<b>I discussed things with other group members without arguing.</b>	
<b>Making fair decisions</b>		<b>Having things go my way is the only way a group should work.</b>	<b>In my group, I only worked with my friend.</b>	<b>Sometimes I had the best idea, and sometimes it was someone else.</b>	<b>Our group made fair decisions as much as we could.</b>	

**Look at where you rated yourself LOWEST. What could you do differently next time to increase that rating?**

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### Collaborative Work Rubric-Group Member

Rate YOUR GROUP MEMBERS on how well they communicated and collaborated while working on the project by noting which level each were on.						
Topic ↓	How did I do? ⇒	Level 1: Beginning	Level 2: Developing	Level 3: Accomplished	Level 4: Exemplary	Rating
<b>Participating in the tasks</b>		Student did not participate in any of the tasks or assignments.	Student participated less than half the time on any tasks or assignments.	Student participated on more than half, but not all the tasks and assignments.	Student participated in all the tasks and assignments.	
<b>Completing my tasks</b>		Student did not complete any of the tasks assigned by the group.	Student completed fewer than half the tasks assigned by the group.	Student completed more than half, but not all, the tasks assigned by the group.	Student completed all of the tasks assigned by the group.	
<b>Listening to other members of the group</b>		Student did not listen to other members of the group; Student did things his/her own way.	Student did not listen to other group members' ideas or suggestions very often.	Student listened to other group members' ideas and suggestions nearly all the time.	Student listened to other group members' ideas and suggestions, and then decided if it would help the project to follow them.	
<b>Co-operating with the group</b>		Student argued with group members and tried to get them to do things his/her way.	Student sometimes argued with other group members.	Student discussed things with other group members and had only a few arguments.	Student discussed things with other group members without arguing.	
<b>Making fair decisions</b>		Student thought having things go his/her way is the only way a group should work.	In the group, the student only worked with his/her friend.	Sometimes the student had the best idea, and sometimes it was someone else.	Our group made fair decisions as much as we could.	

APPENDIX B

STUDENT COMMUNICATION PRE-UNIT SURVEY

### Student Communication Pre-Unit Survey

Circle the column that describes how you feel about each statement.

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am good at communicating with my classmates.	1	2	3	4	5
I always listen to my classmates' ideas when working in a group.	1	2	3	4	5
I want the group to go with my idea.	1	2	3	4	5
I listen when others in the group are offering ideas.	1	2	3	4	5
I argue with my group to get them to listen to my ideas.	1	2	3	4	5
Others in my group argue to get me to listen to them.	1	2	3	4	5
I enjoy working in groups to get projects done.	1	2	3	4	5
It is easy to communicate with others to get a job done.	1	2	3	4	5
I always bring ideas to the group.	1	2	3	4	5

APPENDIX C

STUDENT COMMUNICATION POST-UNIT SURVEY

### Student Communication Post-Unit Survey

Circle the column that best describes how you feel about each statement

Statement	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am good at communicating with my classmates.	1	2	3	4	5
I always hear my classmates' ideas when working in a group.	1	2	3	4	5
I want the group to go with my idea.	1	2	3	4	5
I listen when others in the group are offering ideas.	1	2	3	4	5
I argue with my group to get them to listen to my ideas.	1	2	3	4	5
Others in my group argue to get me to listen to them.	1	2	3	4	5
I enjoy working in groups to get projects done.	1	2	3	4	5
It is easy to communicate with others to get a job done.	1	2	3	4	5
I always bring ideas to the group.	1	2	3	4	5
Using language frames helped me to share my ideas with the group.	1	2	3	4	5
The language frames helped me to hear what my group members had to say.	1	2	3	4	5
Working in groups is more enjoyable when using the language frames.	1	2	3	4	5
I feel there was no change in our group work from before when using the language frames.	1	2	3	4	5